Environmental Risk Assessment – FP3630EU

LON1-East Data Centre

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CONTENTS

Page No.

1.0 INTRODUCTION

This Environmental Risk Assessment (ERA) has been prepared by HDR on behalf of the operator Green Mountain DC (UK) Ltd (Green Mountain), in support of the application to vary the existing Environmental Permit (EP), FP3630EU.

This ERA relates to the proposed operation of the combustion plant and the associated fuel storage facilities at the data centre site, known as LON1-East (formerly Romford North), located at:

3 King George Close
Eastern Avenue
Romford
RM7 7PN
Grid reference: TQ 50290 89820.

This ERA aims to identify potentially significant environmental risks associated with the installation's activities, the applicable source pathway receptors, and the control measures in place to help mitigate the identified risks.

This ERA has been produced in accordance with Environment Agency (EA) guidance – "Risk assessments for your environmental permit" [1].

Please refer to the following reports for detailed risk assessments that have been submitted as part of the application for a permit:

- Air Quality assessment
- Noise assessment
- Site condition report / Site Baseline assessment

The requirement to complete a Climate Change Risk Assessment (CCRA) as part of the application for a new bespoke Installation EP was withdrawn in August 2022[2]. As is now required, this will be integrated into the sites management system.

[1] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit
[2] https://www.gov.uk/guidance/adapting-to-climate-change-risk-assessment-for-your-environmental-permit

2.0 METHODOLOGY

2.1 Approach

This ERA has been prepared in accordance with EA guidance. This guidance recommends that the following steps are undertaken in preparing a risk assessment:

1. Identify and consider risks for your site, and the sources of the risks.
2. Identify the receptors (people, animals, property, and anything else that could be affected by the hazard) at risk from your site.
3. Identify the possible pathways from the sources of the risks to the receptors.
4. Assess risks relevant to your specific activity and check they are acceptable and can be screened out.
5. State what you will do to control risks if they are too high.
6. Submit your risk assessment as part of your permit application.

2.2 Risk scoring

This ERA has been completed using the scoring matrix shown in Table 2.1 – Risk Matrix with definitions for each score as follows:

Probability of exposure:

- High – exposure highly likely to occur
- Medium – considered to be likely
- Low – considered to be unlikely
- Very Low – considered to be highly unlikely / very rare event / mitigation in place

Consequence:

- High – potential for significant impact requiring mitigation / remediation
- Medium – potential for moderate impact which may require mitigation / remediation
- Low – negligible impact that may require mitigated
- Very Low – no significant / perceivable impact to receptor

Table 2.1 – Risk Matrix

	Probability of exposure / Likelihood			
Consequence	High	Medium	Low	Very Low
High	High	High	Medium	Low
Medium	High	Medium	Medium	Low
Low	Medium	Medium	Low	Very low
Very low	Low	Low	Very low	Very low

3.0 SITE CONTEXT

This section contains a high-level site summary. Please refer to the Non-technical Summary (NTS) document submitted with the application for a permit for further details.

3.1 Site location

The site is located in Romford, surrounded by residential properties to the East and North and by commercial/industrial properties to the South and West. The River Rom runs to the West of the site. The A12 road is to the South of the site. The specific location is Green Mountain, 3 King George Close, Eastern Avenue, Romford, RM7 7PN, with National Grid Reference TQ 50290 89820.

The surrounding area has supported various industrial and potentially contaminative land uses, including works and warehouses. No sensitive land uses have been identified. Beyond the direct site boundaries, the closest ecological receptor is the Hainault Forest which (LNR and SSSI) which is approximately 4kmto the N/SE/W of the site.

3.2 Site activities

The site has been operating as a data centre (DC) since 2010. Under normal circumstances, electricity to the site is provided by the National Grid. Grid reliability is critical to a DC and as such the site currently has x7no. emergency standby generators (ESGs) and x2no. emergency DRUPs (Diesel rotary uninterruptible power supply devices) engines to provide standby power in the event of an outage / failure in the grid supply. The ESGs and DRUPS are on site solely to support the campus in times of grid failure.

Expansion works in 2023/24 will see 8 no. additional Emergency Standby Generators (ESGs) installed and commissioned, with the first phase of 5 no. likely to commence commissioning in November 2024. All of the ESGs are over 1MWth and are therefore classed as new ‘Medium Combustion Plant ‘(MCP). These ESGs are ’limited hour MCPs’ as they are purely standby plant that will operate less than 500 hours per year and there is no capacity agreement in place. Details of the existing and new MCPs are in the table below with more details found in the Non-technical Summary submitted with the application.

Table 3.1 Summary of MCP details

MCP type	No.	Thermal capacity	Install date
Existing – Diesel generators	7	45.13 MWth	2011/12
Existing – DRUPS	2	9.03 MWth	2010
New – Diesel generators	8	59.21 MWth	Phase 1 -2024 Phase 2 - TBC
Total after expansion	**17**	**113.37 MWth**	

Current plans are for commissioning of the additional ESGs to commence in Summer 2024. The location of the generators, fuel tanks and emissions points (flues / stacks) and surface water connections are shown below. The installation boundary encompasses the listed activities only.

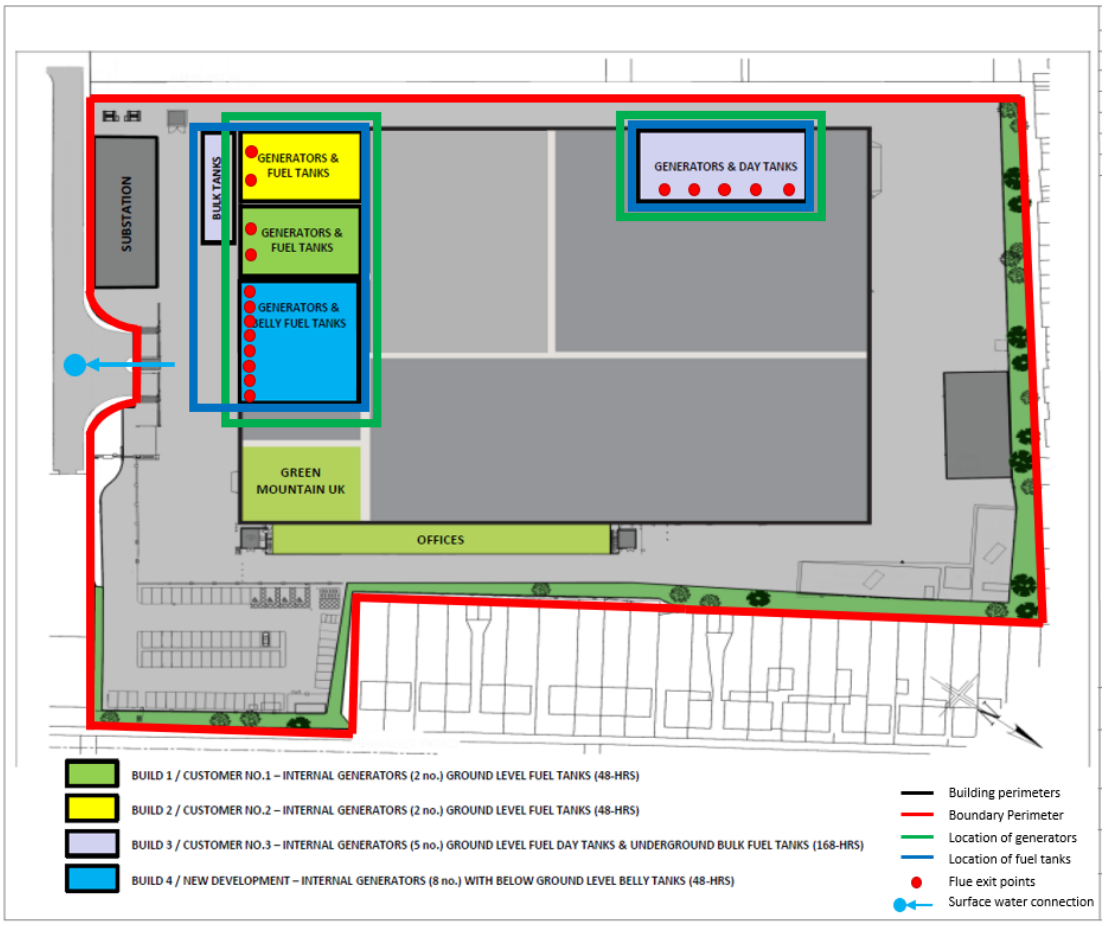

Figure 1 - Site Plan

3.3 Site history

The development site is located on King George Close in the town of Romford in Essex. Historically this site was open land prior to the land being used as a Brick Works by 1920. This was demolished during the 1960s and by 1971 a warehouse was located on site. It has been used for industrial purposes since then.

3.4 Site sensitivity

Please refer to the original baseline Site Condition Report v2.0 for a description of the following:

- Geology
- Hydrogeology
- Hydrology
- Ecology & heritage

3.5 Sensitive receptors

Identified sensitive receptors (human / ecological) that could potentially be affected by the permitted activities are presented in the tables below.

Table 3.2 Human Receptors

Location / description	Approx Distance from site (km)	X grid ref	Y grid ref
Linley Crescent 1	0.1	550148	189892
Linley Crescent 2	0.1	550186	189920
Linley Crescent 3	0.1	550186	189920
Linley Crescent 3	0.2	550095	189867
Linley Crescent 4	0.1	550212	189945
Linley Crescent 5	0.2	550120	189911
Hainault Road 1	0.1	550321	189932
Hainault Road 2	0.1	550381	189844
Hainault Road 2	0.1	550381	189844
Linley Crescent 6	0.2	550030	189868
Hainault Road 3	0.2	550278	189993
Mawney Road 1	0.3	549936	189737
Hainault Road 4	0.1	550365	189915
St Peters Primary School	0.8	551013	189551
The Mawney School	1.0	550735	188927
Poplar Street 1	0.7	550214	189148
Poplar Street 1	0.7	550214	189148
Blandford Close 1	0.9	549547	189297
Cross Road 1	0.7	549605	189943
Orchard Road 1	0.8	549825	190448
Percy Road 1	0.3	550052	189970
Parklands Primary School	0.4	550627	189944
1 Havering Road 1	0.6	550632	190338
Jubilee Close 1	1.3	549885	188593
Parkside Avenue 1	0.9	551079	190149
Mawney Road 2	0.4	549964	189574
Mawney Road 2	0.4	549964	189574
White Hart Lane 1	0.9	549467	190289
Hillfoot Road 1	0.8	550317	190657
Rise Park School	1.2	550949	190793
St Patricks School	1.1	549652	190770

Table 3.3 Ecological Receptors

Site Name	Approx. distance from Site (km)	Designation	X grid ref	Y grid ref
Hainault Forest	4.0	LNR & SSSI	548065	193119
Hainault Forest	4.2	LNR & SSSI	547276	192771
Hainault Forest	4.5	SSSI	548965	194113
Curtismill Green	5.9	SSSI	552932	195064
Curtismill Green	6.3	SSSI	551731	195988
Thorndon Park	10.0	SSSI	560162	191501
Hornchurch Cutting	4.9	SSSI	554564	187454
Ingrebourne Marshes	6.2	LNR & SSSI	553673	184640
Inner Thames Marshes	8.1	LNR & SSSI	552067	181919
Epping Forest	9.4	SSSI	541597	193407
Roding Valley Meadows	8.3	LNR & SSSI	543868	195138

4.0 RISKS IDENTIFIED

Using the guidance and approach outlined in Section 2.0, the following risks have been identified as having potential to cause harm to the environment and / or human receptors:

- Discharges to air, surface, or groundwater
- Global warming potential
- Fugitive Emissions (from uncontrolled sources)
- Odour
- Noise and Vibration
- Visible emissions
- Waste
- Accidents

Section 5.0 presents the risk assessment for each of the above including identification of the potential hazard, receptors, pathway, risk management practices, probability of exposure, consequence of exposure and overall risk.

5.0 ENVIRONMENTAL RISK ASSESSMENT

5.1 Controlled releases to air

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Point source emissions to air- NO_x, CO, SO_2, PM_{10} emissions from generator stacks	Employees, residents, and adjacent premises / pedestrians / road users immediately surrounding the installation. Any future developments within the area are potential receptors.	Airborne	An Air Quality Impact Assessment & Dispersion Model has been completed and submitted in support of this permit application ("Air Quality Assessment"). This report concluded that "Predicted impacts at all human and ecological sensitive receptors for all pollutant concentrations and both annual mean nitrogen and acid deposition rates, with the exception of 1-hour nitrogen dioxide and 24-hour oxides of nitrogen concentrations, associated with normal operation of the site (Scenario 1 & 2) can be considered **not significant**. Based on the predictions and the use of worst-case emissions, it is considered that the overall air quality impacts of the development following the alterations to testing operations would be **not significant**." The ESGs are designed to provide power in the event of grid failure, and during operation are a point source of emissions to air. The National Grid report for 2021-2022 stated the overall reliability of grid supply was 99.999936% for substations above 132kV supplies. This equates to the probability of a 1-minute outage occurring once in 5.8 years and a 1-hour outage occurring once in 346 years. Reliability in 2020-2021 was 99.999966% and 99.999974% in 2019-2020. Flues for the existing no. ESGs terminate vertically at 13.3m from ground level, in line with the apex of the roof, and are unimpeded by cowls/caps. The 8no. new ESGs are set up in units of two, with an adjoining flue stack to dissipate the emissions from each unit. These stacks are unimpeded by flaps or cowls, and the exhaust will exit vertically, approximately 13.3m above the ground and in line with the apex of the roof. A draft Air Quality Management Plan (AQMP) has been submitted with the application and will be finalised once the expansion works are complete and the Data Centre is fully operational. The aim of the AQMP is to seek to reduce AQ impacts during prolonged grid failure events and associated generator operation. The AQMP is based on air dispersion model findings and seeks to determine likely AQ impacts through observations of current weather conditions, time of day, cumulative impacts, and anticipated outage durations. Actions include limiting the operation of the generators as far as possible and notifying sensitive receptors / the EA in the event of a prolonged grid outage.	Low – maintenance and testing Very low – grid failure	Emissions to air can have an adverse impact to human health and ecological receptors in surrounding areas.	Low – maintenance and testing Low – grid failure

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
			Operation of the ESGs is therefore likely to be limited to testing and maintenance. A testing and maintenance schedule is already in place for existing plant, which seeks to minimise the frequency of generator runs and to stagger tests where possible. The intention is for new plant to fall within this same scheduling process. In the event a complaint is raised against the operation of the generators, the complaints procedure should be followed.			

5.2 Accidents

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Accidents relating to fuel storage e.g., Spills, overfilling during refuelling / disposal / transfers, failure in secondary containment, pipe ruptures, valve failure, user error, collision.	Groundwater, surface water, sewer system, soils.	Land/ water	There are 4 no. underground bulk tanks. These feed 5no. day tanks servicing 5no. of the existing diesel generators. In addition to this, there are 2no. existing ground level bulk tanks that feed the remaining 2no. existing diesel generators, and an additional 2no ground level bulk tanks feeding the 2no. existing DRUPS. The 8no. new diesel generators will each have their own dedicated belly tank that will sit below each generator. Tanks are bunded and fitted with bund and overfill alarms. Generator rooms and/or corridors are bunded with spill alarms. The ground level tanks are filled via a local double fill point cabinet. The cabinets are locked when not in use, have a drip tray, instrument mounting panel, 3" filling valve and cap, a BSP valve, and are fitted with an overfill and bund alarm. The underground fuel tanks are filled by via a locked floor cabinet, fitted with instrument mounting panel, 3" filling valve and cap, drip tray, a BSP valve, and hi/low alarms. Each new generator will have its own belly tank. Tanks are to be bunded to BS799 Part 5 Type J 2010 specifications. Fuel detection tapes will be in place around each generator set and along the fuel line zone. Fuel tanks are vented back to the fuel filling points. Tanks are to be filled via x2no. local fill point cabinets installed on the front of the building. The cabinets will be locked when not in use, the contents of which are still in design, but are being designed to comply with relevant regulations. The ground surrounding the ESGs and the fuel storage tanks is to be tarmac / hardstanding. Spill kits are to be located in the vicinity of the generators and also at the fill points. To help reduce the risk of corrosion, all pipework is either painted or constructed of corrosion resistant material. The area surrounding the fuel storage points are tarmac / hardstanding. Fuel deliveries are likely rare events (~0-2 deliveries pa) given the standby nature of the plant means they operate infrequently (~<50hours pa). Existing fuel delivery, emergency preparedness and spill response procedures are to be updated to include additional plant, and are in	Very low – bulk tanks Low – refuelling	Leaks of fuel or other substances associated with Data Centres operations into the surrounding environment can cause adverse impacts to the ground water course as well as adjacent water courses.	Very low – bulk tanks Medium – refuelling

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
			place to minimise the risk of accidents during refuelling. Fuel suppliers are to adhere to applicable procedures when attending site. Deliveries are to be carried out by competent individual(s) and supervised by site staff. As per the drainage plan, a petrol interceptor is in place to act as tertiary containment for only the area surrounding the substation and the existing sub surface fuel bulk tanks. This is fitted with an automatic sensor / shut off valve that will close upon detecting the presence of spilt fuel. The tank will be emptied periodically or in the event of a spillage with contaminated liquids disposed of appropriately as hazardous waste. The site already has incident emergency and preventative maintenance procedures in place, which will be extended to include the new plant. Hazardous waste is disposed of by a licenced carrier with duty of care information retained as evidence following uplift.			
Flooding of drainage network and generators.	Groundwater, surface water, sewer system	Floodwater, surface waters, drainage system etc	The site is located within a Flood Zone 1 which is defined as which is deemed to have less than a 1 in 1000 (0.1%) chance of river flooding in any one year. The site is also assessed as having a 1 in 1000 (0.1%) chance of surface water flooding, predicted to be less than 300mm. Routine maintenance of the onsite drainage system will help prevent surface water drains from being obstructed by debris. Emergency procedures are to be developed and enacted in the event of flooding.	Very low	Flooding / water damage to the generators could impact resiliency for operations.	Very low

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Fire	Emissions to Air / Water	Air & Water	The premises is provided with a Fire Alarm System in accordance with BS 5839 Pt 1 2002 to L1 Level of protection and related Codes of Practice and Local Authority requirements, with the Data Halls installation in accordance with BS6266. Phase III DRUPS – Water mist system provided to A&B engine rooms / fuel storge rooms. Phase IV Generators - Water mist system provided to A&B engine rooms / fuel storge rooms. Phase V Generators - Water mist system provided to each of the generator rooms (5 no). The New generator arrangement remains under design. The preferred fire suppression system is water mist (but remains under design).	Very low	Fire damage to generators could impact resiliency for operations. Fire would also cause emissions to air, having an adverse impact to local environment and receptors. Firewater could infiltrate local water courses, adversely impacting the local environment.	Very low
Vandalism	Land / Surface Water / Ground Water / Air	Drainage systems, air, surface	The site is manned 365 days a year with monitoring by security staff from a security office using a CCTV system. Entry and exit to the site is tightly controlled via a security gate and turnstiles. Fencing around the perimeter prevents unauthorised access to the Data Centre.	Very low	Damage arising from vandalism to the generators / storage tanks could impact emergency back-up potential and/or lead to fugitive emissions	Very low

5.3 Odour

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Odour from storage and combustion of fuel	Employees & residents	Airborne	Fuel is stored in belly tanks for the x8no. new ESGs, in ground level fuel tanks for x2no. ESGs and x2no. DRUPs, and in ground level day fuel tanks fed by underground bulk fuel tanks for the remaining x5no. ESGS. Emissions are not significant, and an odour Management Plan is not required. The complaints procedure should be followed in the event the site receives an odour complaint relating to the permitted activities.	Very low	Nuisance to on site staff and local human receptors. Could lead to complaints.	Very low

5.4 Noise and Vibration

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Noise and Vibration from start-up and operation of generators	Employees, residents, and adjacent premises / pedestrians / road users immediately surrounding the installation.	Air	A noise impact assessment has been completed as part of the planning application and this has been submitted as part of the application to vary the existing environmental permit ('Noise Impact Assessment v1'). The conclusion of this risk assessment are as follows: "*The proposed plant and building design are predicted to produce noise levels of 10 dB below the existing background noise levels at the nearby receptors, during normal operation, with the proposed mitigation. During emergency operation, when the generators operate, the noise levels are predicted to be no more than the existing background levels*". As a result, noise impacts are not anticipated to be a significant risk. Please refer to this report for further details. Significant noise breakout is not expected as the ESGs operate infrequently as they are emergency standby plant designed to provide power in the event of grid failure. This is a highly rare event given grid reliability. As such, annual operation is likely to be limited to testing and maintenance as referenced above. Generators are to be maintained in accordance with manufacturer guidelines as part of a planned preventative maintenance (PPM) regime. The complaints procedure should be followed in the event the site receives a noise complaint relating to the generators.	Low – maintenance and testing Very low – grid failure	Complaints from local residences. Potential harm to human health due to elevated noise levels.	Low – maintenance and testing low – grid failure
Noise from site traffic e.g., fuel deliveries	Employees, residents, and adjacent premises / pedestrians / road users immediately surrounding the installation.	Air	Residential dwellings are along the Northern and Eastern perimeter of the site. x2no. ESGs and x2no. DRUPs are in the Northwest corner of the building, whilst the remaining x5no. ESGs and x8no. new ESGs are located on the Southern length of the building. All generators are emergency standby plant operated infrequently as discussed above. As such fuel consumption is low meaning fuel deliveries are infrequent. The Data Centre may have no deliveries in a year therefore noise from associated traffic is not expected to be significant.	Low	Complaints from local receptors. Potential harm to human health due to elevated noise levels.	Very low

5.5 Fugitive Emissions (from uncontrolled sources)

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Fuel spills during refuelling / leaks / accidents e.g., damaged tanks / pipework.	Groundwater, surface water, sewer system, soils.	Surface run off / surface waters via drainage or vertical leaching.	There is an interceptor which separates fuel from surface water and is levelled out due to the density of each liquid. As part of the Ultimate Fuel Management Solution, this is emptied and inspected periodically. Any waste is collected by a Vac Tanker and disposed of at a Waste Licensed Facility. In the event of a fuel spillage within the generator rooms, the fuel will naturally fall to one side of the fully bunded and tanked pit into a linear gully, from which a temporary pump will be lowered into the gully and fuel pumped into an external tank for site removal.	Very low – bulk tanks Low – refuelling	Pollution and / or harm to environmental and / or human health	Very low – bulk tanks low – refuelling
VOCs / fumes from storage / delivery of fuel	Industrial, commercial, and residential receptors	Air	Fuel tanks are containerised in sealed, bunded belly tanks with fuel volume and leak detection alarms in place, which will minimise the likelihood of release to the environment. Fuel detection tapes will be in place around each generator set and along the fuel line zone. Fuel tanks are vented back to the fuel filling points. Refuelling activities are carried out by approved suppliers with trained competent individuals that operate in accordance with the sites refuelling procedures which will be developed as part of the sites Environmental Management System (EMS). Deliveries are rare, and best practices are adhered to in order to limit durations which fumes could escape into the environment.	Very low	Emissions to air have an adverse impact to human health and ecological receptors in surrounding areas.	Very low

5.6 Visible emissions

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Visible Emissions from generator stacks	Industrial, commercial, and residential receptors	Visual	Smoke may be visible during the first 10-15s of generator operation. After this time visible plumes are not anticipated due to high due to exhaust temperatures (approx. 450°C). In the unlikely event that visible emissions after still present, these are to be investigated as part of the sites PPM regime. Plumes may not be visible due to line of sight, weather conditions, and the timing of generator operation (e.g. nighttime / during working hours). They may also be infrequent therefore are not considered to be likely / significant. The complaints procedure should be followed in the event the site receives complaints relating to the visible emissions from the generators.	Low	Potential visual impacts, particularly during generator start-ups.	Very low

5.7 Global warming potential

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Global Warming Potential from combustion of fuel by generators	Global population	Airborne	The generators are emergency standby plant designed to provide power in the event of grid failure. This is a highly rare event given grid reliability (See BAT Assessment submitted with application for a permit). As such, annual operation and fuel consumption is likely to be limited to testing and maintenance as referenced above. This level of operation is not considered to provide a significant global warming impact.	Very low	Contribute to climate change, due to increase in greenhouse. gases present in the atmosphere.	Very low

5.8 Waste

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Waste associated with generators e.g., waste fuels, oil sorbents and rags, lubricants & hydraulic fuels, solid wastes (air filters, packaging, and spare parts) and end of life plant.	Ground, soil, ground water, surface water, sewer system.	Land/ water	Small quantities of wastes are generated from routine generator maintenance activities or in the event of a spillage/leakage. This is low given the standby nature of the generators and procedures in place to reduce the risk of spills and leaks spillage/leaks. Procedures for licenced and responsible collection of waste oils and other hazardous wastes are in place. This includes the retention of relevant Duty of Care information. Contractors are responsible for waste disposal that arises during maintenance activities.	Very low	Potential to contaminate water/ land.	Very low

6.0 CONCLUSION

This ERA has identified and assessed the potential risks and hazards associated with the operation of the facility and from accidents.

Various measures have been taken to help reduce to mitigate against these as far as reasonably practicable and to a level considered to be acceptable for a Data Centre of this size, nature, and location.