



Site Condition Report RDF Energy No.1 Ltd Newport EfW Facility

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INTRODUCTION

This Application Site Report has been prepared for RDF Energy No.1 Ltd (hereafter referred to as 'RDF Energy') in support of a Permit Application under The Environmental Permitting (England and Wales) Regulations 2018 (as amended) for the operation of an energy from waste facility at their site on Alexandra Dock, Newport.

This document represents the Application Site Condition Report (ASCR) submitted as part of the Application package to Natural Resources Wales (NRW) and has relied on information supplied by the site and various third party information sources (See Section 2).

The energy from waste facility ('the Site') is located on land off Tom Lewis Road, Associated British Ports, Alexandra Docks, Newport, NP20 2WF (National Grid Reference: ST 31253 84755).

The proposed development is a renewable energy generation facility which has been designed to recover energy from the combustion of Refuse Derived Fuel (RDF) feedstocks specifically for the production of electricity. The facility will produce a high temperature flue gas which is then used to raise steam and generate electricity, through steam cycle turbine generation.

The facility is designed to use Refuse Derived Fuel (RDF) feedstocks to produce heat to raise steam in a conventional tube boiler for utilisation in a steam turbine for the production of renewable electricity with a gross electrical output of up to 24MWe.

The Installation has been designed to process approximately 260,000 tonnes of pre-prepared Refuse Derived Fuel (RDF) per annum.

The treatment process will be permitted by Natural Resources Wales (NRW) as a Waste Co-Incineration Activity and will be operated in accordance with the Environmental Permitting Regulations 2018 and Chapter IV of the Industrial Emissions Directive (IED).

The proposed process meets the definition of an Installation as defined by Section 5.1 'Incineration and Co-Incineration of Waste' paragraph A(1)(b) namely:

'The incineration of non-hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 3 tonnes per hour.'

This document has been prepared in accordance with the EA's Guidance Document H5 Site Condition Reports Guidance and Templates (Version 2.0, dated 04/08/08). This report provides baseline information in relation to the site.

1. SITE DETAILS

Table 1.1: Site Details

Name of the Applicant:	RDF Energy No.1 Ltd
Activity Address:	Land off Tom Lewis Way, Associated British Ports, Alexandra Docks, Newport, NP20 2WF
National Grid Reference:	OS X (Eastings) 331253 OS Y (Northings) 184755
Document References:	EP Application Site Condition Report, RDF Energy No.1 Ltd Document reference and date: SOL_22_P087_CO February 2023
Annexes:	Annex A: Figures Annex B: Groundsure Report Annex C: Previous Ground Investigation Report Annex D: Conceptual Model

2. CONDITION AT PERMIT ISSUE

2.1 Environmental Setting

The location of the subject Site is shown on Figure A1, Annex A, centred at approximate National Grid Reference OS X (Eastings) 331253; OS Y (Northings) 184755. The proposed site layout is shown in Figure A2.

The site is located on land south of Tom Lewis Way, Associated British Ports, Alexandra Docks, Newport, NP20 2WZ.

The application site is located within a heavily industrialised dockside area south of the town centre of Newport, South Wales.

The site is roughly rectangular in shape and covers an area of approximately 2.2 hectares. The site currently comprises an area of derelict land with uneven topography and is sparsely vegetated. The facility is within an industrial dockside area and is bound by Tom Lewis Way to the north and east, with industrial sheds to the south and west. Alexandra docks (South Dock) is located approximately 200 m to the south.

The River Ebbw is located approximately 170 m west of the site, flowing in a southerly direction to join the River Usk approximately 900 m south of the site. The River Usk itself is located approximately 1km to the east and 850 m south of the site flowing in a southerly direction to join the Severn Estuary approximately 3 km south. The nearest residential dwelling is sited at New Diary Farm located approximately 870 m southwest of the site, with the residential area of Duffryn located 1 km to the west.

Table 2.1 below provides information regarding the surrounding site.

Table 2.1: Site Setting	
Direction	Observations
North	Immediate Vicinity: Tom Lewis Way Within 500m: Scott Pallets, Oxbow Lake, Derelict Vegetated Ground Beyond 500m: Sawmill, A48, Industrial Estate, Level of Mengeleif Residential Area
North East	Immediate Vicinity: Vegetated ground Within 500m: Industrial Units, Sims Metal Management. Beyond 500m: North Dock, Industrial Units, River Usk, Transport Bridge, A48, Pillgwenlly Residential Area
East	Immediate Vicinity: Industrial Shed Within 500m: Industrial Buildings, Sims Metal Management Fridge Recycling, Conveyors & Dockside Beyond 500m: South Dock, River Usk (Cold Harbour Reach), Liberty Steel, Solutia Nature Reserve

South East	Immediate Vicinity: Industrial Shed Within 500m: South Dock Beyond 500m: Saica Pack Newport, Post Office Building, River Usk, Newport Sailing Club, Uskmouth Power Station, RSPB Newport Wetlands
South	Immediate Vicinity: Industrial Shed, Derelict Land Within 500m: South Dock, Speedy Newport Docks, River Ebbw Beyond 500m: River Usk, Severn Estuary
South West	Immediate Vicinity: Unused land Within 500m: RMS, River Ebbw, Wentlooge Levels Beyond 500m: New Dairy Farm, B4239, Agricultural Land, St Brides Village.
West	Immediate Vicinity: Tom Lewis Way Within 500m: River Ebbw, Wentlooge Levels Beyond 500m: Railway Line, B4239, John Frost School, Duffryn Residential Area,
North West	Immediate Vicinity: Tom Lewis Way Within 500m: Scott Pallets, RMS, Landfill, Oxbow Lake Beyond 500m: River Ebbw, Maes-glas Residential Area, A48, Maes Ebbw School, Railway

2.1.1 Geology, Hydrogeology and Surface Waters

Desk-based research of the local geology, hydrogeology and surface waters has been carried out in order to establish the potential for migration of contamination onto or away from the Site, and to assess the surface water and groundwater sensitivity of the Site area. Information was obtained from a number of sources, namely:

- Natural Resources Wales Flood Risk Map;
- Information provided by Groundsure Reports (Annex B).
- Information outlined within previous Site Investigation Reports (Annex D);
- Geological maps produced by the British Geological Survey (BGS) and the BGS Geology of Britain Viewer (<http://maps.bgs.ac.uk/geologyviewer>);
- MAGIC (<http://magic.defra.gov.uk>); and
- BGS Borehole Record Viewer (<http://www.bgs.ac.uk/data/boreholescans/home.html>).

Geology

According to BGS Geology of Britain viewer, the site is underlain by superficial Tidal Flat Deposits of quaternary age, predominantly comprising of clay and silt. The BGS records the underlying bedrock as part of the Mercia Mudstone Group of Triassic age. This is described in the BGS Lexicon as *'dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/anhydrite widespread; sandstones are also present.'*

Additionally, during the various ground investigations undertaken at the site by Hydrock Ltd in 2008, and Earth, Environmental & Geotechnical Limited (EEGSL) in 2019 and 2020 Made Ground was

encountered across the site at variable thicknesses with a number of anthropogenic potentially contaminative materials present (e.g. brick, paint tins, plastic, rope, glass, cables etc).

According to data issued by the National Radiological Protection Board (NRPB) in 2002 (now the Health Protection Agency), the site is located in an area that is in a lower probability radon area, as less than 1% of homes are above the action level. No radon protection measures would be considered necessary for building construction at the site.

The site is not located in area that may be affected by coal mining.

Shrink Swell

The maximum shrink swell hazard rating identified on the application site is low.

Landslides

The maximum landslide hazard rating identified on the application site is very low.

Soluble Rocks

The maximum soluble rock hazard rating identified on the application site is negligible.

Compressible Ground

The maximum compressible ground hazard rating identified on the application site is moderate.

Collapsible Rocks

The maximum collapsible rocks hazard rating identified on the application site is negligible.

Running Sands

The maximum running sand hazard rating identified on the application site is moderate.

Hydrogeology

The superficial deposits at the site are classed as unproductive, with low permeability deposits and any groundwater of negligible significance for water supply or river base flow.

The Mercia Mudstone Group is classified as a Secondary B Aquifer. This is described as predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. Typically Secondary B Aquifers are generally the water-bearing parts of the former non-aquifers.

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

The groundwater vulnerability at the site is classified as low.

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

There are no recorded groundwater or potable water abstractions within 2km of the site.

Surface Water

There are a number of surface water features in close proximity to the site.

Two main rivers are present in the sites vicinity. These are the River Ebbw located approximately 170 m west of the site, flowing in a southerly direction to join the River Usk approximately 900 m south of the site. The River Usk itself is located approximately 1km to the east and 850 m south of the site flowing in a southerly direction to join the Severn Estuary approximately 3 km south. All these named rivers are tidal in nature.

In addition, Alexandra Dock (South Dock) is located approximately 190 m south of the site. An oxbow lake, formed from a historical meander of the River Ebbw is located approximately 260 m north of the site. The Wentlooge Levels, an area comprising a network of reens and drainage ditches is located across the River Ebbw approximately 330 m west of the site.

There are no surface water abstractions within 1 km of the site. However, there is one identified historical surface water abstraction recorded 1.31 km north of the site. This is shown below:

- Corus UK Ltd (license number 20/56/11/0013), from a single point source, for general use relating to Secondary Category (Medium Loss), located at the dock feeder at pillgwenlly to whitehead. The original start date of this license is 22/10/1973 and there have been 102 issues. The expiry date is not known, nor are limitations to the volume.

The NRW's flood risk map indicates that the site is not at risk of flooding from rivers or sea. However, small areas of the site along the northern boundary may be at low to medium risk of surface water flooding.

2.1.2 Designated Sites

NRW H1 and H5 guidance states that the potential impacts of the site should be assessed for the following habitat sites within 10km of the Installation:

- Special Areas of Conservations (SACs) and candidate SACs (cSACs) designated under the EC Habitats Directive;
- Special Protection Areas (SPAs) and potential SPAs designated under the EC Birds Directive; and
- Ramsar Sites designated under the Convention of Wetlands of International Importance.

It is also stated that within 2km of the Source:

- Sites of Special Scientific Interest (SSSI) established by the 1981 Wildlife and Countryside Act;
- National Nature Reserves (NNR);
- Local Nature Reserves (LNR);
- Local Wildlife Sites (LWS), County Wildlife Sites (CWS) and potential wildlife sites (PWS);

- Sites of Importance for Nature Conservation (SINC); and
- Ancient Woodland.

Information from the Multi Agency Geographic Information for the Countryside (MAGIC) website (<http://magic.defra.gov.uk/>) has been used to obtain the above information.

The designated sites relevant to this study are presented in Table 2.3 below:

Distance & Direction	Receptor	Status
278 m west	Gwent Levels – St Brides	SSSI
426 m south	Severn Estuary	SSSI, Ramsar, SAC, SPA
856 m southeast	River Usk (Lower Usk)	SSSI, SAC
1773 m southeast	Newport Wetlands	SSSI, NNR

In addition, there 7 designated ancient woodlands between 1 – 2 km to the west and northwest of the site.

The site is not located within an Air Quality Management Area.

The proposed operation has minimal environmental emissions to land, controlled waters or atmosphere and therefore it is the conclusion of this assessment that there will be no direct or indirect effects on any of the statutory sites described above.

2.2 Pollution History

2.2.1 Environmental Database Records

The following information has been obtained from a search of a publicly available database of environmental information (Groundsure Report, provided by Groundsure Ltd 17/03/2020 in Annex B).

The database contains records of information from public registers held by environmental regulatory authorities and can be used to assess the site’s sensitivity, the potential for neighbouring activities to pose a risk to the site and to determine whether specific records of pollution relate to the subject site.

Pollution Incidents

There is one recorded Pollution Incident within 500m of the site. This is summarised in the table below.

Table 2.4 Recorded Pollution Incidents within 500m of the Site

Distance and Direction	Details	Pollutant description	Impact
466 m NE	Date: 13 th August 2013 Identification: 1147049	Atmospheric Pollution: Smoke	Water: - Land: Category 4 (No impact) Air: Category 4 (No impact)

Potentially Contaminative Industrial Sites

There are 3 potentially contaminative current land uses within 250m of the site, the details of which are shown in the table below.

Table 2.5 Potentially Contaminative Current Industrial Sites within 250m of the Site

Company / Feature	Distance and Direction	Activity	Category
Electricity Sub Station	141 m SE	Electric Features	Infrastructure Features
Pylon	260 m E	Electric Features	Infrastructure Features
Baldwins Crane Hire Ltd	237 m N	Construction and Tool Hire	Hire Services

Discharge Consents

There are 14 Licensed Discharge Consents within 500m of the site. Those within 250 m and still active are outlined in the table below.

Table 2.6 Active Licensed Discharge Consents within 250m of the Site

Address & Permit Number	Effluent Type	Distance and Direction	Receiving Water	Status
Finnforest BBH Ltd Newport, Alexandra Dock Permit: AN0397001	Sewage Discharges – Final treated effluent – not water company	162 m W	River Ebbw	Effective Issued: 15/06/2006
IAWS Fertilisers, South Dock, Alexandra Dock, Newport Permit: AN0389201	Trade discharges – site drainage	163 m W	River Ebbw	Effective Issued: 21/10/2005
ABP Bulk Cargo North Side, South Dock, Alexandra Dock Permit: AN0395201	Trade discharges – site drainage	163 m W	River Ebbw	Effective Issued: 02/03/2006
Premises at Newport Docks Permit: AN0033343 v2	Unknown	190 m NW	River Ebbw	Effective Issued: 03/11/1992
Premises at Newport Docks Permit: AN0033302 v2	Unspecified	204 m SE	South Dock	Effective Issued: 03/11/1992

Premises at Newport Docks Permit: AN0055401 v2	Unspecified	214 m NW	River Ebbw	Effective Issued: 14/06/1994
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Authorised or Permitted Processes

There are three Environmental Permits to operate part A(2) or B permits within 500m of the site. These are shown in the table below.

Table 2.7. Environmental Permits to operate a Part A(2) or Part B Activity within 500 m

Distance(m) and Direction	Address	Process	Permit Type
477 m N	Platinum Products, Platinum Products, Isca Works, Mill Parade, Newport, NP20 2JQ	Use of bulk cement	Part B – Current
477 m N	Wright Minimix, 18 West Way Road, Alexandra Docks, Newport, South Wales, NP20 2WD	Use of bulk cement	Part B - Current
497 m NE	Pipeline and Metal Coatings, Atlantic Sheds, Alexandra Docks, Newport, South Wales, NP20 2NQ	Coating processes	Part A2 & B - Revoked

There are 17 recorded Part A(1) authorized activities associated within 500m of the site. These relate to two sites with variations between superseded versions. These are all outlined in the table below.

Table 2.8. Environmental Permits to operate a PPC Part A(1) within 500 m of the site

Distance(m) and Direction	Operator and installation name	Process	Permit Number	Status
455 m NE	Operator: Sims Group UK Ltd	Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity of <75 tpd	CP3795FY	Effective Issued: 29/03/2017
477 m W	Operator: Newport City Council Installation Name: Docksway Landfill	Waste landfilling; >10 t/d with capacity >25,000t excluding inert waste AND Combustion; any fuel =>50mw	HP3036GT Original permit number: DP3733BK	Effective Issued: 14/10/2005

There are two recorded active Control of Major Accident Hazards (COMAH) sites located within 250 m of the site. Both are lower tier sites and as below:

- Mole Valley Forage Services Ltd – located adjacent to the east of the site; and
- Origin UK Operations Ltd – located 212 m northeast.

Landfill and Waste Sites

There is one active landfill site within 500 m of the site. This is the Docks Way Landfill (EPR/NP3199FM/V002) operated by Newport City Council and is currently within the closure phase. The landfill is located 130 m west of the site and accepted household, commercial and industrial wastes.

There are 5 historical landfill sites within 500 m of the site which are detailed in the table below.

Table 2.9. Historical Landfills within 500 m of the site					
Distance(m) and Direction	Operator and address	Waste Type	Permit Number	Dates	
Onsite	Gwent Haulage Company Ltd South Dock	Inert, Industrial	WML 004/77	First Waste Recorded: 31/01/1976 Last Waste Recorded: 31/12/1990	
Onsite	H Wessen Old Coal Sidings	Inert, Industrial	WML 015/77	First Waste Recorded: 31/12/1970 Last Waste Recorded: 31/12/1983	
157 m W	Newport County Council Docks Way	Household, Inert, Commercial and Industrial	WML 066/92	First Waste Recorded: 31/12/1980 Last Waste Recorded: -	
267 m NW	Volehurst Ltd Land adjoining Timber Terminal South Docks	Inert, Industrial, Household	WML 043/86, 040/86, 6935/0050	Licence Issued: 27/02/1986 Licence Surrendered: 11/08/1988	
405 m NW	Newport County Council Maesglas Tip	Commercial, liquid sludge	-	First Waste Recorded: 30/04/1967	

In addition, there are 32 licenced waste sites within 500 m of the site. These are predominantly related to the activities at the Sims Metal Recycling site to the south.

2.2.2 Historical Land Uses

Available historic maps for the site have been reviewed to determine if there is the potential for contamination to be present on Site associated with the Sites historical uses.

A summary of the potentially contaminative historical developments of the site and its surroundings are included below.

- **1882 – 1984:** A meander of the River Ebbw cuts directly through the site flowing west - east.

Land on either side of the river banks is agricultural in nature and criss-crossed by a network of reens. Approximately 450 – 750 m to the northeast of the site, Alexandra Dock is present including a Timber Float, sawmill, engine works and associated rail lines. The Great Western

Railway (South Wales Division) runs in a north-south direction approximately 1km to the west of the site.

The River Usk is located approximately 1km to the south and approximately 1km to the northeast beyond the docks.

- **1900 – 1901:** No change onsite.

South Dock has been constructed to the south of the Alexandra dock to the northeast of the site with an appropriate expansion of associated railway lines and dockside industry. Mendalgyf Sanitary Hospital has been constructed approximately 200 m northeast of the site.

- **1920 – 1950:** The eastern part of the site is crossed by rail tracks associated coal hoists located on the north side of the South Dock which has largely expanded to the south of the site.

The course of the River Ebbw has been diverted to the west of the site and its channel is now located approximately 125 m distant from the site boundary. A number of industrial buildings have been constructed around the new dockside, including a Central Store Depot, travelling cranes, transit sheds, workshops and an electric sub station.

By 1950 residential development approximately 1.5 km northwest of the site has been constructed.

- **1955 – 1965:** Rail tracks in the eastern part of the site have slightly expanded. Ground within the western part of the site is labelled as marshy.

The Central Store Depot Building to the south of the site is now labelled as Works and Mills.

- **1968 - 1973:** The rail tracks have been removed from site.

A Timber Storage Shed and timber terminal have been constructed approximately 130 m to the east of the site. The Timber Float to the north of the site has been infilled and railway lines associated with this industry marked as dismantled.

- **1985 – 1992:** The site remains marshy ground.

Land adjacent to the west of the site is marked as a spoil heap, as are large areas to the north of the site alongside the infilled timber float.

- **1995 - 2020:** Land at the site is no longer marked as marshy, however there is no onsite development.

Industrial sheds have been developed adjacent to the southeast of the site. By 2001, an oxbow lake to the north of the site is present as a result of the changing course of the River Ebbw.

A summary of the potentially contaminative historical land uses which may have impacted the site is provided in the table below.

Table 2.10. Potentially Contaminative Historical Land Uses	
Land Use	Contaminants of Concern
<i>Onsite</i>	
Rail Sidings	Hydrocarbons: diesel, lubricating oils, paraffin, PCBs, PAHs, Solvents, Ethylene Glycol, Creosote, Ferrous residues, Metal fines, Asbestos, Coal, Ash and fill and Sulphates.
Refuse tip	Various including metals, asbestos, ammonia, organics, inorganics and ground gases
<i>Offsite</i>	
Railway Sidings & Associated Buildings / Workshops	Hydrocarbons, diesel, lubricating oils, paraffin, PCBs, PAHs; Solvents; Ethylene Glycol, Creosote; Ferrous residues, Metal fines, Asbestos, Ash and fill, Sulphates.
Refuse tip	Various including metals, asbestos, ammonia, organics, inorganics and ground gases

2.2.3 Site Reconnaissance

Visual/Olfactory Evidence of Existing Contamination

All areas of the site and the proposed installation boundary were subject to visual inspection prior to development.

The site comprised an area of disused land populated with scrubby vegetation at the time of walkover. A number of piles of heaped material (spoil / made ground) were present. There was no evidence of fly tipping or other contaminative uses identified onsite.

2.3 Evidence of Historic Contamination

2.3.1 Previous Site Investigations

A number of geo-environmental and geotechnical investigations have taken place at the subject site. These are provided in Annex D and the most recent investigations have been summarised below.

Earth Environmental & Geotechnical Ltd (EEGSL) Site Investigation – August 2019

A desk-based study and preliminary geo-environmental investigation was undertaken by EEGSL in August 2019 in order to assess the ground conditions for foundation design and also the potential presence and extent of contamination across the subject site.

The report reviewed the following previous assessments:

- Hyder Consulting - Geo-environmental Desk Study Report, February 2008, Report No: 5001-NE33910-NER-01; and

- Integral Geotechnique – Shed 21, Newport Docks, Site Investigation Factual Report, September 2016, Report No: 11827/TD/16/SI.

It should be noted that Sol Environment have not reviewed either of the aforementioned reports.

EEGSL undertook intrusive ground investigation in June 2019 comprising:

- Advancement of three cable percussive boreholes to a maximum depth of 21.6 mbGL;
- Excavation of ten trial pits to a maximum depth of 3.2 mbGL;
- Installation of three monitoring wells within the boreholes onsite;
- One groundwater and gas monitoring round;
- Laboratory analysis of soil samples collected during the investigation and groundwater samples obtained during the subsequent monitoring round.

Ground Conditions

Made Ground (MG) was observed across the site at all exploratory locations at thicknesses ranging from 2.9 – 4.3 m. This strata typically comprised sandy gravelly clay with fragments of brick, ash, clinker, rubber, metal and wood.

Superficial Tidal Flat Deposits (TFD) comprising a series of soft clay, sands and gravels, generally coarsening with depth were identified intermittently across the site to depths of up to 20.1 mbGL. Underlying this within the deep boreholes was identified weathered Mercia Mudstone (MM).

Visible and olfactory evidence of hydrocarbon contamination was present in a number of locations.

Groundwater was encountered during the investigation and during the subsequent monitoring rounds at depths of 1.6 – 9.1 mbGL. No groundwater samples were analysed for contamination.

These ground conditions were consistent with those identified during the previous Hyder and Integral Geotechnique investigations.

Soil Analysis

11 soil samples taken during the investigation were analysed for the following determinands:

- Asbestos Screen,
- Heavy metals including arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc;
- Cyanide;
- Thiocyanate;
- Sulphate (SO₄);
- Sulphide;
- pH;
- Sulphur;
- Soil Organic Matter;

- Phenol;
- Extractable Petroleum Hydrocarbons (EPH); and
- speciated Polyaromatic Hydrocarbons (PAH).

The results are summarised below and in more detail within the report provided in Annex D.

Table 2.11 Baseline Soil Analysis 2019

Parameter	Unit	Min	Max	Location of Max
pH	pH Units	7.5	9.3	TP2 (MG)
Total Cyanide	mg/kg	<2	<2	-
Sulphate as SO ₄	mg/kg	402	2917	TP2 (MG)
Sulphide	mg/kg	<5	<5	-
Metals				
Arsenic	mg/kg	5	59	TP2 (MG)
Barium	mg/kg	49	564	TP1 (MG)
Beryllium	mg/kg	<0.5	6.5	TP1 (MG)
Boron	mg/kg	<1	7.3	TP6 (MG)
Cadmium	mg/kg	<0.2	3.9	TP4 (MG)
Chromium	mg/kg	11	93	TP1 (MG)
Copper	mg/kg	40	1390	TP1 (MG)
Lead	mg/kg	83	568	TP1 (MG)
Mercury	mg/kg	<1	1.4	TP6 (MG)
Nickel	mg/kg	9	127	TP1 (MG)
Selenium	mg/kg	<3	<3	-
Vanadium	mg/kg	6	61	TP1 (MG)
Zinc	mg/kg	212	12200	TP1 (MG)
Polycyclic Aromatic Hydrocarbons				
Naphthalene	mg/kg	<0.1	1.59	TP2 (MG)
Acenaphthylene	mg/kg	<0.1	0.11	TP6 (MG)
Acenaphthene	mg/kg	<0.1	0.19	TP6 (MG)
Fluorene	mg/kg	<0.1	0.17	TP6 (MG)
Phenanthrene	mg/kg	0.3	1.75	TP5 (MG)
Anthracene	mg/kg	<0.1	0.52	TP5 (MG)
Fluoranthene	mg/kg	0.26	4.1	TP5 (MG)
Pyrene	mg/kg	0.25	3.38	TP5 (MG)
Benzo[a]anthracene	mg/kg	<0.1	2.42	TP7 (MG)
Chrysene	mg/kg	<0.1	2.28	TP7 (MG)
Benzo[b]fluoranthene	mg/kg	<0.1	3.83	TP7 (MG)
Benzo[k]fluoranthene	mg/kg	<0.1	1.14	TP7 (MG)
Benzo[a]pyrene	mg/kg	<0.1	2.83	TP7 (MG)
Indeno[1,2,3-cd]pyrene	mg/kg	<0.1	1.98	TP7 (MG)

Dibenzo[a,h]anthracene	mg/kg	<0.1	0.39	TP7 (MG)
Benzo[g,h,i]perylene	mg/kg	<0.1	1.6	TP7 (MG)
Total USEPA-16 PAHs	mg/kg	<1.6	24.1	TP7 (MG)
Phenols				
Total (monohydric) Phenols	mg/kg	<2	<2	-
Total Petroleum Hydrocarbons				
Total EPH (C10 – C40)	mg/kg	96	735	TP4 (MG)

Four samples were identified to contain asbestos (both amosite and chrysotile).

A Tier 1 Human Health Risk Assessment was undertaken utilising these results in order to assess risk to both ground workers during construction and future site users based on a commercial/industrial end use.

The assessment concluded that there was a moderate to high risk to ground workers during construction, which could be mitigated through use of PPE and controlled conditions. However it was concluded that there was a low risk to future site users based on a commercial end use which did not necessitate remediation of the site prior to development.

Earth Environment and Geotechnical (EEGSL) Supplementary Site Investigation – March 2020

Following the previous report, EEGSL undertook a second investigation in order to assess the potential levels of contamination within the groundwater at the site and the leachability of identified contaminants within the soils.

The investigation works were undertaken in January 2020 and comprised:

- Advancement of two cable percussive boreholes to a maximum depth of 15 mGL;
- Excavation of seven trial pits to a maximum depth of 3 mbGL;
- Collection of soil samples for subsequent laboratory leachate analysis;
- Installation of groundwater monitoring wells within the two boreholes;
- Completion of one monitoring round including existing and new boreholes across the site to obtain groundwater samples for laboratory analysis.

Ground Conditions

The ground conditions identified were consistent with previous investigation in that varying thicknesses of Made Ground were encountered overlying cohesive Tidal Flat Deposits.

Visible contamination was again identified in Made Ground at the site comprising brick, asphalt, concrete, metal, plastic, rope, glass and cables. Paint cans and engine parts were also identified at one location and groundwater had an oily sheen.

Groundwater ingress was noted in all trial pits at the site and two water bodies have been identified; a shallow perched groundwater body within the Made Ground and a deeper groundwater body at a depth of 13.5 mbGL within natural ground.

Soil Leachate Analysis

10 soil leachate samples were analysed for a number of parameters. The leachate results indicate the concentrations of mobile contamination within the soil rather than the total concentration present. The results are outlined in the table below:

Table 2.12 Baseline Soil Leachate Analysis 2020				
Parameter	Unit	Min	Max	Location of Max
pH	pH Units	8	9.7	TP12 (MG)
Total Cyanide	µg/l	<5	<5	-
Sulphate as SO ₄	mg/l	1	40	CP04 (MG)
Sulphide	mg/l	<0.1	<0.1	-
<i>Metals</i>				
Arsenic	µg/l	<5	7	TP17 (MG)
Barium	µg/l	9	66	TP14 (MG)
Beryllium	µg/l	<3	<3	-
Boron	µg/l	8	365	TP13 (MG)
Cadmium	µg/l	<0.4	<0.4	-
Chromium	µg/l	<5	<5	-
Lead	µg/l	<5	15	TP17 (MG)
Mercury	µg/l	<0.05	0.94	TP13 (MG)
Nickel	µg/l	<5	10	TP17 (MG)
Selenium	µg/l	<5	<5	-
Vanadium	µg/l	<5	32	TP12 (MG)
Zinc	µg/l	<2	17	TP17 (MG)
<i>Polycyclic Aromatic Hydrocarbons</i>				
Naphthalene	µg/l	0.02	127	TP12 (MG)
Acenaphthylene	µg/l	<0.01	0.93	TP13 (MG)
Acenaphthene	µg/l	<0.01	0.9	TP12 (MG)
Fluorene	µg/l	<0.01	0.43	TP12 (MG)
Phenanthrene	µg/l	<0.01	2.1	TP16 (MG)
Anthracene	µg/l	<0.01	0.42	TP16 (MG)
Fluoranthene	µg/l	<0.01	1.54	TP16 (MG)
Pyrene	µg/l	<0.01	1.13	TP16 (MG)
Benzo[a]anthracene	µg/l	<0.01	0.38	TP16 (MG)
Chrysene	µg/l	<0.01	0.33	TP16 (MG)
Benzo[b]fluoranthene	µg/l	<0.01	0.4	TP16 (MG)
Benzo[k]fluoranthene	µg/l	<0.01	0.13	TP16 (MG)

Benzo[a]pyrene	µg/l	<0.01	0.17	TP16 (MG)
Indeno[1,2,3-cd]pyrene	µg/l	<0.01	0.06	TP16 (MG)
Dibenzo[a,h]anthracene	µg/l	<0.01	<0.01	TP16 (MG)
Benzo[g,h,i]perylene	µg/l	<0.01	0.07	TP16 (MG)
Total USEPA-16 PAHs	µg/l	0.15	130	TP12 (MG)
Phenols				
Total (monohydric) Phenols	µg/l	<10	<10	-
Total Petroleum Hydrocarbons				
Total EPH (C10 – C40)	µg/l	<10	705	TP11 (MG)

Elevated levels of leachable PAHs have been identified and deemed a potential risk to both groundwater and surface water bodies in the vicinity of the site.

Groundwater Analysis

11 groundwater samples were analysed for a number of determinands which are summarised in the table below.

Table 2.13 Baseline Groundwater Analysis 2020

Parameter	Unit	Min	Max
pH	pH units	7.4	8.4
Total Cyanide	µg/l	<5	<5
Sulphate as SO ₄	mg/l	15000	119000
Sulphide	mg/l	<0.1	<0.1
Total Organic Carbon	mg/l	17.7	69.3
Metals (Dissolved)			
Arsenic	µg/l	<5	48
Barium	µg/l	69	641
Beryllium	µg/l	<3	<3
Boron	µg/l	844	2630
Cadmium	µg/l	<0.4	<0.4
Chromium	µg/l	<5	<5
Copper	µg/l	<5	<5
Lead	µg/l	<5	<5
Mercury	µg/l	<0.05	3.29
Nickel	µg/l	<5	<5
Selenium	µg/l	<5	<5
Vanadium	µg/l	<5	<5
Zinc	µg/l	<2	9
Polycyclic Aromatic Hydrocarbons			
Naphthalene	µg/l	<0.01	1.19
Acenaphthylene	µg/l	<0.01	<0.01

Acenaphthene	µg/l	<0.01	0.52
Fluorene	µg/l	<0.01	0.2
Phenanthrene	µg/l	<0.01	0.11
Anthracene	µg/l	<0.01	0.02
Fluoranthene	µg/l	<0.01	0.13
Pyrene	µg/l	<0.01	0.1
Benzo[a]anthracene	µg/l	<0.01	<0.01
Chrysene	µg/l	<0.01	<0.01
Benzo[b]fluoranthene	µg/l	<0.01	<0.01
Benzo[k]fluoranthene	µg/l	<0.01	<0.01
Benzo[a]pyrene	µg/l	<0.01	<0.01
Indeno[1,2,3-cd]pyrene	µg/l	<0.01	<0.01
Dibenzo[a,h]anthracene	µg/l	<0.01	<0.01
Benzo[g,h,i]perylene	µg/l	<0.008	<0.08
Total USEPA-16 PAHs	µg/l	<0.01	1.62
Phenols			
Total (monohydric) Phenols	µg/l	<10	<10
Total Petroleum Hydrocarbons			
Total EPH (C10 – C40)	µg/l	16	165
TPH (<C5 – C35)	µg/l	-	<140

Elevated levels of mercury and hydrocarbons have been identified in both the perched shallow groundwater and deeper groundwater within the natural ground at the site. The report concludes that this is likely due to leaching of contaminants within the Made Ground across the site.

It is likely that the deep groundwater at the site is in hydraulic continuity with the rivers in the vicinity of the site (Ebbw, Usk and potentially Severn), therefore these levels of contamination may pose a risk to controlled water. However, due to the distance between the site and these surface water bodies, and the levels of contamination this risk is deemed low – moderate. The docks are considered a man-made feature and are therefore likely to be lined, as such it is not considered that mobilised contaminants in groundwater pose a risk to this particular surface water body.

Development of the site including capping of the Made Ground will minimise rainfall infiltration into soils and mitigate the risk of leachable contaminants becoming mobilised.

2.4 Supporting Information

- Figures detailing the location, boundary and layouts of the Installation are shown in Annex A.
- Groundsure Reports are provided within Annex B.
- Previous Site Investigation Reports are provided in Annex C.
- A Conceptual Model of the site is shown in Annex D.

3. PERMITTED ACTIVITIES

3.1 Proposed Activities Undertaken at the Installation

3.1.1 Description of the New Process

RDF Energy No.1 Limited (the 'Applicant' or the 'Operator') is making a New Bespoke Installation Permit Application for the proposed operation of an energy from waste facility at their site on Alexandra Dock, Newport.

The proposed Installation is located on land off Tom Lewis Road, Associated British Ports, Alexandra Docks, Newport, NP20 2WZ (National Grid Reference: ST 31253 84755).

The proposed development is an energy from waste facility which has been designed to recover energy from the combustion of Refuse Derived Fuel (RDF) feedstocks specifically for the production of electricity. The facility will produce a high temperature flue gas which is then used to raise steam and generate electricity, through steam cycle turbine generation.

The facility is designed to use Refuse Derived Fuel (RDF) feedstocks to produce heat to raise steam in a conventional tube boiler for utilisation in a steam turbine for the production of renewable electricity with a gross electrical output of up to 24MWe.

The Installation has been designed to process approximately 260,000 tonnes of pre-prepared Refuse Derived Fuel (RDF) per annum.

The treatment process will be permitted by Natural Resources Wales (NRW) as a Waste Co-Incineration Activity and will be operated in accordance with the Environmental Permitting Regulations 2018 and Chapter IV of the Industrial Emissions Directive (IED).

The proposed process meets the definition of an Installation as defined by Section 5.1 'Incineration and Co-Incineration of Waste' paragraph A(1)(b) namely:

'The incineration of non-hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 3 tonnes per hour.'

3.1.2 Substances Used at the Installation

Table 3.1: Raw Materials Summary

Material	Nature of storage	Use	Fate
Refuse Derived Fuel	Typically, 260,000 tonnes per annum Delivered on a 'just in time' basis and stored internally	Feedstock for the combustion plant	Thermally converted to ash

Table 3.1: Raw Materials Summary

Material	Nature of storage	Use	Fate
	within fuel storage bunkers or temporarily and periodically externally within wrapped bales		
Diesel	117m ³ tank	Auxiliary burner fuel	100% thermal combustion
Urea	Diluted Urea stored in a 40 m ³ bunded tank	Flue gas treatment	Reacts with flue gas and discharged to atmosphere
Lime	188m ³ silo	Flue gas treatment	Reacts with acid gases and discharged as APC residue from the filter All APC residue will be transferred off site and reprocessed.
Activated Carbon	52 m ³ silo	Flue gas treatment	Discharged from the filters. All APC residue will be transferred off site and reprocessed.
Water Treatment Chemicals	Internal bunded storage tanks (caustic and sulphuric acid) 1.5m ³ each	Used within water treatment system	Discharged to surface water drainage system.

3.1.3 Waste

The main solid by-products produced from the operation of the facility will be:

- Bottom Ash (a mixture of riddling, slag and boiler ash); and
- APC Residue (Air Pollution Control (APC) residues).

Bottom ash comprising riddling and slag from the combustion system will fall to the ash conveyor at the base of the grate where it will be quenched prior to storage within the concrete lined ash bunker. Boiler ash is collected and conveyed to the same common bunker via a humidifier. Bottom ash is then transported offsite for recovery.

APC residue is collected within the hopper at the base of the bag house and conveyed to an enclosed ash silo prior export offsite via enclosed dry powder tanker.

The table below outlines expected annual quantities of waste produced by the installation.

Table 3.2: Waste Summary

Waste	EWC Code	Approx. Quant (tonnes/yr)	Source	R / D Code	Environmental Fate
Bottom Ash	10 01 15	36,800	Combustion Grate	R5 (Off site recycling)	Reused as a re-cycled aggregate
APC Residue	19 01 13* / 19 01 05*	11,200	Baghouse	R5 (Off site recycling)	Exported off site to an appropriate waste disposal facility

3.1.4 Drainage Systems

There will be no direct process emissions to controlled water arising from the Installation.

Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged via an attenuation tank to the docks.

Surface water run-off from other external areas of the site will pass through oil interceptors before discharge via the attenuation tank to the docks. Surface water SuDs features onsite include a rainwater harvesting tank, permeable paving and the attenuation tank (900m³). Surface water will be discharged from the tank at a flow rate of up to 100 l/s via a pump station and new rising main to the dock.

Domestic effluent will be treated at an onsite packaged sewage treatment plant prior to discharge to the dock.

Any effluent arising from the process plant including washdown waters, boiler blowdown etc will be collected in the Sedimentation Basin and treated at the onsite Waste Water Treatment Plant (WWTP) prior to discharge to the docks or removal offsite via tanker. The WWTP incorporates a combination of settlement, pH correction and a bio-disc filter to ensure parameters are in line with the emission limit values which will be set within the permit.

During normal operation it is considered that the external Feedstock Transit Area for bale storage will be empty. As such, surface water run-off will normally be discharged via the attenuation tank to the docks. During periods where bales are stored within the area, drainage will be diverted to the WWTP.

External storage of slag onsite is within a concrete lined bunker. Surface water from this area is recirculated for cooling purposes. Any water not utilised for this purpose is directed to the WWTP.

Above ground drainage shall be designed in accordance with BS EN 12056.

Discharge to the docks is via one discharge point – W1. All emissions to the dock will be in line with NRW requirements.

Hardstanding

The site is located entirely on newly installed good quality concrete hardstanding.

Tanks and Bunds

All storage tanks will be appropriately installed with secondary containment and designed to comply with the Environment Protection Pollution Prevention Guideline Above Ground Oil Storage Tanks: PPG 2.

3.1.5 Potential for Fugitive Releases to Soil, Groundwater and Surface Water

The materials and substances used onsite are not considered to have significant potential to cause ground or groundwater contamination under general storage or operating procedures.

The following measures have been incorporated into the design of the facility to protect groundwater and soil from installation substances;

- All waste reception, processing and the majority of waste storage operations take place internally;
- External storage of waste is limited to well wrapped bales of RDF within a bunded area with segregated sealed drainage;
- Emergency Spill kits will be provided throughout the site and strategically placed in locations;
- All aspects of the facility will be located on impermeable concrete slabs;
- There will be no subsurface infrastructure used for the storage or transfer of hazardous waste; and
- Any effluent is treated at the WWTP prior to discharge.

When constructed and operated in the manner described above the proposed operations will not introduce any sub surface or potentially polluting activities to the site.

Due to the protection measures mentioned above, the risk to soil and groundwater from the development is considered to be LOW as summarised in the Conceptual Site Model below. In the unlikely event that any of the above measures fail, due to all activities being carried out on impermeable hard standing, there would be no impact to soil, groundwater and surface water.

Table 3.3 Conceptual Site Model

Contaminant Source	Contaminants of Concern	Receptor	Exposure Present?	Pathway	Likelihood of Risk
Historical ground contamination from previous site use including railway sidings and refuse tip	Heavy metals, TPH, PAH, inorganics	Construction Workers	Yes – groundworks are anticipated during development of the facility and levels of contaminants in Made Ground have been identified as a risk to human health.		Very Low – Use of control measures during construction work including appropriate PPE will minimise potential exposure.
		Future Site Users	No – entire site will be covered by impermeable concrete hardstanding		Very Low – no exposure route due to covering of Made Ground across site
		Groundwater	Yes – Leaching of contaminants from Made Ground by infiltrating rainfall is possible and leachable contaminants including PAHs identified.		Low - Leaching of contaminants within soils by infiltrating rainfall will be minimal due to presence of hardstanding across site.
		Surface Water	Yes – surface water bodies in the vicinity may be in hydraulic continuity with the underlying groundwater which has been identified to have elevated mercury and hydrocarbon concentrations		Low to Moderate – Hardstanding covers the site, ensuring no contaminants in Made Ground enter surface water run-off and reducing leaching of contaminants in Made Ground into groundwater. The docks are likely lined therefore reducing chance of hydraulic continuity and other surface water bodies are at distance.
Future substances stored, used and generated onsite from use as an energy from waste facility	Heavy metals, TPH, PAH, inorganics	Future Site Users	Yes – Workers at the plant may come into contact with potentially hazardous materials (namely fuels), however internal management systems will be place to mitigate any risks		Low
		Soil & Groundwater	No – All materials onsite shall be stored and processed on hardstanding. Site drainage has the ability to be isolated in the event of any spillages / need to fire water containment.		Low

		Surface Water	Minor – due to the proximity to the docks to the east of the site. However internal operations will prevent infiltration of rainwater into wastes and prevent creation of leachate.	Low – Any discharge to the docks will be following treatment at the onsite WWTP and tested to ensure the effluent meets ELVs as stipulated in the permit so as not to impact the docks. No contaminated run-off / effluent will be discharged to the docks.
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In addition, the site will operate a comprehensive maintenance and management system which is described in Section 2 of the main application document. The environmental management system will be designed to meet the requirements of the Environmental Permitting Regulations and associated pollution prevention guidance.

The management system includes visual inspections of:

- All storage areas, processing areas and hard standing will be physically inspected to detect any signs of deterioration, leaks or spillage. Any corrective action required is reported to and implemented by the Site Manager; and
- Equipment in all process areas as part of the company’s planned/predictive maintenance programme.

Based on this assessment, the potential for the facility to impact on soil and groundwater underlying the installation is considered to be low.

Non-permitted activities undertaken at the Installation	Not applicable
Plan showing activity layout	Refer to Figure A2, Annex A
Environmental Risk Assessment	See attached Main Application Document SOL_22_P087_CO.

ANNEX A: FIGURES

ANNEX B: ENVIRONMENTAL RECORDS

ANNEX C: PREVIOUS SITE INVESTIGATION

ANNEX D: CONCEPTUAL MODEL