Amazon Data Services Ireland Ltd.

Operational Report

Attachment-4-8-1

April 2022

Licence Application (LA009978)

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 on Cruiserath Road, Dublin 15. The site context is shown on Site Location Plan 21_123H-CSE-00-XX-DR-C-0001 - Overall Site Location Plan included with this application. The application relates to the entire facility that is c. 26.05 hectares (ha) in total ('the Site').

The Installation comprises 3 no. two-storey data storage installation buildings (Buildings A, B and C) and 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 storm water drainage network, attenuation basin, internal roading network, and site landscaping. The site includes the Cruiserath 220 kV Substation. The site layout and main buildings is shown on Site Layout Plan Drawing Ref: 21_123H-CSE-00-XX-DR-C-0002-Overall Site Plan included with this application.

The installation requires a continuous supply of electricity to operate. During normal operation, 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 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 once fully operational will have installed a total of 70 no. 6.49 MW_{th} diesel powered emergency back-up generators; 2 no. 2.19 MW_{th} diesel powered emergency back-up generators, and 2 no. 0.520 MW_{th} diesel powered fire sprinkler 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 facility.

The combined thermal input from the emergency generators once operational is 459.72 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.

Once fully operational, up to 50 full time employees will be present on site during the day in each building, including external staff, maintenance contractors and visitors, as required. Staff will be present on a shift basis, so numbers will vary throughout the day. Up to 7 no. staff will be night shifts each day per building. Operational hours are 24 hours a day, 7 days a week.

Development Phasing

Construction of Phase 1 of the Installation commenced in Q3 2019. This comprised the construction of Building A, as well as 2 no. attenuation basins and site landscaping. Construction works were completed in Q3 2020.

Phase 2 of the Installation commenced in Q3 2021 with the construction of the data centre (Building B) located to the north of Buildings A. Building B is anticipated to be operational in Q3 2022.

Phase 3 of the Installation is anticipated to commence in Q3 2023 with the construction of the data centre (Building C) located to the north of Buildings B. Building C is anticipated to be operational in Q2 2024.

2.0 SITE CONTEXT

The Installation is located on a site of c. 26.05 hectares and is located along the R121 Cruiserath Road, Dublin 15. The Installation is built on a greenfield site and is relatively flat though it slopes gently northwards. An existing ESB Wayleave, relating to existing underground power lines, is present along the northern boundary.

The site was previously used for agricultural crops. Much of the surrounding land has been developed in the past 10-15 years, mainly for industrial use (to the east and south) and residential (to the west). The site is not located directly adjacent to any areas of national or local environmental sensitivity/designation.

The eastern boundary of the Site is adjacent to an existing pharmaceutical facility, Bristol-Myers Squibb (herein referred to as BMS). The site is bound to the west by the Cruiserath Road R121 (dual-carriageway) and residential developments and to the north by undeveloped land. Immediately west of this undeveloped land is Cruiserath Drive and the Carlton Hotel. Blanchardstown village is located c. 2.5 km to the south. The closest residential properties are located c. 160m west of the proposed site boundary (across the R121).

The closest occupied residential properties are located c. 200m west of the Site boundary along the Cruiserath Road. The surrounding 1 km of the Site includes IE and IPC Licenced sites including:

- Alexion Pharma International Operations Unlimited Company (P1030), located to the south of the Site in College Business & Technology Park
- Mallinckrodt Pharmaceuticals Ireland Limited (P1060) located to the east in College Business & Technology Park
- Swords Laboratories Unlimited Company Trading As Bristol Myers Squibb Cruiserath Biologics (P0552) located to the east in Cruiserath Road
- Ipsen Manufacturing Limited (P0117) located to the east in Blanchardstown Industrial Park.

The site location and wider context is presented in 21_123H-CSE-00-XX-DR-C-0001 - Overall Site Location Plan included with this application.

3.0 PLANNING STATUS

The Installation received Final Grant of planning permission from Fingal County Council (FCC) and An Bord Pleanála (ABP) under the separate applications listed below:

- Building A; grant of permission on 25 April 2017 (FCC Reg. Ref.: FW17A/0025 and final grant of permission on 16 January 2018 under ABP Reg Ref. L06F.248544).
- Building B and C; final grant of permission on 27 August 2019 (FCC Reg. Ref.: FW19A/0087).

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 the most relevant development class in the context of the proposed Project under Part 2, Schedule 5 is Class 10(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. 26.05 hectares and so exceeds the limit, quantity or threshold set out in Part 2, Schedule 5 is Class 10(a).

An Environmental Impact Statement (EIS) relating to Building A was prepared by AWN Consulting et. al. dated March 2017 with addendum dated September 2017. This EIS was previously submitted to FCC and ABP and is included with this IE Licence application as Attachment-6-3-6-EIS-Planning-Jan-2018 and Attachment-6-3-6-EIS-Addendum-Jan-2018. An Environmental Impact Assessment Report (EIAR) relating to Building B and Building C, was prepared by AWN Consulting et. al. dated May 2019. This EIAR was previously submitted to FCC and is included with Attachment 6-3-6-EIAR-Aug-2019 of the IE Licence application).

The Installation is constructed and operated in accordance with FCC Planning Ref. FW17A/0025 and FW19A/0087, therefore the EIS/EIAR (Attachment-6-3-6-EIS-Planning-Jan-2018, Attachment-6-3-6-EIS-Addendum-Jan-2018, Attachment-6-3-6-EIAR-Planning-Aug-2019) is relevant to this IE License activity.

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. Any further information, including reports and advice, relating to the environmental impact assessment of the proposed activity is made available and contained within Section 7 of this licence application.

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 in Table 3.1 relate to the history of the overall site.

Table 3.1 *Additional Planning Permissions Outside of Main Activity*

Application Details	Description of Development
Applicant: ADSIL Reg. Ref.: FW19A/0177 Final Grant Date: 30 Jan 2020	Underground cable route originating from the existing Macetown ESB station (on Damastown Avenue in the townland of Macetown Middle) , running in an easterly direction along Damastown Avenue and the R121 (in the townlands of Macetown Middle, Macetown South, Tyrrelstown, Cruiserath and Buzzardstown), to a permitted medium voltage (MV) substation located within a permitted data storage facility (An Bord Pleanála, Reg. Ref.:PL06F.248544 / FCC Reg. Ref.: FW17A/0025) in the townlands of Cruiserath and Tyrrelstown.
Applicant: ADSIL Reg. Ref.: SID/01/20 Final Grant Date: 09 Oct 2020	220kV GIS Substation - Electricity Transmission Development The 220kV GIS substation is located on lands to the north of the data storage facility permitted under An Bord Pleanála Reg. Ref PL06F.248544 / Fingal County Council Reg. Ref. FW17A/0025, to the west of the data storage facilities permitted under Fingal County Council Reg. Ref. FW19A/0087, and within an overall landholding bound to the south by the R121 / Cruiserath Road, to the west by the R121 / Church Road and to the north by undeveloped land and Cruiserath Drive, Dublin 15.
Applicant: MIK Developments Reg. Ref.: FW20A/0164 Final Grant Date: 30 Nov 2020	The construction of a medium voltage (MV) substation. The MV substation building has a total gross floor area of c. 30 sq.m, and an overall height of c. 4 meters. The development includes the provision of electrical connections associated with the MV substation, along with all associated hard and soft landscaping, services, and all ancillary works. All on a site with an area of 0.33 hectares. The site is bound to the south by the R121/Cruiserath Road, to the west by the R121/Church Road and to the north by Cruiserath Drive.
Applicant: MIK Developments LLC Reg. Ref.: FW21A/0039 Final Grant Date: 02 Jun 2021	The development comprises the provision of artificial lighting to the substation compound, transformers, and Gas Insulated Switchgear (GIS) building permitted under An Bord Pleanála ref: 30683420 and to the client control building permitted under An Bord Pleanála ref: PL06F.248544/ Fingal County Council Reg. Ref; FW17A/0025, along with all associated site and ancillary works.

4.0 DESCRIPTION OF ACTIVITY

4.1 SITE OVERVIEW

The Installation 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 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 bay, stores, office, and staff facilities. The gross floor area of the building including ancillary elements is c. 20,739 sq.m. The building includes mechanical plant at roof level of the main building with associated visual screening. The external generator yard comprises 26 no. diesel powered emergency back-up generators, with associated diesel fuel day tanks and belly tanks. Diesel fuel is provided to the fuel tanks from the Top Up tank to the southwest of Building A.

Building B consists of a 2-storey building comprising electrical rooms for electronic operations, loading bay, stores, office, and staff facilities. The gross floor area of the building including ancillary elements is c. 21,705 sq.m. The building includes mechanical plant at roof level of the main building with associated visual screening. The external generator yard comprises 22 no. diesel powered emergency back-up generators, and 1 no. diesel powered emergency back up admin generator, with associated diesel fuel belly tanks. Diesel fuel is provided to the belly tanks from the Top Up tank to the west of Building B.

Building C consists of a 2-storey building comprising electrical rooms for electronic operations, loading bay, stores, office, and staff facilities. The gross floor area of the building including ancillary elements is c. 21,705 sq.m. The building includes mechanical plant at roof level of the main building with associated visual screening. The external generator yard comprises 22 no. diesel powered emergency back-up generators, and 1 no. diesel powered emergency back up admin generator, with associated diesel fuel day tanks and belly tanks. Diesel fuel is provided to the day tanks from the Top Up fuel tank to the west of Building B.

<u>In addition to the 3 no. data storage facilities, the Installation also includes:</u>

- An electrical Gas Insulated Switchgear (GIS) 220 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. top up diesel fuel tank 1comprising 1 no. 40,000 L tanks within a concrete bund located in the southwest of the Site associated with Building A;
- 1 no. top up diesel fuel tank 1comprising 1 no. 40,000 L tanks within a concrete bund located in the west of the Site associated with Building B and Building C;
- 1 no. 400 m^3 fire sprinkler tank, and associated pump house including 3 no. diesel powered fire sprinkler pumps for Building A;
- 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

The Installation is supported by diesel-powered emergency back-up generators that are located in the generator compound 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. There is no interconnectivity between the generators of different buildings.

The individual generators are housed within containers with various designed control measures in place including acoustic attenuation, exhaust silencers. Diesel is stored locally in belly tanks and/or day tanks within each containerised generator.

The individual double skinned day tanks at the emergency back-up generators have level gauges (high and low) 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 and 147 car and motorcycle parking spaces, 65 bicycle parking spaces,
- security hut and security fencing; and
- Drainage infrastructure including 3 no. attenuation basins.

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 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: Free Cooling uses outside air and Evaporative Cooling mode or 'Adiabatic Cooling' uses water from the mains supply as the cooling media. Duty and standby units are in place to ensure cooling is available at all times.

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 the year. During elevated external temperatures particularly during summer months, 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 stormwater drainage network.

The evaporative cooling water for the Installation 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 drainage network, furthermore this water diluted in the Installations' stormwater attenuation systems.

The recirculated evaporative cooling water in the humidified water storage tanks is drained down typically every 7 days to the stormwater drainage network to prevent legionella growth in the system. The drained down cycle is sequential to prevent overwhelming the drain capacity of the facility.

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 X and Building Y 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 are 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 the Installation 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 220 kV Substation

The power requirements for the Installation are provided via a direct connection the 220 kV Gas Insulated Switchgear (GIS) Substation Compound located in the west of the Site approved under ABP Planning Ref 306834-20.

The 220 kV Substation (known as Cruiserath) and MV Substation are shown on the Site plan ref 21_123H-CSE-00-XX-DR-C-0002 - Overall Site Plan. In addition there is a medium voltage (MV) Substation approved under FCC Planning Ref. FW20A/0164 located to the south east corner of the Site. The MV Substation is temporary connection for the Site until the Cruiserath Substation is completed.

EirGrid operates the transmission system (TSO) while ESB Networks is responsible for construction, maintenance, and repairs (TAO) under the direction of EirGrid. For the Cruiserath substation, EirGrid will operate transmission stations remotely from their control centres. However, ESB Networks will carry out all local operations on Eirgrid's behalf. 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).

The western part of the Substation compound accommodates a two storey 220kV GIS substation building. The eastern part of the compound accommodates a transformer compound, with four transformers, and a single storey client control building which is owned and operated by ADSIL.

In addition to the mains connection, provision for an array of PV panels will be made to generate on site renewable energy up to a peak of 73.15kWe per building, to comply with Nearly Zero Energy Building (nZEB) requirements. The on-site renewable electricity generation will be back-fed to the electrical general supply for the building, serving lighting, office area general services and office IT equipment.

4.4 WATER, SEWER, AND STORMWATER DRAINAGE INFRASTRUCTURE

4.4.1 Potable 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-east corner of the Installation in accordance with the FCC Planning Ref. FW17A/0025 and FW19A/0087 and ABP Ref.

L06F.248544. 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 development requires an average demand of 1.0 litres/sec whilst peak water demand is 6 litres/sec. 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 is provided at each building. These humidified water storage tanks support the evaporative cooling function of the building's AHUs. Pumps will supply water to the data storage facilities from the humidified water storage tanks.

On-site water storage is provided in 6 no. 59 m^3 steel humidified water tanks on site that have a combined volume of 354 m^3 to support the cooling functions of the building's AHUs. There is no addition of water treatment chemicals applied, the water tanks are emptied once annually.

When constructed the facility has a demand for general potable supply, for cleaning, drinking and sanitary facilities, cooling equipment, and for firefighting. This is sourced from a metred a 500mm ductile iron watermain fed from a pump house off the R121 road, south of the Site.

Fire water

A fire water ring main will be installed around the Site to provide firefighting water to hydrants to be used in the event of a fire. The development will include fire water sprinkler pump room and adjacent storage tank 400 m^3.

A 250-300mm fire ring main is in place to provide firefighting water to the Site in accordance with the FCC Planning Ref. FW17A/0025 and FW19A/0087 and ABP Ref. L06F.248544. The sprinkler pump house is equipped with 2 diesel fired sprinkler pumps) for the supply of firefighting water.

4.4.2 Stormwater Drainage Systems

Rainwater runoff from impermeable areas of the Site will be collected via the onsite stormwater drainage network in accordance with FCC Planning Ref. FW17A/0025 and FW19A/0087 and ABP Ref. L06F.248544.

This network will convey the stormwater collected from buildings and roads via hydrocarbon interceptors to 2 no. offline stormwater detention basins and 1 no. online stormwater detention basin (See Drawing 21_123H-CSE-00-XX-DR -C-1100). The attenuated stormwater discharges offsite at 1 no. Emission Points (SW1) at greenfield runoff rates.

Attenuation Basin 1 (1,745 m^3 capacity), located to the south of Building A is an offline attenuation basin that serves Building A and the surrounding road network. There is 1 no. hydrocarbon interceptor located upstream of the inflow into Attenuation Basin 1 to ensure the removal of hydrocarbons prior to stormwater entering the basin. Located downstream of Attenuation Basin 1 and prior to discharge at SW1, the stormwater network includes 1 no. hydrodynamic solid separator, and 1 no. stormwater flow control device to ensure the removal of debris and to control to the maximum permissible discharge flow rate off site.

Attenuation Basin 2 (1,379 m^3 capacity) is located to the north of Building C of the Site is an online attenuation basin that serves Building B and C and the surrounding road network. There is 1 no. hydrocarbon interceptor located upstream of the inflow into Attenuation Basin 2 to ensure the removal of hydrocarbons prior to stormwater entering the basin. Located immediately downstream of Attenuation Basin 2 and prior to the connection to the main site stormwater network (and discharge at SW1) there is 1 no. stormwater flow control device to control flow to the maximum permissible discharge flow rate into the Site stormwater network.

For Building B and C there is a separate pipe networks for roof water drainage and a separate road/car park drainage both of which discharge to the surface water Attenuation Basin 2. Roof drainage will not discharge to the bypass separator as it is conveyed by means of a separate pipe network which connects to the road drainage network downstream of the bypass interceptor. The separation of roof drainage from the road drainage within the development site assists with the specification and operation of pollution control devices hydrocarbon interceptor as outlined above.

Attenuation Basin 3 (380 m^3 capacity) is located to the west of the Site is an offline attenuation basin that serves the electrical substation, security building, and the surrounding road network. There is 1 no. hydrocarbon interceptor located upstream of the inflow into Attenuation Basin 3 to ensure the removal of hydrocarbons prior to stormwater entering the basin. Located immediately downstream of Attenuation Basin 3 and prior to connection to the main site stormwater network (and discharge at SW1) there is 1 no. hydrodynamic solid separator, and 1 no. stormwater flow control device to ensure the removal of debris and to control to the maximum permissible discharge flow rate into the Site stormwater network.

All stormwater from the Site stormwater network outfalls at 1 no. emission point (SW1) that discharges attenuated flows to the existing 900mm Fingal County Council (FCC) network within the R121 Regional Road (Cruiserath Road) to the south-east of the Site. This network is shown on Drawing 21_123H-00-XX-DR-C-1100 Surface Water Layout Plan.

The FCC network flows to the Baldonnel Stream, and eventually discharges to the Tolka River. The Tolka River is located to the south of the Site; and flows 11.6 km east, to the Liffey Estuary transitional water body, and ultimately the Dublin Bay.

Diesel Top Up Tank Bund and Unloading Bay at Building B and C

Drainage of rainwater from the top up tank bund and unloading bay at Building B and C is directed to stormwater, and connects to the stormwater main at emission point SW1.

The top up tank bund and fuel unloading bay associated with Building B and C have sump with pumping system that discriminates between hydrocarbons and water. The sump pump activates as required to remove only water from the bund, when hydrocarbons are detected the sump pump shuts off. There are hydrocarbon level alarms that will send signal to the BMS to alert EOTs if the sump is full of hydrocarbons. The sump pump for the top up tank bund at Building B and C connects to stormwater via hydrocarbon Interceptor. The hydrocarbon interceptors are equipped with an oil warning system which is connected to the BMS to alert EOTs to warn of high hydrocarbon, liquid and silt levels in the separator.

Evaporative Cooling Water

Evaporative cooling water from the AHUs discharges to the stormwater drainage network. This is recirculated mains water that has been through the AHUs only. There is no addition of water treatment chemicals and therefore the water is of sufficient quality to be discharged to the stormwater drainage network.

4.4.3 Wastewater Drainage System

Domestic Effluent

Domestic effluent arising from occupation of the Site, including the transformer compound and control building will be discharged the public foul sewer (at Emission Point SE1). Refer to Drawing 21_123H-CSE-00-XX-DR-C–1200 for the foul drainage layout. The foul water connection to the public foul sewer is in accordance with the FCC Planning Ref. FW17A/0025 and FW19A/0087 and ABP Ref. L06F.248544.

A gravity piped foul drainage network comprising 225 mm uPVC pipes conveys effluent from internal sanitary locations and outfall into the external 375mm IDA foul network. The outfall into the existing foul network will be at one location, SE1.

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 coveys the wastewater for final treatment and disposal at Ringsend Wastewater Treatment Plant (WWTP) in Dublin.

Diesel Top Up Tank Bund and Unloading Bay at Building A

Drainage of rainwater from the top up tank bunds and unloading bay at Building A is directed to foul sewer and connects to the foul main at emission point SE1.

The top up tank bund and delivery bay associated with Building A has a sump with pumping system that discriminates between hydrocarbons and water. The sump pump activates as required to remove only water from the bund, when hydrocarbons are detected the sump pump shuts off. There are hydrocarbon level alarms that will send signal to the BMS to alert EOTs if the sump is full of hydrocarbons. The sump pump for the top up tank bund at Building A connects to foul water via A hydrocarbon interceptor. The hydrocarbon interceptors are equipped with an oil warning system which is connected to the BMS to alert EOTs to warn of high hydrocarbon, liquid and silt levels in the separator.

Substation and Transformer Compound

There is one transformer compound onsite located at the Cruiserath Substation, the drainage from the transformer compound is directed to foul sewer and connects to the foul main to discharge at emission point SE1.

Drainage from the Cruiserath Substation transformer compound is equipped a with hydrocarbon interceptor. The location of these is illustrated on Drawing 21_123H-CSE-00-XX-DR-C–1200. The hydrocarbon interceptors are equipped with an oil warning system which is connected to the BMS to alert EOTs to warn of high hydrocarbon, liquid and silt levels in the separator.

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 5.1:

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 are located across the Site in highly visible and mobile units. These include absorbent socks, mats, pads, disposable bags, and PPE. Spill kits are 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 additional refrigerants are stored onsite. 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 Top Up diesel tanks, belly tanks and day tanks.

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 1,279,700 litres, 1,279.7 m^3 or approximately 1,100 tonnes (assumed density of 0.86 kg/l). The tanks on site are filled to 80% capacity under normal conditions; therefore, the total diesel storage on site is 1,023,760 litres, 1,023.8 m^3 or approximately 880 tonnes (assumed density of 0.86 kg/l).

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

Diesel Top Up Tank

Diesel is supplied to Building A generators from the 1 no. 40,000 L top up tank located to the south east of Building A; the bund has a capacity of 54.86 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 top up tank bunds are constructed of suitable concrete and have undergone testing for integrity during the commissioning phase.

Diesel is supplied to Building B and C generators from the 1 no. 40,000 L top up tank located to the east of Building B; the bund has a capacity of 54.86 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 top up tank bunds are constructed of suitable concrete and will undergo testing for integrity during the commissioning phase.

Drainage of rainwater from the top up tank bunds and unloading bay at Building A is directed to foul sewer and connects to the foul main at emission point SE1.

The top up tank bund and delivery bay associated with Building A has a sump with pumping system that discriminates between hydrocarbons and water. The sump pump activates as required to remove only water from the bund, when hydrocarbons are detected the sump pump shuts off. There are hydrocarbon level alarms that will send signal to the BMS to alert EOTs if the sump is full of hydrocarbons. The sump pump

for the top up tank bund at Building A connects to foul water via hydrocarbon Interceptor. The hydrocarbon interceptors are equipped with an oil warning system which is connected to the BMS to alert EOTs to warn of high hydrocarbon, liquid and silt levels in the separator.

Drainage of rainwater from the top up tank bunds and unloading bay at Building B and C is directed to foul sewer and connects to the stormwater main at emission point SW1.

The top up tank bund and fuel unloading bay associated with Building B and C have sump with pumping system that discriminates between hydrocarbons and water. The sump pump activates as required to remove only water from the bund, when hydrocarbons are detected the sump pump shuts off. There are hydrocarbon level alarms that will send signal to the BMS to alert EOTs if the sump is full of hydrocarbons. The sump pump for the top up tank bund at Building B and C connects to stormwater via hydrocarbon Interceptor. The hydrocarbon interceptors are equipped with an oil warning system which is connected to the BMS to alert EOTs to warn of high hydrocarbon, liquid and silt levels in the separator.

The top up fuel tank itself is fitted with automated level gauges and the online readings from these gauges are fed back into the facility's BMS/EPMS. The top up tank has 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 top up tank will take place within the designated fuel unloading bays under strict Standard Operating Procedures. Diesel will be piped from the top up tank to an internal double-skinned day/belly tanks at each of the back-up generator units. Diesel fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system). All pipelines are integrity tested following installation by the vendor.

Building A

Diesel is piped from the top up tank at Building A to internal double-skinned belly tanks at each of the back-up generator units. Diesel is then suppled from the belly tank to the individual double-skinned day tank within the generator container.

Each of the 26 no. 6.49 MW_{th} emergency backup generators at Building A are accompanied by a double skinned belly tank (16,000 litres each) and double skinned day tank (1,000 litres each) for immediate supply to the generator. These belly and day tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

Furthermore, 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 sprinkler pump.

Building B and C

Diesel is piped from the top up tank at Building B and C to internal double-skinned belly tanks at each of the back-up generator units. Diesel is then suppled from the belly tank to the individual double-skinned day tank within the generator container.

Each of the 22 no. 6.49 MW_{th} emergency backup generators at Building B, and 22 no. 6.49 MW_{th} emergency backup generators at Building C are accompanied by a double

skinned belly tank (16,000 litres each) and double skinned day tank (1,000 litres each) for immediate supply to the generator.

The 2 no. 2.19 MW_{th} emergency backup administration generators each have a double skinned day tank (4,700 litres) for immediate supply to the generator. The belly tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

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 Resource use at the Installation

Resource	Estimated quantity per annum
Electricity (purchased) (max consumption)	727,080 MWh
Total Electricity (generated and used) (max consumption)	727,080 MWh
Electricity (generated and exported)	N/A
Natural Gas	N/A
Diesel (Gas Oil)	987.92 tonnes annually
Water (Public Supply)	22,377 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 OR 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).

The Top Up tank bunds are equipped with hydrocarbon probes in the bund sump which detects diesel in the bund. This triggers closure of the sump discharge and sends an alarm signal to the BMS.

The Top Up tank (See section 6.1,1) is bunded to a capacity that 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. Drainage from the bunds is diverted for collection and safe disposal.

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 will be 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 to alert in the event of a leak from the generator fuel tank or lubricating oil tank. 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.

7.0 EMISSIONS AND ABATEMENT TREATMENT SYSTEMS

This section describes the emissions from the unit 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_123H-CSE-00-XX-DR-C–2000 Air Emission Layout Plan.

- Building A: 26 no. 6.49 MW_{th} diesel powered emergency back-up generator stacks with a height of 20 m above ground level.
- Building B: 22 no. 6.49 MW_{th} diesel powered emergency back-up generator stacks with a height of 20 m above ground level. 1 no. 2.19 MW_{th} diesel powered emergency back-up administration generator.
- Building C: 22 no. 6.49 MW_{th} diesel powered emergency back-up generator stacks with a height of 20 m above ground level. 1 no. 2.19 MW_{th} diesel powered emergency back-up administration generator.
- Sprinkler Pumphouse associated with Building A: 2 no. 0.52 MW_{th} diesel powered emergency back-up fire sprinkler pumps.

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

The environmental impact of these minor emissions are 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 top up tank and belly at the facility each include two-way normal pressure (breather) vents. These produce minor diesel vapour (trace) emissions:

- 2 no. Diesel Top Up Tank Emergency Relief Vents (1 per each top up tank).

- 72 no. Belly Tank Emergency Relief Vents 1 per each belly tank).

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 one location, one to the south of the Site (emission point SE1). This outfall (SE1) will cater for foul flows from Building A, B and C as well as the welfare facilities associated with the Cruiserath Substation.

The emission discharge point is labelled as SE1 on the Foul Water Drainage Drawing 21_123H-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 or process water produced from the facility. This will be treated offsite at the Ringsend Wastewater Treatment Plant.

Rainfall which passes through the back-up generator exhaust stacks will discharge to a hydrocarbon interceptor for Building B and C before connecting to the foul drainage network. The hydrocarbon interceptor is located downgradient of the foul drain which collects the rainwater which passes through the backup generator stacks. The location of these are illustrated on Drawing 21_123H-00-XX-DR-C-1200.

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.

The rainwater management system for the top up tank and unloading bay at Building A and the transformer compounds at the Cruiserath Substation are equipped with hydrocarbon interceptors to prevent hydrocarbons entering the foul network. The location of these are illustrated on Drawing 21_123H -CSE-00-XX-DR-C-1200. The hydrocarbon interceptors are equipped with level detection sensors which sends an alarm signal to the BMS to alert EOTs to warn of high hydrocarbon, liquid and silt levels in the separator.

As there are no food preparation areas within the data storage 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

As there is no separate process and foul water network on site, no monitoring of the overall sewer discharge is proposed.

The emission / offsite discharge points are labelled SE1 on the Foul Water Drainage Drawing 21_123H-CSE-00-XX-DR-C-1200 Layout included with the application.

7.3 SURFACE WATER EMISSIONS

The emissions to storm sewer consist of stormwater runoff from building roofs, yards and the road network, and residual evaporative cooling water (mains water that has passed through the cooling equipment).

The Site stormwater is attenuated prior to outfall, within 3 no. Attenuation Basin(s) located on the Site as described in Section 4.4.2. All stormwater from the Site stormwater network outfalls at 1 no. emission point (SW1) that discharges attenuated flows to the existing Fingal County Council (FCC) network in the R121 Regional Road (Cruiserath Road) to the south-east of the Site. This network is shown on Drawing 21_123H-00-XX-DR-C-1100 Surface Water Layout Plan.

The FCC network flows to the Baldonnel Stream, and eventually discharges to the Tolka River. The Tolka River is located to the south of the Site; and flows 11.6 km east, to the Liffey Estuary transitional water body, and ultimately the Dublin Bay.

7.3.1 Treatment and Abatement systems

The site stormwater network conveys the stormwater from yards and the road network via Class 1 hydrocarbon interceptors to capture any hydrocarbons prior to outfall. These hydrocarbon interceptors are located upgradient of the each of the 3 no. stormwater attenuation basins, and they ensure the quality of stormwater prior to entry into the attenuation basin, and subsequent outfall to the FCC stormwater network.

The hydrocarbon interceptors are equipped with level detection sensors which sends an alarm signal to the BMS to alert EOTs to warn of high hydrocarbon, liquid and silt levels in the separator.

The rainwater management system for the top up tank and unloading bay at Building B and C are equipped with hydrocarbon interceptors to prevent hydrocarbons entering the stormwater network. The location of these are illustrated on Drawing 21_123H - CSE-00-XX-DR-C-1200. The hydrocarbon interceptors are equipped with level detection sensors which sends an alarm signal to the BMS to alert EOTs to warn of high hydrocarbon, liquid and silt levels in the separator.

The residual evaporative cooling water that is discharged to storm is effectively clean water that has passed through the cooling equipment and does not require further treatment or abatement.

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 diesel top up tank with high- and low-level alarms;
- Bulk diesel top up tank bund and delivery bay at Building B and C that connects to stormwater is equipped with a pumping system that discriminates between hydrocarbons and water. The sump pump activates as required to remove only water from the bund; while retaining hydrocarbons within the sump.
- 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 Point SW1-1, and SW1-2).

It is intended to install a penstock at the outfall prior to the discharge into the stormwater main (Emission Points SW1). Once installed, the penstock will allow the outfall of the stormwater network to be closed off to inhibit the outflow in the event of a spill or a fire. Any resulting stormwater of unacceptable quality will be pumped out or otherwise removed from the stormwater network and disposed of appropriately.

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 emissions to ground from the installation.

7.5 NOISE EMISSIONS

During operation, 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 in order 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.

Assessments have taken place during the Installation's design process to ensure that the Site operates within the constraints of best practice guidance noise limits adopted as part of the detailed noise 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 (EMS)

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 (BMS) and Electrical Power Monitoring System (EPMS)

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 the facility 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 centre 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.

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.

Based on the site-specific data available from the Site investigations undertaken in 2016, prior to the construction of the ADSIL facilities buildings an assessment of source-pathways-receptors has been completed. The following conclusions have been made:

- Bedrock is shallow at the Site and the aquifer underlying the Site is poor to locally important, with high to extreme vulnerability.
- The site was used as agricultural land up to 2019 and there are no previous uses that could lead to historical contamination at the Site.
- Site specific soil and water quality data show no evidence of any historical contamination at the Site.
- 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 South Dublin Bay and River Tolka Estuary SPA or the South Dublin Bay and North Dublin Bay SAC's.

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 Environmental Impact Assessment Report (EIAR) relating to this activity, prepared by AWN Consulting et. al. dated May 2019, which has been previously submitted to

FCC and has been submitted to the Agency as part of this application (Attachment 6-3-6 of the IE Licence application).

The mitigation measures proposed are outlined in the EIAR completed for the installation at planning phase (operational phase and construction phase). These represent the best practice for achieving minimal impact on the receiving environment.

For each environmental factor considered within the EIAR, the specialist considered the existing environment, likely impacts of the development and reviewed feasible mitigation measures to identify the most suitable measure appropriate to the environmental setting the project design. In making a decision on the most suitable mitigation measure the specialist considered relevant guidance and legislation at the time. The selected mitigation measures are set out in the EIAR Chapters (Attachment 6-3-6 of the IE Licence application).

In each case, the specialist at the time reviewed the possible mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction and offsetting (not required in this development). The mitigation measures presented in the EIAR report represent the best options for the Site.

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.