ARUP

Virtus Holdco Ltd

London 14 Data Centre, Prologis Park Heathrow, Hayes

Environmental Risk Assessment - Environmental Permit Application

Reference: 294760-EP-ERA

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Contents

Tables

Figures

1. Introduction

Ove Arup & Partners Ltd (Arup) has been commissioned by VIRTUS (henceforth referred to as 'the Operator') to prepare an Environmental Risk Assessment (ERA) to accompany a bespoke application for an Environmental Permit for the London 14, or LON14 data centre.

The application is made by VIRTUS Holdco Limited which is the legal entity that will be responsible for operating the generating installation.

The Site comprises the redevelopment of the current DC6 commercial warehouse building to house a new data centre, complete with new utilities gantry, office and other ancillary spaces and will house 16 containerised generators stand-by backup generators (SBG) for emergency back-up purposes, with a combined thermal input capacity of 110 MWth.

The data centre is located at DC6, Unit D, Plot C, Prologis Park Heathrow, Stockley Road, Hayes in the London Borough of Hillingdon.

The purpose of the ERA is to identify any potential significant risks to the environment that may be associated with the proposed operations at the data centre and demonstrate that the associated risks will be acceptable once the proposed mitigation and management are accounted for.

Note, the methodology for the climate change assessment has been based on the Environment Agency's (EA) now withdrawn guidance on climate change adaptation for Environmental Permits, in the absence of further reference material.

2. Assessment Approach

Risk assessments are an effective tool for identifying potentially hazardous or polluting consequences of activities and providing mitigation systems that reduce the risk of those activities causing pollution.

The assessment aim is to reduce the potential risk of emissions from the facility or the impact of the emissions on the environment, through specific mitigation measures identified for each specific risk.

The assessment has been completed in accordance with the EA Technical Guidance 'Risk Assessments for you Environmental Permit' dated August 2022, using the following approach:

- Identify and consider risks for your site, and the sources of risks;
- Identify potential receptors which could be affected;
- Identify pathways from the sources of risks to the receptors;
- State any risk control measures; and
- Assess risks relevant to the activities and whether the can be screened out or need further detailed assessment.

2.1 Identifying Risks

The risk assessment approach is based on the potential frequency or probability of the event occurring and the resulting consequence or potential effect of the event on the environment.

These potential risks however are considered following the implementation of effective controls or mitigation to limit the potential for emissions and/or impacts. Once all of these factors are considered, the overall risk is the residual risk of any impact from the emission, following the mitigation.

As a result, assessment of the following aspects is required, where applicable:

- Risks to surface water from hazardous pollutants;
- Risks to surface water from sanitary and other pollutants;
- Risks to groundwater;
- Noise and Vibration;
- Odour;
- Accidents and fugitive emissions
- Global Warming Impact; and
- Installations must also decide how to treat, recycle or dispose of waste.

3. The Site

3.1 Overview

The Site is situated in the Prologis Park Heathrow, located in a light industrial and commercial area in Hayes with the location shown in Figure 1.

The northern boundary of the site consists of the Reading to London Paddington train line / Elizabeth line, with commercial / light industrial units beyond. To the west lies the London Heathrow Airport line link and another commercial building in the Business Park. Residential properties are located immediately to the east and south, approximately 15m from the site boundary. The A408 Stockley Road is located to the west, with the M4 located 1km to the south.

The site was historically agricultural land until the Second World War when the site was developed as a Royal Ordnance Factory for the production of armaments. In the 1950's the site was taken over by the Public Records Office and used by various government departments (including the Ministry of Defence) for the archiving of documentation. In the early 2000's the site was redeveloped for mixed commercial / industrial use and formed the Prologis Park development.

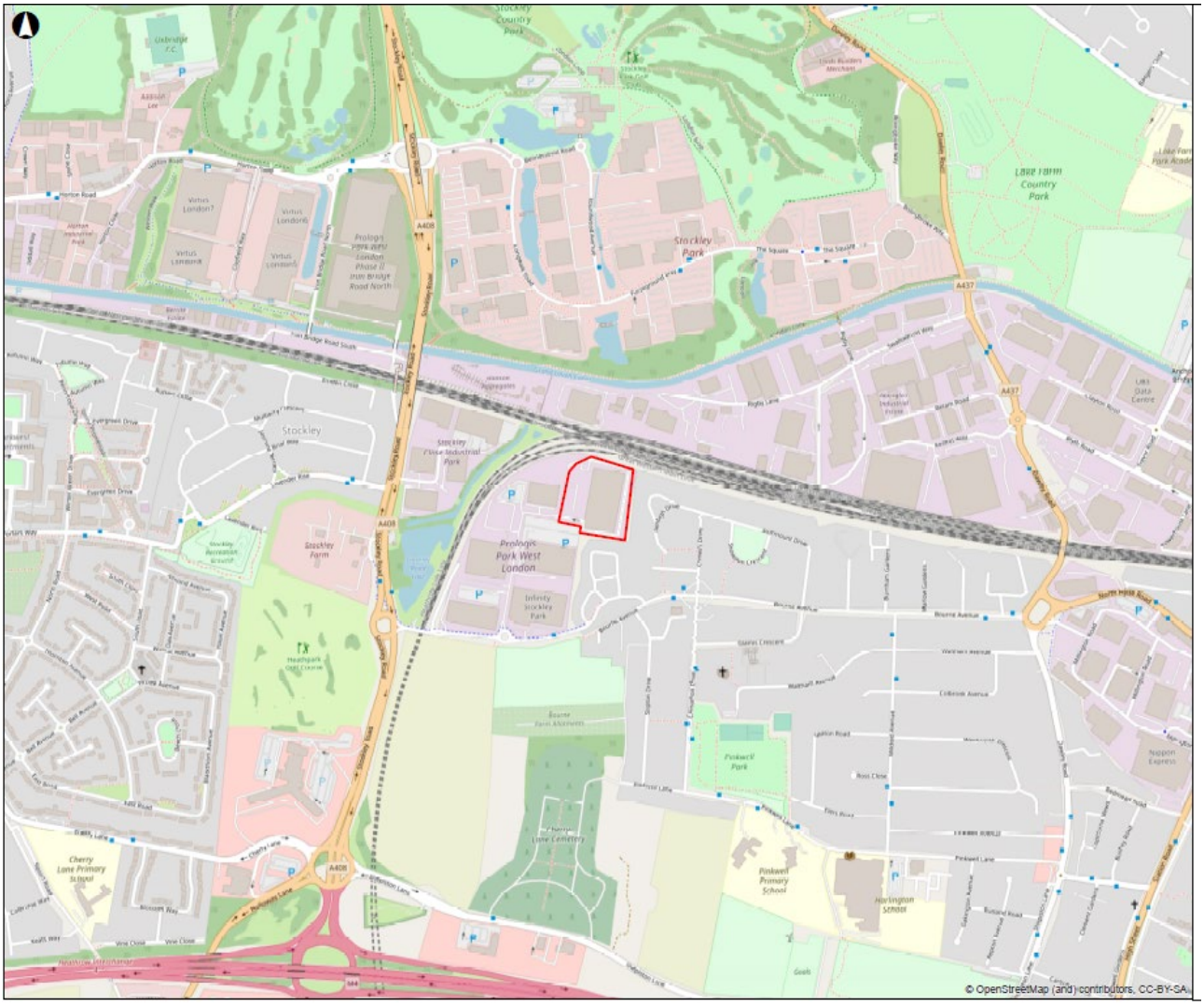

Figure 1: Site location

3.2 Geology, Hydrogeology and Hydrology

This section summaries the overall findings, however full details can be found in the Site Condition Report (SCR)[1] provided with the EP application.

Geology

The British Geological Survey (BGS) mapping the geological succession at the site is as indicated in the table below. BGS Sheet 269 indicates that the site is underlain by Langley Silt (a sandy clay and silt) over Lynch Hill Gravel (fourth terrace of River Thames). These superficial deposits overly London Clay.

Ground investigations at the site have identified limited deposits of made ground overlying a natural sequence of Langley Silt, Lynch Hill Gravel and London Clay. Made ground in the southeast of the VIRTUS site area included infill to a former pond, which is understood to have been remediated and is no longer present.

Table 1 Summary of geology from BGS and previous GI

Strata	Location	Short description (based on BGS map)	Remarks based on data from GIs	Recorded depth and thickness (m)
Made Ground (general)	Not shown on BGS map. Encountered in majority of GI points	n/a	Soft sandy clay and loose sandy gravel with fragments of brick, cement, concrete, ceramic and metal [1]	Relatively limited deposits, average of 0.6m thick [1]
Made Ground (former backfilled pond)	Formerly in southeast of Virtus site area – removed during remediation in 2006	n/a	Fill materials comprising brick, wood, metal, asbestos sheeting, cables, breeze block, plastics, glass and concrete [1]	1.5m [1]
Langley Silt	Shown by BGS maps across entirety of site	Aeolian sand and silt, possibly redeposited from water [2]	Locally absent in GI points. Soft to firm friable orange brown sandy silty clay with gravel [1]	Where present in boreholes, average thickness of 0.9m [1]
Lynch Hill Gravel	Not shown at surface within the Virtus site boundary on BGS mapping, but understood to underlie the Langley Silt across the whole site	Fluvial sand and gravel, forming beds and lenses. Locally with lenses of silt, clay or peat [3]	Medium dense to dense orange brown gravelly sand [1]	Variable thickness. Average of 2.5m [1]
London Clay	Shown by BGS maps across entirety of site	Silty clay or clayey silt [4]	Firm to stiff grey mottled brown gravelly clay [1]	Within Virtus site area, London clay was encountered in historic boreholes at 7.5mbGL in the north of the site, 3.5mbGL in the southwest of site, and 2.4mbGL to 3.7mbGL in the southeast of site

A series of ground investigations have been undertaken within the wider Prologis Park site; with exploratory holes which are within or in very close proximity to the boundary of VIRTUS London 14 site.

[1] Site Condition Report – Environmental Permit Application (2023) (Document ref 294760-EP-SCR)

Hydrogeology

Within the VIRTUS London 14 site, groundwater was struck by WSP during the drilling at depths ranging from 1.75m to 3.70m below ground, typically within the Lynch Hill Gravels or in one case at the boundary, between the Lynch Hill Gravels and London Clay.

Subsequent post-fieldwork monitoring undertaken by WSP in 2003 encountered water levels within the borehole standpipes closest to the Environmental Permitting Boundary ranging from 1.53m to 1.86m below ground. The WSP Land Quality report states groundwater is considered to generally flow to the south.

Statutory and non-statutory designation information pertaining to groundwater has been reviewed on DEFRA's MagicMap:

- Bedrock (London Clay) at the site is classed as a non-aquifer.
- Superficial deposits at the site are classed as a non-aquifer.
- Groundwater vulnerability mapping shows the site as Unproductive strata.
- The site is not within a Drinking Water Safeguard Zone for groundwater.
- The site is not located within any Source Protection Zones (SPZ).
- The site is not located within a Nitrate Vulnerable Zone.

In consideration of the above, the site setting can be considered to be of low sensitivity with regards to groundwater, due to the presence of unproductive strata and absence of abstractions or protection zones affecting the site.

WSPs previous reporting from 2013 states that the Lynch Hill Gravels comprised a Principal Aquifer, however review of current aquifer mapping in 2023 suggests that this aquifer classification does not apply as superficial strata are now classed as a non-aquifer.

Hydrology

The (EA) Flood Map[2] indicates that the site is located within Flood Zone 1. This means that the annual probability of flooding from a river or the sea is less than 1 in 1000, i.e. there is less than 0.1% annual probability that the site will suffer from river or sea flooding in a given year.

Regarding groundwater flooding risk, the London Borough of Hillingdon Strategic Flood Risk Assessment (SFRA) highlights two artificial waterbodies within the vicinity of the site, namely the Grand Union Canal to the north and a lake to the west.

The SFRA does not identify the site as being at risk from groundwater flooding and does not note any historical flooding occurring within the site. Taking account of all sources, the site is concluded to be at low risk of flooding.

3.3 Ecology and Cultural Heritage

Following the pre-application screening information, the EA provided a Nature and Heritage Conservation Screening Report which sets out the conservation sites which should be considered in the EP Application.

Please see drawing titled 294760-EP-DR004 Cultural and Natural Heritage[3] for further details. The Screening report is also provided in Appendix 05-01 to the Application.

[2] Environment Agency. Flood Map for Planning. Available at: https://flood-map-for-planning.service.gov.uk/ [Accessed August 2023]

[3] Cultural and Natural Heritage (294760-EP-DR004-Cultural and Natural Heritage).

Ecology

There is one Special Protection Area (SPA) within 10km, known as South West London Waterbodies. There are also multiple non-statutory designated Local Wildlife Sites (LWS) within 2 km of the site. Further details can be found in Table 2.

Cultural Heritage

There is one Grade II Listed Building within 1km of the Site, namely the War Memorial at Cherry Lane Cemetery at TQ07947869, approximately 800m to the south. The Data Centre is not considered to have the potential to adversely affect this.

No Grade II* or Grade I Listed Buildings were identified within 1km of the Site.

There are no scheduled monuments located within 2km of the Site.

There are World Heritage Sites located within 5km of the Site.

3.4 Sensitive Receptors

A summary of the sensitive receptors with the potential to be affected by the data centre at set out in Table 2.

Table 2 Sensitive Receptors

Receptor Name	Receptor Type	Direction	Approximate Distance at Closest Point (m)
Local receptors within 500m (see drawing Site Layout and Emission Points[4])			
Residential Properties	Residential	East and South	15
Ecological and Cultural Heritage Receptors (see drawing Cultural and Natural Heritage[3])			
South West London Waterbodies	Special Protection Area	South-west	6,000
London's Canals	Local Wildlife Sites	North	185
Stockley Business Park Lakes & Meadows	Local Wildlife Sites	North	225
Bolingbroke Way Sunken Pasture	Local Wildlife Sites	North-east	950
Cranford Lane Gravel Workings	Local Wildlife Sites	South-east	2000
Iron Bridge Road Railsides (formerly The Piggeries)	Local Wildlife Sites	West	550
Stockley Park Country Park	Local Wildlife Sites	North-west	930
Stockley Road Rough	Local Wildlife Sites	West	350
Cranford Countryside Park and Open Space	Local Wildlife Sites	South-east	2000
Wall Garden Farm Sand Heaps	Local Wildlife Sites	South	1300
Lake Farm Country Park	Local Wildlife Sites	North-east	1000
Carp Ponds and Broads Dock	Local Wildlife Sites	West	230

[4] Site Layout and Emission Points (294760-EP-DR002a-Site Layout and Air Emissions Points).

4. Environmental Risk Assessment

4.1 Overview

The following tables in this section assess the potential risk to receptors from the following hazards, taking into account the measures proposed to reduce those risks.

The method relies on a scoring system that is based on the frequency or probability of the event occurring and the resulting consequences or potential effect of the event on the environment (see Figure 2).

Controls or mitigation are also identified in the assessment, which consist of measures or actions that can be carried out to limit the potential for impacts.

The probability of exposure is the likelihood of the receptors being exposed to the hazard, and is defined as low, medium, or high. These terms are qualified as follows:

- Low: exposure is unlikely, barriers in place to mitigate against exposure;
- Medium: exposure is fairly probable, barriers to exposure less controllable; and
- High: exposure is probable, direct exposure likely with few barriers.

The aim is to reduce the risk of fugitive emissions from the facility or the impact of the emissions on the environment, through specific mitigation measures identified for each specific risk.

Control and mitigation measures have been identified for all risks identified in the assessment, based on the Best Available Techniques (BAT) measures set out int eh guidelines and on operational experience. These measures specific to each risk are described in the assessment. The mitigation measures will be incorporated into the site management processes and site operative will be made aware of the measures during training.

More general mitigation measures to avoid emissions, in line with indicative BAT standards, are also set out in the relevant sections of the Summary Technical Report (Document Reference 2947600-EP-STR).

Consequence	Exposure probability		
	Low	Medium	High
Low	Low Risk	Low Risk	Medium Risk
Medium	Low Risk	Medium Risk	High Risk
High	Medium Risk	High Risk	High Risk

Figure 2 Risk Assessment Matrix

4.2 Primary risks

The primary risks to the environment as a result of the Installation are considered to be from emissions to air as a result of the diesel-fuelled SBG use, together with the potential for leaks from the associated fuel tanks and delivery systems affecting water and land. These items are set out in the tables below in Section 1.

Other potential environmental risks are also covered including Noise and Vibration, Odour, Accidents and fugitive emissions and Global Warming Impact.

4.3 Emissions to water

There are no point source emissions to and from the SBGs or associated fuel storage.

4.4 Waste generation

There will be no industrial waste generated on-site and therefore it is not discussed any further in this risk assessment.

Minimal solid waste generation is anticipated on site. In general staff will only be required on site during testing and routine inspections. All staff will be trained in waste management procedures by their supervisors.

All wastes produced during maintenance tasks will be immediately removed by vendors (specialist contractors) from the installation following completion of the relevant maintenance task.

4.5 Risk Assessment Tables

The following section contains the assessment tables following the EA's risk assessment approach for potential factors which could cause environmental impact.

Table 3 Emissions to air

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Emissions from generator stacks during routine maintenance / testing; emergency outage	Receptors identified in drawings Environmental Site Settings [5].	Air	No significant impacts are predicted at any human or ecological receptor during testing or emergency scenario. This is due to the SBGs meeting BAT for NOx emissions, having further SCR emissions abatement, an optimized stack design increase dilution of SBG emissions, limited operational hours and regular maintenance	Low.	Low adverse impact on human health and ecological receptors in surrounding area	Low
Visible generator emissions during start-up	Receptors identified in drawings Environmental Site Settings.	Air	Plant will be maintained in line with manufacturer's recommendations. This includes checking for deterioration of plant conditions. Repairs will be undertaken as appropriate to rectify any identified defects. The operator will implement visual checks for visible emissions from the generators during start up. Visible plumes are not anticipated to occur for the majority of operational time due to the diesel being combusted and resulting high exhaust gas temperatures. The engines will not be in operation for the majority of the time and therefore there would be zero visible plume during this time. Any visible plumes observed during normal operation will be reported and investigated.	Low due to limited operational hours and regular maintenance.	Low adverse impact on human health receptors in surrounding area	Low

[5] See Chapter 7 Drawings - 294760-EP-DR004-Cultural and Natural Heritage.pdf

Table 4 Fugitive emissions

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
To air						
Vapour release through leakages from fuel tanks and pipes during fuel delivery	On-site staff. Off-site receptors identified in drawings Environmental Site Settings and Cultural and Natural Heritage**Error! Bookmark not defined.**.	Air	All tanks, pipes and valves are designed to appropriate industry standards and flanged connections between pipes are kept to a minimum by the proximity of the tanker fill point. All tanks, silos, pipes and valves have a preventative maintenance programme to ensure ongoing integrity and effectiveness. Fuel tank filing will be carried out by trained fuel tanker drivers. This removes any significant risk of vapour release and spillages during deliveries. The diesel tanks will be fitted with vents however these terminate within the generator enclosures will only allow minimal potential for fumes to escape. Lubricating oil is present within the generators but this will be within a closed loop system with no emissions.	Low due to design and on-site management processes.	Low adverse impact on human health and ecological receptors in surrounding area	Low
Dust generating activities or dusty materials	Off-site receptors identified in drawings Environmental Site Settings and Cultural and Natural Heritage.	Air	There are no significant dust-generating activities or dusty materials used or stored within the installation. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Low due to design and on-site management processes.	Low adverse impact on human health and ecological receptors in surrounding area	Low
To water and land						
Spillage of waste, fuels or other materials	Water / Land	Surface water / ground water	The generator belly tanks are enclosed, integrally bunded to 110% above ground and fitted with telemetry which allows instant accurate assessment of the filling level. All tanks will be fitted with leak detection and high-level alarms to avoid overfilling.	Low due to design and on-site management processes.	Medium adverse impact on ground / water courses	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
			All tanks, pipes and valves are designed to appropriate industry standards and flanged connections between pipes are kept to a minimum by the proximity of the tanker fill point. Fuel tank filing will be carried out by trained fuel tanker drivers. This removes any significant risk of spillages and leaks. The operator will carry out daily checks for signs of leakage. All fuel storage/refuelling and car park hardstanding have a site drainage system passes through one of two oil interceptors with automatic close upon detection of oil. High standards of housekeeping will be maintained across the site. Trained personnel will ensure that any spills are cleaned as soon as practicable with the correct safety measures being taken. Spill kits will be available to deal with any leaks. Relevant spill response equipment will be situated at various locations around the site, designed for the particular hazard characteristics of the materials (fuel) present. All spillages will be logged, investigated and corrective action will be taken.			
Leaks from tanks, containers or pipework	Water / Land	Surface water / ground water	The generator belly tanks are enclosed, integrally bunded to 110% above ground and fitted with telemetry which allows instant accurate assessment of the filling level. All tanks, pipes and valves are designed to appropriate industry standards and flanged connections between pipes are kept to a minimum by the proximity of the tanker fill points. Fuel tank filing will be carried out by trained fuel tanker drivers. This removes any significant risk of spillages and leaks. The operator will carry out daily checks for signs of leakage. Spill kits will be available to deal with any leaks.	Low due to design and on-site management processes.	Medium adverse impact on ground / water courses	Low

Table 5 Nuisance

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
To water and land						
Mud/litter carried onto highway	Water Land	Public	All internal roads, storage and processing areas will be hard-surfaced with concrete or tarmac and swept when required.	Low due to design and on-site management processes.	Low adverse impact on ground / water courses	Low
Pest, vermin and scavengers	Land	Staff Public	Waste that is likely to attract pests, vermin and scavengers will be transferred to the main waste handling area. The facility will contract a local specialised company to implement a pest control management plan. This will include vermin, flies and birds.	Low due to design and on-site management processes.	Low adverse impact on ground / water courses	Low
Waste generation	Land	Staff Public	Minimal solid waste generation is anticipated on site. In general staff will only be required on site during testing and routine inspections. All staff will be trained in waste management procedures by their supervisors. All wastes produced during maintenance tasks will be immediately removed by vendors (specialist contractors) from the installation following completion of the relevant maintenance task.	Low due to design and on-site management processes.	Low adverse impact on ground / water courses	Low

Table 6 Noise

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Noise from operation of generators during routine maintenance / testing; emergency outage	On-site staff. Off-site receptors identified in drawings Environmental Site Settings and Cultural	Air	During the monthly testing (Scenario1) the predicted SBG noise would not exceed the noise emission limits during the day-time periods at the nearest sensitive receptors. Routine testing and maintenance would only occur during day-time hours. During the Scenario 2 (annual test), an exceedance of the day-time periods is predicted at residential properties on Nine Acres Close, with a predicted level of 47LAeq,T above a design level of 44 LAeq,T. Given the annual test is only planned to occur for two	Low due to design mitigation, limited operational hours and regular maintenance.	Statutory nuisance - medium	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
	and Natural Heritage.		hours per year, this exceedance is not considered to be significant. All other modelled receptors are predicted to be below the relevant design level criteria. During a full emergency scenario, the SBG noise levels are predicted to exceed the day-time limits at nearby sensitive receptors, however the likelihood of this occurring is considered to be low based on the network reliability and in-built design resilience.			
Noise from vehicles delivering fuel	On-site staff. Off-site receptors identified in drawings Environmental Site Settings[5] and Cultural and Natural Heritage.	Air	HGV reversing will be minimized where possible. Fuel deliveries will be in daytime working hours to minimize potential disturbances out of hours. Engines will be switched off when not in use. Personnel responsible for the generator installation will be part of the staffing of the wider data storage installation site therefore there will be no additional staff vehicle movements over and above those employed within the adjacent data centre. Additional vehicle movements will be associated with planned maintenance and deliveries which will take place during normal working hours. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Low due to on-site management processes.	Statutory nuisance - low	Low
Vibration from the installation	On-site staff. Off-site receptors identified in drawings Environmental Site Settings[5] and Cultural and Natural Heritage.	Ground	Significant vibration effects are not anticipated for the installation. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Low due to design mitigation, limited operational hours and regular maintenance.	Statutory nuisance - low	Low

Table 7 Odour

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Odour from loading and storage of fuel	On-site staff. Off-site receptors identified in Environmental Site Settings and Cultural and Natural Heritage**Error! Bookmark not defined.**.	Air	Fuel tank filing will be carried out by trained fuel tanker drivers in-line with VIRTUS' Business Partner Fuel Policy. Staff training will include raising employee awareness with respect to normal plant operational odour levels and actions to be taken to rectify any faults.	Low due to on-site management processes.	Statutory nuisance – low	Low
Odour release from combustion plant	On-site staff. Off-site receptors identified in Environmental Site Settings[5] and Cultural and Natural Heritage**Error! Bookmark not defined.**.	Air	Regular maintenance of the generators will reduce the level of emissions from the combustion process.	Low due to on-site management processes.	Statutory nuisance - low	Low

Table 8 Accidental releases

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Fuel delivery						
Major vehicle accident – leading to a significant loss of fuel	On-site staff. Off-site receptors identified in Environmental	Air Ground Water	VIRTUS has a comprehensive Business Partner Fuel Policy. It includes the following requirements: - To cover all drains within a 20-meter radius of delivery & filling activities using neoprene drain covers. - To have sufficient, unused spill kits readily available for	Low due to on-site management processes.	Medium adverse impact on air / ground / water courses	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
	Site Settings and Cultural and Natural Heritage.		filling delivery & filling activities - To have the T-Key ready for use to activate the manual penstocks in the event of a spillage. - Delivery & filling activities to be attended by both a member of VIRTUS technical staff and a member of the Facilities Management (FM) Team. For re-fueling, the fuel tanker will be parked on an area of treated slab that slopes towards drains which are connected to an oil separator, before discharge to ground. The oil interceptor has been sized to accommodate one compartment of a fuel tanker i.e. capable of retaining the full loss of contents of one road tanker. The Pollution (Oil Spill) Procedure also sets out the four steps to follow upon identifying any spill, namely around: - - Containing a spill - Cleaning a spill - Waste disposal - Drainage system check/clean. The FM Team shall also inform both VIRTUS and site security that fuel delivery is to take place. Where necessary the local area will be appropriately cordoned off using barriers and cones. Delivery of fuel will not be carried out until any remedial actions are conducted. The FM Team must ensure that all combustible materials, flammables and naked lights and mobile phones are removed or switched off within the fuel delivery area and immediate vicinity. The FM Team are also to obtain delivery receipts/reports indicating the exact amount of fuel delivered to individual fuel storage tanks. An Emergency Operating Procedure (EOP) exists in the event of a spillage or leakage of fuel (EOP (M) 013 – Diesel Fuel Spill), which triggers the Pollution Incident Response Plan if required. Virtus operate a Nine Point Fuel / Chemical Spill Procedure which assesses the severity of the spill and associated risks, and initiates the appropriate response in terms of alarms, actions, notifications and records. Re-fueling will occur with a direct connection to the containerised			

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
			generator package. The fill point cabinet will house the 2" delivery connection, a drip tray, a CTS alarm unit (audible tank bund, low & high conditions at 25% and 95% fuel capacity, respectively) and the visible gauge, with continuous level reading. All signals will be repeated at the generator control panel. The cabinets will be lockable, with a common key to be used on both fill point & polisher cabinets. The pipework between the fuel tank and the generator / filter assembly & fuel tank / fuel fill point is within the (bunded) enclosure. Both of these runs utilise single-skin, mild steel pipes, with final connections using standard, flexible hoses. There is no leak detect facility for these pipes, however, the bunded enclosure is complete with two off floor recesses, each containing a float switch to detect the presence of liquids/leaks. These two float switches are connected in parallel and monitored by the electronic management system. Drainage will be regularly maintained to keep standing water off roads and site roads will be cleaned regularly to remove any scum, oils etc			
Fuel tanks overfill	On-site staff. Off-site receptors identified in Environmental Site Settings[5] and Cultural and Natural Heritage. Water	Ground Water	The generator belly tanks are enclosed, integrally bunded to 110% above ground and fitted with telemetry which allows instant accurate assessment of the filling level. All tanks, pipes and valves are designed to appropriate industry standards and flanged connections between pipes are kept to a minimum by the proximity of the tanker fill point. Fuel tank filing will be carried out by trained fuel tanker drivers. This removes any significant risk of spillages and leaks. The operator will carry out daily checks for signs of leakage. Spill kits will be available to deal with any leaks.	Low due to on-site management processes.	Medium adverse impact on air/ ground / water courses	Low
General site issues						

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Fire	On-site and human and ecological receptors.	Air /Land/ Water	VIRTUS has a comprehensive Fire Prevention and Control procedure set out within the 6.6.2 of Chapter 6 OHS manual (see Appendix 03.08). The site will benefit from a fire alarm system and associated fire suppression systems inside the data centre building. There is no fire suppression within generator containment units themselves, however in the event of a fire within the generator container units, each generator enclosure is equipped with multi-sensor fire detectors (smoke & heat) and a manual call point. The generator enclosure fire alarm system is fully interfaced with the data centre fire alarm system and notifies operations, and is an addressable system. Generator unit separation distances are used as per UK regulations to provide minimum separation distances between the generators and the main building. Fire extinguishers will be available at strategic points around the site used to extinguish or control small fires in emergencies. The site will maintain extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment. The generator belly tanks areas are enclosed, integrally bunded to 110% above ground, with surface water drainage passing through an oil interceptor before any discharge.	Low	Medium adverse impact on environment	Low
Security and Vandalism	On-site and human and ecological receptors.	Air/ Land/ Water	Access to the main Prologis Business Park will be controlled by security barriers and a perimeter fence. Access will only be available via a secure entrance requiring reporting to the site reception. In addition, CCTV equipment on mounting poles are positioned around the external and internal fence perimeters. The site will be staffed by security personnel 24 hours a day.	Low	Allow adverse impact on environment	Low
Flooding	On-site and human and	Water/ Land	Surface water drainage design includes consideration of potential flooding events.	Low	Low adverse impact on environment	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
	ecological receptors.		The (EA) Flood Map indicates that the site is located within Flood Zone 1. This means that the annual probability of flooding from a river or the sea is less than 1 in 1000, i.e. there is less than 0.1% annual probability that the site will suffer from river or sea flooding in a given year.			

Table 9 Global Warming Potential

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Generation of CO_2e emissions	National and global climate change	Air	Operation of the generators will involve the combustion of diesel fuel to generate electricity for use at the site in the event of an emergency power outage. The generators will be subject to planned maintenance and testing. The combustion of diesel during maintenance and testing will result in the generation of CO_2e emissions of 67 tonnes per year. This is based on the operational regime and generator fuel use set out in the Summary Technical Report, resulting in 266MWh/yr of delivered energy from Gas oil (diesel), with a CO_2 factor of 0.25 from H1 Annex F. VIRTUS will participate in a Climate change levy agreement for LONDON14	Low	Low adverse impact on environment	Low

Table 10 Climate Change Risk Assessment

Potential change	Impact	Likelihood	Severity	Risk	Mitigation	Likelihood (after mitigation)	Severity (after mitigation)	Residual Risk
1) Summer daily maximum temperature may be around 7°C	An increase in cooling water temperature may cause a drop in efficiency, higher temperature	1	3	3	A temperature limit will be set. Return fuel oil shall not exceed 50°C.	n/a	n/a	n/a

Potential change	Impact	Likelihood	Severity	Risk	Mitigation	Likelihood (after mitigation)	Severity (after mitigation)	Residual Risk
	discharge or decreased operation							
	Potential for greater use of back-up generators on-site (with increased emissions to air and diesel use) through more frequent	1	2	2	The National Grid recognise that with increasing temperatures there is also an increase in potential for impact on electricity supply through damage to assets. The Air Quality Assessment (294760-EP-AQ) concludes no significant effects during testing or emergency scenarios. However, the risk of this scenario occurring is also very unlikely based on electrical grid reliability and inbuilt design resilience	n/a	n/a	n/a
2) Winter daily maximum temperature could be 4°C more than the current average, with the potential for more extreme temperatures, both warmer and colder than present resulting in potential impacts on the site.	No negative impact expected	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3)Daily rainfall intensity could	Flash flooding on site	1	3	3		n/a	n/a	n/a

Potential change	Impact	Likelihood	Severity	Risk	Mitigation	Likelihood (after mitigation)	Severity (after mitigation)	Residual Risk
increase by up to 20% on today's values resulting in flooding on the site.	Surface water run-off systems need to be cleared and account for increased flows to prevent them being overwhelmed Potential for increased site surface water flooding				Appendix 05-02 sets out the flood risk assessment prepared as part of the wider Prologis Business Park Development. The site is shown to be located entirely in Flood Zone 1, assessed as having less than a 1 in 1000 (0.1%) annual probability of flooding. No further mitigation will therefore be implemented.			
4)Average winter rainfall may increase by over 40% on today's averages resulting in potential increased risk of site surface flooding and could impact site wide drainage capacity.	As above	1	3	3	Appendix 05-02 sets out the flood risk assessment prepared as part of the wider Prologis Business Park Development. The site is shown to be located entirely in Flood Zone, assessed as having less than a 1 in 1000 (0.1%) annual probability of flooding. No further mitigation will therefore be implemented.	n/a	n/a	n/a
5)Sea level rise which could be as much as 0.6m higher compared to today's level.	Fluvial flooding on the site	1	1	1	The Flood Risk Assessment (FRA) completed for the site determined the risk of fluvial and tidal flooding is low and therefore no mitigation is necessary.	n/a	n/a	n/a
6)Drier summers which could see potentially up to	No negative impact is expected. Water	1	1	1	n/a	n/a	n/a	n/a

Potential change	Impact	Likelihood	Severity	Risk	Mitigation	Likelihood (after mitigation)	Severity (after mitigation)	Residual Risk
40% less rain than now.	use is not integral to the back-up generator use. On site water tanks will be available on site for the use of the fire hydrants in the event of a fire.							
7)Flows in river could be 50% more than now as its peak and 80% less than now at its lowest	The site may be subject to cooling water restrictions of temperature and volume.	1	1	1	n/a	n/a	n/a	n/a
	Surface flooding	1	3	3	Appendix 05-02 sets out the Flood Risk Assessment prepared as part of the wider Prologis Business Park Development. The site is shown to be located entirely in Flood Zone, assessed as having less than a 1 in 1000 (0.1%) annual probability of flooding. No further mitigation will therefore be implemented.	n/a	n/a	n/a
	Potential for increased impact on the river due to an increased temperature and the impact of the emission on lower flows.	1	1	1		n/a	n/a	n/a