Amazon Data Services Ireland Ltd.

Operational Report

Attachment-4-8-1

March 2022

Licence Application (LA009911)

CONTENTS

1.0 SITE OVERVIEW

The following Operational Report relates to the Amazon Data Services Ireland Ltd. ("ADSIL" or 'the applicant') data storage facility (the subject 'Installation' under this licence application), located in the Hibernian Industrial Estate, Greenhills Road, Tallaght, Dublin 24. The site context is shown on Drawing Ref: 21_123E-00-XX-DR-C-0001 Site Location Plan included with this application. The application relates to the Installation, that covers c. 7.72 hectares (ha) in total ('the Site').

The Installation comprises 3 no. two storey data storage buildings (Buildings A, Building B and Building C) with ancillary elements. The ancillary elements of the development include loading bays, maintenance and storage spaces, associated water tanks, sprinkler, tanks, pump house and electrical rooms, security and utility spaces, underground foul and stormwater drainage network, underground attenuation systems, internal roading network, and site landscaping. The overall site includes the Bancroft 110 kV GIS Substation. The site layout and main buildings is shown on Site Layout Plan Drawing Ref: 21_123E-00-XX-DR-C-0002 Site Plan included with this application. The site is split in two, divided by the Hibernian Industrial Estate Road, Building B and C are to the north of the road with Building A to the south.

The Installation requires a continuous supply of electricity to operate. During normal operations, the Installation is supplied electricity from the national grid. Outside of normal operations, the installation is first supplied electricity by some or all of the onsite battery installations and then by some or all of the onsite emergency backup generators. Outside of routine testing and maintenance, the operation of these emergency back-up generators is typically only required under the following emergency circumstances:

- A loss, reduction, or instability of grid power supply,
- Critical maintenance to power systems,
- A request from the utility supplier (or third party acting on its behalf) to reduce grid electricity load.

The Installation will comprise 37 no. 5.19 MW_{th} diesel powered emergency back-up generators; 9 no. 6.60 MW_{th} diesel powered emergency back-up generators; and 4 no. 0.42 MW_{th} diesel powered fire pumps.

The relevant requirement for an Industrial Emissions (IE) Licence is outlined within the First Schedule of the EPA Act 1992. Activity '*Class 2.1 Combustion of fuels in installations with a total rated thermal input of 50 MW or more'* specifically relates to this installation.

The combined thermal input from the emergency generators is 253.11 MW_{th}, this exceeds the 50MW_{th} threshold of *Class 2.1* First Schedule of the EPA Act 1992. The applicant is applying to the Environmental Protection Agency (EPA) for an Industrial Emissions (IE) Licence principally relating to the operation of diesel-powered emergency standby generators under Activity Class 2.1.

Approximately 50 personnel will be present on site daily at each data storage facility (Buildings A, Building B and Building C) meaning that 150 people will be on site at any one time, including external staff, maintenance contractors and visitors. Staff will be present on a shift basis, so numbers will vary throughout the day. Operational hours are 24 hours a day, 7 days a week.

2.0 SITE CONTEXT

The Installation is located on a site of c. 7.72 hectares. The site is located within Hibernian Industrial Estate, 250 m to the east of Greenhills Road, Tallaght. The site is split in two, divided by the Hibernian Industrial Estate Road, Building B and C are to the north of the road with Building A to the south.

The lands in the immediate vicinity surrounding the industrial park comprise of predominantly 'individual lot' type developments of commercial and retail uses, including manufacturing, warehousing, logistics and postal services, printing and design services, veterinary pharmaceuticals, offices uses, and data centres.

The site is bounded to the west by the Hibernian Industrial Estate Road, and to the east by the Greenhills Business Park and residential properties located at Tymon North Green, Tymon North Lawn. To the south of the site is the recreational area known as Bancroft Park, as well as the and the Tymon River. The closest residential properties are located at Tymon North Green, and Tymon North Lawn to the east c. 50 m of the site boundary.

Located within 1 km area of the Site are the Integrated Pollution Prevention Control (IPPC) licenced facilities: Microprint (IPPC Ref: P0659) printing and design services, and Bimeda Animal Health Limited (IPPC Ref: P0357) veterinary pharmaceuticals. APW Enclosures Limited (IPPC Ref: P0485) has a surrendered licence. Located 980 m to the west of the Site is a data centre owned, Installation and operated by the applicant.

Beyond the industrial areas surrounding the site, there are the residential areas of Tallaght, Kingswood Heights Tymon North, Fettercairn, Millbrook Lawns, as well as educational and recreational facilities with areas of open space and parks.

The site layout and main buildings is shown on Site Layout Plan Drawing Ref: 21_123E-00-XX-DR-C-0002 Site Plan included with this application.

3.0 PLANNING STATUS

The Installation has received Final Grant of planning permission from South Dublin County Council (SDCC) under the separate applications listed below:

- Building A; final grant of permission on 2 August 2011 (SDCC Reg. Ref.: SD11A/0116). Building A Extension final grant of permission on 16 July 2014 (SDCC Reg. Ref.: SD14A/0091).
- Building B; final grant of permission on 19 January 2015 (SDCC Reg. Ref.: SD14A/0232).
- Building C; final grant of permission on 4 April 2018 (SDCC Reg. Ref.: SD17A/0469). An EIA Screening Report was submitted with this application and is included as Attachment-6-3-6-EIAS-Planning-Apr-2018.

All planning permissions for the data storage facilities that are relevant to this Licence application under Class 2.1 of the EPA Act 1992 (as amended) have been granted on site (refer to Section 6 of this licence application). Any further information relating to the environmental assessment of the activity is made available and contained within Section 7 of this licence application.

Project Threshold and Planning

Ireland's list of Projects for which an EIA is required are set out in Part 1 and Part 2 of Schedule 5 of the Planning and Development Regulations 2001-2018. This list was developed from Annex I and Annex II of the EIA Directive. The proposed activity is not directly listed under Annex I of the EIA Directive, or Part 1, Schedule 5, or Part 2, Schedule 5.

It is considered that most relevant development class in the context of the proposed Project under Part 2, Schedule 5 is Class 10(a):

10. Infrastructure projects

(a) Industrial estate development projects, where the area would exceed 15 hectares.

The development is within an Industrial Estate and as the total site area is c. 7.72 hectares and so does not exceed the limit, quantity or threshold set out in Part 2, Schedule 5 is Class 10(a), therefore an EIA is not required.

Additional Planning Permissions Outside of Main Activity:

In addition to the relevant planning permissions for the Data Storage buildings and combustion of fuels (that relate to the IE application being made) the following additional permissions below relate to the history of the overall site.

Table 3.1 Planning Permission

Application Details	Description of Development
Applicant: ADSIL Reg. Ref.: SD16A/0427 Final Grant Date: 14/03/2017	Upgrade of the existing boundary railings and palisade fence by increasing the height of the existing fencing and railings by 0.7 meters to the overall site boundary.
Applicant: ADSIL Reg. Ref.: SD16A/0402 Final Grant Date: 27/02/2017	Construction of a new boundary railing to the main road frontage and an increase in height to the existing fencing on the east and west boundaries of the overall site.
Applicant: ADSIL Reg. Ref.: SD13A/0266 Final Grant Date: 31/03/2014	Demolition of the existing industrial building and ancillary structures on the site.
Applicant: ADSIL Reg. Ref.: SD12A/0048 Final Grant Date: 19/06/2012	Construct a new GIS (Gas Insulated Switchgear) 110kV electricity substation and to carry out ancillary site works: (1) all necessary site works for construction of a concrete compound area to the southwest of the existing ADSIL facility; (2) construction of an ESB GIS substation control building within the fenced compound area; (3) construction of a client control building and a transformer bay to house two transformers within the compound area; (4) construction of a 6m wide concrete access road within the perimeter of the site area; (5) installation of all substation apparatus within the compound area and buildings.
Applicant: ADSIL Reg. Ref.: SD11A/0268 Final Grant Date:	Upgrade of existing boundary fencing/railings; revised site entrance locations and layouts; new security hut and upgrading of the site security system to include red-wall system, CCTV, public lighting poles and associated underground services. Retention of a

21/02/2012	temporary 10MVA ESB substation of 31sq.m. facing onto Greenhills Road.

4.0 DESCRIPTION OF ACTIVITY

4.1 SITE OVERVIEW

The site consists of 3 no. two storey data centre buildings (Buildings A, Building B and Building C) with facilities containing; data storage rooms, electrical and mechanical plant rooms and support areas including offices and welfare facilities, loading bays, back-up generators with emission stacks, water storage tanks, and mechanical plant at roof level. The site is split in two, divided by the Hibernian Industrial Estate Road, Building B and C are to the north of the road with Building A to the south.

The three data storage facilities generally consist of the following primary aspects:

- Data Storage Rooms housing IT electrical equipment;
- Internal and External Air Handling Unit (AHU) Plant Rooms to house the equipment required to maintain the temperature, humidity, and power supply for the installation;
- Administration areas (office space, meeting rooms, welfare facilities etc.);
- Diesel powered emergency back-up generators, including day tanks (and associated emissions stacks/flues);
- Evaporative cooling water storage tanks; and;
- Loading bays and associated infrastructure.

Building A consists of a 2-storey building comprising electrical rooms for electronic operations, loading bays, stores, office, and staff facilities. The gross floor area of the building including ancillary elements is c. 34,783 sq.m. The building includes, mechanical plant at roof level of the main building with associated visual screening. The external generator yard comprises 24 no. 5.19 MW_{th} diesel powered emergency back-up generators, with associated diesel fuel day tanks. Diesel fuel is provided to the day tanks from the Tank Farm to the south of the Site.

Building B consists of a 2-storey building for use as electrical rooms for electronic operations, electrical and mechanical plant rooms and support areas including offices and welfare facilities, loading bays. The gross floor area of the development including ancillary elements is c. 11,920 sq.m. The building includes, mechanical plant at roof level is screened from view on all sides by permanent screens. An external generator yard contains 13 no. 5.19 MW_{th} diesel powered emergency back-up generators, with associated diesel fuel day tanks. Diesel fuel is provided to the day tanks from the Tank Farm to the north of the Site.

Building C consists of a 2-storey building for use as electrical rooms for electronic operations, electrical and mechanical plant rooms and support areas including offices and welfare facilities, loading bays. The gross floor area of the development including ancillary elements is c. 8,229 sq.m. The building includes, mechanical plant at roof level is screened from view on all sides by permanent screens. An external generator yard contains 9 no. 6.60 MW_{th} diesel powered emergency back-up generators, with associated diesel fuel day tanks. Diesel fuel is provided to the day tanks from the Tank Farm to the north of the Site.

In addition to the 3 no. data storage facilities, the Installation also includes:

- An electrical Gas Insulated Switchgear (GIS) 110 kV Substation (owned and operated by ESB);
- 1 no. transformer compound located at the GIS Substation with associated control room (owned and operated by ADSIL);
- 1. no. transformer compound located at the north east of the Site with associated control room (owned and operated by ADSIL);
- 1 no. diesel fuel tank farm comprising 4 no. 54,000 L tanks within a concrete bund located in the east of the site associated with Building A;
- 1 no. diesel fuel tank farm with 4 no. 52,000 L tanks within a concrete bund located in the north east of the site associated with Building B and Building C;
- 1 no. 250 m^3 sprinkler water tanks, compound, and associated pump house for Building A, including 2 no. diesel powered firewater pumps;
- 1 no. 250 m^3 sprinkler water tanks, compound and associated pump house for Building B and Building C, including 2 no. diesel powered firewater pumps;
- Internal site road network, and car parking;
- Underground foul and storm water drainage network,
- Underground water supply network

4.2 PRIMARY PROCESSES/ACTIVITIES

4.2.1 Emergency Backup Generators (Generation Compound)

The Installation is supported by containerised diesel-powered emergency back-up generators that are located externally in the generator yard associated with each data storage building. These generators provide the necessary power to ensure the data centre buildings continue to operate in the event of a temporary failure of electricity supply. An uninterruptible power source or UPS system is also provided for the short-term transition from mains power to the emergency back-up generators.

The Installation requires a continuous supply of electricity to operate. During normal operations, the facility is supplied electricity from the national grid. Outside of normal operations, the facility is first supplied electricity by some or all of the onsite battery Installations and then by some or all of the onsite backup generators. Outside of routine testing and maintenance, the operation of these back-up generators is typically only required under the following emergency circumstances:

- A loss, reduction, or instability of grid power supply,
- Critical maintenance to power systems,
- A request from the utility supplier (or third party acting on its behalf) to reduce grid electricity load.

Each of the three data storage buildings are accompanied by a designated generator compound for the supply of emergency power to that building. There is no interconnectivity between the generators of different buildings.

The individual generators are housed within a container with various designed control measures in place including acoustic attenuation, exhaust silences. Diesel is stored locally in in day tanks within each containerised generator.

The individual double skinned day tanks at the emergency back-up generators have level gauges (high and low) within the fuel tanks connected to an onboard controller which will alarm to prevent overfilling and identify a sudden loss of fuel within the tank.

The containerised emergency backup generator housing includes retention bunding in the base of the container, there are leak detection systems within the bund, should hydrocarbon be detected in the base of the container the system sends an alarm signal to the BMS to alert EOTs. The onboard controller for individual generators is connected to the Building Management System (BMS).

4.2.2 Data Storage Building(s)

Data storage facilities are centralised computer server systems on a large scale. At typical data storage facility scale (typically involving systemised racks of hundreds/thousands of server units), they offer significant advantages (and economies of scale) over traditional in-house data storage systems. The primary advantages are:

- Higher reliability and redundancy of systems,
- 24/7 monitoring and maintenance of storage by staff,
- Higher security and data protection, and
- Flexibility – ability to increase or decrease storage requirements at short notice in line with specific business needs.

The demand for cloud computing and data storage continues to be high and the Installation is intended to help meet this need.

4.3 SECONDARY PROCESS/ACTIVITIES

4.3.1 Ancillary infrastructure

There are integrated administration areas, associated with each main data hall buildings. The administration areas comprise the following main components:

- Reception areas,
- Open office areas, and conference rooms/meeting rooms,
- Maintenance and storage spaces; and
- Break room and sanitary facilities.

Additional Ancillary infrastructure includes:

- Underground foul and storm water drainage network,
- Utility ducts and cables,
- Internal road network an. car and motorcycle parking spaces. sheltered bicycle parking spaces,
- security hut and security fencing; and
- Drainage infrastructure including 3 no. underground attenuation systems.

4.3.2 Data Hall Cooling Systems

The location of the facilities in Ireland allows for the use of free-cooling media without the need for mechanical cooling. To take advantage of this, the air handling equipment will be fitted with airside condensers to utilise this outdoor air to cool the space.

The cooling units or Air Handling Units (AHUs) provide conditioned air to maintain temperature, relative humidity, and pressurisation in the data halls. The cooling units operate under 2 modes; Free Cooling and Evaporative Cooling. Duty and standby units are in place to ensure cooling is humiavailable at all times. The AHUs have two modes

of operation: Free Cooling which uses outside air, and Evaporative Cooling mode or 'Adiabatic Cooling' which uses water from the mains supply as the cooling media.

In the Free Cooling system, fresh air from outside the buildings enters the data halls via external louvres. The air is warmed as it passes across the IT servers located in the data halls, and subject to temperature conditions, this air is either recirculated or exhausted to atmosphere by the exhaust fans located at roof level. There is no emission of air pollutants from this process; and therefore, the exhaust is not considered an 'emission point'.

Free Cooling is sufficient to cool the data halls for the majority of time. There are a small number of hours each year, during elevated external temperatures particularly during summer months, that Evaporative Cooling (also known as adiabatic cooling) is required.

Evaporative cooling utilises mains water (at ambient temperature) from the mains supply as the cooling media. This water is stored within humified water storage tanks located adjacent to each building.

The Fresh air is passed over evaporative cooling pads that are dampened by the cooling water as it is drawn into the building, the external air is cooled through an air/water heat exchange before entering the data hall. The majority of the evaporative cooling water is evaporated in this process. The evaporative cooling system provides greater energy efficiency than other options such as the use of chillers/compressor systems.

Evaporative cooling water is distributed via a ring main to each AHU corridor. The Evaporative Cooling Water quality is maintained by a UV water sterilizer. The AHU has a water 'sump' which is supplied from the cooling water tanks. These sumps are equipped with a mechanical float valve to maintain the water level at an operational level to ensure there is sufficient water for the pumping system. Water is then pumped up into the AHU. Water that is not evaporated at the end of the cooling cycle is discharged to storm water.

The evaporative cooling water for the Site is sourced from the mains water provided by Irish Water, the water requires no chemical treatment. The AHUs are clean systems and therefore the evaporative cooling water is of sufficient quality to be discharged to stormwater, furthermore this water diluted in the Site's stormwater attenuation systems.

The recirculated evaporative cooling water in the humidified water storage tanks is drained down typically every 7 days to the storm water drainage network to prevent legionella growth in the system.

The regular replenishment of the evaporative cooling Water prevents legionella growth. A conductivity probe is in the AHU sump is used to determine the level of salts build up – there is no water treatment or water softeners added.

In the event that conductivity exceeds 1,500 µS/cm, water is bled off constantly when 1,500 µS/cm is reached, the sump is not drained fully as that would impede the evaporative system. Water is bled off until conductivity drops below 1,500 µS/cm and the drain valve is closed.

Cleaning of the water-based cooling systems including all AHUs and pipelines with hydrogen peroxide solution is only undertaken if positive legionella samples have been detected in the unit.

4.3.3 Office Space Air Conditioning

Office air conditioning is provided by a Variable Refrigerant Flow (VRF) system which allows varying degrees of cooling across the office and support spaces thereby reducing energy consumption. High efficiency unit are used to minimise the electrical power demand.

The fresh air ventilation system for the office areas of Building B and Building C are served using energy efficient Heat Recovery Units which will recover waste heat from the office spaces and re-use to pre-heat the air with the HRU.

This will reduce the overall energy consumption for this system. The toilet areas shall be mechanically ventilated and automatically controlled by occupancy sensors to set back the ventilation rate during periods of non-use.

4.3.4 Waste Heat Recovery

The cooling system design for Building B and C can accommodate the future Installation of heat recovery coils in the central ventilation plant. If incorporated, the heat recovery coils would remove heat from the air after it passes through the data storage rooms to a hydraulic (water) pipe network before the air is re-introduced to the data storage room or exhausted to the atmosphere.

The heat recovery coils could generate hydraulic temperatures of between 20-30°C at the point of recovery.

The above provision could supply heat energy to a future district heating scheme developed by others external to The Site boundary. It should be noted that in order to benefit from the above heat recovery that district heating infrastructure external to The Site including plate heat exchangers, pumps and distribution networks would need to be developed by others.

A suitable receiver of waste heat from the Installation is not currently available and therefore this is not included in the licence application.

4.3.5 Electricity Supply and 110 kV Substation

The power requirements for the Installation are to be provided via a direct connection the 110 kV Gas Insulated Switchgear (GIS) Substation Compound located in the southwest of the site. The 110kV Substation (known as Bancroft) is shown on the Site plan Ref 21_123E-00-XX-DR-C-0002- Overall Site Plan.

Bancroft is a distribution HV substation. ESB Networks are the Distribution System Operator (DSO) and Distribution Asset Owner (DAO). ESB Networks is a subsidiary within ESB Group. ESB Networks finances, builds, operates, and maintains the distribution system through which electricity is distributed to end users. It does this under DSO and DAO licences granted by the Commission for Regulation of Utilities (CRU).

There is 1 no. transformer compound containing 2 no. transformers and associated control building to the south the GIS Substation owned and operated by ADSIL. There

is 1 no. transformer compound containing 2 no. transformers and associated control building to the north east of Building B owned and operated by ADSIL.

4.4 WATER, SEWER, AND STORMWATER DRAINAGE INFRASTRUCTURE

4.4.1 Water Supply

The water supply to the Site is sourced from mains water supply via a metred connection from the existing main to the south of the Installation in accordance with the SDCC Planning Ref: SD11A/0116, .SD14A/0091, SD14A/0232 and SD17A/0469. Water is used at the Installation for both staff welfare and cooling functions of the building's AHUs.

The Installation has a demand for general potable supply, for cleaning, drinking and sanitary facilities, cooling equipment, and for firefighting. The average water consumption for the Installation is 23,912 m^3 per year. Where water demand is required during a short-term drought, additional supply can be provided from an alternative source such as tanker supply.

On-site water storage to support the cooling functions of the building's AHUs. Building A uses 6 no. cold water storage tanks located to the southeast of the Site with c. 40,000 m^3 capacity each, that are typically filled to only 32,000 liters. Building B and C use 6 no. cold water storage tanks located to the northeast of the Site with c. 40,000 m^3 capacity each, that are typically filled to only 32,000 liters.

Pumps will supply water to the data storage facilities from the storage tanks. The storage tanks will act as break tanks and buffer demand on the public watermain infrastructure.

Fire water

A 250-300mm fire ring main is in place to provide firefighting water to the Site. There is 1 no. 250 m^3 sprinkler water tank and pump house associated with Building A, including 2 no. diesel powered firewater pumps. There is 1 no. 250 m^3 sprinkler water tank and pump house associated with Building B and C, including 2 no. diesel powered firewater pumps.

There is no addition of water treatment chemicals applied, the water tanks are emptied once annually.

4.4.2 Stormwater Drainage Systems

Rainwater runoff from impermeable areas of the Site is collected via the onsite storm water drainage network in accordance with the SDCC Planning Ref. SD11A/0116, SD14A/0091, SD14A/0232 and SD17A/0469.

This network is shown on Drawing 21_123E-00-XX-DR-C-1100 Surface Water Layout Plan. The stormwater discharges offsite at 6 no. Emission Points (SW1, SW2, SW3, SW4, SW5 and SW6).

There are 3 no. Attenuation Storm Cells located on site that are designed to attenuate waters from the new build areas:

- Attenuation Storm Cell No. 1 (187.2 m^3) located in the southwest of the Installation site designed to cater for runoff from Building A extension.

- Attenuation Storm Cell No. 2 (460 m^3) located in the north east of the Installation site, is designed to cater for runoff from Building B.
- Attenuation Storm Cell No 3 (277 m^3) in the east of the site, is designed to cater for runoff from Building C.

There is a stormwater flow control device located downstream of the storm cells to reduce to the maximum permissible flow rate.

The stormwater from the site is discharged at the 6 no emission points to the 450 mm diameter, 600mm diameter or 900mm diameter public storm sewer that is located to the east of the site that flows north to south. The stormwater passes through Hydrocarbon Interceptors (with the exception of SW4 and SW6) to ensure that the quality of the stormwater discharge is controlled. This network is shown on Drawing 21_123E-00-XX-DR-C-1100 Surface Water Layout Plan. The stormwater network discharging to SW6 collects surface water from roof run off from Building B, and the stormwater network discharging to SW 4 included general site drainage from a car parking area to the north of Building A.

The stormwater from the site ultimately culminates off site within the 900mm diameter public storm sewer to the south-west of Building A, this public stormwater sewer discharges to the Tymon Stream, it flows through Bancroft Park. The small river flows through Tymon North, turning northeast. It flows into the River Liffey as the Poddle River at Wellington Quay in central Dublin 10.2 km downstream of the Site.

Evaporative Cooling Water Drain Down

Evaporative cooling water from the AHUs discharges to the stormwater network. This is recirculated mains water that has been through the AHUs only. There is no addition of water treatment chemicals. The air handling units are clean systems and therefore the water is of sufficient quality to be discharged to storm.

4.4.3 Wastewater Drainage System

Domestic effluent arising from occupation of the Site, including the from the transformer compound and control building will be discharged the public foul sewer (at Emission Points SE1 through SE5). Refer to Drawing 21_123E-00-XX-DR-C-1200 for the foul drainage layout. The foul water connection to the public foul sewer is in accordance with the SDCC Planning Ref. SD11A/0116, .SD14A/0091, SD14A/0232 and SD17A/0469.

Domestic Effluent

The foul drainage network comprising of 150-225 mm pipes take effluent from internal sanitary locations and outfall into the external foul network. The outfall into the foul network is at 5 locations (SE1, SE2, SE3, SE4 and SE5) This foul sewer discharges to a 450 mm diameter public foul sewer.

All internal foul drainage networks were designed in accordance with the relevant guidance including Irish Waters Code of Practice for Wastewater Infrastructure, National Building Regulations Technical Guidance Document H – Drainage & Waste Disposal.

The foul network ultimately discharges into a regional pumping station before final treatment and disposal at Ringsend Wastewater Treatment Plant (WWTP) in Dublin.

Diesel Tank Farm(s)

Drainage of rainwater from the diesel tank farm and associated fuel unloading bays to the south of the Site (Building A) is directed to foul sewer and connects to the foul main at emission point SE2. The drainage from the diesel tank farm and associated fuel unloading bays to the north of the Site (Building B and C) is directed to foul sewer and connects to the foul main at emission point SE4.

The drainage sumps at the fuel unloading bays and in the bulk tank concrete bunds contain hydrocarbon detectors which automatically shut off drainage from these sumps if diesel is detected in the sump, preventing any contaminated stormwater from exiting the bund. These probes are also connected to the BMS/EPMS critical alarm.

Drainage from these bulk tank farm are equipped with hydrocarbon interceptor(s). The location of these are illustrated on 21_123E-00-XX-DR-C-1200. The hydrocarbon interceptors are equipped with an oil warning system which is connected to the BMS/EPMS critical alarm.

Transformer Compound

There are two transformer compounds onsite, one in the northeast and one in the southwest. The southwest transformer compound and control building are located adjacent to the Bancroft GIS Substation, drainage from the southwest transformer compound is directed to foul sewer, and connects to the foul main to discharge at emission point SE3. Drainage from the northeast transformer compound is directed to foul sewer and connects to the foul main to discharge at emission point SE4.

Drainage from the Bancroft GIS Substation transformer compound, and transformer compound to the northeast of the site are equipped with hydrocarbon interceptors. The location of these are illustrated on Drawing 21_123E-00-XX-DR-C-1200. The hydrocarbon interceptors are equipped with an oil warning system which is connected to the BMS/EPMS critical alarm.

5.0 BEST AVAILABLE TECHNIQUES AND COMMISSION IMPLEMENTING DECISION

Section 86A(3) of the EPA Act 1992 as amended, requires that the Agency shall apply BAT conclusions as a reference for attaching one or more conditions to an IE Licence. The Installation has principally been assessed against the BAT conclusions contained in Table 6.1:

Table 5.1 Applicable BAT documents

Horizontal BREF	Publication date	Attachment
Best Available Techniques (BAT) Reference Document for Large Combustion Plants	2017	Attachment-4-7-1-BREF - Large Combustion Plants
Reference Document on the Best Available Techniques for Energy Efficiency	2009	Attachment-4-7-2-BREF - Energy Efficiency
Reference Document on the Best Available Techniques on Emissions from Storage	2006	Attachment-4-7-3 BAT REF - Emissions from Storage
Reference Document on the application of Best Available Techniques to Industrial Cooling Systems	2001	Attachment-4-7-4 BAT REF -

		Industrial Cooling Systems

The assessment has demonstrated that the Installation will comply with all applicable BAT Conclusion requirements specified in the CID and will be in line with the guidance specified in the other relevant BREF Documents and relevant national BAT notes.

6.0 MANAGEMENT OF RAW MATERIALS, INTERMEDIARIES AND WASTES

A list of all raw materials in use on the Site is provided in Attachment-4-6-2. The only chemical stored in bulk is diesel.

Spill kits will be located across the Site in highly visible and mobile units. These will include absorbent socks, mats, pads, disposable bags, and PPE. Spill kits will be utilised in the event of a spill and staff are trained in the use of spill management materials. Staff will be fully trained in site procedures, including all Standard Operating Procedures (SOPs) and emergency response and safety procedures in relation to the storage and handling of all substances being used at the Installation.

6.1 RAW MATERIALS MANAGEMENT

The only chemical stored on site in bulk is diesel. There are no other raw materials held onsite other than domestic cleaning chemicals for cleaning of the staff facilities. These are managed by the cleaning company. All oils, paints, adhesives, or other materials required are brought onsite and removed from site by the relevant contractors.

Refrigerant is held within the VRF system for the offices. No refrigerants are stored onsite. R407C, R410A and R32 refrigerants are held within this enclosed system on a continuous basis and would only be removed during decommissioning.

The small amounts of hazardous waste generated are stored internally in appropriate waste receptacles on bunds, or externally to each building in appropriate waste receptacles in covered bunds.

Hazardous waste is covered, and a mobile retention bund is in place to contain any liquid waste that requires storage. The waste is collected from this area by an authorised waste management contractor for disposal off-site.

Waste oil and filters and waste batteries are not stored onsite and are removed by the maintenance companies during maintenance operations and change outs.

6.1.1 Diesel Fuel Oil

Fuel (diesel) for the emergency back-up generators is stored in multiple locations across the Site; that includes bulk diesel tanks and day tanks contained within each emergency back-up generator container..

All fuel tanks, bunded storage and pipelines have been designed for the specific purpose and contents. As required the structures will be rendered impervious to the materials stored therein. All fuel tanks, bunded storage and pipelines are integrity tested following installation by vendor. Diesel fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

There is a total diesel storage capacity on site of 545,000 litres, 545 m^3 or approximately 468 tonnes (assumed density of 0.86 l/kg). The tanks on site are filled to 80% capacity under normal conditions; therefore, the total diesel storage on site is 436,000 litres, 436 m^3 or approximately 375 tonnes (assumed density of 0.86 l/kg).

There are 2 no. diesel fuel unloading bays on site located at each of the bulk diesel tank farms.

In accordance with the Commission for Energy Regulation (CER) regulations, low sulphur diesel is used.

Bulk Diesel Tank Farm

Bulk diesel is supplied to Building A generators from the 4 no. 54,000 L tanks located in the southeast of the Site; the bund has a capacity of 89.55 m^3. The bund capacity exceeds the EPA guidance for 110% of the capacity of the largest tank or drum within the bunded area, or 25% of the total volume of the substance which could be stored within the bunded area.

Bulk diesel is supplied to Building B and C generators from the 4 no. 52,000 L tanks located in the northeast of the Site; the bund has a capacity of 405.27 m^3. The bund capacity exceeds the EPA guidance for 110% of the capacity of the largest tank or drum within the bunded area, or 25% of the total volume of the substance which could be stored within the bunded area.

The bund is constructed of suitable concrete and has undergone testing for integrity during the commissioning phase. All pipelines are integrity tested following installation by vendor. The bunds and delivery bays are equipped with hydrocarbon probes in the bund sump which detects diesel in the bund. This triggers closure of the sump discharge should hydrocarbon be detected in the sump and sends an alarm signal to the BMS to alert EOTs.

The bulk fuel tanks are fitted with automated level gauges and the online readings from these gauges are fed back into the facility's BMS/EPMS. The bulk tanks also have high/low level alarms (90% high, 30% low) and a high-level switch at 95% which alarm to the BMS/EPMS critical alarm.

Fuel delivery to the bulk storage tanks will take place within the designated fuel unloading areas under strict Standard Operating Procedures. Diesel will then be piped from the bulk storage tanks to the emergency backup generator. Diesel fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

Buildings A

Bulk diesel is supplied to the emergency backup generator day tanks at Buildings A from the Bulk Tank Farm in the southeast of the site.

Each of the 24 no. emergency backup generators at Buildings A are accompanied by a double skinned day tank (2,500 litres each) for immediate supply to the generator. These day tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

There are 2-no. diesel powered fire pumps at the sprinkler house that have 3 no. double skinned day tanks (1,000 litres each) for immediate supply to the fire pump.

Buildings B and C

Bulk diesel is supplied to the emergency backup generators day tanks at Building B and C from the Bulk Tank Farm in the northeast of the site.

Each of the 13 no. emergency backup generators at Buildings B, and 9 no. emergency backup generators at Buildings C, are accompanied by a double skinned day tank (4,000 litres each) for immediate supply to the generator. These day tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

There are 2-no. diesel powered fire pumps at the sprinkler house that have 3 no. double skinned day tanks (1,000 litres each) for immediate supply to the fire pump.

6.1.2 Energy Use

The operation of the Installation will involve the consumption of electricity, fuel, and mains water. The estimated quantities to be used when the Installation is operational are specified in Attachment-4-6-1 of the application and are shown below in Table 6.1 below.

Table 6.1 Summary of the Estimated Future Resource use at the Installation Resource

Resource	Estimated quantity per annum
Electricity (purchased) (peak site usage)	615,828.00 MWh
Total Electricity (generated and used) (peak site usage)	615,828.00 MWh
Electricity (generated and exported)	N/A
Natural Gas	N/A
Diesel (Gas Oil)	662.94 tonnes annually
Water (Public Supply)	23,912.64 m3

The applicant will employ a variety of technologies to maximise the efficient use of energy within the Installation. The Installation is operated in accordance with an Energy Efficiency Management System (ENEMS)as well as the requirements of BAT.

The application of BAT provides for the efficient use of resources and energy in all site operations. It requires an energy audit to be carried out and repeated at intervals as required by the Agency and the recommendations of the audit to be incorporated into the ENEMS.

6.2 INTERMEDIATES AND PRODUCTS

There are no intermediates or products produced as part of the data storage operations.

6.3 WASTE MANAGEMENT

There will be minimal solid and liquid waste produced at the data storage facilities, the waste will comprise mainly domestic wastes, kitchen wastes, packaging wastes, non-hazardous WEEE, E-Waste, filters, waste oils and spent batteries. A more detailed description of the waste types and their management is provided in Section 8 of this application.

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in designated, easily accessible areas of the Site.

Packaging waste associated with rack deliveries to the data storage facilities is collected in recycling bins.

The small amounts of hazardous waste generated are stored in designated storage areas. The waste is covered, and a mobile retention bund is in place to contain any liquid waste that requires storage, where required. The waste is collected from these areas by an authorised waste contractor for recovery and / or disposal off-site.

Waste oil and filters and waste batteries are not stored onsite and are removed by the maintenance contractors during maintenance operations and change outs.

Waste sludge from the hydrocarbon interceptors are removed directly from each interceptor by a specialised and appropriately licensed contractor by means of a vacuum tanker.

Other smaller amounts of domestic waste are produced at the offices and other staff areas including the canteens. This includes paper and office waste as well as dry mixed recyclables and compost food wastes. Very small quantities of mixed municipal wastes may also be produced from time to time. These are separated at each of the individual data storage facilities and then are emptied into skips/larger bins externally for collection by the nominated waste contractor. The quantities are small due to the number of staff present onsite on a daily basis.

6.4 TANKS, BUNDS, AND PIPELINES

All tanks, bunded storage and pipelines have been designed for the specific purpose and contents. As required the structures will be rendered impervious to the materials stored therein. Diesel fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

Bunds and delivery bays are equipped with hydrocarbon probes in the bund sump which detects diesel in the bund. This triggers closure of the sump discharge should hydrocarbon be detected in the sump and sends an alarm signal to the BMS to alert EOTs.

The bulk diesel tanks are located within a bunded area meeting the requirements of Agency guidelines on the “Storage and Transfer of Materials for Scheduled Activities”. All bunds will be capable of containing 110% of the volume of the largest drum/tank within the bund or 25 % of the total volume of the substance stored and will designed in accordance with the EPA’s guidelines for the storage and transfer of materials for scheduled activities (EPA, 2004).

Fuel will be supplied from the bunded diesel tanks to the day tanks and emergency back-up emergency backup generator units via distribution lines, these are double lined when underground. Leak detection systems are installed on all below ground fuel delivery lines which alarm to the BMS/EPMS critical alarm.

Delivery of diesel fuel oil will be a controlled process. and is undertaken in accordance with the Fuel Delivery SOP. Deliveries will be supervised and will take place in designated bunded loading bays. Hydrocarbon interceptors are in place for the diesel tanker delivery bay to capture any spills.

The containerised emergency backup generator housing includes retention bunding in the base of the container, there are leak detection systems within the bund, should hydrocarbon be detected in the base of the container the system sends an alarm signal to the BMS to alert EOTs. The onboard controller for individual generators is connected to the Building Management System (BMS).

The removal of any waste (oil/diesel) from the interceptors is undertaken by a licenced contractor.

All bunds and underground pipelines are integrity tested following installation by the vendor. Follow up integrity testing will be completed every three years in accordance with the IE Licence.

7.0 EMISSIONS AND ABATEMENT TREATMENT SYSTEMS

This section describes the emissions from the operations above and the abatement or treatment system in place for those emissions and summarises any monitoring controls in place. There are no planned emissions to ground, ground water or surface water from the operational development therefore this has not been described.

7.1 AIR EMISSIONS

Main Air Emissions

There are no main air emissions proposed.

Minor emissions

The following is a list of the minor air emission points from each of the emergency back-up generators on the Site. These emission points are shown in Drawing No. 21_123E-00-XX-DR-C-2000 Air Emission Layout Plan.

- Building A: 24 no. 5.19 MW_{th} diesel powered emergency back-up generator stacks with a minimum height between 6m and 18m above ground level;
- Building B: 13 no. 5.19 MW_{th} diesel powered emergency back-up generator stacks with a minimum height of 16.7 m above ground level,
- Building C: 9 no. 6.6 MW_{th} diesel powered emergency back-up generator stacks with a minimum height of 21.7 m above ground level.
- Sprinkler Pumphouse associated with Building A: 2 no. 0.420 MW_{th} diesel powered emergency back-up fire pumps.
- Sprinkler Pumphouse associated with Building B and C: 2 no. 0.420 MW_{th} diesel powered emergency back-up fire pumps.

The Installation requires a continuous supply of electricity to operate. During normal operations, the Installation is supplied electricity from the national grid. Outside of normal operations, the Installation is first supplied electricity by some or all of the onsite battery installations and then by some or all of the onsite backup generators. Outside of routine testing and maintenance, the operation of these back-up generators is typically only required under the following emergency circumstances:

- A loss, reduction, or instability of grid power supply,
- Critical maintenance to power systems,

- A request from the utility supplier (or third party acting on its behalf) to reduce grid electricity load

The environmental impact of these minor emissions is set out in Section 7; Attachment-7-1-3-2-Air Emissions Impact of this license application.

Potential Emissions

These are emissions which only operate under abnormal process conditions. Typical examples include bursting discs, pressure relief valves, and emergency generators. The emergency back-up generators are included as minor emission sources due to the routine testing and maintenance.

- 8 no. Diesel Tank Emergency Breather Vents (1 per each bulk tank).

The diesel storage bulk tanks at the facility each include two-way normal pressure (breather) vents. These produce minor diesel vapour (trace) emissions.

Fugitive Emissions

Fugitive emissions are defined as low level diffuse emissions, mainly of volatile organic compounds, that occur when either gaseous or liquid process fluids escape from plant equipment. There are no such emissions anticipated from the Installation. External pipelines containing diesel will have flange guards to prevent fugitive emissions.

7.1.1 Treatment and Abatement Systems

The emissions from the emergency back-up generators have been considered against the Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193). Under the Regulations, new medium combustion plants which do not operate more than 500 operating hours per year, as a rolling average over a period of three years, shall not be required to comply with the Emission Limit Values (ELV) under the Regulations.

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. Air dispersion modelling has been undertaken as discussed in Attachment-7-1-3-2-Air Emissions Impact to ensure that the appropriate ambient air quality standards are met. The modelling has been undertaken using the AERMOD air dispersion model in line with EPA Guidance Note AG4.

The stack heights of the emergency back-up generators for the emergency back-up generators have been designed to ensure that an adequate height was selected to aid dispersion of the emissions and achieve compliance with these ambient air quality standards at all off-site locations (including background concentrations). There is no SCR abatement or treatment systems proposed or required for the emergency diesel generators.

The results on the air dispersion model undertaken for the Installation is set out in Attachment-7-1-3-2-Air Emissions Impact. The USEPA methodology modelling results (based on 72 hours of operation) indicate that ambient ground level concentrations are below the relevant air quality standards for NO_2 for all scenarios modelled and no additional abatement systems are required.

7.1.2 Control and Monitoring

The emissions from the emergency back-up generators have been considered with respect to the Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193).

The diesel generators are for emergency back-up use only and are not anticipated to operate in excess of 500 hours per annum. Therefore, the emergency generators are exempt from complying with the emission limit values subject to Section 13(3) of the Medium Combustion Plant (MCP) Regulations.

7.2 EMISSIONS TO SEWER (WASTEWATER EMISSIONS)

Foul Water Drainage

Foul drainage is collected in the onsite foul network and will be discharged to the mains foul sewer. The outfall into the mains foul network is at five locations, two to the east of Building A (emission point SE1 and SE2), two connection points between Building A and Building C (emission point SE3 and SE5) and one in the southeast of Building B (emission point SE4).

SE1 caters for domesic foul flows from Building A; and SE2 caters for flows from the the diesel and fuel tank farm bund at Building A. SE3 caters for foul flows from Building A extension and drainage from Bancroft substation, Control Building and Transformer yard. SE4 caters for foul flow from Building B, the diesel and fuel tank farm, and the Control Building and Transformer yard in the north east of the site. SE5 caters for domesic foul flows from Building C, and the Building C generator yard. The emission discharge points are labelled SE1 through SE5 on the Foul Water Drainage Drawing 21_123E-00-XX-DR-C-1200 Layout included with the application.

The wastewater discharged from the Site will ultimately discharge to the Ringsend WWTP and will not materially impact on its capacity.

No monitoring is proposed for the foul water discharge.

7.2.1 Treatment and Abatement systems

There is no requirement for onsite treatment or abatement for foul effluent (domestic only) from the Installation. This will be treated offsite at the Ringsend Wastewater Treatment Plant.

Foul drainage from the bulk tank farm's, as well as the transformer compound's and the Bancroft Substation, are equipped with hydrocarbon interceptors. The location of these are illustrated on Drawing 21_123E-00-XX-DR-C-1200. The hydrocarbon interceptors are equipped with an oil warning system which is connected to the BMS/EPMS critical alarm.

As there are no food preparation areas within the buildings there is no requirement for the installation of a grease trap to prevent fats, oils and greases (FOG) from entering the foul network.

7.2.2 Control and Monitoring

There is no process water discharged to the foul water network on site (domestic foul only), no monitoring of the overall sewer discharge is proposed.

The emission / offsite discharge points are labelled SE1 through SE5 on Drawing 21_123E-00-XX-DR-C-1200 Foul Water Layout plan included with the application.

7.3 SURFACE WATER EMISSIONS

The emission to storm sewer consists of stormwater runoff from building roofs, yards, and the road network. The residual evaporative cooling water, associated with the evaporative cooling process, is also discharged from the cooling systems to the stormwater network. The cooling water discharged from the evaporative cooling units is effectively clean water that has passed through the cooling equipment.

The stormwater discharges off site at 6 no. Emission Points; SW1, SW2, SW3, SW4, SW5 and SW6. The site drainage is shown on Drawing 21_123E-00-XX-DR-C-1100 Surface Water Layout Plan included with this application.

There are 3 no. attenuation systems on site comprising:

- Attenuation Storm Cell No. 1 187.2 m^3 discharges at Emission Point SW1, SW4 and SW5 into the existing 900 mm storm sewer to the south.
- Attenuation Storm Cell No. 2 460 m^3 discharges at Emission Point SW3 into the existing 450 mm storm sewer to the east.
- Attenuation Storm Cell No 3 277 m^3 discharges at Emission Point SW2 and SW6 into the existing 225 mm storm sewer to the north.

7.3.1 Treatment and Abatement systems

The site stormwater network conveys the stormwater through hydrocarbon interceptors to one of 3 no. stormwater attenuation systems constructed on the Site or directly to the storm main. The residual evaporative cooling water that is discharged to storm is associated with the evaporative cooling process, this is effectively clean water that has passed through the cooling equipment and does not require further treatment or abatement.

The discharge from site will pass through Class 1 hydrocarbon interceptors (with the exception of SW4 and SW6) to capture any hydrocarbons prior to outfall. The stormwater network that discharges to emission points SW4 and SW6 collects stormwater from part of the sites legacy stormwater network and does not include hydrocarbon interceptors, however, these areas are low risk for hydrocarbon spillage.

The Class 1 hydrocarbon interceptors are located down gradient of the storm cells, and prior to outfall to ensure the quality of stormwater discharge is controlled prior discharge offsite. The interceptors are equipped with level detection and will connect to the BMS/EPMS critical alarm.

There is no further requirement for additional on-site treatment of stormwater from the Site.

Additional onsite control and mitigation measures are in place including:

- Double skinned day tanks, with high- and low-level alarms;
- Bunded bulk diesel tanks with high- and low-level alarms;
- Bulk diesel tank bunds and delivery bays are equipped with hydrocarbon probes in the bund sump which detects diesel in the bund. This triggers closure

of the sump discharge should hydrocarbon be detected in the sump and sends an alarm signal to the BMS to alert EOTs.
- Hydrocarbon interceptors with level alarms; and
- Standard operating procedures for fuel delivery.

7.3.2 Control and Monitoring

No online monitoring is proposed for the stormwater discharge. The only bulk chemicals stored are hydrocarbons; adequate control measures are in place to monitor any potential leaks or spills of hydrocarbons at source.

It is proposed that weekly visual inspections for discolouration and odour are undertaken upstream of the stormwater discharge points (Monitoring Points SW1-1, SW2-1, SW3-1, SW4-1, SW5-1, and SW6-1).

It is intended to install a penstock on the outfall prior to the discharge into the stormwater main (Emission Points SW1, SW2, SW3, and SW5). Once installed, the penstock will allow the outfall of the storm cell(s) to be closed off to inhibit the outflow in the event of a spill or a fire. Potentially polluted water that reaches the storm cell(s), (for example, in the case of a fire) shall be tested before release to the receiving storm water main. Any stormwater of unacceptable quality will be pumped out or otherwise removed of the attenuation storm cell(s) and disposed of appropriately. In the highly unlikely event of a major spill that entered the storm cell(s), inspection would be undertaken to ensure there is no subsurface contamination.

Due to the limited storage of bulk chemicals (diesel fuel only) on site, and the robust control measures outlined above it is considered that not further monitoring or control methods are required for storm water.

7.4 EMISSIONS TO GROUND

There are no proposed process emissions to ground from the Installation.

7.5 NOISE EMISSIONS

During operational activities, the primary source of noise is expected to arise from building service plant which will be required to service the data storage facilities (i.e., the AHU air intake and the AHU air exhaust) as well as the operation of the emergency back-up generators during testing and emergency scenarios (i.e., generator air intake, generator air exhaust and generator engine exhaust).

An assessment of the noise emission impacts in line with the EPA *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)* has been conducted by AWN and included in Attachment-7-1-3-2-Noise Emissions Impact Assessment.

7.5.1 Treatment and abatement systems

Plant items have been selected to achieve the required noise levels in order that the plant noise emission levels are achieved on site during operations. Each emergency generator is contained within an acoustic container to dampen the noise, and in line attenuators for the generator stacks and exhausts are used where necessary.

With due consideration as part of the detailed design process, this approach will result in the Site operating well within the constraints of the best practice guidance noise limits that have been adopted as part of the detailed assessment.

It is anticipated that the noise abatement measures are sufficient to ensure that the noise levels comply with the daytime, evening and night-time noise limits proposed, to be stipulated in the IE licence at the nearest noise sensitive receptors.

7.5.2 Control and Monitoring

Annual day time, evening and night-time monitoring is proposed to be undertaken in accordance with standard IE licence requirements.

8.0 MANAGEMENT AND PROCESS CONTROL SYSTEMS

8.1 ENVIRONMENTAL MANAGEMENT SYSTEM

An Environmental Management System (EMS) will be developed for the Site in accordance with the requirements of BAT. The EMS will outline the management of the Site's environmental program and, although not certified by ISO, will be in line with the principals of ISO14001.

8.1.1 Building Management System and Electrical Power Monitoring System

The Installation operates a Building Management System (BMS) and an Electrical Power Monitoring System (EPMS) for control and monitoring, data collection and alarm/reporting of the air handling systems and mechanical utility systems site wide. Specifically, this includes the cooling systems, electrical supply, emergency back-up generators, water supply, fire alarms, fire detection and suppression systems and fuel oil use.

The BMS/EPMS will ensure that the Installation is running an optimal efficiency and will alert the operators in the event of a malfunction through the use of visual and auditable alarms. This includes malfunctions of the bulk fuel tank level indications and of the hydrocarbon interceptors, and any fuel bund or tank leaks.

The EPMS monitors the total fuel use as required for the GHG Permit. The EPMS will also control the changeover in electrical supply from the grid to the emergency back-up generators in the event of an outage.

8.2 EMERGENCY RESPONSE PLAN

An on-site Emergency Response Plan (ERP) has been developed for the data storage facilities and will be updated to incorporate any requirements of the Licence and future development. The ERP details the required actions to be undertaken in the event of an incident on site and will cover all possible emergency scenarios including fires, explosions, natural disasters, chemical spills, terrorism, etc. The ERP also includes the arrangements for contacting the emergency services and the relevant ADSIL personnel. The ERP is reviewed regularly by the Regional Environmental Manager and Regional Safety Manager and is updated as required.

It should be noted that the Installation will operate 24/7, 365 days a year. There is therefore no additional specific procedure required for emergencies outside normal working hours.

In addition to the ERP there is a disaster response procedure which provides instruction for the Disaster Response Action Team (AWS DRT).

8.3 STANDARD OPERATING PROCEDURES

Standard Operating Procedures (SOPs) have been developed for ADSIL sites and these will be continuously updated in conjunction with the EMS. These address all the relevant environmental matters onsite including, but not limited to;

- Spill prevention and response procedures,
- Pollution management and prevention,
- Waste Management,
- Fuel delivery,
- Emergency electricity supply and changeover procedures.

8.4 PREVENTATIVE MAINTENANCE

Preventative Maintenance (PM) is undertaken on mechanical moving parts equipment and electrical equipment including pumps, AHUs, humidifiers, generators, power transformers, etc. This maintenance includes all the regular and systematic tasks that ADSIL will carry out to ensure that the equipment is in an acceptable working condition, delivering required performance and expected durability.

Enterprise Asset Management (EAM) is the software platform ADSIL Infrastructure uses to maintain and manage its mechanical, electrical, and plumbing (MEP) equipment. This platform enables Infrastructure teams to do a variety of tasks:

- Track and coordinate planned and unplanned maintenance,
- Track the full life cycle of critical data center assets,
- Identify defective equipment through mechanisms like field service bulletins (FSBs),
- Provide tracking for DCEO spare part inventory,
- Provide key insights for equipment failure, root cause analysis (RCA), and total cost of ownership (TCO).

The EAM team maintains the EAM system – the EAM team objective is to create and maintain a reliable maintenance platform that improves operational excellence, reduces both equipment failures and maintenance costs, and promotes standardized processes that support operations in ADSIL data centers.

A Maintenance Plan is developed before commissioning of equipment to include all the operations to be carried out in detail, as well as the means to be used and the estimated duration of the operations. The plan shall also include periodic assessments of the state of the installation and proposals for improvement.

In addition to the PM, regular inspections of all infrastructure onsite. The twice a shift inspection of infrastructure ensures that any issues are dealt with if they arise.

8.5 WASTE MANAGEMENT

Most of the wastes generated at the Installation will be non-hazardous. Waste operations will involve proper segregation and management of waste.

All waste leaving site will be recycled or recovered, except for those waste streams where appropriate recycling facilities are currently not available and the waste is disposed of as a last resort. All waste leaving the Site will be transported by suitably permitted contractors and taken to suitably registered, permitted and / or licenced facilities. All waste leaving the Site will be recorded and copies of relevant documentation maintained.

Any waste classed as hazardous will be stored in a designated area (suitably bunded, where required) and will be removed off site by a licensed hazardous waste contractor(s).

Waste oil, filters, waste batteries and waste sludge from the hydrocarbon interceptors will be removed directly by the maintenance contractors as and when generated; however, the Operator will appropriate permits and waste documentation, compliant with relevant legislation are provided by the licensed waste contractors.

Waste SOPs are in place for the operation of the data storage facilities. This will ensure the proper management and recycling of wastes generated at the facilities. The waste SOPs will enable the facility to contribute to the targets and policies outlined in the *Eastern-Midlands Region Waste Management Plan 2015-2021.*

8.6 ENERGY MANAGEMENT

Energy management forms an integral part of the Installation's management. Measures are in place to minimise energy use as far as possible. ADSIL is committed to continually improving their energy efficiency and reducing their carbon footprint.

A BMS/EPMS is in place to track the operation of critical sub-units and report back on energy efficiency of each section.

The Energy Efficiency Management System (ENEMS) that will be developed for the Site in accordance with BAT will set out the energy targets for the specific facility on an annual basis along with the responsible party; and targets will be assessed at the end of each year and reported in the Annual Environmental Report for the facility. Energy efficiency learnings are shared between sister facilities in Ireland and Europe.

The ENEMS will include Key Performance Indicators (KPIs) for energy efficiency. The efficient use of energy will be monitored as part of the Site's continuous improvement programme to ensure all colleagues on site actively participate in the programme. Key process monitoring will be carried out to monitor the plant performance including water usage, energy consumption (diesel and electricity), hours of operation and power generated. The energy monitoring via the BMS will be accessible in real time so that future decisions on energy management/optimisation can be made on a fully informed basis.

Electrical performance monitoring in respect of Power Usage Effectiveness (PuE) of the Site is undertaken on a continuous basis. PUE is an indicator for measuring the energy efficiency of a data centre. PuE is measured as a ratio of total amount of energy used by a computer data storage facility to the energy delivered to computing equipment. An ideal PUE is 1.0. Anything that isn't considered a computing device in

a data storage facility (i.e., lighting, cooling, etc.) falls into the category of facility energy consumption.

Further details of energy efficiency measures on site are included in Attachment-4-7-2 of this Application.

8.7 FIRE MANAGEMENT

A system is provided for detection, alarm, and fire suppression to enhance life safety and protection of property by the detection of fire, enabling an audio/visual alarm to be given such that emergency actions may be taken fully compliant with Irish and EU regulations and in accordance with the insurers' requirements.

The data storage facilities are equipped with automated fire detection systems (heat and smoke). These are connected to a main fire panel in the security office which is manned at all times. In the event that a fire is detected, the fire panel will display the location of the detected fire. Once detected the location of the potential fire will go into an alarm state. The fire detection and alarm systems are connected to the sprinkler system, and these will be triggered in the event of a fire.

The fire detection and alarm systems are/will be subject to routine checks by site personnel and are/will be inspected and tested by the external service provider on a regular basis.

A firewater retention risk assessment is included with this application documentation Attachment-9-2-3-FWRA.

9.0 CESSATION OF ACTIVITY

9.1 SITE CLOSURE

A certain amount of environmental risk is associated with the cessation of any licensable activity (site closure). An outline Site Closure report has been provided in Section 9 of this application. Details outlined in the Site Closure Plan include the following:

- Decommissioning of equipment will involve disconnecting all electrical connections and decommissioning the IT Hardware, the diesel fired generators, the transformers, and all other relevant operational equipment at the installation,
- The diesel generators, transformers, servers, and other equipment will be removed and sold to a third party or scrapped depending on the age/condition at the time of closure,
- Hazardous materials stored in chem-stores, raw materials in the operations area, and any other materials on site will either be returned to the suppliers or disposed of as hazardous waste by a suitable waste contractor; and
- All non-hazardous waste will be sent for appropriate recycling, recovery, treatment, or disposal.

It is anticipated that the EPA will impose suitable Conditions to the IE Licence once granted to ensure the proper closure of the activity with aim of protecting the environment.

A complete Baseline Report for the Site has been produced and included in Attachment-4-8-3 Complete Baseline Report. The baseline report provides conditions of the Site prior as it existed prior to the construction and operation of the facility.

On the basis of the detailed phase II site investigation undertaken prior to construction of the ADSIL facility and an assessment of source-pathways-receptors, the following conclusions have been made:

9.2 BASELINE REPORT

A complete Baseline Report for the Site has been produced and included in Attachment-4-8-3 Complete Baseline Report. The baseline report provides conditions of the Site prior as it existed prior to the construction and operation of the facility.

There is instructive site investigation information available for the southern section and mid-section of the ADSIL site. There is no site investigation information available for the northern section of the ADSIL site.

Based on the site specific data available from the site investigations undertaken, prior to the construction of the ADSIL facilities Buildings A and C an assessment of source-pathways-receptors has been completed. The following conclusions have been made:

- Bedrock is greater than 8.0 mbgl and there is a proven depth of boulder clay greater than 6.0 meters.
- A review of the available soil and water quality confirms that the majority of the southern section of the site is free from hydrocarbon contamination.
- There was evidence of residual hydrocarbon contamination beneath part of the southern section of the site in 2008. However, this is localised contamination that is residual to a known incident that was subject to remedial works and does not pose a risk to human health or environmental receptors or prevents the site from being used for commercial purposes.
- The remedial works completed in the southern section of the ADSIL site in 1998/1999 were completed in the north-western section which included the installation of a recovery sump and the removal of an UST at the northern boundary of the site. Boreholes completed in the 2008 intrusive investigation confirmed the soil and groundwater downgradient of the historical incident remained free of hydrocarbon contamination. Borehole WS-10 identified localised residual hydrocarbon contamination at the location of the former UST. Made ground was encountered to a greater depth (3.3 mbgl) at this location than across the site which is consistent with a localised excavation. Residual contamination was also identified at 2.6 mbgl at this location which is at a greater depth than the low permeability boulder clay encountered across the site. Both localised areas of hydrocarbon contamination are being naturally attenuated by the boulder clay.
- Based on regional information and the available site information the underlying bedrock aquifer is protected from the identified residual hydrocarbon contamination and any further potential contamination arising from the sites in the future.
- There is only bulk diesel storage proposed for the facility. However, the risk prevention measures planned at the facility significantly reduce the potential for an environmental impact to soil or water to occur. These measures include bunded or double contained vessels, dual-contained fuel pipe system (when underground), and spill management procedures.

- Source-pathway-receptor linkages were assessed for the bulk storage areas. It was concluded that there are no direct pathways to either the soil and groundwater environment. Interceptors are installed on the surface water drainage. A leakage from a bulk tank would be fully contained in the designated bund or the double skin lining of the tank, with leaks during delivery fully contained within the continuous hard stand delivery area. Any leakage outside of the delivery area would be contained within the drainage system.
- Based on the assessment of the source-pathway-receptor linkages, there no potential for impact of any downgradient Natura site.

9.3 ALTERNATIVES

9.3.1 Process alternatives

In terms of technology, the Installation will employ similar data server technology that is used by the Operator at their other facilities, in the greater Dublin area and around the world, and represents state of the art technology.

Alternative technologies are considered on an ongoing basis by the Operator as a part of each of its designs based on many factors including technical feasibility, environmental impact, efficiency, security, reliability, and cost.

The Operator is committed to continually assessing and improving this technology particularly with respect to minimising power and water consumption, in accordance with the goals of Irelands Framework for Sustainable Development *'Our Sustainable Future'*. The operator's designs are constantly evolving, and hardware is chosen with energy efficiency central to the decision-making process.

High efficiency EC direct drive fans will be used in all air supply and extract systems serving the data storage rooms. Also, the office air conditioning shall be served by a variable refrigerant flow (VRF) refrigerant system. Typically, the energy efficiency of a VRF system will exceed that of traditional air-cooled chillers by 15-25%.

9.3.2 Alternative Mitigation Measures

The mitigation measures for the environmental aspects considered under this IE licence application (if relevant) are set out in the accompanying emissions impact assessment reports within Section 7 of this licence application.