Amazon Data Services Ireland Ltd.

Operational Report

Attachment-4-8-1

Revised June 2025

Licence Application (LA011866)

CONTENTS

1.0 REPORT INTRODUCTION AND PURPOSE OF IE LICENCE REVIEW

This Operational Report relates to the Amazon Data Services Ireland Ltd. (“ADSIL” or ‘the applicant’) data storage facility (the subject ‘installation’ under this Industrial Emissions (IE) Licence review application) located in Clonshaugh Business and Technology Park, Clonshaugh, Dublin 17 (“the IDA Park”).

This IE Licence review relates to the extension of the existing Installation (Licence P1186-01) from 7.9 ha to c. 9.963 hectares (ha) (‘the Site’). The site layout is shown on Drawing 21_123F-CSE-00-XX-DR-C-0002 - Site Layout Plan included with this application.

1.1 SITE OVERVIEW

The existing Installation (Licence P1186-01) comprises the following: 3 no. 2-storey data storage installation buildings with mezzanine floors at each level (Buildings W, X and Y) and ancillary elements. Building X and Y consists of a 2-storey building connected via link corridor and share a loading bay and offices. The ancillary elements of the development include; loading bay, maintenance and storage spaces, associated water tanks, sprinkler tanks, pump house and electrical rooms, security and utility spaces, underground foul and storm water drainage networks, attenuation storm cells (referred to as Stormtech systems), internal road network, and site landscaping. The site includes the Newbury 110 kV Substation that is constructed on lands held by ADSIL under lease, but which is owned and under the control of ESB.

The extended Installation comprises the following additional elements: 2 no. 2-storey data storage installation buildings with mezzanine floors at each level (Buildings U and V) and ancillary elements. The ancillary elements of the development include; loading bays, maintenance and storage spaces, office administration areas, electrical and mechanical plant rooms with plant at roof level, sprinkler tank and pump house, security and utility spaces, underground foul and storm water drainage networks, an attenuation Stormtech system, internal road network with car and cycle parking, and site landscaping. Building U has solar panels at roof level. The site includes a substation which is owned and under the control of ESB.

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 an Uninterrupted Power Supply (UPS) system and then by some or all of the onsite emergency back-up 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 UPS systems are contained in small Backup Battery Units (BBUs) or located within Battery Rooms. BBUs are installed within individual server racks internally within the data storage rooms of each building. The BBUs and Battery Rooms will maintain data storage room operation during brief power outages. The UPS system is designed to operate for up to 4 minutes to allow time for the emergency back-up generators to start up and stabilize.

The existing Installation (Buildings W, X and Y) comprises 40 no. 5.44 Megawatt Thermal Input (MW_{th}) emergency back-up generators, 2 no. 0.337 MW_{th} fire sprinkler pumps and 2 no. 0.423 MW_{th} fire sprinkler pumps.

The extended Installation (Buildings U and V) once fully operational will have installed 10 no. 6.49 MW_{th} emergency back-up generators, 1 no. 3.6 MW_{th} emergency back-up generator, 1 no. 2.19 MW_{th} emergency back-up generator, and 2 no. 0.57 MW_{th} 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 installation.

The combined thermal input from the emergency back-up generators and fire sprinkler pumps is 290.95 MW_{th}, comprising 219.12 MW_{th} from the existing Installation and 71.83 MW_{th} from the extended Installation. This exceeds the 50MW_{th} threshold of *Class 2.1* First Schedule of the EPA Act 1992. The IE Licence principally relates to the operation of emergency standby generators under Activity Class 2.1.

The current IE licenced site has up to 100 personnel on site daily, approximately 50 personnel at Building W, and 50 personnel at Building X and Building Y; including external staff, maintenance contractors and visitors. Staff are present on a shift basis, so numbers vary throughout the day. Operational hours are 24 hours a day, 7 days a week. There will be an additional 50 personnel present on site at Buildings U and V, increasing the total Site personnel to approximately 150. Operational hours for Buildings U and V are also 24 hours a day, 7 days a week and shift patterns are similar to the current Site operations.

The layout of the existing Installation is shown in Figure 1.1 and the extended Installation is shown in Figure 1.2.

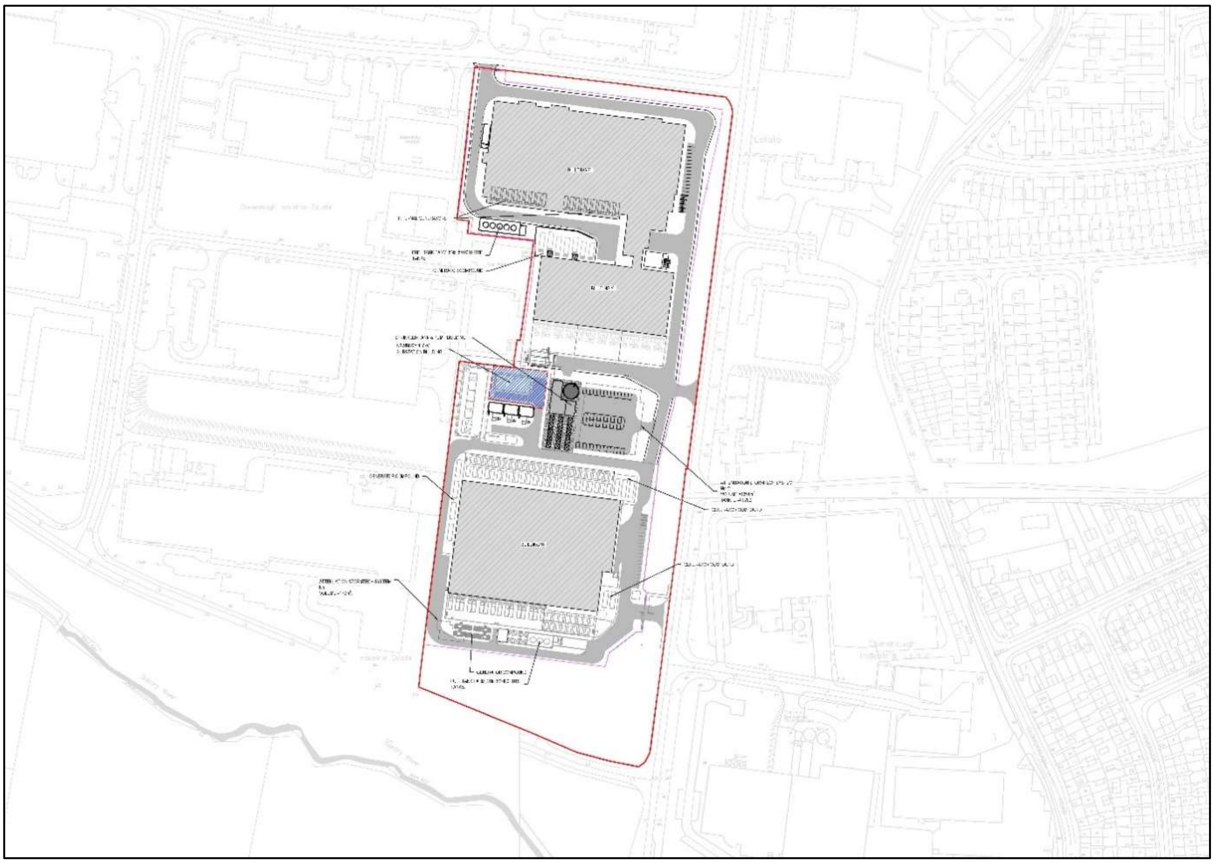

Figure 1.1 Site Layout (existing Installation refer to Drawing 21_123F-CSE-00-XX-DR-C-0002 - Site Layout Plan

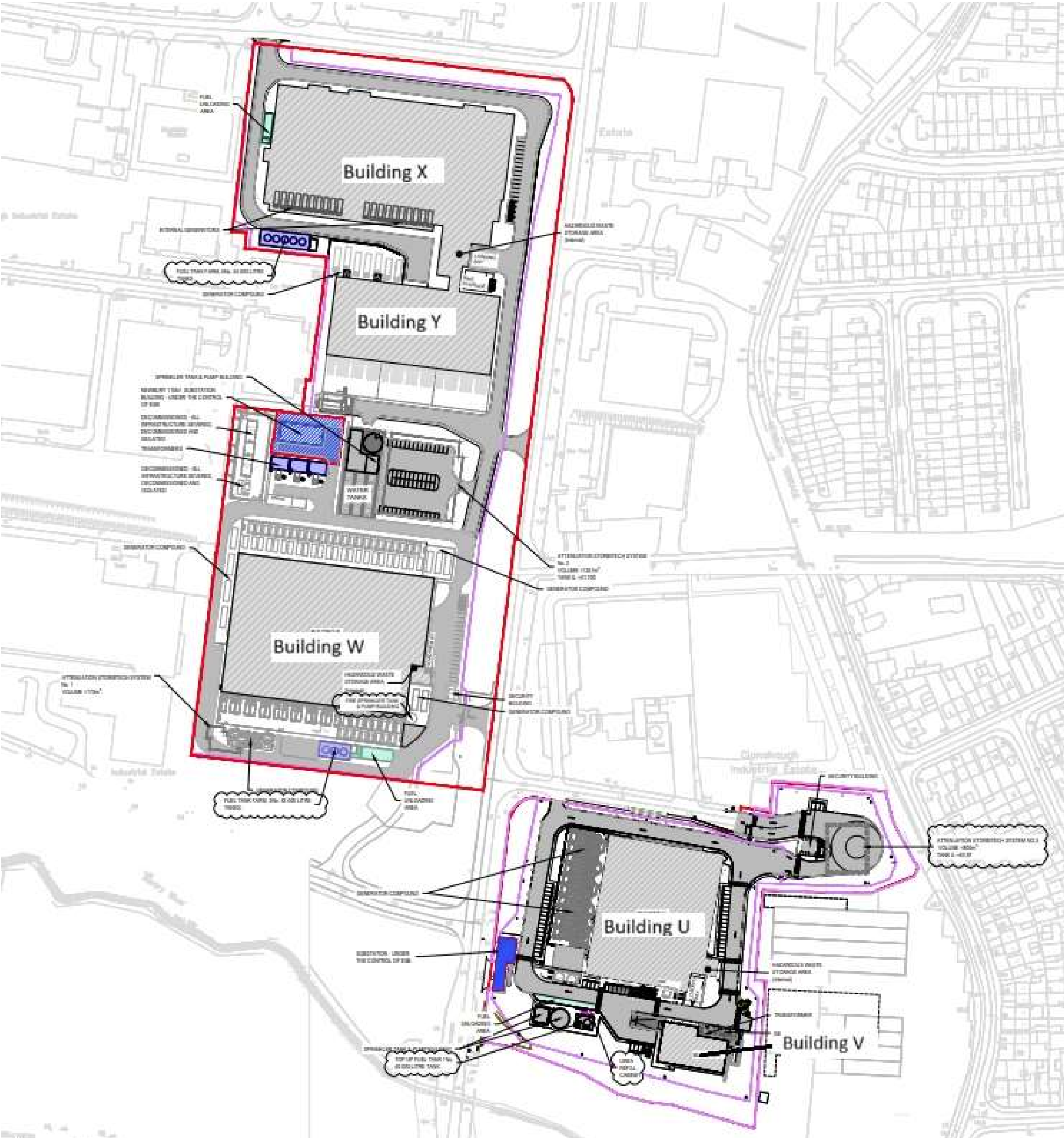

Figure 1.2 Site Layout (existing with extended Installation refer to Drawing 21_123F-CSE-00-XX-DR-C-0002 - Site Layout Plan

2.0 SITE CONTEXT

The Installation is located on a site within IDA managed Clonshaugh Business and Technology Park ("the IDA Park"), approximately 50 m from Oscar Traynor Road. The IDA Park lies approximately 6.5 km north of Dublin's city centre and 3 km south of Dublin Airport. Access to and from the IDA Park is from Oscar Traynor Road. This license review increases the Installation area from c. 7.9 hectares to c. 9.963 ha.

The IDA Park accommodates a range of technology and industrial type uses. Developments within the IDA Park are similar 'individual lot' type developments. The

IDA Park is bounded by the M50/M1 to the west, the Santry River to the south with Oscar Traynor Road beyond, residential areas to east and the R139 to the north.

To the south of the IDA Park is a sports grounds facility (Coolock Lane Park) and to the east are residential estates along Clonshaugh Road. The M1 motorway runs parallel to the IDA Park site boundary to the west of the Site and the Santry River is located to the south of the IDA Park, with the Oscar Traynor Road beyond. The R139 is to the north of the IDA Park. With the extended Installation, the closest occupied residential properties are c. 28 m east of the site boundary along the Clonshaugh Road, in comparison to the existing licenced Installation, where the closest are c. 145 m east from the site boundary.

The wider context of the Site is defined primarily by commercial and industrial development. Large areas of the surrounding lands to the south and north within the IDA Park have been developed in the past 10-15 years and are occupied by industrial campuses including commercial and retail uses, including manufacturing, data centres and food manufacturing uses.

The surrounding 3 km of the site includes IE and IPC Licensed sites including:

- Forest Laboratories Ireland Limited (P0306-04), located to the immediate west of the site;
- Global Switch Property Ltd (P0109-01), located to the north of the site within the Clonshaugh Business and Technology Park;
- ADSIL (P1171-01), located to the north of the site within the Clonshaugh Business and Technology Park;
- Wood-Printcraft Limited (P0143-01), located to the southeast in Coolock Industrial Estate;
- Mondelez Ireland Production Limited (P0809-01), located to the southeast in Coolock Industrial Estate;
- Crown Paints Ireland Ltd (P0248-01), located to the southeast in Coolock Industrial Estate; and
- Barclay Chemicals Manufacturing Ltd (P0317-01), located to the southwest in Lilmar Industrial Estate.

The site location and wider context is presented in 21_123F-CSE-00-XX-DR-C-0001 Site Location Plan included with this application. The wider context of the IDA Park is largely unchanged from the original IE Licence application.

3.0 PLANNING STATUS

Existing Installation

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

- Building W; final grant of permission on 2 April 2012 (DCC Reg. Ref.: 3534/11).
- Building X and Y; final grant of permission on 19 August 2013 (DCC Reg. Ref.: 2688/13), and final grant of permission on 24 October 2013 DCC Reg. Ref.: 2979/13).

Extended Installation

For the extended Installation, Final Grant of planning permission was obtained from DCC under the following applications:

- Buildings U and V: DCC Reg. Ref.: 3641/21, final grant of permission on 24 August 2022
- DCC Reg. Ref.: 3200/20, final grant of permission on 18 November 2020 (Grant retention)
- DCC Reg. Ref.: 2229/19, final grant of permission on 05 July 2019

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

10. Infrastructure projects

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

The overall development is within an Industrial Estate and as the total site area is c. 9.963 hectares, it does not exceed the limit, quantity or threshold set out in Part 2, Schedule 5, Class 10(a), therefore an EIAR is not required for this IE licence review 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 review application being made) the following additional permissions below relate to the history of the overall site.

Table 3.1 Planning Permissions

Application Details	Description of Development
Applicant: Amazon Data Services Ireland Ltd Reg. Ref.: 3400/19 Final Grant Date: 07 Oct 2019	Planning permission for development on a site of c. 0.025 hectares at Clonshaugh Business and Technology Park, Dublin 17. The site is located to the south of an existing data storage facility at the former Cahill Printers building (Building X). The proposed development comprises of a container compound for the purposes of providing ancillary modular plant, electronic equipment and machinery space. The development comprises 4 no. prefabricated metal containers (stacked to form 2 no. storeys), associated access arrangements and staircases, a boundary fence enclosure around the proposed development with 3no. access points, and all ancillary works.
Applicant: Amazon Data Services Ireland Limited Reg. Ref.: 2244/17	The development will consist of the upgrade of 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

Final Grant Date: 22 May 2017	
Applicant: ADSIL Reg. Ref.: 2273/12 Final Grant Date: 21 Aug 2012	Permission to construct a new GIS (Gas Insulated Switchgear) 110kv electricity substation and to carry out ancillary site works. The proposed works will consist of the following: 1. All necessary site works for construction of a concrete compound area to the north of the existing ADSIL facility. 2. Construction of an ESB GIS substation control building within the compound area. 3. Construction of a client control building and a transformer bay to contain three number 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.: 3676/11 Final Grant Date: 23 Mar 2012	Upgrade of existing boundary fencing/railings, upgrade of existing site entrance, new security hut and upgrading of the site security system to include red-wall system, CCTV, public lighting poles and associated underground services to the site.
Applicant: Bellpark Developments Ltd Reg. Ref.: 3679/08 Final Grant Date: 09 Sep 2008	Development on a site of c0.325 hectares within Unit AF1, Clonshaugh Industrial Estate, Dublin 17. The application site will be located to the east of permitted Block no. 3 (per reg ref 1883/07) and will be located generally by the internal road network permitted under reg ref 1883/07. The development will consist of: A) 2 no. blocks as follows: - i) Block 1 (3 storey overall height 9.8m; GFA 2,343sqm) to comprise of 24no. own door office units (ranging in size from 72.0sqm to 138.5sqm). ii) Block 2 (single storey; overall height 8.1m; total GFA 1,146.1sqm) to comprise of 5 no. light industrial / workshop / enterprise units (ranging in size from 194.3sqm to 281.6sqm). The total GFA of the proposed blocks is 3,489.1sqm. B) 4 no. block indicator signs (each being 3m high with advertising space of c.2.8sqm each). C) All associated car parking, cycle parking, landscaping and site development works. D) Vehicular access and the internal road network to serve the proposed development will be per that permitted under reg ref 1883/07.
Applicant: Bellpark Developments Ltd Reg. Ref.: 5594/07 Final Grant Date: 08 Jan 2008	Permission for development of light industrial/warehouse/enterprise units, area 6,857.6sqm, consisting of: Block 1 (area 3,363.6sqm) containing 14 no. units for use as light industrial/warehouse/enterprise units ranging from 132.5 to 323.6sqm on ground and part first floors; Block 2 (area 1,771.3sqm) containing 7 no. units for use as light industrial/ warehouse/ enterprise units ranging from 142.7 to 355.1sqm, on ground and part first floors; Block 3 (area 1,697.4sqm) containing 10 no. units for use as light industrial/ warehouse/ enterprise units ranging from 142.7 to 210.3sqm, on ground and first floors: ESB substation and switchroom (area 25.3sqm); new vehicular access; car parking & associated site works.
Applicant: Unknown Reg. Ref.: 2524/96 Final Grant Date: May 1997	Retain and complete, compressor building at the rear of premises
Applicant: Acco Ireland Limited Reg. Ref.: 1248/96 Grant Date: 11 Sept 1996	Elevation modifications, provision of internal factory toilets, lunch rooms, offices, external signs, palisade fencing to yard, lighting standards and extra parking.
Applicant: Acco Ireland Limited Reg. Ref.: 2230/96 Grant Date: 8 Jan 1997	Twenty car park spaces, landscaping and pedestrian access on the east side of the building

Applicant: Donnelley Documentation Services Reg. Ref.: 2382/92 Grant Date: Feb 1993	Application for Planning Permission for a ‘Two-Bay’ Extension, New Entrance and Associated Site Works to the Donnelley Documentation Services Building at Clonshaugh Industrial Estate, Dublin 17.
Applicant: Mountcoal Investments Limited Reg. Ref.: 2512/90 Grant Date: 1 March 1991	Construction of additional 2-storey offices, ESB substation and ancillary buildings to previously approved industrial unit and offices.
Applicant: Mountcoal Property Investments Limited Reg. Ref.: 1172/90 Grant Date: 24Sept1990	Erect extension to existing general industrial unit.
Applicant: Acco Ireland Limited Reg. Ref.: 1036/90 Grant Date: 24 Sept 1990	Extension to Existing Factory
Applicant: Irish Printers Limited Reg. Ref.: 736/90 Grant Date: June 1990	Modification to existing Entrances and Boundary Fence, Build new entrance and Car Park.
Applicant: Mountcoal Investments Limited Reg. Ref.: 2772/89 Grant Date: 20 April 1990	Erection of an Industrial Unit and Offices.
Applicant: Mountcoal Investments Limited Reg. Ref.: 2772/89 Grant Date: Feb 1990	Erection of an Industrial Unit and Offices
Applicant: Mountcoal Investments Limited Reg. Ref.: 1477/89 Grant Date: 11 Oct 1989	Change of use of Light Industrial Unit including Offices to General Industrial Unit and erection of ESB Substation
Applicant: Chisima (Ireland) limited Reg. Ref.: 2146/89 Grant Date: 23 Sept 1989	Erection of Company Sign
Applicant: Unknown Reg. Ref.: 2321/88 Grant Date: Unknown	Original Planning Application cannot be found by DCC
Applicant: Acco Ireland Limited Reg. Ref.: 2219/852 Grant Date: 26 March 1985	Plant Room Extension to Factory
Applicant N1 Property Developments Limited Reg. Ref.: 5950/07 Grant Date: 15 May 2009	Ten year planning permission for development to create a new Northside Town Centre comprising a mixed use retail, office, residential, restaurant, bar, creche, community and recreational development over two phases on a 30.28 hectare site.

4.0 DESCRIPTION OF ACTIVITY

4.1 SITE OVERVIEW

4.1.1.1 Existing Installation (Building W, Y and X)

The existing Installation (Licensed under P1186-01) consists of 3 no. two storey data centre buildings (Buildings W, Building X and Building Y) 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. Building X and Y are connected via link corridor and share loading bay and offices.

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.);
- Emergency back-up generators, including fuel storage tanks (and associated emissions stacks/flues);
- Water storage tanks for evaporative cooling systems; and;
- Loading bays and associated infrastructure.

Building W 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. 9,469 sq.m. The building includes mechanical plant at roof level of the main building with associated visual screening. The external generator compound comprises 13 no. containerised emergency back-up generators, with associated fuel day tanks. Fuel is provided to the day tanks from the fuel tank farm to the south of Building W.

Building X and Y consists of a 2-storey building connected via link corridor and comprises electrical rooms for electronic operations, electrical and mechanical plant rooms and support areas including offices and welfare facilities and a loading bay. The gross floor area of the development including ancillary elements is c. 21,750sq.m.. The building includes ground level external air handling units with associated visual screening. Building X includes an internal generator compound containing 20 no. emergency back-up generators, with associated fuel day tanks. Building Y includes an external generator compound containing 7 no. containerised emergency back-up generators, with associated fuel day tanks. Fuel is provided to the day tanks associated with Building X and Y from the fuel tank farm to the south of Building X.

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

- An electrical Gas Insulated Switchgear (GIS) 110 kV Substation (owned and operated by ESB (named Newbury));
- 1 no. transformer compound located at the GIS Substation with associated control room (owned and operated by ADSIL);
- 1 no. fuel tank farm comprising 3 no. 52,000 L tanks within a concrete bund located to the south of Building W;

- 1 no. fuel tank farm with 5 no. 54,000 L tanks within a concrete bund located to the south of Building X, associated with Building X and Building Y;
- 1 no. 250 m^3 fire sprinkler tank, and associated pump house including 2 no. fire sprinkler pumps for Building W;
- 1 no. 405 m^3 fire sprinkler tank and associated pump house including 2 no. fire sprinkler pumps for Building X and Building Y;
- Internal site road network, and car parking;
- Underground foul drainage system;
- Underground storm water drainage network and attenuation system; and
- Underground water supply network.

4.1.1.2 Extended Installation (Buildings U and V)

The extended Installation (subject to this license review) consists of 2 no. 2-storey data storage buildings with mezzanine floors at each level (Buildings U and V) and ancillary elements. The ancillary elements of the development include; loading bays, maintenance and storage spaces, office administration areas, electrical and mechanical plant rooms, with plant at roof level, sprinkler tank and pump house, security and utility spaces, underground foul and storm water drainage networks, attenuation storm cell, internal road network with car and cycle parking, and site landscaping. Building U will have solar panels at roof level.

The two additional data storage buildings and ancillary development of the extended Installation will become part of the licenced Installation under this license review.

Similar to Buildings W, X and Y, Buildings U and V 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, storage areas, welfare facilities etc.);
- Emergency back-up generators including fuel storage tanks (and associated emissions stacks/flues);
- Water storage tanks for evaporative cooling systems; and;
- Loading bays and associated infrastructure.

Building U consists of a 2-storey building with two mezzanine levels, comprising electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant at roof level. The gross floor area is c. 12,875 sq.m. The external generator compound comprises 11 no. containerised emergency back-up generators, with associated belly tanks. Fuel is provided to each belly tank from the Top Up fuel tank.

Building V consists of a 2-storey building comprising electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant at roof level. The gross floor area of the building including ancillary elements is c. 1,455 sq.m. The external generator compound comprises 1 no. containerised emergency back-up generator, with associated belly tank and a fuel day tank. Fuel is provided to the to the belly tank from the Top Up fuel tank.

In addition to the 2 no. data storage facilities, the extended Installation also includes:

- 1 no. 40,000 L top-up fuel tank within a concrete bund located to the south of Building U;
- 1 no. 256 m^3 fire sprinkler tank, compound, and associated pump house including 2 no. fire sprinkler pumps located to the south of Building U;
- On site Substation (owned and under the control of ESB)
- Security building;
- Internal site road network, landscaping, and car parking;
- Underground foul and storm water drainage networks; and
- Underground water supply network.

4.2 PRIMARY PROCESSES/ACTIVITIES

4.2.1 Emergency Back-up Generators

The Installation is supported by emergency back-up generators that are located either in designated external generator compounds (Buildings W, Y, U and V) or a designated internal generator compound (Building X). 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 Installation is supplied electricity from the national grid. Outside of normal operations, the Installation is first supplied electricity by a UPS system 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 emergency back-up generator operating hours are recorded on the Enterprise Asset Management System (EAM). For each emergency generator, the Operations Team automatically tracks planned and emergency run hours and the description of the operation (run reason) onto the EAM system.

When an emergency operation is logged, an email alert is sent to the Environmental Team for review. The Operations team also maintain an electronic system on which they record every emergency operation of a generator. The environmental team review this information after every emergency event.

4.2.1.1 Existing Installation (Building W, Y and X)

Building W, Building Y and Building X each have designated emergency back-up generators. There is no interconnectivity between the generators of different buildings.

Individual generators for Building W and Y are containerised and are housed within designated external generator compounds. Generators for Building X are located within an internal generator compound and are not containerised. , There are various designed control measures in place including acoustic attenuation and exhaust silencers. Fuel is stored locally under the generators in double-skinned day tanks in the generator building (for Building X) or under each containerised generator (Building W and Y).

The individual double-skinned day tanks at the emergency back-up generators have level gauges (high 90%, and low 30%) connected to an onboard controller which will alarm to prevent overfilling and identify a sudden loss of fuel within the tank.

The containerised emergency back-up generator housing (Building W and Y) includes retention bunding in the base of the container, there are leak detection systems within the bund. The emergency back-up generators serving Building X have leak detection systems within the external skin of the storage tanks.

Should the level alarms or leak detection alarms activate, an alarm signals to the Building Management System (BMS) to alert Engineering Operations Technicians (EOTs). The onboard controller for individual generators is connected to the BMS.

4.2.1.2 Extended Installation (Buildings U and V)

Buildings U and V are each accompanied by an external generator compound. 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 and exhaust silencers. For Building U, fuel is stored locally within individual belly tanks, whilst the generator for Building V has a belly tank and a day tank.

The individual double skinned day tank, and belly 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 individual double skinned day tank, and belly tanks have leak detection alarms in place within the external skin of the storage tank. The containerised emergency back-up generator housing includes retention bunding in the base of the container, there are leak detection systems within the bund.

Should the level alarms or leak detection alarms activate, an alarm signal is sent to the BMS to alert EOTs. The onboard controller for individual generators is connected to the BMS.

Selective Catalytic Reduction System and Urea

The emergency back-up generators (excluding the 1 no. 2.19 MW_{th} generator) for Buildings U (10 no. 6.49 MW_{th}) and V (1 no. 3.6 MW_{th}) are each fitted with a Selective Catalytic Reduction (SCR) unit to reduce exhaust emission gases to air. The SCR system injects a reductant, an aqueous solution of urea, into the exhaust stream of the engine. The mixed exhaust gases and urea solution pass through a specialised catalytic converter, known as the SCR catalyst. Inside the SCR catalyst the high-temperature exhaust gases react with the urea significantly reducing NOx and producing nitrogen gas (N_2) and water vapor (H_2O).

The aqueous solution of urea is unloaded into a distribution manifold, which serves to fill the 11 no. urea day tanks (10 no. for Building U and 1 no. for Building V) located within each individual generator container.

4.2.2 Data Storage Building(s)

Data storage buildings 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.

The additional data storage buildings (U and V) for the extended Installation are similar in nature to the existing Installation data storage buildings (W, X and Y).

4.3 SECONDARY PROCESS/ACTIVITIES

4.3.1 Ancillary infrastructure

For both the existing and extended Installation, there are integrated administration areas associated with each main data centre building. The administration areas comprise the following main components:

- Reception areas;
- Open office areas,
- Conference rooms/meeting rooms;
- Maintenance and storage spaces; and
- Break room or canteen; and
- Sanitary facilities.

Additional Ancillary infrastructure includes:

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

4.3.2 Data Storage Rooms Cooling Systems

4.3.2.1 Existing Installation (Building W, Y and X) and extended Installation (Building U)

The Air Handling Units (AHUs) are fitted with airside condensers to utilise outdoor air to cool the space.

The cooling units or AHUs provide conditioned air to maintain temperature, relative humidity and pressurisation in the data storage rooms. The cooling units operates under 2 modes;

- Free Cooling – Utilises outdoor air during normal atmospheric temperatures. No water is consumed in this mode.
- Evaporative (Adiabatic) Cooling – Uses mains water as the cooling medium when ambient temperatures exceed the capacity of free cooling.

Duty and standby AHUs are installed to ensure continuous cooling availability. Free cooling is sufficient to meet the cooling requirements of the data storage rooms for the majority of the year. During periods of elevated external temperatures , evaporative cooling is employed.

The cooling system features:

- Cooling Water Storage Tanks – to provide a reserve supply of water on site
- UV water steriliser – Maintains microbial quality of the cooling water.
- Air Handling Units - Each containing an integrated cooling water sump (c. 60 litres per unit)

Cooling water is distributed from the storage tanks via a ring main to each AHU. The UV water steriliser ensures the water remains biologically suitable for use, with no chemical additives such as anti-corrosion agents or water softeners. The evaporative cooling water is sourced from the mains water supply provided by Uisce Éireann and does not require any chemical treatment when operational.

Each AHU contains a 'cooling water sump' which is supplied with cooling water 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. The cooling water sump is maintained with water for operational readiness.

A simplified schematic of the cooling water cycle is shown in Figure 4.1 below.

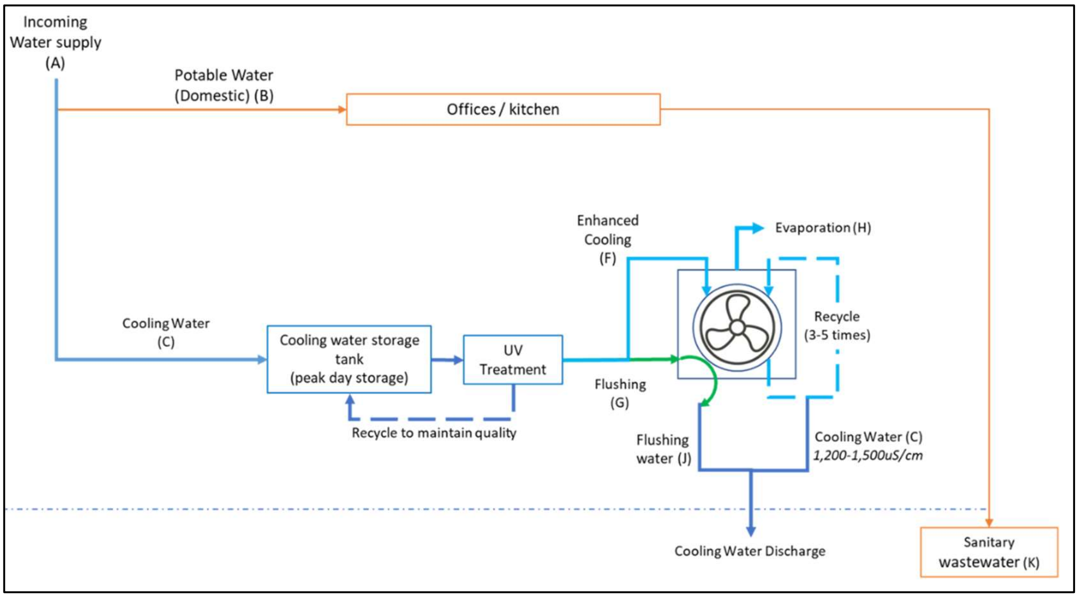

Figure 4.-1 - simplified schematic of the cooling water cycle

<u>*Free Cooling Mode*</u>

In free cooling mode, no water is consumed. Fresh outdoor air is drawn into the data storage rooms through external louvres. The air is warmed as it passes across the IT servers located in the data storage rooms, 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'.

Evaporative (Adiabatic) Cooling Mode

Evaporative cooling provides enhanced cooling and is activated when ambient temperatures or temperatures in the data storage rooms exceeds the capacity of what can be managed with the free cooling mode (above 25°C).

In this cooling mode, mains water (at ambient temperature) is used as the cooling media to provide additional cooling. Fresh air is passed over evaporative cooling pads as it is drawn into the building that are dampened by the cooling water. The external air is cooled through an air/water heat exchange before entering the data storage rooms. The evaporative cooling system provides greater energy efficiency than other options such as the use of chillers/compressor systems.

During this cooling process, the majority of the water is evaporated as it absorbs heat from the incoming air. Water that is not evaporated is recirculated back to the AHU sump, where it is reused in subsequent cooling cycles, thereby reducing overall water consumption.

After approximately 3-5 cycles of cooling water (depending on the quality of the water, and amount of evaporation) the recirculated water in the cooling water sump begins to accumulate dissolved salts, increasing its electrical conductivity. When conductivity level in the cooling water sump reaches 1,500 µS/cm, the system initiates a bleed-off process, whereby a portion of the sump water is discharged to the storm water sewer and replaced with mains water from the on-site storage tanks.

The cooling water bleed-off occurs gradually over a period of 4–6 hours while conductivity remains above the threshold. The cooling water sump is not fully drained, as doing so would disrupt the operation of the evaporative cooling system. Once no more bleed-off is required, the drain valve automatically closes, and normal recirculation resumes.

A simplified schematic of the evaporative cooling system is shown in Figure 4.2 below.

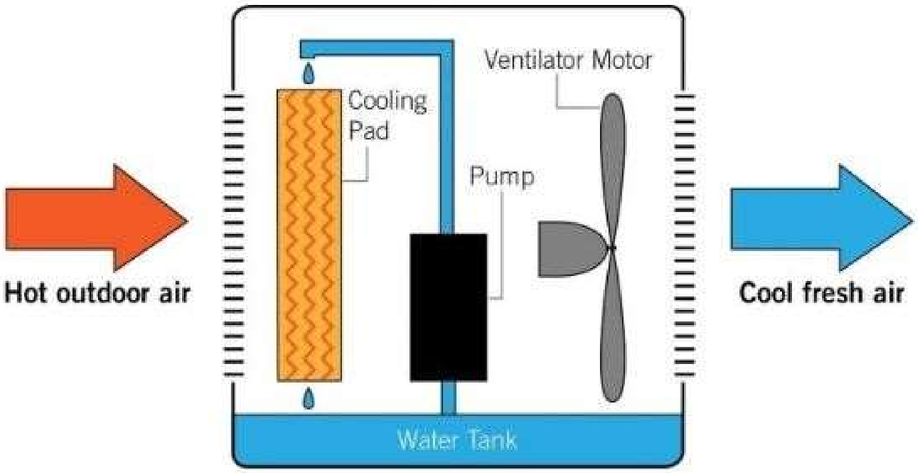

Figure 4.-2 - simplified schematic of the evaporative cooling system

Discharge of Cooling Water During Cooling Operations

The evaporative cooling system initiates above 25°C. During evaporative cooling mode the conductivity level in the cooling water sump increases, and when it exceeds 1,500 µS/cm, the system initiates a bleed-off process, whereby a portion of the sump water is discharged to the storm water sewer and replaced with fresh mains water. A conductivity probe in the cooling water sump is used to determine the level. The cooling water bleed-off occurs gradually over a period of 4–6 hours while conductivity remains above the threshold.

During peak cooling the maximum discharge flow from the site is 129 m^3 per day. This maximum discharge quantity is considered to be conservative, as peak discharge is only likely to occur during extremely high ambient temperatures, typically exceeding 30.4°C.

The AHUs are clean systems, during normal operation of the system no water treatment chemicals are added, and therefore the evaporative cooling water is of sufficient quality to be discharged to storm water.

The maximum discharge flow and concentrations of cooling water has been assessed in the *Technical Note: Storm Water Impact Assessment; Clonshaugh, Dublin 17*. This assessment adopts a conservative worst-case approach, accounting for both (short-term, worst-case) and seasonal conditions (mean flow conditions) are assessed.

Discharge of Water During Anti Stagnation Cycle

When cooling water discharge is not occurring, evaporative cooling water within the air handling unit (AHU) sumps is typically drained every 7 days to the storm water drainage network. This drain-down occurs only when the evaporative cooling system has remained unused for a continuous period of 7 days. The purpose of this regular drain-down is to prevent stagnation and minimise the risk of legionella growth within the system.

The maximum weekly drain-down volume across the site is **15.72 m^3**, at a worst case this maximum drain down is all discharged in one day. However, this process is carried out sequentially throughout the week over a **4–6 hour** period (per building) to prevent overloading the storm water drainage system. As the water has not been used for cooling, it remains equivalent in quality to the mains water that was supplied and is suitable for direct discharge to the storm water drainage network.

Water anti-stagnation cycle within the evaporative cooling systems occurs year-round across the site, with the exception of Building U. Building U incorporates a newer system design that includes a winterisation function. Winterisation at Building U is implemented outside of the cooling season, typically from 1 October to 31 March. During this period, the cooling water sumps are drained and not replenished, meaning no recirculation occurs in Building U during these months. Recirculation in Building U resumes from April to September, coinciding with the active cooling season.

The expected worst-case maximum discharge flow and maximum concentrations of peak cooling water discharge has been assessed in the Technical Note: Storm Water Impact Assessment; Clonshaugh, Dublin 17. The anti-stagnation drain-down represents a lessor discharge scenario than the assessed worst-case conditions.

Cooling System Cleaning and Legionella Management

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

In accordance with ADSIL legionella management procedure, every cooling system is sampled annually for legionella bacteria. If a result exceeds 1000CFU/L, the air handling unit is disinfected with a hydrogen peroxide solution. Based on past experience, disinfection is required on approximately 10% of systems annually. During the disinfection process, 50 ml of hydrogen peroxide solution is dosed into the air handling unit and water is recirculated through the cooling system. The disinfected water is discharged to the cooling system drain and ultimately to the storm water network. During dosing, the AHU is placed in blowdown mode, continuously cycling water through the unit to flush it out. Any residual hydrogen peroxide is oxidised by organics in the blowdown and in the onsite storm water drainage network, and converted to water and oxygen prior to discharge via storm sewer.

There is no storage of hydrogen peroxide at the site; it is brought in and used only as needed. The estimated annual usage of hydrogen peroxide varies depending on if legionella is detected.

4.3.2.2 Extended Installation (Building V)

Building V does not utilise evaporative cooling. Instead, it operates a mechanical air-cooling system, which is refrigerant-based, using R32 and R410A. In the mechanical cooling system, refrigerant circulates within a sealed, closed-loop cycle to remove heat from the air. The process operates through the following key stages:

1. Compression: A compressor raises the pressure and temperature of the gaseous refrigerant.
2. Condensation: The hot, high-pressure refrigerant gas flows to a condenser, where it releases heat to the environment (usually air or water) and condenses into a liquid.
3. Expansion: The high-pressure liquid refrigerant passes through an expansion valve, which reduces its pressure and temperature.
4. Evaporation: The low-pressure, cold liquid refrigerant flows through an evaporator (the cooling coil), where it absorbs heat from the surrounding air

and evaporates back into a gas. This cools the air that is being circulated in the data centre.

5. Return to Compressor: The low-pressure, gaseous refrigerant returns to the compressor, and the cycle repeats.

This cycle operates continuously to maintain appropriate indoor temperatures for the data storage rooms in Building V. The R32 and R410A refrigerant quantities are included in Attachment-4-6-2-Raw Materials Interim Products. These systems are designed to be sealed, with no discharges during normal operations.

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 units are used to minimise the electrical power demand.

The fresh air ventilation system for the office areas of the buildings are served using energy efficient Heat Recovery Units (HRU) which will recover waste heat from the office spaces and re-use to pre-heat the air with the HRU. This reduces 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 data centre buildings within the existing and extended 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 system, 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.

4.3.5 Electricity Supply and Substation

4.3.5.1 Existing Installation (Building W, Y and X)

The power requirements for the installation are provided via a connection to an 110kV Gas Insulated Switchgear (GIS) Substation Compound located to the north of Building W, and to the south of Building Y, that was approved under DCC Planning Ref. 2273/12.

The 110kV Substation (known as Newbury) 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 3 no. transformers and associated control building owned and operated by ADSIL, located to the south of the Newbury Substation.

4.3.5.2 Extended Installation (Buildings U and V)

The power requirements for the extended Installation are provided via 2 Medium Voltage (MV) cable connections to the ESB Substation located to the west of Building U. This includes the substation building (floor area c. 34.5 sq.m), permitted under DCC Planning Ref 2229/19, and extended DCC Planning Ref. 3641/21 (c. 115 sq.m additional GFA).

4.4 WATER, SEWER, AND STORM WATER DRAINAGE INFRASTRUCTURE

4.4.1 Potable Water Supply

The Installation has a demand for general potable supply, for cleaning, drinking and sanitary facilities, cooling equipment, and for firefighting.

4.4.1.1 Existing Installation (Building W, Y and X)

The water supply to the existing Installation is sourced from mains water supply via a metred connection from the existing main to the south of the existing Installation, in accordance with DCC Planning Refs. 2979/13, 2688/13 and 3534/11. Water is used at the Installation for both staff welfare, cooling functions of the building's AHUs, and firefighting.

The existing Installation requires an average annual water supply of 17,886 m^3. Where water demand is required during a short-term drought, additional supply can be provided from an alternative source such as tanker supply.

Pumps supply water to the data storage buildings AHUs from the external water storage tanks.

On-site water storage is provided at each building in external water tanks on site that have a combined volume of 326 m^3 to support the cooling functions of the building's AHUs. During routine operations there is no addition of water treatment chemicals, the water tanks are emptied once annually.

Fire water

A 250-300mm fire ring main is in place across the campus to provide firefighting water to the existing Installation in accordance with DCC Planning Ref. 2979/13, 2688/13 and 3534/11.

There is 1 no. 250 m^3 fire sprinkler tank and pump house associated with Building W, which contains 2 no. fire sprinkler pumps. There is 1 no. 405 m^3 fire sprinkler tank and pump house associated with Building X and Y, containing 2 no. fire sprinkler pumps.

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

4.4.1.2 Extended Installation (Buildings U and V)

The water supply for Buildings U and V is sourced from mains water supply and from harvested rainwater. The mains supply is via a metred connection from the existing main in the IDA estate road to the north of the site, in accordance with DCC Planning Ref. 3641/21.

The buildings are designed to harvest rainwater when available, which could provide up to 73% of the annual cooling water requirements of Buildings U, offsetting the water taken from the local supply. It is estimated that there will be up to 792 m^3 water available from rainwater harvesting. However this supply is not guaranteed, therefore the estimated mains annual water supply for the extended Installation is c. 1,086 m^3 (with a total annual water supply of 18,972 m^3 for the combined existing and extended Installation).

As with the existing Installation, on-site water storage is provided at each building to support the evaporative cooling function of the building's AHUs. Pumps will supply water to the data storage facilities from the external water storage tanks. The water tanks have a combined volume of 168 m^3, the water tanks are filled with a combination of mains water and harvested rainwater (when available). There is no addition of water treatment chemicals applied during normal operations, the water tanks are emptied once annually.

Fire water

A 250mm fire ring main provides firefighting water to the extended Installation in accordance with DCC Planning Ref. 3461/21.

There is 1 no. 285 m^3 fire sprinkler tank and pump house associated with the site, which contains 2 no. fire sprinkler pumps.

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

4.4.2 Storm Water Drainage Systems

4.4.2.1 Existing Installation (Building W, Y and X)

Storm water (rainwater) runoff from impermeable areas of the site (with the exception of rainwater discussed in Section 4.4.3 Wastewater Drainage System) is collected via the onsite storm water drainage network in accordance with DCC Planning Ref. 2979/13, 2688/13 and 3534/11. This network conveys the storm water to one of 2 no. storm water attenuation systems (referred to as stormtech systems) (See Drawing 21_123F-CSE-00-XX-DR-C-1100-Surface Water Layout Plan) before the attenuated storm water discharges offsite at 2 no. emission points (SW1 and SW2).

There are 2 no. Attenuation stormtech systems located on site that are designed to attenuate storm water discharge flows:

- Attenuation stormtech system no. 1 (170 m^3 capacity) is located to the south of Building W and is an offline attenuation storm cell. Storm water from Building W and the Newbury Substation is discharged at emission point SW1, which connects to the existing 450 mm IDA Park storm sewer located to the south of the existing Installation and subsequently to the Santry River.

- Attenuation Stormtech system no 2 (1,351 m^3 capacity) is located to the south of Building Y. From there, the storm water is discharged at emission point SW2 which connects to the existing 900 mm IDA Park storm sewer located to the east of the existing Installation that flows north to south, and subsequently to the Santry River.

There is negligible retained water within the attenuation stormtech system No.1 and 2 under dry weather conditions. The allowable runoff rate for Building W is restricted to pre-development flows of 294.8 litres per second (l/s) or 1061.28 cubic meters per hour (m^3/hour). The allowable greenfield runoff rate for Building X and Y is 7 l/s or 25.2 m^3/hour.

Prior to discharge to the IDA Park storm sewer(s), the storm water passes through hydrocarbon interceptors to ensure that the quality of the storm water discharge is controlled:

- Prior to discharge at SW1, the storm water passes through a Bypass hydrocarbon Class 1 interceptor (FRS2)
- Prior to discharge at SW2, the storm water passes through a Bypass hydrocarbon Class 1 interceptor (FRS1)

All hydrocarbon interceptors for the existing Installation have:

- high level liquid sensors, which indicates when the liquid level in the hydrocarbon interceptor rises excessively and triggers an alarm: and
- oil level detection systems, which detects the oil level based on conductivity and triggers an alarm.

These alarms are connected to the BMS/EPMS critical alarm. Should the interceptor alarms activate, they send an alarm signal to the BMS/EPMS critical alarm to alert Engineering Operations Technicians (EOTs).

This network and the hydrocarbon interceptors, including class and type are shown on Drawing 21_123F-00-XX-DR-C-1100 Surface Water Layout Plan.

The IDA Park storm sewer(s) outfall into the Santry River located to the south of the Site; the Santry River flows c. 5.15 river km east, to the North Bull Island transitional water body, and ultimately the Dublin Bay.

Evaporative Cooling Water

Evaporative cooling water (refer to Section 4.3.2) from the AHUs in Building W, Y and X discharges to the storm water drainage network. This is recirculated mains water that has been through the AHUs only. There is no addition of water treatment chemicals during normal operations and therefore the water is of sufficient quality to be discharged to the storm water drainage network.

Flue drainage discharge

Rainfall which passes through the back-up generator exhaust stacks for Building Y discharges to the storm water drainage network via a Class 1 Bypass hydrocarbon interceptor (FRS1) prior to discharge from the site. For Building X (which have horizontal stack tips) rainwater is prevented from entering the generator flues and therefore there is no rainwater collection/discharge. For Building W, the generator stacks are horizontal and no rainwater enters the stacks, therefore there is no discharge to storm water.

4.4.2.2 Extended Installation (Buildings U and V)

For the extended Installation, storm water runoff from impermeable areas, including runoff from the fuel tank farm, exhaust stacks, unloading bay and transformer areas, is collected via the onsite storm water drainage network in accordance with DCC Planning Ref. 3461/21. This network conveys the storm water to an attenuation system via hydrocarbon interceptors to ensure that the quality of the storm water discharge is controlled (See Drawing 21_123F-CSE-00-XX-DR-C-1100-Surface Water Layout Plan). The attenuated storm water discharges offsite at emission point SW3.

There is 1 no. Attenuation Stormtech system for the extended Installation that is designed to attenuate storm waters discharge flows:

- Attenuation stormtech system no 3 (800 m^3 capacity) at the north east corner of the extended part of the site, close to Building U. From there, the storm water is discharged at emission point SW3, which connects to the 900mm diameter storm sewer running north to south beneath the entrance road to the IDA Park and subsequently to the Santry River.

There is negligible retained water within the Attenuation Stormtech system No.3 under dry weather conditions.

The allowable greenfield runoff rate for Buildings U and V is restricted to pre-development flows of 7.24 litres per second (l/s) or 26.64 cubic meters per hour (m^3/hour).

This network is shown on Drawing 21_123F-00-XX-DR-C-1100 Surface Water Layout Plan.

The storm water passes through hydrocarbon interceptors to ensure that the quality of the storm water discharge is controlled. This network and hydrocarbon interceptors, including class and type are shown on Drawing 21_123F-00-XX-DR-C-1100 Surface Water Layout Plan.

- Storm water runoff from the Top-up Fuel tank and associated unloading bay passes through a forecourt Class 1 hydrocarbon interceptor (FRS3)
- Storm water runoff from the generator compound at Building U passes through a Class 1 full retention hydrocarbon interceptor (FRS4)
- Storm water runoff from the generator compound at Building V passes through a Class 1 full retention hydrocarbon interceptor (FRS6)
- Prior to entering the attenuation stormtech system No. 3, all storm water passes through a Class 1 Bypass hydrocarbon interceptor (FRS5).

All hydrocarbon interceptors for the extended Installation have:

- high level liquid sensors, which indicates when the liquid level in the hydrocarbon interceptor rises excessively and triggers an alarm: and
- oil level detection systems, which detects the oil level based on conductivity and triggers an alarm.

These alarms are connected to the BMS/EPMS critical alarm. Should the interceptor alarms activate, they send an alarm signal to the BMS/EPMS critical alarm to alert Engineering Operations Technicians (EOTs).

As per the existing Installation, the IDA Park storm sewer outfalls into the Santry River located to the south of the Site; the Santry River flows c. 5.15 river km east, to the North Bull Island transitional water body, and ultimately into Dublin Bay.

Evaporative Cooling Water

Evaporative cooling water (refer to Section 4.3.2) from the AHUs in Building U discharge to the storm water drainage network at Emission Point SW3. This is recirculated mains water that has been through the AHUs only. There is no addition of water treatment chemicals during normal operations and therefore the water is of sufficient quality to be discharged to the storm water drainage network.

Flue drainage discharge

Rainfall which passes through the back-up generator exhaust stacks for Building U will discharge to the storm water drainage network via a Class 1 bypass hydrocarbon interceptor (FRS5) and for Building V will pass via a Class 1 full retention hydrocarbon interceptor (FRS6) prior to entering the attenuation stormtech system.

Top Up Fuel Tank Bund

Drainage of rainwater from the top up tank bund south of Building U is directed to the storm water drainage network via Class 1 forecourt hydrocarbon interceptor (FRS3).

The drainage sump located in the top-up tank concrete bund contains a hydrocarbon detection system which automatically shuts off the drainage from the sump if fuel is detected, preventing any contaminated storm water from exiting the bund. Should the detector alarm activate, an alarm is sent to the BMS/EPMS critical alarm to alert Engineering Operations Technicians (EOTs).

4.4.3 Foul Water (Wastewater) Drainage System

Domestic effluent arising from occupation of the existing and extended Installation is discharged to the IDA Park foul sewer, at emission points SE2, SE3, SE4 and SE5). Storm water from the fuel tank farm bund serving Building W is discharged via 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 foul water for final treatment and disposal at Ringsend Wastewater Treatment Plant (WWTP) in Dublin.

4.4.3.1 Existing Installation (Building W, Building Y and Building X)

Domestic Effluent

For the existing Installation, a gravity piped foul drainage network comprising 225 mm uPVC pipes conveys effluent from internal sanitary locations and discharges to the external foul sewer at: SE2, SE3 and SE4. Refer to Drawing 21_123F-00-XX-DR-C-1200-Foul Water Layout Plan for the foul drainage layout.

The foul water connections to the foul sewer is in accordance with the DCC Planning Ref. 2979/13, 2688/13 and 3534/11.

Fuel Tank Farm(s)

Drainage of storm water from the fuel tank farm and associated fuel unloading bays to the south of the existing Installation (Building W) is discharged to foul sewer at emission point SE1.

- Prior to discharge, storm water runoff passes through a Full retention Class 1 hydrocarbon interceptor (FR3)

The drainage from the fuel tank farm and associated fuel unloading bays for the existing Installation (Building X and Y) is directed to foul sewer at emission point SE3.

- Prior to discharge, storm water runoff passes through a Full retention Class 1 hydrocarbon interceptor (FR1)

The drainage sumps at the fuel unloading bays and in the bulk tank concrete bunds contain hydrocarbon detector system which automatically shuts off drainage from these sumps if fuel is detected, preventing any contaminated storm water from exiting the bund. Should the detector alarm active, they send an alarm signal to the BMS/EPMS critical alarm to alert Engineering Operations Technicians (EOTs).

Drainage from the bulk tank farms is equipped with hydrocarbon interceptor(s). The locations of these are illustrated on 21_123F-00-XX-DR-C-1200-Foul Water Layout Plan.

All hydrocarbon interceptors for the existing Installation have:

- high level liquid sensors, which indicates when the liquid level in the hydrocarbon interceptor rises excessively and triggers an alarm: and
- oil level detection systems, which detects the oil level based on conductivity and triggers an alarm.

These alarms are connected to the BMS/EPMS critical alarm. Should the interceptor alarms activate, they send an alarm signal to the BMS/EPMS critical alarm to alert Engineering Operations Technicians (EOTs).

Transformer Compound

There is one transformer compound onsite, located at the Newbury GIS Substation. The drainage from the transformer compound is directed to the foul drainage network and connects to the foul sewer at emission point SE2.

- Prior to discharge, storm water runoff passes through a Full retention Class 2 hydrocarbon interceptor (FR2)

The hydrocarbon interceptor is equipped with a high level liquid and oil level detection system, which is connected to the BMS/EPMS critical alarm, as described in Section 4.4.2.1).

The locations of these items are illustrated on Drawing 21_123F-00-XX-DR-C-1200-Foul Water Layout Plan.

4.4.3.2 Extended Installation (Buildings U and V)

Domestic Effluent

Domestic effluent arising from the extended Installation, i.e. Buildings U and V is discharged to foul sewer (at emission point SE5). Refer to Drawing 21_123F-00-XX-DR-C-1200-Foul Water Layout Plan for the foul drainage layout. The foul water connection to the foul sewer is in accordance with the DCC Planning Ref. 3461/21.

Fire Sprinkler Pumphouse

A foul drainage line (as can be seen on Drawing 21_123F-00-XX-DR-C-1200-Foul Water Layout Plan) serves the fire sprinkler pumphouse to the south of Building U. This is connected to the internal floor gully. There is a Class 2 full retention hydrocarbon interceptor on this line (FR4). The foul line and interceptor act as a tertiary containment measure for unplanned emergency events, such as spillages associated with the pump and fuel tank. Under normal operating conditions, there is no discharge to the foul sewer.

All hydrocarbon interceptors for the extended Installation have:

- high level liquid sensors, which indicates when the liquid level in the hydrocarbon interceptor rises excessively and triggers an alarm: and
- oil level detection systems, which detects the oil level based on conductivity and triggers an alarm.

These alarms are connected to the BMS/EPMS critical alarm. Should the interceptor alarms activate, they send an alarm signal to the BMS/EPMS critical alarm to alert Engineering Operations Technicians (EOTs).

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, including the extended Installation, has principally been assessed against the BAT conclusions contained in Table 5.1 below:

Table 5.1 Applicable BAT documents

Relevant BREF	Publication date	Attachment
Best Available Techniques (BAT) Reference Document for Large Combustion Plants (CID)	2021	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.

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 are 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

For both the existing and extended Installation, the only chemical stored on site in bulk is fuel (HVO, diesel or HVO/diesel blend). Either diesel or HVO may be used for emergency back-up generators, with a preference to use only HVO when supply is available. Smaller tanks of Urea are stored on site as described in Section 6.1.2. No maintenance chemicals are held on site. 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, hydrogen peroxide, 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 and Building V. No additional refrigerants are stored onsite. R410A, R32, R134a and R407c refrigerants are held within this enclosed system on a continuous basis and would only be removed during decommissioning. Refer to Section 6.3 for waste management.

6.1.1 Fuel Oil

Fuel for the emergency back-up generators is stored in multiple locations across the Site; that includes bulk fuel tanks, belly tanks and day tanks located with each emergency back-up generator.

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. Fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

The total fuel storage capacity is shown in Table 6.1. A combination of both diesel and HVO may be used. HVO and diesel can be stored simultaneously in the same fuel storage tanks. There are no separate or dedicated tanks exclusively for HVO. Due to HVO's slightly lower density (0.846 t/m³ compared to diesel's 0.86 t/m³), this difference affects the total storage capacity when measured in tonnes.

ADSIL will use HVO if it is available from the supplier. When HVO is not available, diesel will be used on site. The ratio of diesel to HVO in the fuel tanks at any time will vary depending on the availability of HVO.

Table 6.1 Fuel Storage

Fuel Storage Tank	No. tanks	Storage volume per tank (m^3)	Total storage volume (m^3) @100% full	Total storage volume (m^3) @90% full	Total capacity (tonnes) diesel (0.86 t/m^3)	Total capacity (tonnes) HVO (0.846 t/m^3)
Existing Installation						
Bulk Fuel Tanks (W)	3	52	156	140.4	120.74	118.78
Bulk Fuel Tanks (X, Y)	5	54	270	243	208.98	205.58
Back up Gen Day Tanks (X, Y)	27	2.5	67.5	60.75	52.25	51.39
Back up Gen Day Tanks (W)	13	2.5	32.5	29.25	25.16	24.75
Fire Sprinkler Pumps	6	1	6	5.4	4.64	4.57
Extended Installation						
Bulk Fuel (Top-Up) Tank (U, V)	1	40	40	36	30.96	30.46
Back up Gen Belly Tanks (U)	10	16	160	144	123.84	121.82
Back up Gen Belly Tanks (U)	1	4.95	4.95	4.455	3.83	3.77
Back up Gen Belly Tanks (V)	1	8.5	8.5	7.65	6.58	6.47
Back up Gen Day Tanks (V)	1	1	1	0.9	0.77	0.76
Fire Sprinkler Pumps	2	0.45	0.9	0.81	0.70	0.69
Fire Sprinkler Pump	1	0.9	0.9	0.81	0.70	0.69
Total			748.25	**673.43**	**579.15**	**569.72**

Therefore, the total combined fuel tank capacity is 748,250 litres (748.25 m^3), however as per standard ADSIL policy, tanks are filled to 90% capacity (max.), i.e. 673,425 litres (673.43 m^3). It should be noted that the tanks cannot be filled more than 90% as an alarm will be activated and the system will automatically shut-off.

In the worst case scenario, the fuel tanks will contain only diesel (i.e. 579.15 tonnes) and no HVO (0 tonnes), in the best case scenario, the fuel tanks will contain only HVO (i.e. 569.72 tonnes) and no diesel (0 tonnes). In reality, the ratio of diesel to HVO will vary and the amount of HVO and diesel will vary between these 2 scenarios.

In accordance with the Commission for Energy Regulation (CER) regulations, low sulphur diesel is used. In addition, Hydrotreated Vegetable Oil (HVO) is now used on all sites (with a preference to use only HVO when supply is available) to power backup emergency back-up generators. ADSIL are committed to operating all of their data centres on the basis of net zero greenhouse gas (GHG) emissions. HVO has the advantage of GHG emission reductions of greater than 75% compared to fossil-fuel derived diesel and thus will contribute to achieving net zero GHG emissions by 2050 in line with Irish and EU targets.

The Installation will use suppliers of HVO that can provide Proof of Sustainability (PoS) under the Renewable Energy Directive (RED) Voluntary Scheme system. Ireland does not have its own national RED certification scheme so compliance must be demonstrated through a European Commission approved scheme or the national scheme of another Member State.

Under the PoS the HVO Feedstock is certified to ensure that it meets the definition of waste or residue under the REDIII Directive. Presently, the site utilises Certa as a supplier of HVO Fuel. Certa's current supply of HVO is derived from used cooking oil (UCO). Other waste-based feedstocks such as palm oil mill effluent (POME) and tallow are also utilised in the production of HVO provided that they meet the definition of waste or residue under the REDIII Directive.

HVO at the site will be sourced from reputable suppliers to ensure it meets the high-quality standards. HVO is a manufactured product designed specifically for fuel use and is not a waste material. HVO fuel complies with EN 15940 standards (paraffinic diesel fuel).

There is currently no significant commercial HVO fuel production in Ireland. A substantial proportion of imported HVO fuel is produced in the Netherlands, with additional sources including the USA, Sweden, Belgium, China, and Italy. The fuel is produced outside Ireland and imported into Ireland as a finished product. Since the imported HVO fuel is a product, and not a waste, its use as fuel does not fall within the scope of the Waste Framework Directive.

6.1.1.1 Existing Installation (Building W, Y and X)

The Existing Installation (Building W, Y and X) includes the following fuel storage tanks:

- Bulk Fuel Oil Storage
  - 3 no. fuel storage tanks (Building W), each 52,000 litres
  - 5 no. fuel storage tanks (Building X ,Y), each 54,000 litres
- Emergency Backup Generator Fuel
  - 13 no. day tanks (Building W), each 2,500 litres
  - 20 no. day tanks (Building X), each 2,500 litres
  - 7 no. day tanks (Building Y), each 2,500 litres
- Fire Sprinkler Pump Fuel
  - 3 no. fuel tanks (located between Building W and Y), each 1,000 litres
  - 3 no. fuel tanks (located at Building W), each 1,000 litres

Bulk Fuel Tank Farms

Bulk fuel is supplied to Building W emergency back-up generators from the 3 no. 52,000 L tanks located south of Building W; the bund has a capacity of 316.80 m^3.

Bulk fuel is supplied to Building X and Y emergency back-up generators from the 5 no. 54,000 L tanks located south of Building X; the bund has a capacity of 408 m^3. Bund capacity for each tank farm 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 bunds are constructed of suitable concrete and have undergone testing for integrity during the commissioning phase. All pipelines are integrity tested following installation by vendor.

The drainage sumps at the fuel unloading bays and in the bulk tank concrete bunds contain hydrocarbon detection systems which automatically shuts off drainage from these sumps if fuel is detected, preventing any contaminated storm water from exiting the bund. Should the detector alarm activate, an alarm signal is sent to the BMS/EPMS critical alarm to alert Engineering Operations Technicians (EOTs).

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

Fuel delivery to the bulk storage tanks takes place within the designated fuel unloading areas under strict Standard Operating Procedures. Fuel is then piped from the bulk storage tanks to the emergency back-up generators. Fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

Buildings W

Bulk fuel is supplied to the emergency back-up generator day tanks at Building W from the Bulk Tank Farm located south of Building W.

Each of the 13 no. emergency back-up generators 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 alarm to BMS/EPMS critical alarm.

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

Buildings X and Y

Bulk fuel is supplied to the emergency back-up generators day tanks at Building X and Y from the Bulk Tank Farm located south of Building X.

Each of the 20 no. emergency back-up generators at Buildings X, and 7 no. emergency back-up generators at Buildings Y, 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 alarm to BMS/EPMS critical alarm.

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

6.1.1.2 Extended Installation (Buildings U and V)

The Extended Installation (Buildings U and V) includes the following fuel storage tanks:

- Bulk Fuel Oil Storage (Top-Up Tank)
  - 1 no. fuel storage tank (Buildings U, V), 40,000 litres
- Emergency Back-up Generator Fuel
  - 10 no. belly tanks (Building U), each 16,000 litres
  - 1 no. belly tank (Building U), 4,950 litres
  - 1 no. belly tank (Building V), 8,500 litres
  - 1 no. day tank (Building V), 1,000 litres
- Fire Sprinkler Pump Fuel
  - 2 no. fuel tanks, (Buildings U, V) each 450 litres
  - 1 no. fuel tank, (Buildings U, V) 900 litres

Top-Up Fuel Tank Farm

Fuel is supplied to Buildings U and V generators from the 1 no. 40,000 L top-up tank located in the south of the extended Installation; the bund has a capacity of 63 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 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 drainage sumps at the fuel unloading bays and in the bulk tank concrete bunds contain hydrocarbon detection systems which automatically shuts off drainage from these sumps if fuel is detected, preventing any contaminated storm water from exiting the bund. Should the detector alarm activate, an alarm signal is sent to the BMS/EPMS critical alarm to alert Engineering Operations Technicians (EOTs).

The top-up tank is fitted with automated level gauges and the online readings from these gauges are fed back into the Installation's BMS/EPMS. The top up tank also has high/low level alarms (90% high, 30% low).

Fuel delivery follows the same strict SOPs as the existing Installation. Fuel is piped from the top up tank to the emergency back-up generators. Fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

There are 2-no. fire sprinkler pumps at the sprinkler house that have 3 no. double skinned tanks (2 x 450 litres and 1 x 900 litres) for immediate supply to the fire sprinkler pump.

Building U

Fuel is supplied to the emergency back-up generator belly tanks at Building U from the top up tank to the south of Building U.

Each of the 11 no. emergency back-up generators at Buildings U have their own fuel belly tank with local control panel for immediate supply to the generator, with motorized valve for fuel fill and leak detection prevention, and safety alarms to the BMS/EPMS. 10. no belly tanks have a fuel storage capacity of 16,000 litres (critical generators), 1 no. belly tank has a capacity of 4,950 litres (house generator).

Buildings V

Fuel is supplied to the emergency back-up generator's belly tank and day tank at Building V from the top up tank in the south of the site.

The 1 no. emergency back-up generator at Building V has a belly tank (8,500 litres) and is accompanied by a double skinned day tank (1,000 litres) for immediate supply to the generator. There is a leak detection system in place and the belly and day tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

6.1.2 Urea (aqueous solution)

For the extended Installation, the individual emergency back-up generators (excluding the 1 no. 2.19 MW_{th} backup house generator) for Buildings U (10 no. 6.49 MW_{th} critical generators) and V (1 no. 3.6 MW_{th} critical generator) uses an aqueous solution of urea for SCR abatement system, stored in single-skinned storage tanks.

The extended Installation includes the following urea storage tanks:

- Building U - 10 no. urea tanks (each 850 litres useable capacity, 895 litres total capacity); and
- Building V – 1 no. urea tank (1,275 useable capacity, 1,410 litres total capacity).

The filling process is managed via the unloading yard and distribution manifold (refill cabinet), which serves to fill the 11 no. urea day tanks (10 no. for Building U and 1 no. for Building V) located within each individual generator container.

The urea tanks are stored inside the individual generator enclosures. There is no storm water runoff from the urea tanks. If there is a leak, this is contained within the generator containers.

For safety and efficiency, the urea tanks are equipped with overflow and leak protection devices and alarms, and controlled based on low and high level sensors. The level gauge sensors are integrated with an onboard controller that triggers audible alarms in case of overfilling or sudden loss of urea from within the tank, which will alarm to BMS/EPMS critical alarm.

These precautions prevent spills and ensure optimal usage of the solution.

The design and construction of the urea tanks and pipelines are tailored specifically for this purpose, ensuring they are rendered impervious to the stored materials. This measure guarantees the integrity and containment of the urea aqueous solution, mitigating any potential risks associated with its storage and use in the SCR abatement system.

6.1.3 Resource Use

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

Table 6.2 Summary of the Estimated Current and Future Resource use at the Installation

Resource	Estimated Current Quantity per annum	Estimated Future Quantity per annum
Electricity (purchased) (average consumption)	248,720 MWh	318,799 MWh
Electricity (generated and exported)	N/A	N/A
Natural Gas	N/A	N/A
Fuel Oil (expected use)	1,083.23 tonnes (diesel only)	1,409.59 tonnes (using diesel only) 1,383.7 tonnes (using HVO only)
Fuel Oil (maximum use)		3,716.32 tonnes (using diesel only) 3,655.82 tonnes (using HVO only)

Resource	Estimated Current Quantity per annum	Estimated Future Quantity per annum
Water (Public Supply)	17,886 m^3	18,972 m^3

It should be noted that the fuel oil (maximum use) figures are conservative and based on 45 no. emergency back-up generators running at 100% load for a total of 150 hours per generator per year, in addition to testing and maintenance of all 52 emergency back-up generators.

The applicant employs 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.

The applicant is focused on efficiency and continuous innovation across global infrastructure. AWS is committed to achieving Amazon's goal of net-zero carbon by 2040. AWS is committed to building a sustainable business for their customers and the planet. In 2019, the Operator co-founded The Climate Pledge—a commitment to be net zero carbon across their business by 2040. AWS is investing and innovating in efficiency in every aspect of their operations and is on a path to be powered by 100% renewable energy by 2025.

6.2 INTERMEDIATES OR PRODUCTS

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

6.3 WASTE MANAGEMENT

For the Installation, including the extended section, there is minimal solid and liquid waste produced at the data storage facilities. The waste comprises 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 are segregated into appropriate categories and 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 internally in appropriate waste receptacles on bunds; storage locations are identified on Drawing 21_123F-CSE-00-XX-DR-C–0002 – Site Layout Plan. At present there is no external hazardous waste storage area. If external storage is required in future, this will be in bunded and covered chemical stores.

The waste is collected from the designated areas by an authorised waste management contractor for off-site management.

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/oily water from hydrocarbon interceptors is removed directly from each interceptor by means of a vacuum tanker. Once removed by the vacuum tanker, it is removed from the Installation. There is no storage of this waste on site and there is no discharge of oily water or waste sludge from the hydrocarbon interceptors to foul sewer /storm water network. Under normal operating conditions, there is no oil/fuel discharged into the foul sewer / storm water drainage system. The interceptors serve solely as a final containment measure in the event of a significant spill, leak or incident on site.

Preventative maintenance of hydrocarbon interceptors is undertaken by independent contractors regularly. Hydrocarbon interceptors are inspected at the time of installation and inspected and cleaned typically every 6 months by a specialist vendor/contractor.

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. 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 fuel 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 / top up tank are located within bunded areas meeting the requirements of Agency guidelines on the “Storage and Transfer of Materials for Scheduled Activities”. All bunds are 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 are designed in accordance with the EPA’s guidelines for the storage and transfer of materials for scheduled activities (EPA, 2004).

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

The containerised emergency back-up generator housing includes retention bunding in the base of the container. There are leak detection systems within the bund and 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 liquid waste (oil/diesel/HVO) 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 Installation 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, groundwater or surface water from the operational development,.

7.1 AIR EMISSIONS

7.1.1.1 Existing Installation (Building W, Y and X)

Main Air Emissions

There are no main air emissions.

Minor emissions

The following is a list of the minor air emission points from each of the emergency back-up generators under the existing Licence. These emission points will remain in place and are shown in Drawing No. 21_123F-00-XX-DR-C-2000 Emission Layout Plan.

- Building W: 13 no. 5.44 MW_{th} emergency back-up generator stacks with a minimum height of 6 m above ground level.
- Building X: 20 no. 5.44 MW_{th} emergency back-up generator stacks with a minimum height of 16 m above ground level.
- Building Y: 7 no. 5.44 MW_{th} emergency back-up generator stacks with a minimum height of 16 m above ground level.

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 back-up generators. However, the emergency back-up generators are included as minor emission sources due to the routine testing and maintenance.

- 8 no. Fuel Top Up Tank Emergency Relief Vents (1 per each top-up/bulk tank)
- Sprinkler Pumphouse associated with Building W: 2 no. 0.337 MW_{th} emergency back-up fire sprinkler pumps
- Sprinkler Pumphouse associated with Building X and Y: 2 no. 0.423 MW_{th} emergency back-up fire sprinkler pumps.

The fuel storage bulk tanks at the Installation each include two-way normal pressure (breather) vents. These produce minor 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 fuel will have flange guards to prevent fugitive emissions.

7.1.1.2 Extended Installation (Buildings U and V)

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 for the extended site, i.e. Buildings U and V. These emission points are shown in Drawing No. 21_123F-00-XX-DR-C-2000-Emission Layout Plan.

- Building U: 10 no. 6.49 MW_{th} emergency back-up generator stacks with a minimum height of 25 m above ground level.
- Building U: 1 no. 2.19 MW_{th} emergency back-up generator stack with a minimum height of 25 m above ground level.
- Building V: 1 no. 3.6 MW_{th} emergency back-up generator stack with a minimum height of 15.6 m above ground level.

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 licence review application.

Potential Emissions

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

- 1 no. Fuel Top Up Tank Emergency Relief Vents (for the bulk tank).

- Sprinkler Pumphouse associated with Buildings U and V: 2 no. 0.57 MW_{th} emergency back-up fire sprinkler pumps.

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 extended installation. External pipelines containing fuel will have flange guards to prevent fugitive emissions.

7.1.2 Treatment and Abatement Systems

The emissions from the emergency back-up generators for the overall Installation (including the extended Installation) 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 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).

The emergency back-up generators (excluding the 1 no. 2.19 MW_{th}) for Buildings U (10 no. 6.49 MW_{th}) and V (1 no. 3.6 MW_{th}) are each fitted with an SCR unit to reduce exhaust emission gases to air. The SCR abatement is not required for compliance with ambient air quality standards.

The results of the air dispersion model undertaken for the Installation has included the NOx reduction achieved by the SCR abatement set out in Attachment-7-1-3-2-Air Emissions Impact. The USEPA methodology modelling results (based on 150 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.

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

Under the MCP Regulations Schedule 3, Part 1, Article 3 that sets out the monitoring requirements for MCP Measurements shall be required only for: (a) pollutants for which an emission limit value is laid down in this Directive for the plant concerned; (b) CO for all plants. Under Regulation 13(3) of the MCP 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) set out in Part 2 of Schedule 2. As the plant do not operate more than 500 operating hours per year, there are no ELV laid down, and therefore, emissions monitoring is only required for CO in relation to the MCP plant at this Installation.

As per Schedule A.1 of the existing licence: In the event that a generator is unavailable due to maintenance or other reasons, a mobile generator may be used. The combined thermal input of both the stationary and mobile generators, which are operated at any one time, shall be equivalent to 45 no. emergency back-up generators running at 100% load.

The emergency back-up generators (excluding the 1 no. 2.19 MW_{th} generator) for Buildings U (10 no. 6.49 MW_{th}) and V (1 no. 3.6 MW_{th}) SCR abatement system includes electronic sensors checks for proper urea injection, ensuring that the catalyst is functioning effectively to reduce NOx emissions. Any discrepancies or malfunctions are detected by the system. Monitoring and diagnostics of engine emissions via the SCR abatement systems is crucial to identifying any deviations from emission standards.

The SCR system represents the latest technology and does not require additional monitoring or control for SCR functionality. NH_3 emissions are calculated by the onboard controller, which is programmed to shut down the SCR system in the event of excessive ammonia slip. Given this built-in control mechanism, there is no proposal for continuous NH_3 monitoring. Under the LCP BAT (BAT5, and BAT15 of the LCP BAT) for the monitoring of sulphur trioxide (SO_3) relates to the emissions to water from flue-gas treatment. The generators fitted with SCR abatement do not have any emissions to water from flue-gas treatment. Therefore, no SO_3 monitoring is required or proposed.

The emergency back-up generator operating hours are recorded on the Enterprise Asset Management System (EAM). For each generator, the Operation’s Team manually enters planned and emergency run hours and the description of the operation (run reason) onto the EAM system.

The environmental team must approve all generator operation associated with on-load planned maintenance/testing to ensure the run hours do not exceed what is allowed under the site’s Licence conditions. This is done automatically on ADSIL’s internal maintenance approval system platform.

When an emergency operation is logged, an email alert is sent to the Environmental Team for review and tracking. The Operations team also maintain appropriate records of generator operations.

7.2 EMISSIONS TO FOUL SEWER (WASTEWATER EMISSIONS)

Foul drainage is collected in the onsite foul network and will be discharged to the mains foul sewer.

7.2.1.1 Existing Installation (Building W, Y and X)

The outfall into the mains foul network from the existing licenced site is at four locations, one to the south of Building W (emission point SE1), one connection point to the east of Building W (SE2), one to the east of Building X (emission point SE3) and one to the east of Building Y (emission point SE4).

- Emission point SE1 caters for storm water flows from the fuel tank farm bund and associated fuel unloading bays at Building W.
- Emission point SE2 caters for domestic foul flows from Building W as well as the welfare facilities associated with the Newbury GIS Substation control building and storm water flows from the transformer yard.
- Emission point SE3 caters for domestic foul flow from Building X, and storm water flows from the fuel tank farm and fuel unloading bays associated with Building X and Building Y.
- Emission point SE4 caters for domestic foul flow from Building Y.

The emission discharge points are labelled SE1 through SE4 on Drawing 21_123F-00-XX-DR-C-1200-Foul Water Layout Plan included with the application.

7.2.1.2 Extended Installation (Buildings U and V)

The outfall into the mains foul network from Buildings U and V is at one location, to the west of Building U (emission point SE5).

Emission point SE5 caters for domestic foul flows from Buildings U and V. Under normal operating conditions, only domestic foul drainage is discharged to SE5 (Refer to Section 4.4.3.2).

The emission discharge point is labelled SE5 on Drawing 21_123F-00-XX-DR-C-1200-Foul Water Drainage Layout Plan included with the application.

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

The foul drainage line (as can be seen on Drawing 21_123F-00-XX-DR-C-1200-Foul Water Layout Plan) that serves the fire sprinkler pumphouse to the south of Building U is connected to the internal floor gully. There is a Class 2 full retention hydrocarbon interceptor on this line. The foul line and hydrocarbon interceptor act as a tertiary containment measure for unplanned emergency events, such as spillages associated with the pump and fuel tank. Under normal operating conditions, there is no discharge to the foul sewer.

No monitoring is proposed for the foul water discharge.

7.2.2 Treatment and Abatement systems

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

Storm water runoff that drains to foul sewer from the bulk tank/top-up tank farms and associated unloading bays and the transformer compound are equipped with hydrocarbon interceptors (Refer to Section 4.4.3).

The types and locations of the hydrocarbon interceptors are illustrated on Drawing 21_123F-00-XX-DR-C-1200. The hydrocarbon interceptors are equipped with high liquid level and oil level warning systems which are connected to the BMS/EPMS critical alarm (Refer to Sections 4.4.2 and 4.4.3).

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

No further treatment or abatement is required for the foul drainage line (as can be seen on Drawing 21_123F-00-XX-DR-C-1200-Foul Water Layout Plan) that serves the fire sprinkler pumphouse to the south of Building U. As outlined above, there is no discharge to the foul sewer. No further treatment or abatement is required.

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

7.2.3 Control and Monitoring

There is no planned discharge of trade effluent or other matter (other than domestic sewage or storm water) to the foul water network on site, therefore no monitoring of the overall sewer discharge is proposed.

Under normal operating conditions, there is no oil/fuel discharged into the foul sewer. The interceptors serve as a final containment measure in the event of a significant spill, leak or incident on site.

The emission / offsite discharge points are labelled SE1, SE2, SE3, SE4, and SE5 on the Foul Water Drainage Drawing 21_123F-CSE-00-XX-DR-C-1200 Layout included with the application.

7.3 STORM WATER EMISSIONS

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

7.3.1.1 Existing Installation (Building W, Y and X)

The attenuated storm water for the existing Installation drains at 2 no. emission points (SW1 and SW2). The site drainage is shown on Drawing 21_123F-CSE-00-XX-DR-C-1100-Surface Water Layout Plan included with this application. Attenuation Stormtech system No.1 discharges at emission point SW1 into the existing 450mm IDA Park storm sewer to the south of the existing Installation. Attenuation Stormtech system No.2 discharges at emission point SW2 into the existing IDA Park 900mm storm sewer to the east of the existing Installation. There is negligible retained water within the Attenuation stormtech systems under dry weather conditions.

The allowable runoff rate for Building W is restricted to pre-development flows of 294.8 litres per second (l/s) or 1061.28 cubic meters per hour (m^3/hour). The allowable greenfield runoff rate for Building X and Y is 7 l/s or 25.2 m^3/hour. Evaporative cooling water is discharged at ambient temperature to the storm water network. Evaporative cooling water has estimated conductivity values of between 1,200-1,500 µS/cm. See Attachment 7-1-3-2 Soil and Water Impact Assessment for further details.

7.3.1.2 Extended Installation (Buildings U and V)

The attenuated storm water for the extended part of the site, i.e. Buildings U and V, drains at 1 no. Emission Point (SW3). The site drainage is shown on Drawing 21_123F-CSE-00-XX-DR-C-1100 included with this application. Attenuation Stormtech system No.3 discharges at Emission Point SW3 into the existing IDA Park 900mm storm sewer to the west of the extended part of the Site. There is negligible retained water within the Attenuation storm cell under dry weather conditions.

The allowable greenfield runoff rate for Buildings U and V is restricted to pre-development flows of 7.24 litres per second (l/s) or 26.64 cubic meters per hour (m^3/hour).

The IDA Park storm sewer outfalls into the Santry River, which is located to the south of the Site; the Santry River flows c. 5.15 river km east, to the North Bull Island transitional water body, and ultimately into Dublin Bay.

Evaporative cooling water is discharged at ambient temperature to the storm water network. Evaporative cooling water has estimated conductivity values of between 1,200-1,500 µS/cm. See Attachment 7-1-3-2 Soil and Water Impact Assessment for further details.

7.3.2 Treatment and Abatement systems

7.3.2.1 Existing Installation (Building W, Y and X)

For the existing Installation, the site storm water network discharges to the IDA Park storm sewer system. There are 2 no. storm water attenuation systems constructed on the site, to attenuate storm water and manage discharge flow rates.

The residual evaporative cooling water that is discharged to the storm water drainage network 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 passes through hydrocarbon interceptors to capture any hydrocarbons prior to discharge from the site (Refer to Section 4.4.2). For the existing Installation, the hydrocarbon interceptors are located down gradient of the Stormtech systems, and prior to outfall. For the extended Installation, the storm water flows through the interceptors before entering the Stormtech system, prior to outfall at SW3.

The hydrocarbon interceptors are equipped with high liquid level and oil level detection sensors and connects to the BMS/EPMS critical alarm. There is no further requirement for additional on-site treatment of storm water from the Site.

Additional onsite control and mitigation measures are in place including:

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

7.3.2.2 Extended Installation (Buildings U and V)

For the extended Installation, the site storm water network conveys the storm water via hydrocarbon interceptors to capture any hydrocarbons, to 1 no. Storm water attenuation system constructed on the site. The residual evaporative cooling water that is discharged to the storm water drainage system 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 hydrocarbon interceptors are equipped with high liquid level and oil level detection sensors and connects to the BMS/EPMS critical alarm. There is no further requirement for additional on-site treatment of storm water from the Site.

Additional onsite control and mitigation measures are in place including:

- Double skinned day tanks, with high- and low-level alarms, and leak detection;
- Bunded top up tank with high- and low-level alarms;
- The top up tank bunds and delivery bays are equipped with hydrocarbon probes in the bund sump which detects fuel 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.

7.3.3 Control and Monitoring

No online monitoring is proposed for the storm water discharge. The only bulk chemicals stored that have the potential to result in soil, surface water or groundwater contamination are diesel/HVO fuel. Adequate control measures are in place to monitor any potential leaks or spills of hydrocarbons at source.

In accordance with the existing Licence (P1186-01) daily visual inspections for discolouration and odour are undertaken upstream of the storm water discharge points, and pH, temperature, TOC and conductivity are monitored weekly (monitoring points SW1-1 and SW2-2). The same monitoring regime is proposed for the extended Installation at SW3-1).

Under normal operating conditions, there is no oil/fuel discharged into the storm water drainage system. The interceptors serve as a final control measure in the event of a significant spill, leak or incident on site.

Potentially polluted water that reaches the Stormtech system in an abnormal event, (for example, in the case of a fire) shall be tested before release to the receiving storm water sewer system. Any storm water of unacceptable quality will be pumped out or otherwise removed from the attenuation stormtech system(s) and disposed of appropriately. For the extended Installation, hydrocarbon interceptors are located upstream of the stormtech system, which decreases the risk of potentially polluted water entering the stormtech system. In the highly unlikely event of a major spill that entered the stormtech system (s), inspection would be undertaken to ensure there is no subsurface contamination.

Due to the limited storage of bulk chemicals on site, and the robust control measures outlined above it is considered that no further monitoring or control methods are required for storm water.

7.4 EMISSIONS TO GROUND

There are no process emissions to ground from the installation.

7.5 NOISE EMISSIONS

During operation, the primary source of noise arises from building service plant which services 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. The emergency generator container provides an acoustic enclosure to dampen the noise, and in line attenuators for the generator stacks and exhausts are used where necessary.

Assessments have been 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 will 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) has been developed for the site in accordance with the requirements of BAT. The EMS outlines the management of the site's environmental program and is certified by ISO14001. This EMS will be updated to incorporate the extended installation, i.e. Buildings U and V and associated ancillary development.

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 ensures the installation is running an optimal efficiency and alerts 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.

In the event that any BMS / Critical alarm is activated, the following steps are taken:

- The BMS sends out an email to the subscribers on the email list.
- Data Centre Engineering Operations (DCEO) Engineering Operations Technicians (EOTs) receive this email and page. If the EOT is in a position to reply, he/she should REPLY ALL giving a brief description of what is happening. “DCEO onsite investigating”.
- The FOC call the site security and request communication from DCEO.
- Security Notify DCEO EOT of the alarm via Radio.
- In order to speed up the investigation and communication, the EOT onsite must designate somebody (may be located in a different building) to be the Incident Controller (IC). The IC is usually better placed to carry out communications or updates. This allows the onsite EOT to focus on the investigation and he/she can keep the IC updated directly.
- The IC should keep communication lines open with the onsite EOT via radio and keep the ticket updated with relevant information. Updates are required every 5 minutes until event is stood down.

The EPMS monitors the total fuel use as required for the GHG Permit (a variation request to the existing current GHG Permit Register No. IE-GHG173-04 has been accepted). The EPMS also controls 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. It includes any requirements of the existing Installation, and will be updated to incorporate the extended Installation and any future development. The ERP details the required actions to be undertaken in the event of an incident on site and covers 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 operates 24/7, 365 days a year. Therefore, there is 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 centres.

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 are carried out 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 are non-hazardous. Waste operations involve proper segregation and management of waste. No new waste types are produced as a result of the extended Installation.

All waste leaving site is 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 is transported by suitably permitted contractors and taken to suitably registered, permitted and / or licenced facilities. All waste leaving the Site is recorded and copies of relevant documentation maintained.

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

Waste oil, filters, waste batteries and waste sludge from the hydrocarbon interceptors are removed directly by the maintenance contractors as and when generated; however, the Operator will ensure 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 and will cover the extended Installation. This ensures the proper management and recycling of wastes generated at the facilities. The waste SOPs enable the Installation to contribute to the targets and policies outlined in *The National Waste Management Plan for a Circular Economy 2024 – 2030.*

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 Building Management System (BMS) / Electrical Power Management System (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) for the Site in accordance with BAT will set out energy targets for the specific Installation 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 installation. Energy efficiency learnings are shared between sister facilities in Ireland and Europe.

The ENEMS includes Key Performance Indicators (KPIs) for energy efficiency. The efficient use of energy is monitored as part of the Site's continuous improvement programme to ensure all colleagues on site actively participate in the programme. Key process monitoring is carried out to monitor plant performance including water usage, energy consumption (fuel oil and electricity), hours of operation and power generated. The energy monitoring via the BMS is 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- BREF-Energy Efficiency 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. This fire management system will include the extended part of the site.

The data storage facilities are equipped with automated fire detection systems (heat and smoke). These are connected to main fire panels in the security offices which are 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 subject to routine checks by site personnel and are inspected and tested by the external service provider on a regular basis.

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 emergency back-up generators, the transformers, and all other relevant operational equipment at the installation,
- The emergency back-up 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.

9.2 BASELINE REPORT

There is no instructive site investigation information available for the part of the site on which the existing Installation is located. There is information available for the extended Installation part of the site, and along with information gathered from extensive intrusive investigation works completed on other sites within the Clonshaugh Business and

Technology Park, there is detailed understanding of the local environmental conditions (Refer to Attachment 4-8-3-Complete Baseline Report).

Based on the data available the following conclusions have been made:

- Bedrock is greater than 20.0 mbgl and is overlain by shallow fill and low permeability boulder clay greater than 20.0 meters. As such there is no source-pathway-receptor linkage to the underlying aquifer.
- Based on the low-level detection of constituents of concern below the available soil and groundwater standards and guideline values, the site is of low environmental risk.
- The historic site uses have utilised chemicals as part of their manufacturing and printing processes - these chemicals were likely to be stored in smaller containers and within the footprint of the building reducing the risk of potential historic contamination occurrences. The only bulk chemical likely to be present was fuel oil. There is no record of any spills at the site prior to redevelopment. However, based on the natural conditions present if any localised leaks or spills occurred, these would be contained within the clays on site and naturally degrade over time.
- There is bulk diesel storage proposed for the installation (diesel, HVO or a blend of both may be used). However, the risk prevention measures present at the Installation 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), spill management procedures and incorporation of interceptors on storm water lines.
- 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 storm water drainage network. 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 hardstand delivery area. Any leakage outside of the delivery area would be contained in hydrocarbon interceptors within the drainage system.
- There is an indirect connection through the storm water drainage to the Santry River and ultimately Dublin Bay. Based on the assessment of the source-pathway-receptor linkages, there ino potential for impact of any downgradient Natura site (c.5.15 river km from the Installation).

9.3 ALTERNATIVES

9.3.1 Process alternatives

In terms of technology, the Installation employs 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 are used in all air supply and extract systems serving the data storage rooms. Also, the office air conditioning is 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.