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Consulting Engineers Limited

Medway Energy Recovery Limited

Site Condition Report

ENGINEERING CONSULTING

Document approval

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Document revision record

Revision no	Date	Details of revisions	Prepared by	Checked by
0	22/12/2023	For Client	JS1	JRS
1	17/01/2024	Final for issue	JS1	JRS
2	14/03/2024	For issue	JS1	JRS

Contents

1 Introduction

1.1 Project Overview

Medway Energy Recovery Limited is applying to the Environment Agency (EA) under the Environmental Permitting Regulations (EPR's) for an Environmental Permit (EP) to operate the MedwayOne Energy Hub (the Facility). The Facility will comprise a twin line waste incineration plant and associated infrastructure including battery storage and hydrogen production facilities, and will be located at Medway One, Kent. A detailed description of the Facility is provided in Section 1.4 of the supporting information.

1.2 The Objective

This Site Condition Report summarises the existing ground conditions for the land within the Installation Boundary (the 'Site') and describes the setting for the Facility at the time of applying for the EP. This report draws on the following sources of background information which are provided as Appendices:

- Kingsnorth Power Station – Site Wide Remediation Strategy, RPS, 30 September 2019 (the 'Remediation Strategy') (Appendix A);
- Groundsure Insight Report (the 'Groundsure Report') (Appendix B).

The report:

1. considers the proposed activities to be carried out at the site;
2. identifies any land contamination risk the activities pose that may be linked to previous pollution events; and
3. provides a baseline for the existing ground conditions.

The report will present details on the following:

1. geology;
2. hydrogeology;
3. hydrology and flooding;
4. historical and present land use; and
5. existing ground conditions.

Plans and drawings can be found in Appendix A of the Application Pack, including but not limited to the following:

- site location plan;
- installation boundary drawing;
- emission points drawing; and
- process schematics.

2 Site Details

2.1 Site address

The Site address is MedwayOne Energy Hub, MedwayOne, Medway, Kent ME3 9NQ.

2.2 National grid reference

The grid reference for the centre of the Facility is TQ 80982 72531.

2.3 Site location

The Site is located within the wider MedwayOne development, a large new development site in Medway. The MedwayOne development is comprised of four parcels of land (Parcels 1, 2, 3 and 4). The Site is located in parcel 1 which is located in the northern part of the MedwayOne development.

The Site is located on the Hoo Peninsula in Medway, Kent, immediately south of the Damhead Creek CCGT power station. The site is located approximately 4 km east of Hoo St Werburgh, and approximately 15 km northeast of Chatham. Damhead Creek Gas-fired Power Station is located to the north of the site, with the Kingsnorth industrial estate lying to the northeast of the Site. Marshland lies to the west of the Site, whilst the southern and eastern boundaries of the Site are next to the estuary of the River Medway.

The Site is a mix of brownfield and greenfield land on which the former Kingsnorth coal-fired power station was located prior to demolition, and has a varied topography.

3 Condition of Land at Permit Issue

3.1 Environmental setting

3.1.1 Geology

The Groundsure Report presents the solid geology at scale of 1:50,000 at the Site. The information is summarised in Table 1.

Table 1: Description of the geology of the Site from the Groundsure Report.

Lithology	Description
Artificial/Made Ground	No data available
Superficial Deposits	The superficial deposits underlying the site is alluvium – clay, silt, sand and peat.
Bedrock	The bedrock underlying the site is London Clay Formation – clay and silt – deposited during the Ypresian Age (56 million to 47.8 million years ago)

The British Geological Society (BGS) Historic Borehole index indicates that there are four confidential boreholes within the within the Installation Boundary:

- KINGSNORTH B POWER STN TP 417 (GR: 581031 172414)
- KINGSNORTH B POWER STN 923 (GR: 581105 172520)
- KINGSNORTH B POWER STN 132 (GR: 581049 172549)
- KINGSNORTH B POWER STATION 132 (GR: 581049 172549)

In addition, the Remediation Strategy presents the shallow geology, as encountered the various phases of ground investigation, at the MedwayOne development. The information is summarised in Table 2.

Table 2: Description of the geology of the MedwayOne development from the Remediation Strategy.

Lithology	Description
Artificial/Made Ground	Variable soil present across the site including clay, gravelly and sandy clays, sandy gravel and gravelly sand. Gravel is typically flint, brick, concrete and occasional ash. Thickness generally between 0.3 – 6.7m.
Superficial Deposits	Alluvium – green/grey brown silt, brown gravelly clay, sandy clay or clay with peat inclusions in places. Gravel is typically flint. Thickness generally between 1.7 – 7.7m.
	River Terrace Deposits – Orange brown sand and gravel (flint). Thickness generally between 2 – 8.7m.
Bedrock	London Clay – Firm to stiff brow grey clay. Maximum proven thickness of 1.4m.

3.1.2 Hydrogeology

The Groundsure Report presents the underlying hydrology at the Site. The information is summarised in Table 3.

Table 3: Description of the hydrology of the Site from the Groundsure Report.

Lithology	Description
Superficial Aquifer	The superficial aquifer underlying the site is a secondary undifferentiated aquifer. Secondary undifferentiated aquifers are assigned where it is not possible to attribute either category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
Bedrock	The bedrock underlying the site is classed as unproductive. Bedrock aquifers are classed as unproductive when the rock layers or drift deposits have low permeability or have a negligible significance for water supply or river base flow.

Relating to the hydrology of the Site and its surroundings, the Groundsure Report states:

- there are no Source Protection Zones (SPZ) within the Site or within 500 m of the Installation Boundary;
- there is a high groundwater vulnerability within the Site;
- there are no active licensed groundwater abstraction or active licensed surface water abstractions within the Site; and
- there are 12 active licensed groundwater abstractions and five active licensed surface water abstractions within 2 km of the Installation Boundary.

In addition, the Remediation Strategy states that the hydrogeology within MedwayOne development is as follows:

- Groundwater is present within the Made Ground and upper layers of Alluvium, as 'perched' groundwater. A second separate groundwater body has been encountered within the underlying River Terrace Deposits. However, based on previous groundwater monitoring data, it is not considered that the two groundwater bodies are hydraulically connected.
- Groundwater monitoring data has not conclusively established the direction of groundwater flow within the perched groundwater. It is considered likely that shallow groundwater flow would be inhibited by the presence of buried structures and drainage infrastructure. Despite this, levels to the north of the site were noted to be higher, suggesting the possibility of a southerly groundwater flow. It is considered that the most likely discharge points for shallow perched groundwater are the River Medway and Damhead Creek, in addition to drainage ditches present in the northern and western parts of the site (which ultimately discharge to the River Medway).

- Groundwater monitoring data has also indicated that groundwater within the River Terrace Deposits is tidally influenced by the estuary of the River Medway which is adjacent to the site, thereby indicating some hydraulic connectivity.

3.1.3 Hydrology and Surface Waters

The Groundsure Report states that there are no surface water features (rivers, streams, lakes, ponds) recorded within the Site or within 250 m of the Installation Boundary.

The Groundsure Report states that there is one Water Network record (rivers, streams, lakes and canals) within the Site and seven Water Network records within 250 m of the Installation Boundary. The information is summarised in Table 4.

Table 4: Water Network records within the Site and within 250 m of the Installation Boundary.

Type	Location	Details
Inland river not influenced by normal tidal action	On Site	Permanence: Watercourse contains water year round (in normal circumstances). Ground level: Underground
Inland river not influenced by normal tidal action	7 m SE	Permanence: Watercourse contains water year round (in normal circumstances). Ground level: On ground surface
Inland river not influenced by normal tidal action	11 m SW	Permanence: Watercourse contains water year round (in normal circumstances). Ground level: On ground surface
Inland river not influenced by normal tidal action	12 m S	Permanence: Watercourse contains water year round (in normal circumstances). Ground level: Underground
Inland river not influenced by normal tidal action	13 m S	Permanence: Watercourse contains water year round (in normal circumstances). Ground level: On ground surface
Inland river not influenced by normal tidal action	30 m NE	Permanence: Watercourse contains water year round (in normal circumstances). Ground level: On ground surface
Inland river not influenced by normal tidal action	246 m SE	Permanence: Watercourse contains water year round (in normal circumstances). Ground level: On ground surface
Inland river not influenced by normal tidal action	246 m W	Permanence: Watercourse contains water year round (in normal circumstances). Ground level: Underground

The Groundsure Report states there is one Water Framework Directive (WFD) (for the protection of inland surface waters, estuaries, coastal waters and groundwater) surface water body catchment feature within the Site and one surface WFD water body feature within 250 m of the Installation Boundary. The information is summarised in Table 5.

Table 5: WFD features within the Site and within 250 m of the Installation Boundary.

Type	Location	Details
Surface water body catchment	On-site	Type: Coastal catchment (not part of a river WB catchment) Water Body ID: 132 Operational catchment: Lower Medway Management catchment: Medway
Surface water body	79 m SE	Name: Medway Type: Transitional Water body ID: GB530604002300 Overall rating: Moderate Chemical rating: Fail Ecological rating: Moderate Year: 2019

The Groundsure report states that the site has a low risk of flooding (less than 1 in 100 but greater than or equal to 1 in 1000 chance). The Groundsure Report states there is one record of a historical flooding within the Site and within 250 m of the Installation Boundary. The information is summarised in Table 6.

Table 6: Records of flooding within the Site and within 250 m of the Installation Boundary.

Type	Location	Details
Tidal	On-site	Event name: 07301e900/c100_Feb1953_Isle Of Grain Date of flood: 1 February 1953 – 5 February 1953 Flood source: Sea Flood cause: Overtopping of defences

The Groundsure report states that there is one flood defence located approximately 12 m NE of the Installation Boundary. There are two records of areas benefitting from flood defences within the Site and within 250 m of the installation boundary. The information is summarised in Table 7.

Table 7: Areas benefitting from flood defences within the Site and within 250 m of the Installation Boundary.

Type	Location
Area benefitting from flood defences	On-site
Area benefitting from flood defences	176 m E

The Groundsure report states that there are no records of flood storage areas within the Site or within 250m of the Installation Boundary.

The Groundsure Report states that if the Site were not protected by flood defences, the Site would lie within EA Flood Zone 3. Land that is within Flood Zone 3 are at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

In addition, the Remediation Strategy states that the hydrology at the MedwayOne development is as follows:

- A shallow drainage ditch lies to the north of the site which discharges into a tributary of the River Medway to the west of the site. Damhead Creek (a manmade tidal body linked to the

River Medway, formerly used for the discharge of cooling water from Kingsnorth Power Station) lies to the east of the site.

- The River Medway lies to the south of the site and is a tidal river.

3.2 Pollution History

3.2.1 Site History

The Groundsure Report summarises the history of the land use at the Site and the surrounding area. The information has been summarised in Table 8.

Table 8: Land use history for the Site and surrounding area.

Years	Description
1986-2003	A sports ground was developed on the Site.
1970-2012	The Kings North Power Station, a dual-fired coal and oil power station, is located adjacent to the Site to the south.

As shown in the Groundsure Report, the Site has a history of industrial use and energy features. There have been a number of storage tanks associated with previous land uses, located within 500m of the Installation Boundary.

The Groundsure Report states there are no historical petrol stations or historical garages within the Site or within 500m of the Installation Boundary.

3.2.2 Historical Incidents

EA data from the Groundsure report indicates that there are no pollution incidents within the Site. There are two records of pollution incidents within 500 m of the Installation Boundary. The information is summarised in Table 9.

Table 9: Summary of all historical pollution potential sources within the Site and within 500 m of the Installation Boundary.

Location	Date	Details	Impact
406 m S	30/11/2002	Incident Identification: 124271 Pollutant: Contaminated Water Pollutant Description: Other Contaminated Water	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
473 m NW	06/10/2001	Incident Identification: 34974 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

3.2.3 Licenses and Authorisations

The Groundsure Report states there are four licensed waste sites within 500 m of the Installation Boundary. The information is summarised in Table 10.

Table 10: Licensed waste sites within 500 m of the Installation Boundary.

Location	Details
357 m NW	Site Name: Composting Facilities Services Ltd EPR (Waste) Licence Number: 633886 EPR reference: EA/EPR/KP3494VZ Operator: Composting Facilities Services Limited Waste Management licence No: 101293 Status: Issued
358 m S	Site Name: Kingsnorth Power Station EPR (Waste) Licence Number: 650517 EPR reference: EA/EPR/HP3430RV Operator: Uniper Uk Limited Waste Management licence No: 403084 Status: Issued
482 m NW	Site Name: M T S Cleansing Services Ltd EPR (Waste) Licence Number: MTS001 EPR reference: EA/EPR/DP3893LS/S003 Operator: M T S Cleansing Services Ltd Waste Management licence No: 100781 Status: Surrendered
482 m NW	Site Name: M T S Cleansing Services Ltd EPR (Waste) Licence Number: 644132 EPR reference: EA/EPR/DP3893LS Operator: M T S Cleansing Services Ltd Waste Management licence No: 100781 Status: Surrendered

3.2.4 Groundwater Abstractions

The Groundsure Report states that there are no groundwater abstractions associated with the land within the installation boundary and 23 groundwater abstractions within 2 km of the Installation Boundary. However, most of the groundwater abstractions are no longer active. The active groundwater abstractions have been summarised in Table 11.

Table 11: Active groundwater abstractions within 2 km of the Installation Boundary.

Location	Details
183 m N	Licence No: 9/40/02/0019/GR/R01 Direct Source: Southern Region Groundwater Point: Damhead Creek Power Station, Kingsnorth, Rochester, Kent Annual Volume: 230000 m^3 Expiry Date: 31/03/2030
555 m SW	Licence No: SO/040/0001/045 Direct Source: Southern Region Groundwater Point: Area Underground Strata at Kingsnorth Quarry Kingsnorth Kent

Location	Details
	Annual Volume: 3969000 m^3 Expiry Date: 01/05/2027
706 m W	Licence No: 9/40/02/0254 Direct Source: Southern Region Groundwater Point: Point A, Seepage Pit at Kingsnorth Annual Volume: 90000 m^3 Expiry Date: -
1280 m N	Licence No: 9/40/02/0243/G Direct Source: Southern Region Groundwater Point: Borehole 8, Polly Adams Nr. Stoke Annual Volume: 1889836 m^3 Expiry Date: -
1296 m N	Licence No: 9/40/02/0243/G Direct Source: Southern Region Groundwater Point: Borehole 6, Whitehall Farm in Hoo Annual Volume: 1889836 m^3 Expiry Date: -
1323 m W	Licence No: SO/040/0001/044 Direct Source: Southern Region Groundwater Point: Underground Strata at Kingsnorth Quarry Kingstorth Kent Annual Volume: 220146 m^3 Expiry Date: 01/05/2027
1415 m W	Licence No: 9/40/02/0230/G Direct Source: Southern Region Groundwater Point: Area 2, Unnamed Lake at Hoo Annual Volume: 15911 m^3 Expiry Date: -
1429 m W	Licence No: 9/40/02/0230/G Direct Source: Southern Region Groundwater Point: Area 1, Unnamed Lake at Hoo Annual Volume: 15911 m^3 Expiry Date: -
1462 m NW	Licence No: 9/40/02/0243/G Direct Source: Southern Region Groundwater Point: Borehole 5, Beluncle In Hoo Annual Volume: 1889836 m^3 Expiry Date: -
1497 m W	Licence No: 9/40/02/0011/GR Direct Source: Southern Region Groundwater Point: Point 1, S Drift, Head Brickearth U/G Strata, Hoo. Annual Volume: 18439 m^3 Expiry Date: -

Location	Details
1612m W	Licence No: 9/40/02/0011/GR Direct Source: Southern Region Groundwater Point: Point 2, S Drift, Head Brickearth U/G Strata, Hoo Annual Volume: 18439 m^2 Expiry Date: -
1699 m NE	Licence No: 9/40/02/0243/G Direct Source: Southern Region Groundwater Point: Borehole 9, Stoke Saltings Nr. Stoke Annual Volume: 889836 m^2 Expiry Date: -

3.2.5 Surface Water Abstractions and Discharges

The Groundsure report states there are no surface water abstractions associated with the land within Site and there are five surface abstractions associated with the land within 2 km of the Installation Boundary, all of which are active. The active surface water abstractions have been summarised in Table 12.

Table 12: Active surface water abstractions within 2 km of the Installation Boundary.

Location	Details
1534 m NE	Licence No: 9/40/02/0256/CA Direct Source: Southern Region Surface Waters Point: Points D-E, Unnamed Watercourse, North Street Farm, Hoo Annual Volume: 65917 m^3 Expiry Date: -
1534 m NE	Licence No: 9/40/02/0256/CA Direct Source: Southern Region Surface Waters Point: Points D-E, Unnamed Watercourse, North Street Farm, Hoo Annual Volume: 65917 m^3 Expiry Date: -
1646 m NW	Licence No: 9/40/02/0246/CA Direct Source: Southern Region Surface Waters Point: Points 1-2, Watercourse at Beluncle Farm At Hoo Annual Volume: 29549 m^3 Expiry Date: -
1815 m N	Licence No: 9/40/02/0256/CA Direct Source: Southern Region Surface Waters Point: Point C, Unnamed Watercourse, North Street Farm, Hoo Annual Volume: 65917 m^3 Expiry Date: -
1815 m N	Licence No: 9/40/02/0256/CA Direct Source: Southern Region Surface Waters Point: Point C, Unnamed Watercourse, North Street Farm, Hoo

Location	Details
	Annual Volume: 65917 m^3 Expiry Date: -

3.2.6 Landfill and Waste Sites

The Groundsure report states that there are no recorded active landfill sites or historic landfill sites within the Site. However, there are two recorded historical landfill sites within 500 m of the Installation Boundary. The information is summarised within Table 13.

Table 13: Historic landfill sites within 500 m of the Installation Boundary.

Location	Details
152 m E	Site address: Kingsnorth Power Station, Kingsnorth, Kent Site reference: P/03/6C, 21EB Operator: Central Electricity Generating Board Licence Holder: Central Electricity Generating Board
215 m NE	Site address: Kingsnorth, Rochester, Kent Site reference: 21DY, P/03/10 Operator: British Oil and Minerals Licence Holder: Bristol Oil

The Groundsure Report states that there are no recorded historical waste sites or licenced waste sites within the Site. However, there are records three historical waste sites and seven licensed waste sites within 500 m of the Installation Boundary. The information is summarised within Table 14.

Table 14: Historical and licensed waste sites within 500 m of the Installation Boundary.

Location	Status	Details
258 m NW	Licensed	Site name: Darnet Yard Site address: Parkes Utilities Surfacing Ltd, Darnet Yard, Kingsnorth Works, Hoo, ME3 9NZ. EPR reference: EA/EPR/WE4758AB/A001 Type of Site: Inert & excavationWaste TS + treatment Operator: Parkes Utilities Surfacing Ltd
332m NW	Licensed	Site name: M T S Cleansing Services Limited Site address: Units 212 & 213, Kingsnorth Ind Est, Hoo, Rochester, Kent, ME3 9NZ EPR reference: FP3299LM/A001 Type of Site: Biological Treatment Facility Operator: M T S Cleansing Services Limited
338 m NW	Licensed	Site name: Composting Facilities Services Ltd Site address: 212, Kingsnorth Ind Est, Hoo, Rochester, Kent, ME3 9NZ EPR reference: EA/EPR/KP3494VZ/V004 Type of Site: Biological Treatment Facility

Location	Status	Details
		Operator: Composting Facilities Services Ltd
357 m NW	Licensed	Site name: Composting Facilities Services Ltd Site address: Composting Facilities Services Limited, 212 Kingsnorth Ind Est, Kingsnorth Ind Est, Hoo, Rochester, Kent, ME3 9NZ EPR reference: EA/EPR/KP3494VZ Type of Site: Biological Treatment Facility Operator: Composting Facilities Services Ltd
388 m S	Licensed	Site name: Kingsnorth Power Station EPR/HP3430RV Site address: Uniper UK Limited, PO Box 15, Hoo, Kent, ME3 9LD EPR reference: EA/EPR/HP3430RV Type of Site: Industrial Waste Landfill (Factory curtilage) Operator: Uniper UK Limited
482 m NW	Licensed	Site name: Composting Facilities Services Ltd Site address: Kingsnorth Works, Hoo, Rochester, Kent, ME3 9NZ EPR reference: EA/EPR/DP3893LS/S003 Type of Site: Composting Facility Operator: Composting Facilities Services Ltd
482 m NW	Licensed	Site name: Composting Facilities Services Ltd Site address: Kingsnorth Works, Hoo, Rochester, Kent, ME3 9NZ EPR reference: EA/EPR/DP3893LS Type of Site: Composting Facility Operator: Composting Facilities Services Ltd
348 m SW	Historical	Site name: - Site address: Kingsnorth Power Station, Hoo St Werburgh, Rochester, Kent, ME1 EPR reference: - Type of Site: Recycling and Power Station Operator: -
347 m NW	Historical	Site name: - Site address: 212 & 213,Kingsnorth Works, Hoo, Rochester, Kent, ME3 9N EPR reference: - Type of Site: Waste Transfer Station Operator: -
478 m NW	Historical	Site name: - Site address: Unit 139, Kingsnorth Ind Estate, Hoo St Werburgh, Rochester, Kent, ME3 9ND EPR reference: - Type of Site: Waste Oil Storage Tanks

Location	Status	Details
		Operator: -

3.2.7 Environmental Designations

Priority habitats have been included within the Priority Habitat Inventory (PHI) under the Natural environment and Rural Communities Act. Priority habitats are those which have been deemed to be of principal importance for the purpose of conserving biodiversity. The Groundsure Report states that there are two records of priority habitats within the Site and four records of priority habitats within 250m of the Installation Boundary. The information is summarised within Table 15.

Table 15: Records of habitats from the PHI within the Site and within 250m of the Installation Boundary.

Location	Details
On-site	Coastal and floodplain grazing marsh
On-site	Coastal and floodplain grazing marsh
0 m NE	Coastal and floodplain grazing marsh
36 m NE	Coastal and floodplain grazing marsh
141 m W	Coastal and floodplain grazing marsh
230 m W	Coastal and floodplain grazing marsh

The Habitat Networks dataset describes the geographic extent and location of Habitat Networks for 18 priority habitats based primarily, but not exclusively, on the priority habitat inventory with additional data added in relation to habitat restoration-creation, restorable habitat, plus fragmentation action, and network enhancement and expansion zones. The Groundsure Report states that there are two records of the Habitat Networks within the Site and 10 records of Habitat Networks within 250 m of the Installation Boundary. The information is summarised within Table 16.

Table 16: Records of Habitat Networks PHI within the Site and within 250m of the Installation Boundary.

Location	Details	Habitat
On-site	Network Enhancement Zone 1	Not specified
On-site	Restorable Habitat	Not specified
65 m SE	Network Enhancement Zone 2	Not specified
68 m NW	Network Enhancement Zone 2	Not specified
115 m E	Network Enhancement Zone 2	Not specified
115m E	Network Enhancement Zone 1	Not specified
140 m E	Network Enhancement Zone 2	Not specified
140 m E	Network Enhancement Zone 1	Not specified
165 m E	Network Enhancement Zone 2	Not specified
216 m E	Network Enhancement Zone 1	Not specified
231 m SE	Network Enhancement Zone 2	Not specified

Location	Details	Habitat
245 m NE	Primary Habitat	Saltmarsh

Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates. There is one site verified as Open Mosaic Habitat within the Site and five verified as Open Mosaic Habitat within 250 m of the Installation Boundary. The information is summarised within Table 17.

Table 17: Verified Open Mosaic Habitats within the Site and within 250 m of the Installation Boundary.

Location	Details
On-site	Site reference: Kingsnorth Industrial Estate Identification confidence: High Primary source: BugLife All Of A Buzz Data
34 m SE	Site reference: Kingsnorth Industrial Estate Identification confidence: High Primary source: BugLife All Of A Buzz Data
151 m S	Site reference: Kingsnorth Industrial Estate Identification confidence: High Primary source: BugLife All Of A Buzz Data
194 m NE	Site reference: NLUD Ref: 228000124 Identification confidence: Low Primary source: National Land Use Database - Previously Developed Land
247 m SE	Site reference: Kingsnorth Industrial Estate Identification confidence: High Primary source: BugLife All Of A Buzz Data
248 m NW	Site reference: Kingsnorth Industrial Estate Identification confidence: High Primary source: BugLife All Of A Buzz Data

4 Permitted Activities

4.1 Activities

The permitted activities will consist of the Schedule 1 installation activities (as defined in the Environmental Permitting Regulations) and directly associated activities listed in Table 18.

Table 18: Scheduled and Directly Associated Activities

Type of Activity	Schedule 1 Activity	Description of Activity	Limits of specified activity
Installation	Section 5.1 Part A(1) (b)	The incineration of non-hazardous waste in a two stream waste incineration plant with a capacity of 3 tonnes per hour or more	From receipt of waste to treatment and emission of exhaust gas and disposal of any residues arising and processing of incinerator bottom ash.
Directly associated activities			
Directly associated activities		Energy generation	Generation of up to 49.9 MW of electrical power using a steam turbine, with electricity exported to the National Grid, and the potential to export heat to local heat users from energy recovered from the flue gases
Directly associated activities		Back-up diesel generator	For providing emergency electrical power to the plant in the event of supply interruption. Operation for no more than 50 hours per year for testing purposes (unless in emergency situations).
Directly associated activities		Surface water management	From collection of uncontaminated surface water drainage for discharge to the MedwayOne drainage system.

4.2 On-site Fuel and Chemical Storage Facilities

As identified in the Supporting Information, the activities undertaken at the Facility will utilise a number of fuels and chemicals. These materials will be stored in accordance with current guidance.

The delivery and transfer details, and secondary and tertiary containment systems associated with the storage of these materials are presented in Table 19.

Table 19: Raw material containment facilities – Primary raw materials

Material	Delivery details	Transfer for storage details	Storage containment details
Primary raw materials			
Low sulphur fuel oil	Delivered using tanker.	Unloading from delivery vehicle tanker into storage tank using sealed pipework. Storage tanks located with a dedicated concrete sump or other bunding. Hardstanding in this area will also have links to process drainage system.	Primary: Tank Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Ammonia hydroxide (or urea) solution	Delivered using tanker.	Unloading from sealed delivery vehicle into storage tank via standard hose connection, under supervision by trained site operatives. Storage tanks and unloading located in a covered area with a dedicated concrete sump or other bunding. Hardstanding in this area will have contained drainage. Tanks to have high tank level alarms or trips.	Primary: Tank Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Lime	Delivered using tanker.	Pneumatic unloading from delivery vehicle into storage silo. Exhaust air to be de-dusted using fabric filters and automatic cleaning with compressed air after filling. Filter to be regularly inspected for leaks. Silos to be fitted with a high level alarm system to prevent overfilling.	Primary: Silo Secondary: Hardstanding Tertiary: Contained process drainage
Activated carbon	Delivered using tanker.	Pneumatic unloading from delivery vehicle into storage silo. Exhaust air to be de-	Primary: Silo Secondary: Hardstanding

Material	Delivery details	Transfer for storage details	Storage containment details
		dusted using fabric filters and automatic cleaning with compressed air after filling. Filter to be regularly inspected for leaks. Silos to be fitted with a high level alarm system to prevent overfilling.	Tertiary: Contained drainage
Water treatment chemicals[1]			
Sodium hydroxide	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: IBC Secondary: Hardstanding Tertiary: Contained drainage
Sulphuric acid	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Hydrochloric acid	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Sodium chloride	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package or bag Secondary: Hardstanding Tertiary: Contained drainage
Oxygen scavenger (Boilex 510A or equal)	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package Secondary: Hardstanding Tertiary: Contained drainage

Material	Delivery details	Transfer for storage details	Storage containment details
Sodium phosphate	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package Secondary: Hardstanding Tertiary: Contained drainage
Other raw materials1			
Hydrated lime	Delivered using tanker.	Pneumatic unloading into silo, dusts abated using fabric filers, high level alarm to prevent overfilling, areas for delivery/transfer will have links to process drainage system.	Primary: Silo Secondary: Hardstanding Tertiary: Contained process drainage
Lubrication and hydraulic oil	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: Barrels or IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Lubrication greases	Delivered by HGV or other large vehicle.	Consumer package or barrels assumed to be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Barrels or consumer package Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Washing Solvent	Delivered by HGV or other large vehicle.	Consumer package or barrels assumed to be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Barrels or consumer package Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Ethylene or propylene glycol	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: Barrels or IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage

Material	Delivery details	Transfer for storage details	Storage containment details
Propane	Delivered by HGV or other large vehicle.	Unloaded using suitable mobile plant and transferred to dedicated storage area.	Primary: Bottles Secondary: Hardstanding Tertiary: Contained drainage
Calibration gases / liquids	Delivered by HGV or other large vehicle.	Unloaded using suitable mobile plant and transferred to dedicated storage area.	Primary: Bottles Secondary: Hardstanding Tertiary: Contained drainage
Fire extinguisher foam	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: IBC Secondary: Hardstanding Tertiary: Contained drainage
[1] These are examples of typical chemicals (including delivery/storage details) used at similar waste incineration facilities to the Facility. Details specific to REC may be subject to final design.			

Various maintenance materials (oils, greases, insulants, antifreezes, welding and firefighting gases etc.) will be stored in an appropriate manner. Any gas bottles on-site will be kept secure in dedicated area(s).

4.3 Environmental Risk Assessment

An Environmental Risk Assessment has been carried out following the Environment Agency Horizontal Guidance Note H1. This is included within Appendix D of the Application Pack. The assessment considers all potential sources of ground and surface water pollution that could occur due to fugitive emissions from the Facility or from accidents occurring at the Facility. The risk assessment also details any mitigation measures that will be employed to reduce the frequency or impact of these events.

The Environmental Risk Assessment identifies that the operation of the Facility will require the storage of various chemicals, which could pose a risk to the ground and groundwater during normal operation. All process areas, loading/unloading areas, materials handling areas and roadways will be covered in concrete and/or tarmac hardstanding. As such, it is regarded that there will be little risk of ground/groundwater contamination during normal operation of the Facility.

Therefore, it is concluded that REC will pose little risk of pollution. However, periodic soil and groundwater samples at the Site will be undertaken to fulfil the requirements of Articles 14(1)(b), 14(1)(e) and 16(2) of the Industrial Emissions Directive (IED).

5 EC Guidance: Stage 1 – 3 Assessment

In accordance with European Commission Guidance concerning baseline reports under Article 22(2) of the IED, a Stage 1 – 3 assessment has been undertaken to identify hazardous substances used at the Facility.

Stages 1 – 3 of the assessment are described as follows:

1. Identify which hazardous substances are used, produced or released at the installation.
2. Identify which of these substances are classed as 'relevant hazardous substances' (defined within Article 3 of EC Regulation 1272/2008). Justify any hazardous substances which have been excluded due to their incapability to contaminate soil or groundwater.
3. For each relevant hazardous substance, identify the actual possibility for soil or groundwater contamination at the Site (including probability of release), taking into account quantities, storage and transport, risk of release.

The full stage 1 – 3 assessment of the primary raw materials and residues handled at the Facility is presented in Table 20. The substances handled at the Facility are identified in the context of their hazards and theoretical pollution risk, with justification as to whether the substance is of concern or not in the context of the Site.

Table 20: Stage 1 - 3 assessment of materials at the Facility

Stage 1: Chemicals handled	Stage 2: Chemical characteristics and toxicity							Stage 3: Site specific characteristics			Stage 4: Site specific risk
Substance	**Concentration / State**	**CAS No.**	**EC/List No.**	**Hazard statements (CLP)**	**Hazard substance under Stage 2?**	**Environmental fate / behaviour**	**Potential Pollution Risk?**	**Approx. Quantity Stored**	**Storage Arrangements/ Containment**	**Delivery, Storage and use details**	**Comments/ Chemical of concern?**
Waste and raw materials											
Non-hazardous waste	S (possibly some liquids)	N/A	N/A	N/A	No	Mostly insoluble, however potential for a wide range of contaminants and potential for liquids to be present.	Yes	18,000 m^3 (approx. 6,300 tonnes or 5 days processing capacity)	The waste bunker, constructed of reinforced concrete.	Waste will be delivered in enclosed waste delivery vehicles from the MRF and off-site sources into the ERF enclosed waste reception and bunker.	Waste unloading and storage activities will be undertaken on areas of hardstanding. Periodic inspections of waste levels against maximum capacity will be undertaken. Any spillages will be cleaned up. Regular preventive maintenance of the bunker.
Fuel Oil (saturated and aromatic hydrocarbons)	Liquid	68334-30-5	269-822-7	H226, H304, H373, H315, H332, H351, H411, H350	Yes	Insoluble, high toxic effects, volatile	Yes	120 m^3	Enclosed tank with bunding	Delivery to REC in dedicated road tankers, unloaded into storage tank via flexible hose, direct feed into burners.	Periodic inspections of tank undertaken (preventative maintenance), refuelling undertaken on areas of hardstanding with contained drainage, overfill protection on tank.
Ammonium hydroxide solution, NH_4OH	25% NH_3, Liquid	1336-21-6	215-647-6	H314, H335, H400	Yes	Water soluble Potential for mobility in soil and water systems	Yes	75 m^3	Enclosed tank, double skinned, bunding	Delivered by road tanker and pumped into storage tank via flexible hose, direct feed from tank into the process	Unloading operations on areas of hardstanding with contained drainage, storage in a bunded area, site drainage will be able to be isolated in a spill event, air emissions system is subject to advanced control measures
Lime, $Ca(OH)_2$	100%, Solid	1305-62-0	215-137-3	H315, H318, H335	Yes	High aqueous solubility	Yes	240 m^3	Enclosed silo(s)	Delivered in tankers, unloaded into storage silo by flexible hose, direct feed into flue gas treatment systems, collected on bag filters.	Any spillages easily swept up, site containment and handling procedures are good. Chemical dosing rates and flows within the FGT process are subject to control systems. Storage silos will be located above concrete hardstanding, and fitted with high-level alarms for unloading operations. Drainage in these areas will be contained.

Stage 1: Chemicals handled	Stage 2: Chemical characteristics and toxicity							Stage 3: Site specific characteristics			Stage 4: Site specific risk
Substance	**Concentration / State**	**CAS No.**	**EC/List No.**	**Hazard statements (CLP)**	**Hazard substance under Stage 2?**	**Environmental fate / behaviour**	**Potential Pollution Risk?**	**Approx. Quantity Stored**	**Storage Arrangements/ Containment**	**Delivery, Storage and use details**	**Comments/ Chemical of concern?**
Powder Activated Carbon, C	100%, Solid	7440-44-0	231-153-3	H252	Yes	Insoluble	No	75 m^3	Enclosed silo	Delivered by road, unloaded into silo via flexible hose. Direct feed into flue gas treatment system.	Any spillages easily swept up, site containment and handling procedures are good. Silo located above an area of concrete hardstanding.
Boiler Treatment Chemicals (salts, oxygen scavenger, corrosion inhibitor)	Liquid and solids	Various	Various	Dependent on chemicals used (subject to detailed design)	Yes	Potential for mobility in soil and water systems, potential for toxicity	Yes	N/A – various storage facilities	IBCs for liquids, with bunding where appropriate. Consumer package or bags for solids	Boiler treatment chemicals will be stored in a designated area in/near the water treatment plant.	Spillages will be contained by hardstanding and contained drainage.
Residues											
APCr (contains heavy metals, POPs)	Solid	90989-48-3	292-705-7	N/A	Yes	Presence of persistent organic pollutants (e.g. dioxins), volatiles.	Yes	730 m^3	2 x APCr silo	Collection on bag filters, direct feed from flue gas treatment system into residue silo, then loaded into tanker (all enclosed) for transfer to hazardous landfill disposal.	Any leaks during loading/ unloading operations will be contained by concrete hardstanding, with measures to prevent overfilling in place. APCr storage and unloading will be in areas with contained drainage to the process drainage network.
Incinerator Bottom Ash (IBA)	Solid	91082-83-6	293-798-7	N/A	No	Limited solubility, potential for the presence of heavy metals	No	1,550 tonnes	IBA Storage Area in enclosed building.	Transferred from the ERF to the IBA Storage Area via conveyor.	Inert and non-hazardous. Transfer to IBA facility will be via an enclosed conveyor. Storage in an enclosed reception area.

6 Previous Contamination and Site Investigations

6.1 Site Investigations

As stated within Article 22 (2) of the EA Industrial Emissions Directive (IED):

> *"Where the activity involves the use, production or release of relevant hazardous substances [RHS] and having regard to the possibility of soil and groundwater contamination at the site of the installation, the operator shall prepare and submit to the competent authority a baseline report before starting operation of an installation or before a permit for an installation is updated for the first time after 7 January 2013".*

Furthermore, the EA guidance note '*H5: Site Condition Report – Guidance and Templates*' states that "*where a facility involves the use, production or release of RHS*", a baseline report must be submitted as part of the application.

RPS, the author of the Remediation Strategy, has undertaken 3 phases of ground investigation at the MedwayOne development since 2013:

1. The 2013 ground investigation involved the drilling of 14 cable percussive boreholes, drilling of 50 window sample boreholes, installation of gas and groundwater monitoring wells within a total of 34 boreholes, excavation of 28 hand dug pits, excavation of 27 machine excavated trial pits and 3 rounds of gas and groundwater monitoring and sampling. The investigation concluded that soil and groundwater contamination was not widespread across the site, but the following points were noted:
   - localised areas of TPH and benzo(a)pyrene contamination;
   - concentrations of inorganic and PAH contaminants within the groundwater;
   - localised concentrations of TPH contaminants within the groundwater noted to be more persistent and consistent with high soil TPH concentrations;

   It was recommended that additional ground investigation was undertaken to further define areas of known contamination, or to define the level of contamination within areas not accessible during the investigation.

   Only one borehole from the site investigation was located within the installation boundary, and could be used to inform the baseline ground conditions for the Facility. However, no monitoring data from the soil analysis has not been provided within the Remediation Strategy, and limited data from the groundwater monitoring was provided. Furthermore, given that the investigation was undertaken in 2013, it is not considered to provide suitable data to inform the baseline ground conditions.
2. A supplementary ground investigation was undertaken in 2014 to determine the extent of soil hydrocarbon contamination within Zone 1 and Zone 3. The investigation comprised the drilling of 30 window sample boreholes and the installation of a total of 19 groundwater monitoring wells. Additionally, a single round of groundwater monitoring and sampling was undertaken.

   None of the boreholes or groundwater monitoring wells were located within the installation boundary; therefore, the data collected is not relevant to the land within the installation boundary and cannot be used to inform the baseline ground conditions.
3. Another supplementary ground investigation was undertaken in 2015 better define the extent of soil and groundwater contamination. The ground investigation comprised the drilling of 2

cable percussive boreholes and 12 window sample boreholes and the installation of 7 groundwater monitoring wells.

None of the boreholes or groundwater monitoring wells were located within the installation boundary; therefore, the data collected is not relevant to the land within the installation boundary and cannot be used to inform the baseline ground conditions.

6.2 Baseline Reference Data

As stated within Article 22 (2) of the IED:

"Where the activity involves the use, production or release of relevant hazardous substances and having regard to the possibility of soil and groundwater contamination at the site of the installation, the operator shall prepare and submit to the competent authority a baseline report before starting operation of an installation or before a permit for an installation is updated for the first time after 7 January 2013."

Prior to commencement of construction, the area of land which the Facility will be located on will be cleared and prepared for construction. If during clearance and preparation works any contamination is identified, samples will be taken and records retained. Records of any remediation undertaken during the construction phase will also be retained. This information will be used to further update the baseline ground conditions for the installation prior to the commencement of operations.

During construction of the Facility, the site infrastructure, including hardstanding, site drainage, raw material and waste storage facilities, will be constructed to provide protection of the underlying ground and groundwater.

7 Ongoing Management

Any additional data obtained on the ground conditions at the Site, either prior to commencement of construction, or through the construction phase, will be collated within this Site Condition Report. This Site Condition Report will be updated following completion of any additional site investigations, groundwater monitoring or ground gas monitoring, and will be maintained throughout the lifetime of the Facility.

During the lifetime of the permit, the Site Condition Report will be updated to take into account the following:

- any changes to the permitted activities or the Installation Boundary;
- any measures taken to protect the underlying land and groundwater;
- any pollution incidents that may have had an impact on land and associated remediation; and
- any soil, gas or groundwater monitoring (where undertaken).

At the end of the operational life of the Facility, the Site Condition Report will be updated to include for decommissioning and site closure. It will be demonstrated that all sources of pollution risk have been removed and whether decommissioning has had any impact on the land. Any required remedial works will be documented and incorporated into the report. A statement of site condition will be made to confirm that:

- the permitted activities have stopped;
- decommissioning is complete, and the pollution risk has been removed; and
- the land is in a satisfactory condition.

8 Conclusions

This report has identified the historical and current condition of land, the activities to be permitted at the Facility, and detail on the reagents and residues to be involved with the operations undertaken at the Facility.

At the time of writing there is limited data available on the existing ground conditions at the Site. As part of the design and development of the Site, additional intrusive investigations will be undertaken to determine the ground conditions. Records obtained from the intrusive investigations, and also during construction, will be utilised to update and inform the baseline ground conditions prior to commencement of commissioning of the Facility.

During the Operational phase of the Facility, any records which demonstrate how the land and groundwater have been protected will be maintained. This information will include inspection records of site infrastructure, pollution/incident reports, records of any ground investigations undertaken, and any monitoring records of soil, gas and/or water during the life of the permit. Where it is identified that pollution has occurred, records will be maintained to demonstrate any pollution incidents that may have affected the land or groundwater. These records will be retained to be used at Permit Surrender.

Appendices

A Kingsnorth Power Station – Site Wide Remediation Strategy, RPS, 30 September 2019

B Groundsure Insight Report

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