Crag Digital Limited

Operational Report

Attachment-4-8-1

December 2023

Licence Review

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1.0 REPORT INTRODUCTION AND PURPOSE OF IE LICENCE

This Operational Report relates to the Crag Digital Limited (hereafter referred to as "the Applicant") Energy Centre and Information and Communication Technology Facility (ICTF) located at Crag Avenue, Clondalkin Industrial Estate, Dublin 22, D22 Y921 (the 'Installation' subject to this Licence Review). The location of the subject site is shown on D10EC-ARC-ZZ-ZZ-DR-A-0200-Site Location Map, this Industrial Emissions (IE) licence review application relates to the entire Installation that covers c. 13.49 hectares (ha) in total (hereafter referred to as the 'Site').

The Installation main buildings, and site infrastructure is shown on D10EC-ARC-ZZ-ZZ-DR-A-0202-Site Layout Plan. The Installation, when constructed, will consist of 10 no. Gas Turbines (GT) and 2 no. Steam Turbines (ST) along with associated plant equipment located in the western portion of the site (hereafter referred to as the 'Energy Centre'), and 4 no. 2-storey Information and Communication Technology Facility (ICTF) buildings (named ICTF1, ICTF2, ICTF3 and ICTF4) along with associated ancillary development located in the eastern and southern parts of the site.

The Energy Centre will supplement the existing ESB Networks 40MVA grid connection to provide power to the 4 no. ICTF buildings. The Energy Centre incorporates two principal technologies, an open cycle Gas Turbines (OCGT) and combined cycle Gas Turbines (CCGT). The CCGT are capable of operating in Combined Cycle (CC) (through the Heat Recovery Steam Generator (HRSG) or Open Cycle (OC) (bypassing the HRSG). Further information is provided in Section 2.0 of this report.

The Energy Centre include the following combustion emission sources:

- 5 no. 46 Megawatt Thermal Input (MW_{th}) Combined Cycle Gas Turbines
- 3 no. 42 MW_{th} Combined Cycle Gas Turbines
- 2 no. 46 MW_{th} Open Cycle Gas Turbines
- 6 no. 5.9 MW_{th} Black Start Diesel Generators (BSDG)
- 2 no. 0.7 MW_{th} Fire Sprinkler Pumps.

The individual ICTF Buildings include the following combustion emission sources:

- 18 no. 5.4 MW_{th} Emergency Generators associated with ICTF1.
- 2 no. 6.8 MW_{th} Emergency Landlord Generators associated with ICTF1.
- 3 no. 5.4 MW_{th} Emergency Generators associated with ICTF4.

The relevant requirement for an Industrial Emissions (IE) Licence is Activity Class 2.1 of the First Schedule of the Environmental Protection Agency EPA Act 1992 (as amended) (EPA Act 1992). Activity Class 2.1 states:

> *Combustion of fuels in installations with a total rated thermal input of 50 MW or more*

In addition to this IE Licence Application the Installation will require a Greenhouse Gas (GHG) Emissions permit in accordance with the European Communities (Greenhouse Gas Emissions Trading) Regulations 2004, (S.I. 437 of 2004 and amendments) when an 20MW_{th} installed capacity is exceeded.

On 18 January 2023, Eamon Ryan, Minister for the Environment, Climate and Communication, issued a general policy directive under Section 79 of the Environmental Protection Agency Act 1992, as amended (the Policy Directive). The Policy Directive requires the EPA to priorities the consideration of IE licence

applications (including licence review applications) which impact on the State's energy security of supply. This includes a Licence review application made by Crag Digital Limited, as the Energy Centre is contracted to deliver 30MW of generation in the Capacity Year 2024/25.

1.1 SITE CONTEXT

The site, which is c. 13.49 hectares, is the site of a former Eircom cable depot, and is located in Clondalkin Industrial Estate, to the northeast of Clondalkin Village. The site is zoned '*EE: To provide for enterprise and employment related uses'* in the SDCC development plan 2016-2022.

The M50 Motorway is directly to the east of the site, and the Grand Canal is directly to the south of the site, with the New Nangor Road/R134 located further to the south. Most of the surrounding lands within the industrial estate are occupied by light industrial uses including light engineering, construction, waste management and food manufacturing uses. Cloverhill Industrial Estate is located directly north of Clondalkin Industrial Estate and has a similar light industrial profile.

The nearest dwellings to the project are located to the south of Clondalkin Industrial Estate, along the Grand Canal (c. 80 m) separated from the site by the canal and the R134 regional road, and east of the M50 including some high-rise development (c. 200 m) at Park West and Woodford Walk. The wider Clondalkin area is densely populated, however the subject site is removed from any existing residential development.

The Gallanstown stream runs along the southern boundary of the site and flows to the east. A toe drain runs north to south along the M50 and also joins the Gallanstown Stream.

The southern boundary water course referred to as the Gallanstown Stream is ecologically now considered a drainage ditch due to its linear properties, and heavy modification of the original stream channel. The Gallanstown stream drains the land to the west of Clondalkin and borders the Grand Canal but does not connect to the canal. Historical mapping shows this stream connecting to the old Corporation waterworks located on the eastern side of the M50 in the Park West Business Park. The water course is occasionally fed stormwater from the M50 and is culverted underneath the M50. This watercourse flows East towards the M50 and enters a large box culvert to pass under before merging with the Camac River approximately 0.7 km downstream of the site (eastwards).

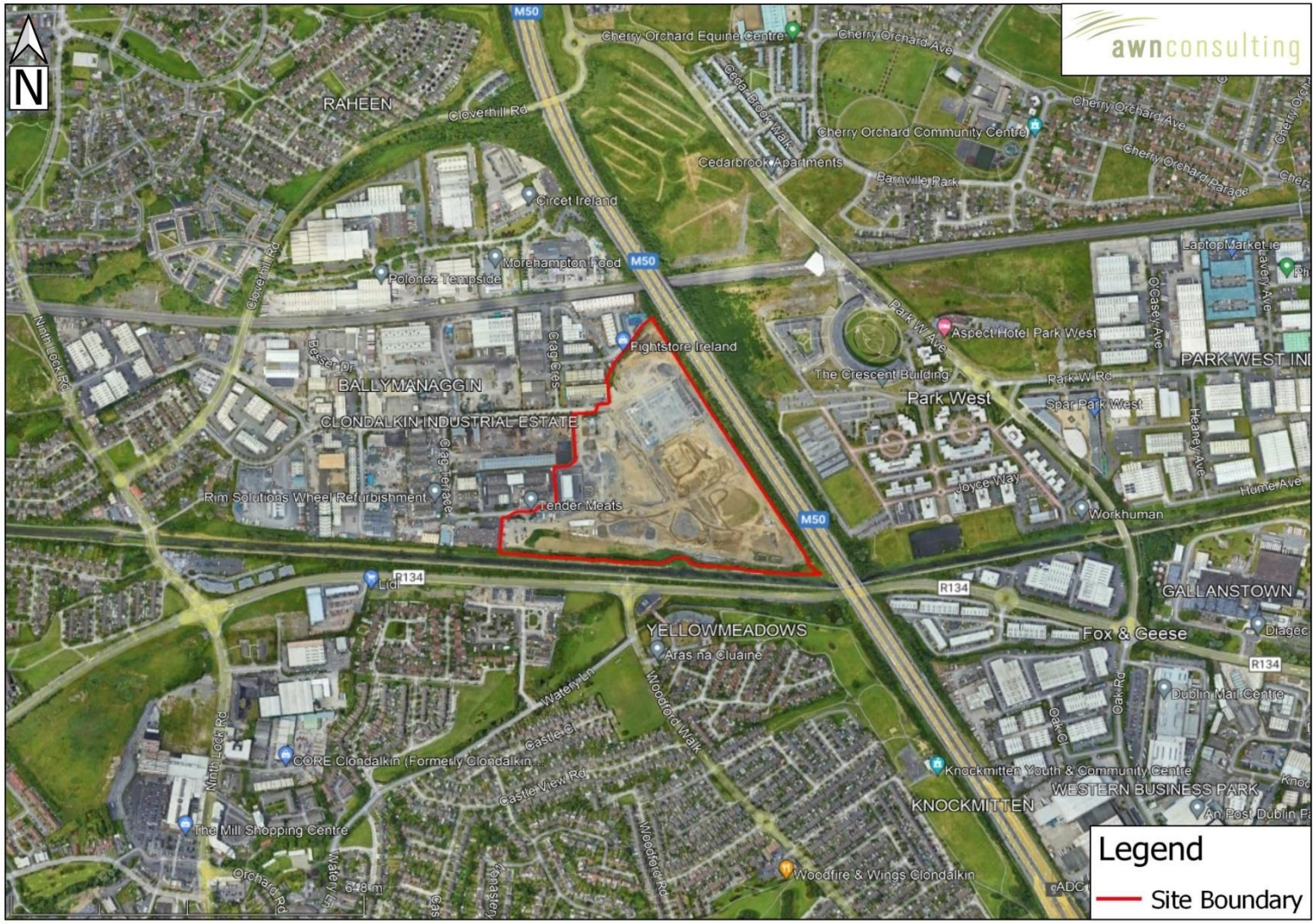

Figure 1.1 Site Location Map – Indicative site area shown (Source: Google Maps)

1.1.1 Industrial Sites in the Surrounding Area

Existing development that may be capable of combining with the Installation to result in cumulative effects are those that have similar emission sources or environmental effects during the operation of these existing developments.

To provide context to this IE application and the impact assessments undertaken for the Site a search using the EPA Maps[1] has been undertaken to identify existing IE licenced, Waste Licenced, or Integrated Pollution Control (IPC) licenced facilities within 3 km of the Installation site boundary these are listed in Table 1.1 below.

Table 1.1 *EPA licenced sites within 3 km of the site boundary*

Name	Address	Approx. Distance (km) from the Site	EPA Licence Number	Industry
Green Circular Economy Unlimited Company	Crag Avenue, Clondalkin Industrial Estate, Clondalkin, Dublin 22	0.3	W0205-01	Waste
Metal Processors Ltd	Station Road, Clondalkin, Dublin 22	0.6	P0401-01	Metals
R&A Bailey & Company	Nangor House, Nangor Road, Western Estate, Dublin	0.93	P0807-01	Food and Drink
(Proposed) Facility at GaelSafe Ltd	Unit 430, Western Industrial Estate, Dublin 12	1.31	W0007-02	Waste
Sorundon Ltd t/a Irish Environmental Services	520 Beech Road, Western Industrial Estate, Naas Road, Dublin 12, Dublin	1.39	W0040-01	Waste
Padraig Thornton Waste Disposal Limited	Unit 28, John F Kennedy Road, JFK Industrial Estate, Naas Road, Dublin 12	1.49	W0227-01	Waste
SRCL Limited	420-430 Beech Road, Western Industrial Estate, Naas Road, Dublin 12	1.76	W0055-02	Waste
Colas Bitument Emulsions (East) Limited	Bluebell Avenue, Bluebell Industrial Estate, Dublin 12	1.8	P0080-01	Chemicals
Jfk Environmental Ltd	John F Kennedy Industrial Estate, JFK Road, Naas Road, Dublin	1.86	W0196-01	Waste
Kayfoam Woolfson	Bluebell Industrial Estate, Dublin 12	1.96	P0058-02	Chemicals
Sun Chemical Inks Ltd	John F Kennedy Drive, Bluebell, Dublin 12	1.84	P0230-01	Chemicals
BOC Gases Ltd	P.O.Box 201, Bluebell, Dublin 12	1.92	P0051-02	Chemicals
BASF Printing Systems Ireland Ltd	Bluebell Avenue, Bluebell Industrial Estate, Dublin 12	1.8	P0228-01	Chemicals

[1] https://gis.epa.ie/EPAMaps/

Name	Address	Approx. Distance (km) from the Site	EPA Licence Number	Industry
Thorntons Recycling Centre (Ballyfermot)	Killeen Road, Ballyfermot, Dublin 10	1.82	W0044-02	Waste
Ringsend FlexGen	South Bank Road, Pigeon House Road, DUBLIN 4	2.03	P1151-01	Energy
Oxigen Environmental (Merrywell)	Merrywell Industrial Estate, Ballymount Road Lower, Clondalkin, Dublin 22	2.1	W0208-01	Waste
Henkel Operations and Research Ltd	Kylemore Park North, Ballyfermot, Dublin 10	2.15	P0078-01	Chemicals
Starrus Eco Holdings Limited	Merrywell Industrial Estate, Ballymount Road Lower, Ballymount, Dublin 12	2.17	W0238-01	Waste
Helton Buckley Ltd	Robinhood Industrial Est., Robinhood Road, off Longmile Road, Dublin 22	2.19	P0340-01	Chemicals
CVP Limited	Kylemore Road, Ballyfermot, Dublin 10	2.37	P0094-01	Chemicals
Galco Steel Ltd	Ballymount Road, Walkinstown, Dublin 12	2.39	P0284-02	Metals
Starrus Eco Holdings Limited (Ballymount)	Ballymount Cross, Tallaght, Dublin 24, Dublin	2.42	W0039-02	Waste
SRCL Limited (Kylemore Road) trading as Eco-Safe Systems Ltd	Unit 1 A, Allied Industrial Estate, Kylemore Road, Ballyfermot, Dublin 10	2.53	W0054-02	Waste
Ultra Packaging Ltd	Unit 1, Allied Industrial Estate, Kylemore Road, Dublin 10	2.51	P0092-01	Surface Coatings
Irish Packaging Recycling	Ballymount Road, Walkinstown, Dublin 12	2.67	W0263-01	Waste
Irish Printed Circuits Ltd	Block B, Unit E, Ballymount Drive, Walkinstown, Dublin 12	2.75	P0217-01	Surface Coatings
Jamestown Shot Blasting & Metal Coating Ltd	Jamestown Road, Inchicore, Dublin 8	2.87	P0796-01	Surface Coatings
Sun Chemical Inks Ltd	Glenside Works, Mill Lane, Palmerstown, Dublin 20	2.88	P0241-01	Chemicals
Ballymount Baling Station	Ballymount Road, Walkinstown, Dublin 12	2.93	W0003-03	Waste

To provide context to this IE Licence Review and the impact assessments undertaken a similar search has been undertaken within 3 km of the site boundary for existing Control of Major Accident Hazards (COMAH) / Seveso Directive III establishments

registered with the Health and Safety Authority[2]. These sites are listed in Table 1.2 below.

Table 1.2 *Seveso establishments within 3 km of the site boundary*

Name	Address	Seveso Tier	Distance (km) from the Site	Consultation Zone (km)
Kayfoam Woolfson	Bluebell Industrial Estate, Dublin 12	Lower	1.7	0.3
BOC Gases Ireland Ltd	P.O.Box 201, Bluebell, Dublin 12	Upper	2.1	0.8
Irish Distillers Ltd (Dublin)	Robinhood Road, Fox & Geese, Clondalkin, Dublin 22	Lower	1.9	0.4

1.2 PLANNING STATUS

Development at the licenced Installation site was first permitted in July 2014 (SDCC Reg. Ref. SD13A/0271, ABP Reg. Ref. PL06S.243151) and has since undergone a number of amendments, and ultimately superseded in its entirety by SDCC Reg. Ref. SD18/0068 and SD20A/0309. The parent permission (SDCC Reg. Ref. SD18/0068 and SD20A/0309) has also undergone a number of amendments. These granted permissions at this Installation also include for an ESB 110 kV Gas Insulated Substation (SD19A/0185) and for ducted service connections which will run beneath the Grand Canal to the south of the ICT and Energy Facility Site (SD20A/0242).

The current design of the Energy Centre the subject of this Licence Review is permitted (final grant notice pending) under SDCC Reg. Ref.: SD23A/0158. The current design of the ICTF Buildings the subject of this Licence Review is permitted under SDCC Reg. Ref.: SD20A/0309 as amended by Reg. Ref.: SD22A/0093.

Detailed information of the planning permissions relevant to the IE licence application can be found in Section 6 (Attachment-6-1-Stakeholder-Engagement) of the license application, including the Planning Decision and Planning Report for each application.

A summary of all relevant planning permissions for the site is provided in Table 1.3 below.

[2]https://www.hsa.ie/eng/your_industry/chemicals/legislation_enforcement/comah/list_of_establishments/

Table 1.3 *Summary of Planning Permissions Granted at Installation Site*

Application Details	Description of Development
SD23A/0158 Decision by SDCC to Grant Permission 05/03/2023 Appealed September 2023 - Appeal withdrawn December 2023	Alterations to the development permitted under Reg. Ref.: SD18A/0068, as previously amended under Reg. Ref.: SD19A/0185 and Reg. Ref.: SD20A/0242, and to the development permitted under Reg. Ref.: SD20A/0309, as previously amended under Reg. Ref.: SD22A/0093. The proposed alterations in summary comprise the provision of an altered Energy Centre design and all associated development, along with minor alterations to the permitted site layout, provision of a gas AGI, and all ancillary works. The development, for which a 5-year planning permission is sought, will comprise the following: Construction of a revised Energy Centre in the western part of the subject site, to accommodate alternate generation technology, including 10 no. gas generation turbines (all with associated flues, 8 no. c. 33 metres (m) in height and 2 no. c. 15 m in height), 2 no. steam turbines including 2 no. steam turbine generator enclosure buildings with a gross floor area (GFA) of 219 sq.m each and a height of c. 6.2 m, associated steam turbine generator distribution and control structure with a GFA of 84 sq.m and an overall height of c. 4.2 m, and 2 no. steam turbine / air cooled condenser structures with a height of c. 25.4 m. Construction of 8 no. 33/20kV transformer bays to the southeast of the Energy Centre, with a further 12 no. gas / steam transformers to serve the proposed turbines to the west of the Energy Centre. Provision of 3 no. 13.6 m high fuel storage tanks, a fuel oil enclosure building (with a GFA of 50 sq.m and an overall height of c. 3.8m), a fire pump enclosure building (with a GFA of 65 sq.m and an overall height of c. 3.2 m) along with 3 no. c. 14.1 m high sprinkler tanks, a c. 14.5 m high water tank, and a water treatment plant building (with a GFA of 218 sq.m and a maximum height of c. 17 m including rooftop plant). Provision of 6 no. black-start / Emergency Generators to the south of the Energy Centre with an overall height of c. 5 m; Provision of a single storey over basement level powertrunk building (with a GFA of 932 sq.m and an overall height of c. 4.1 m) to the southeast of the proposed Energy Centre. Provision of a 3-storey over basement medium voltage / low voltage building (with a GFA of 3,161 sq.m and an overall height of c. 16.3 m) to the southwest of the proposed Energy Centre. Provision of 2 no. transformers adjacent to the substation constructed under Reg. Ref.: SD18A/0068, as amended by Reg. Ref.: SD19A/0185 (located to the southwest of the proposed Energy Centre). Provision of a guard hut with a GFA of 21 sq.m and with a height of c. 3.2m, to the west of the medium voltage / low voltage building. Provision of a Gas AGI (above-ground Installation) to the southwest of the subject site within a fenced compound, accommodating a single storey control room building with a GFA of 10 sq.m and overall height of c. 3 m, a plant kiosk with a GFA of 17 sq.m and an overall height of c. 3 m, and a boiler house with a GFA of 13 sq.m and an overall height of c. 3m. Reorientation of permitted ICT Facility Building No. 4 to accommodate the revised Energy Centre layout (with no other change to this permitted building). Associated and ancillary alterations to the site layout relating to landscaping, parking (including 18 no. car parking spaces, and bicycle parking within a covered bicycle shelter to serve the Energy Centre) and roads layouts, lighting and services, boundary treatments, drainage, landscaping, and all associated and ancillary works. An Environmental Impact Assessment Report (EIAR) will be submitted to the Planning Authority with the planning application and the EIAR will be available for inspection or purchase at a fee not exceeding the reasonable cost of making a copy at the offices of the Planning Authority. An EPA-Industrial Emissions Directive (IE) licence will be applied for to facilitate the operation of the proposed development.
SD22A/0093 Grant Permission 30/08/2022	Amendments to the development permitted under Reg. Ref. SD20A/0309 comprising: alterations to permitted ICT Facility buildings 2 and 3, to include internal reconfiguration of the ICT equipment halls, associated electrical and mechanical plant rooms, loading bays, maintenance and storage space, office administration areas, and reconfiguration of screened plant; alterations to the external facades of permitted ICT Facility buildings 2 and 3 to include modification and reconfiguration of fenestration, louvers, loading bays, and access doors, along with an increase in height of 1.2 metres to main parapet level and reduction in the height of rooftop plant to not exceed the parapet height of the buildings, along with the omission of previously permitted flues and exhaust ducts at roof level; omission of Emergency Generators and associated flues from permitted ICT Facility buildings 2 and 3; The

Application Details	Description of Development
	proposed amendments to ICT Facility buildings 2 and 3 result in an increase in their gross floor area (GFA) of 2,511sq.m for each building, resulting in an overall increase in the GFA of the two buildings of 5,022sq.m; Alterations to the water storage tanks serving the permitted ICT Facility buildings, including total increase of 268 sq.m GFA to the permitted pumprooms and a reduction in the scale of the associated water storage tanks. All associated and ancillary works; The application site is subject to an EPA Industrial Emissions Licence relating to the Energy Centre permitted on site (under Reg. Ref.: SD18A/0068 as amended by Reg. Ref.: SD19A/0185).
SD20A/0309 Grant Permission 04/05/2021	Provision of 4 new information and communications technology (ICT) Facility buildings and associated development at the subject site, superseding elements of the extant planning permissions on site (Reg. Ref.: SD18A/0068 and Reg, Ref.: SD19A/0185). The application site is subject to an EPA Industrial Emissions Licence (Ref. No.: P1113-01) relating to the Energy Centre permitted on site, The single storey Energy Centre, gas pressure reduction station, and 110kV Gas Insulated Switchgear (GIS) substation permitted under Reg, Ref.: SD18AI0068 and Reg. Ref.: SD19AI0185 will be constructed as previously approved and are not affected by the current application. The proposed development will comprise the following: The construction of 4 ICT Facility buildings (ICT Facilities 1, 2, 3, and 4) with a combined total gross floor area {GFA) of c. 47,564.5 sq.m, Each ICT Facility building includes associated external plant areas, totalling c, 20,649.5 sq,m, ICT Facilities 1, 2, and 3 will be located in the eastern portion of the site, and each comprise a GFA of c. 15,196 sq.m (including ancillary office and administration space) over part two and part three levels with a maximum height of c, 25 metres and a parapet height of c, 19.5 metres, Each of the ICT Facilities will include an associated external plant area of c, 6,624 sq,m, ICT Facility 4 will be located in the southern portion of the site and comprises a GFA of c, 1,976.5 sq,m (including ancillary office and administration space) over two levels with a maximum height of c, 15 metres and a parapet height of c. 10.5 metres, This ICT Facility includes an associated external plant area of c. 777.5sq.m, Each ICT Facility building will accommodate ICT equipment halls, associated electrical and mechanical plant rooms, loading bays, maintenance and storage space, office administration areas, and screened plant. Construction of internal road network and circulation areas, footpaths, provision of 153 no. car parking spaces and 54 no, cycle parking spaces. Connections to vehicular access routes, roads, services and permitted infrastructure relating to the Energy Centre and 110kV GIS substation permitted under Reg, Ref.: SD18A/0068 and Reg, Ref.: SD19A/0185. Provision of Emergency Generators with associated flues, water storage tanks and associated pump rooms (comprising 150 sq,m in total) to serve each of the proposed ICT Facility Buildings. Hard and soft landscaping and planting, lighting, and all associated works, including underground foul and storm water drainage network, boundary treatments and security fencing, attenuation areas, and utility cables.
SD20A/0317 Grant Permission 15/03/2021	Replace existing 18 metre telecommunications support structure (monopole design) previously granted under planning Ref. SD18A/0418 with a new 24 metre high structure (lattice structure design) carrying telecommunications equipment and ground level equipment cabin and fencing.
SD20A/0242 Grant Permission 12/02/2021 Appealed May 2019 Appeal Withdrawn Jan 2019	The provision of alternate entrance and access arrangements from Crag Avenue to serve the permitted data storage centre, Energy Centre and substation development permitted under Reg. Ref. SD18A/0068, as amended by Reg. Ref. SD19A/0185 including the provision of ducted services connections between the permitted substation on site (permitted under Reg. Ref. SD18A/0068 as amended by Reg. Ref. SD19A/0185) and existing services to the south of the Grand Canal. The proposed ducted services connections will exit the permitted substation compound and run southward, crossing beneath the Grand Canal by way of a horizontal directional drill, before proceeding east and west to connect to existing services located to the south of the Grand Canal. This proposed development is also located on lands within the Grand Canal Corridor to the north of the R134 Regional Road, Clondalkin, Dublin 22.

Application Details	Description of Development
SD19A/0185	Alterations to approved plans (Grant of Permission ref PL06S.243151 and PA Reg Ref SD13A/0271 and SD18A/0068) to the previously granted planning permission for the construction of an ESB 110kV Gas Insulated Substation for the use by Crag Digital Limited in support of the development and to incorporate an ESB Network Substation to improve and upgrade power supply to Clondalkin and adjoining areas; the proposed ESB 110kV Gas Insulated Substation is a two storey building of gross floor area of 1,586sq.m and Client Control Room building of an area of 116sq.m; single storey 2MV ESB Substation of 38sq.m floor area is proposed to be constructed to facilitate the construction of the already granted development until completion and commissioning of the proposed ESB 110kV GIS Substation, including for 3 ESB external transformers and 3 Crag Digital Limited external transformers; alterations include for the relocation on site of previously granted client transformers, control building and Energy Centre ancillary building to facilitate the revised ESB 110kV Substation building layout; ESB Substation and client control building and transformer compound are to be secured with a 2.6m and 3m high palisade fence and access gates; all landscaping and ancillary site works as per previously granted planning permission SD18A/0068.
SD18A/0068 Grant Permission 13/05/2019	Alterations to approved plans (Grant of Permission ref PL06S.243151 and PA Reg Ref SD13A/0271) consisting of the following to be constructed in a minimum of two phases: The construction of a similar 2 storey data centre with a gross floor area of c.44,323sq.m associated single storey combined heat and power plant (Energy Centre) with a gross floor area of c.7,109sq.m with ancillary 2 storey operations building with part basement with a gross floor area of c. 2,998sq.m. The Data Centre shall comprise the following uses: offices, canteen, computer and associated support areas, electrical component rooms, plant and associated equipment. The combined heat and power plant shall comprise the following uses: generator and gas fired engine rooms, boiler rooms, chiller rooms, plant and associated equipment. On the site are previously granted gas pressure reduction station and previously granted 110kV substation solely for the use of Crag Digital Limited in support of this development. Also proposed as revisions are removal of 2 end masts for undergrounding of overhead 38kV Power Lines, revisions to Security Hut, omission of Cooling Towers and all revised associated storage tanks, flues, access roads, services, entrance gates and perimeter fencing at 3m high, landscaping and infrastructure inclusive of 94 car parking spaces, retention pond and revised diversion of existing 1200mm diameter arterial sewer as agreed with Irish Water, and all sundry associated minor works. The development will be consequent on previously granted demolition of the existing logistics centre and associated ancillary buildings, retention of existing mobile phone mast and ancillary plant. An Environmental Impact Assessment Reports (EIAR) has been submitted with this application. An-EPA Industrial Emissions Licence has been applied for on 28th November 2017 Reg: P1066-01.
SD13A/0271 Grant Permission 21/07/2014 Appealed Mar 2014 Appeal Decision July 2017: To amend condition	Demolition of existing logistics centre and associated ancillary buildings; retention of existing mobile phone mast and ancillary plant; the construction of a two storey data centre with a gross floor area of 43,805sq.m.; two storey ancillary office building of 4,308sq.m. gross floor area; associated single storey combined heat and power plant (Energy Centre) with a gross floor area of 5,306sq.m. with ancillary two storey operations building with a gross floor area of 2,322sq.m. and single storey generator building 228sq.m. Also proposed on the site area a gas pressure reduction station and 110kV substation solely for the use of Eircom Ltd. in support of this development; also proposed are a Medium Voltage Substation, Generator Building, Security Hut, Cooling Towers, 2 no. end masts for undergrounding of overhead 38kV Power Lines and all masts for undergrounding of overhead 38kV Power Lines and all associated storage tanks, access roads, services, fencing, landscaping and infrastructure inclusive of 120 no. car parking spaces, retention pond and diversion of existing 1200mm diameter arterial sewer. An Environmental Impact Statement has been submitted with this application; an Integrated Pollution Control Licence may be required for the 2nd phase of this development. The development to be constructed in a minimum of 2 phases.

2.0 DESCRIPTION OF ACTIVITY

2.1 INSTALLATION OVERVIEW

In this section of the Operational Report present a concise overview of the Installation as fully constructed and operational. The Installation when constructed will consist of an Energy Centre (10 no. Gas Turbines) and 4 no. two-storey Information Communication Technology Facility (ICTF) buildings with associated infrastructure. It is important to note that this overview is not exhaustive nor intended to detail of every element on the site. Instead, the objective is to outline the core components that define the Installation relevant to the Licenced activity. The Installation main buildings, and site infrastructure is shown on D10EC-ARC-ZZ-ZZ-DR-A-0202-Site Layout Plan.

2.1.1 Energy Centre

The Energy Centre, situated in the western part of the site, encompasses various components, including:

- 8 no. combined cycle gas generation (CCGT) turbines, each accompanied by flues with a height of 33 meters.
- 2 no. open cycle gas generation (OCGT) turbines each accompanied by flues with a height of 15 meters.
- 2 no. enclosed steam turbines, associated steam turbine generator distribution and control structure, and 4 no. steam turbine/air-cooled condensers.
- 8 no 33/20kV transformer bays positioned to the southeast of the Energy Centre, along with an additional 12 no. transformers serving the turbines to the west of the Energy Centre.
- Demineralised water storage tank and a water treatment plant.
- 4 no. fuel storage tanks with a capacity of 255 m^3.
- A fire pump enclosure building, housing two fire sprinkler pumps and sprinkler tanks.
- 6 no. black-start/Emergency Generators located to the south of the Energy Centre each accompanied by flues with a height of c. 4.97 meters.
- A single-storey over basement power trunk building situated to the southeast of the Energy Centre.
- A three-storey over basement medium voltage/low voltage (MV/LV) building positioned to the southwest of the Energy Centre.

To operate the Energy Centre, a maximum estimated staff of 25 individuals will be employed, working on a 24/7 rotational shift system. These staff members will be stationed in both the control room and involved in performing maintenance tasks.

2.1.2 Information Communication Technology Facility (ICTF) Buildings

The ICTF buildings, situated in the eastern and southern part of the site, encompasses various components, including:

- 4 no. ICTF buildings (ICTF 1, 2, 3, and 4) each housing ICT equipment halls, associated electrical and mechanical plant rooms, loading bays, maintenance storage space, office administration areas, water storage tanks, and pump rooms. Additionally, there is cooling plant equipment located at roof level.

- ICTF1 located in the southern part of the site includes a screened plant area enclosing 18 no. Emergency Generators each accompanied by flues with a height of 25 meters; and 2 no. Emergency Landlord Generators located at roof level flues with a height of 22 meters. The generator fuel filling cabinet for ICTF1 is situated at ground level on the western side of the building.
- ICTF4 located in the southern portion of the site includes a screened plant area and 3 no. Emergency Generators each accompanied by flues with a height of 15 meters. The generator fuel filling cabinet for ICTF4 is situated at ground level on the western side of the building.

It is estimated that when the site is fully developed for ICTF1, ICTF2, ICTF3 there will be 30 no. staff (technicians, office-based and maintenance) onsite per building for the 2 no. day shifts (7.00-15.00, 15.00-23.00) and 15 staff for the 1 no. night shift (23.00-7.00), for ICTF4 8 no. staff (technicians, office-based and maintenance) onsite per building for the 2 no. day shifts (7.00-15.00, 15.00-23.00) and 3 personnel for the 1 no. night shift (23.00-7.00). A total of 244 staff employed across the ICTF Buildings over a 24 hour period.

2.1.3 Ancillary Infrastructure.

In addition to the primary buildings and infrastructure above the site includes associated and ancillary Infrastructure including:

- Car parking spaces, bicycle parking, roads, footpaths, and all related works.
- Lighting and services, along with underground systems for foul and stormwater drainage.
- Sustainable Urban Drainage Systems (SUDs) and attenuation system.
- An Above Ground Installation (AGI) for incoming gas situated southwest of the site within a fenced compound. This area accommodates a single-storey control room building, a plant, and a boiler house.
- A 110 kV Gas Insulated Switchgear (GIS) substation with associated transformers located southwest of the Energy Centre, adjacent to the substation building.
- Site security fencing and a guard huts.
- Landscaping features and boundary treatments.

Figure 2.1 *Site Plan (D10EC-ARC-ZZ-ZZ-DR-A-0202-SITE LAYOUT PLAN)*

2.1.4 Installation Construction Phasing

The construction of the development is to be undertaken on a phased basis to implement the overall site masterplan. The phasing corresponds with occupier requirements and is based on the detailed planning and design of the construction phase of the project. The ICTF buildings are designed to allow for this phased construction, being delivered and occupied in an orderly and efficient manner.

The development on site has commenced in accordance with extant planning permissions, and the completed works consist of construction of the 110 kV Gas Insulated Switchgear (GIS) Substation, ducted service connections between this substation and existing services to the south of the site. Since 2022 construction of 2 no. ICT Facilities has commenced along the eastern boundary of the site, and this construction (commissioning and fitout) continues. Table 2.1 sets out the current timelines for the Installation.

Table 2.1 Installation Construction Phasing

Item Building Name	Estimated Start	Estimated End	Construction Duration (months)
110 kV Substation	Q1 2021	Q4 2022	Completed
Ducted Service Connections	Q1 2022	Q2 2022	Completed
ICT Facility 3	Q1 2022	Q1 2024	c. 25
ICT Facility 2	Q2 2022	Q1 2024	c. 22
Energy Centre (Phase 1 4 no. turbines)	Q1 2024	Q2 2024	c. 6
Energy Centre (Phase 1 6 no. turbines)	Q1 2024	Q3 2024	c. 9
ICT Facility 1	Q2 2023	Q4 2024	c. 22
ICT Facility 4	Q2 2023	Q4 2024	c. 18

2.2 PRIMARY PROCESSES

2.2.1 Energy Centre (EC)

The Energy Centre consists of 10 no. Gas Turbines (GT) and 2 no. Steam Turbines (ST), providing a total installed capacity of 204.5 MW_e. The normal operational load from the Energy Centre to be supplied from 7 no. GT and 2 no. ST. The Energy Centre will provide power to the 4 no. ICTF buildings and supplement the existing ESB Networks 40MVA grid connection. The Energy Centre is designed to operate 24 hours a day throughout the year. The Installation, once fully operational, will require c.120 MWe to operate, with an IT load in the order of 90 MWe.

The electricity generated by the Energy Centre is distributed throughout the ICTF Buildings to power various equipment, including servers, cooling systems, lighting, and other electrical loads essential for the facilities operations.

Energy Centre Gas Turbines, Heat Recovery Steam Generator, and Steam Turbines

The EC includes 10 no. Gas Turbines (GT) consisting of:

- 8 no. Gas Turbines. These 8 no. GT are each configured with heat recovery steam generators (HRSG), these are capable of operating in Combined Cycle (CC) (through the HRSG) or Open Cycle (OC) (bypassing the HRSG). These 8 no GT include individual 33 meter (above ground level) emissions stacks.
- 2 no. Open Cycle (OC) Gas Turbines are 'stand by' units that will be used when other GT's are out for maintenance or if the steam turbines are not operational. These 2 no GT include individual 15-meter (above ground level) emissions stacks.

In the CC configuration two different types of power generation technologies are used to produce electricity (Gas Turbine and steam turbine). The primary fuel source for the GT is natural gas supplied from the national grid via the Gas Above Ground Installation. The fuel is burned in the combustion chamber to drive the GT and generator to produce electricity. The exhaust gases from combustion are directed to a HRSG, recovering waste heat from the GT exhaust that is used to heat water and produce steam for the Steam Turbine (ST). The HRSG consists of boiler drums to collect steam, superheaters to increase steam temperature, economizers to preheat water, dampers to control gas flow, and a computerized control system for monitoring and optimizing performance. The 8 no. GT that include HRSG units, located at the emission stack, will provide steam along the pipe rack to the 2 no. ST plant. These 8 no. GT units can operate in an OC configuration with the HRSG bypassed and electricity only produced by the GT. Figure 2.2 below provides an outline schematic of the Combined Cycle Gas Turbine, HRSG, Steam Turbine, and Air Cooled Condenser.

The remaining 2 no. GT plant have a singular method of power generation (Open Cycle) and do not include a heat recovery system, the waste heat from these 2 no. units is exhausted to atmosphere. The 2 no. OC GT plant are installed as 'stand by' units for redundancy and operational flexibility. The 2 no. OC GT plant are more flexible and can be started and stopped quickly, making them useful for meeting peak demand for electricity. The 2 no. OCGT 'stand by' units are not anticipated to operate in excess of 500 hours per year.

The normal operational load from the EC will be supplied from 7 no. GT and 2 no. ST. Of the total 10 no. GT the balance of 4 no. GT (2 no. equipped with HRSG, and 2 no. without HRSG) are 'stand by' units for redundancy, in case of equipment failure, scheduled shut down / maintenance cover, and operational flexibility to ensure a reliable power supply. The primary fuel source for the Energy Centre is natural gas supplied from the national grid via the Gas Above Ground Installation (AGI). In the unlikely eventuality of transmission gas failure, the GT have dual-fuel functionality can be powered by a light fuel oil (LFO).

Electricity is generated at 11kV from the GT and ST. This is then transformed up to 33kV to minimise the fault current on the system at the point of parallel connection with the ESBN network.

To ensure optimal performance and safety, the Energy Centre Advanced Control System (ACS) utilises a highly reliable, fully distributed Programmable Logic Controller (PLC) to automatically optimize the load distribution among ICT Facility Buildings, maximising power production efficiency for each Gas Turbine. The ACS ensures that each machine operates as close to its peak efficiency point as possible, reducing overall fuel consumption. The control system will continuously monitor the live EC energy usage and production data.

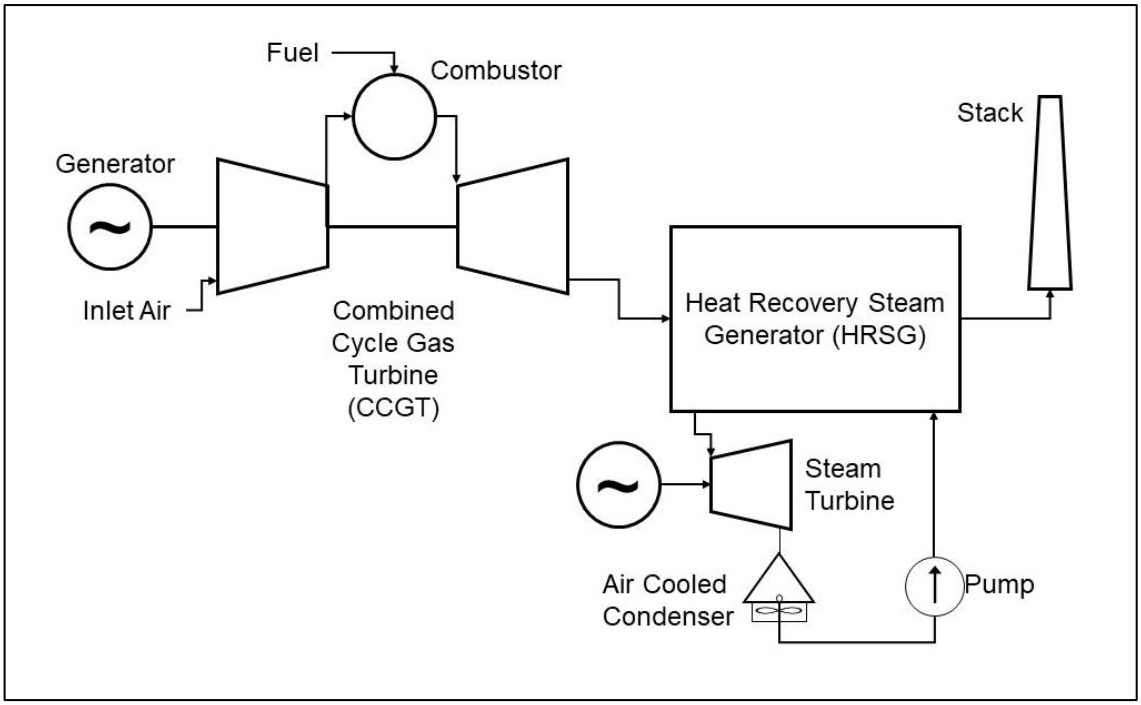

Figure 2.2 *Combined Cycle Gas Turbine Schematic*

Air Cooled Condensers

The Combined Cycle Gas Turbines (CCGT) utilises a heat recovery steam generator (HRSG) that captures the waste heat from the GT's exhaust gases and uses it to produce steam. This steam is then directed to the Steam Turbine. After passing through the steam turbine to generate additional electricity, the steam exits at a lower pressure and temperature. It is then directed to an array of 6 no. air-cooled condensers (ACC). In the ACC, large fans blow ambient air over a network of finned tubes. The cooler ambient air absorbs heat from the steam, causing it to condense back into water. This water is then collected and returned to the HRSG to be heated and converted back into steam. This is a Closed Loop Cooling System. Figure 2.2 above provides an outline schematic of the Combined Cycle Gas Turbine, HRSG, Steam Turbine, and Air Cooled Condenser.

Unlike traditional water-cooled condensers, which use large quantities of water for cooling, ACCs use ambient air to condense the steam back to feedwater. To remove the quantity of heat required for the Energy Centre a wet system (once-through, natural draft cooling tower, mechanical draft cooling tower, etc) was considered but not deemed viable due to the large quantities of water required and the limited availability of water in the area.

There are multiple pressure, flow and temperature instruments and transmitters that report back to the Plant Control System (PCS). The control system software will alarm if levels drop or pressures drop below pre-conditioned limits which would indicate a leak in the system. Sections of the system can be isolated to contain a leak with the use of valves in the system. The systems are designed for a pressure above their operating pressure and the systems is tested above this pressure as per ASME B31.1, this reduces the likelihood of a leak.

Black Start Diesel Generators

The purpose of a Black Start Diesel Generator (BSDG) system is to provide an auxiliary power to the start-up of the Gas Turbine units. It is called a "black start" generator because it is capable of starting up and restoring power to a completely "black" or non-functioning system.

The 6 no. 5.9 MW_{th} enclosed BSDG and 6 no. associated step up transformers are located to the south of the Gas Turbines(s). The BSDG do not operate in normal operation and are only required to provide electric power to start up the GT.

Process Water Treatment and Process Wastewater Discharge

The water treatment system for the Energy Centre is vital for maintaining high-quality water used for cooling and steam generation. Clean demineralised water is to be provided via tanker to the site. This water undergoes additional pre-treatment (screening and filtration), and chemical dosing for scale and bacteria prevention, pH adjustment, and the addition of a corrosion inhibitor. Additionally, an oxygen scavenger is employed to reduce or eliminate the presence of dissolved oxygen in water. The chemical dosing system is equipped with various sensors and monitoring equipment to measure the water quality and ensure that the dosing system is working correctly. The ultra clean water is then stored in 2 no. 50 m^3 vertical, atmospheric and aboveground water tanks (45 m^3 usable volume). The treatment system significantly improves the quality of the water to ensure the plant's equipment operates efficiently and helping to reduce the risk of equipment damage.

Various pumping systems are in place; raw water forwarding pumps supplying water systems pre-process and demineralised water forwarding pumps providing water to the GT. All pumps are housed on skids on concrete pads with enclosures. All pumps have localised control solutions linked to tank control systems that monitor water level.

The Energy Centre necessitates a regular discharge of process wastewater, comprising steam cycle residue and utility wash water. Wastewater is collected from the steam cycle and directed to a wastewater neutralization sump situated to the north of the steam turbines. Quality testing of the wastewater within the sump will be undertaken to ensure its suitability for discharge into the on-site foul sewer. If the water quality proves unsuitable for discharge into the foul sewer, it can be extracted by tanker directly from the neutralisation sump. The utility wastewater is directed to the foul sewer located between the GTs via one of 3 no. hydrocarbon separators (Class II) before discharging it into the on-site foul sewer. The hydrocarbon separator are designed to remove oils/grease from the wastewater. This process ensures the proper management and disposal of wastewater generated in the Energy Centre.

Energy Centre Electrical, Control buildings, Transformers and Electrical Equipment

The EC development and ancillary development encompasses a range of essential infrastructure and facilities that are crucial to the operation of the GTs. Among these key components are the EC electrical control buildings, transformers, and various electrical equipment. Together, these elements form an integrated system that supports and enhances the performance of the GTs, ensuring the efficient generation and distribution of electricity.

Power Trunk Building (Building 12) is the location for switchgear and control for 33kV system. Furthermore, it provides back up control centre in case of emergency and issue with MV/LV 2-Level Building (Building 14).

MV/LV 2-Level Building (Building 14) in the upper level includes the welfare, administration and control areas for the operation of the Energy Centre. The building is centrally located to give management and operations teams oversight of all of the plant. Incoming power from the GT / ST is controlled via this hub and distributed to the Power Trunk Building (Building 12).

The development will have a mixture of dry type and oil filled transformers depending on location. Below is a description of the different types and their location use:

- 12 No. 11/33kV step up providing power from the GT / ST. Oil filled transformers, west of the site, externally located in concrete bunds to retain any leakage and provide fire separation and isolation.
- 8 No. 33/20kV step down providing power from the EC to the ICT Facility. These are oil filled transformers, located to the east of the Energy Centre, externally located in concrete bunds to retain any leakage and provide fire separation and isolation.
- 6 No. 11kV transformers integrated into the Black Start Diesel Generator container. Dry Type connects the BSDG to the GT providing power to the Gas Turbines to start them.
- 2 No. 110/33kV step down transformers providing 40MW of ESBN power. Oil filled transformers, west of the site, externally located in concrete bunds to retain any leakage and provide fire separation and isolation.

Heat Recovery

In principle the CCGT uses Gas Turbines to drive an electrical generator and recover waste heat from the turbine exhaust to generate steam. The steam from waste heat received by the HRSG is run through a steam turbine to provide supplemental electricity.

Future Installation of secondary heat exchangers is the HRSG can be accommodated. The secondary heat exchangers would remove heat from the exhaust gases to a hydraulic (water) pipe network, before the exhaust gases are rejected to atmosphere. The temperature of the exhaust gases being discharged to atmosphere via the HRSG exhaust stacks is approximately 175 degrees C. The secondary heat exchangers could generate hydraulic temperatures of between 80-100 degrees C at the point of recovery. The above provision could supply heat energy for reuse to provide high grade heat export for a future district heating scheme.

Fire Protection Systems

Fire Water Storage consists of 3 no. 181.8 m^3 tanks, along with associated fire protection pump, located within a self-contained building. All pumps have localised control solutions linked to tank control systems that monitor water level. The fire sprinkler house includes 2 no fire sprinkler pumps (0.7 MW_{th} each). The fire sprinkler pump includes individual fuel storage tanks.

2.2.2 Information Communication Technology Facility (ICTF) Buildings

The overall purpose of the Installation is to provide data storage solutions for its customers. The facility buildings, ICTF 1, 2, 3 and 4, when completed will house IT and technical hardware to facilitate the secure storage and distribution of information to individuals, businesses, and organisations.

The ICT equipment, including associated mechanical and electrical plant, require electricity to maintain availability and the necessary environmental conditions. This will be provided by electricity supplied primarily by the on-site Energy Centre and supplemented by the ESB networks connection. In the event of a loss of power supply and a failure of the incoming gas supply the Emergency Generators (as outlined in Section 2.2.2.4) maintain the power supply to ICTF1 and ICTF4.

2.2.2.1 ICTF 1, 2 and 3 Cooling Systems

The ICTF equipment rooms and electrical rooms require a consistent temperature and humidity to operate; the equipment rooms of buildings ICTF1, ICTF2 and ICTF3 will be cooled through the use of Air Handling Units (AHU's) (in either a direct air or indirect air configuration) located in the plant level of each building. The cooling system operates in two different modes dry cooling and adiabatic (wet) cooling mode.

There is process water demand to provide the required water for these cooling units when operating in adiabatic (wet) cooling mode and for humidification processes within the IT rooms. The volume of water required and used is related to ambient temperature and will fluctuate in order to maintain the IT equipment at optimal temperatures and humidity. During wet cooling mode, water use is optimised through the recirculation of cooling water, with water consumed through evaporation. Once the cooling water reaches a setpoint level of concentration, this is discharged to the Installations wastewater network. The water use is continuously monitored by the building management and control systems. The tracking of water use ensures that the system is operating as designed.

The control system includes sensors to monitor various environmental factors, such as temperature, humidity, and air quality. These sensors provide real-time data to the control unit, which processes the information and adjusts the cooling system settings variable speed drive fans (VSD) and electrically commutated (EC) motors accordingly. The control system regulates the speed of fans, evaporative cooling activation, control heating or cooling elements to maintain the desired temperature.

2.2.2.2 ICTF 4 Cooling Systems

The cooling system in ICTF4 is a hybrid cooling system using both free cooling (outdoor air) and mechanical refrigeration to cool the working fluid. The closed-loop cooling system utilises a c. 25% glycol-water solution, with added corrosion inhibitors. The system is initially filled during Installation and requires only infrequent top-ups thereafter. This fluid acts as the heat transfer medium, circulating through a network of pipes and heat exchangers. Unlike open-loop systems, this closed-loop design does not consume water during the cooling process. When the external air temperatures rise beyond the effective range of free cooling the mechanical refrigeration activated to provide additional cooling to the working fluid. The refrigerant undergoes phase changes within the closed-loop system, efficiently absorbing heat from the indoor air and releasing it outside the building. This ensures a controlled and energy-efficient cooling process, maintaining optimal conditions within the IT Rooms.

The control system includes sensors to monitor various environmental factors, such as temperature, humidity, and air quality. These sensors provide real-time data to the control unit, which processes the information and adjusts the cooling system settings variable speed drive fans (VSD) and electrically commutated (EC) motors accordingly. The control system regulates the speed of fans, mechanical refrigeration activation, control heating or cooling elements to maintain the desired temperature.

2.2.2.3 Process Water Treatment and Process Wastewater Discharge

Cooling water for the evaporative cooling systems for ICTF1, ICTF2 and ICTF3 (described in Section 2.2.2.1 above) is provided through a combination of rainwater harvesting (harvested at roof level and stored in a rainwater recovery system), the Uisce Eireann mains supply, and on-site groundwater abstraction.

This water undergoes additional treatment within water treatment rooms located externally to the ICTF buildings to provide sufficient quality for the cooling and humidification processes. This water treatment system including filtration and softening, as well as chemical dosing for scale and bacteria prevention, pH adjustment, and the addition of a corrosion inhibitor. Water treatment is only undertaken for the cooling water units, the domestic consumptive water use on site is provided direct from the mains supply.

The operation of the cooling units produces residual cooling water, a wastewater by-product from the cooling systems. As the supply water undergoes chemical treatment and is a by-product from the cooling system it is classified as a process wastewater (Trade Effluent). The process wastewater is collected in and discharged to the foul sewer. These underground networks are shown on DWG-007-FOUL DRAINAGE included with the application documentation. The process water combines with the domestic effluent and discharges into the offsite Uisce Éireann foul sewer.

2.2.2.4 Emergency Generators

There are 9 no. enclosed Emergency Generators (EG) on the Level 1 plant section of ICTF1, and 9 no. on Level 2. There are 2 no. landlord generators at roof level. ICTF1 has a total of 20 no. EG. ICTF4 includes 3 no. enclosed EG on the Level 1 plant section.

In the event of a loss of electricity supply (either from the mains and/or from the Energy Centre) EG are provided to maintain power supply to ICTF1 and ICTF 4. These EG are designed to automatically activate and provide power to the respective ICTF Buildings pending restoration of mains power. The required light fuel oil (diesel) to operate the Emergency Generators will be supplied by individual double walled storage tanks or ‘belly tanks’ that are located below the enclosure at each generator.

Each EG is contained within a specialised acoustic enclosure. Drip trays are strategically placed at the fuel cabinet fill point to capture any potential spills. To further enhance safety, the containerised generator housing features retention bunding at the base. In the event of any leaks from the generator's fuel tank or lubricating oil tank, leak detection systems within the generator enclosure are activated to promptly alert personnel.

It is anticipated that EG will rarely be used. However, they will be tested periodically to maintain operational readiness. It is expected that these generators will be used less than 500 hours per year. The EG are fitted with data loggers which track the number of hours each generator operates.

The advanced onboard controller of each generator allowing for monitoring and control. This integration provides real-time information on the performance and facilitates responses to any operational issues, ensuring optimal functionality and reliability.

2.3 SECONDARY PROCESSES AND INFRASTRUCTURE

2.3.1 Water, Wastewater, and Stormwater Drainage Infrastructure

2.3.1.1 Potable Water and Process Water Supply

The Installation's domestic water use includes welfare facilities and staff use, serving the needs of the on-site personnel. Industrial (process) water use, is required for ICTF cooling systems, and the Energy Centre steam cycle. The Installation domestic and industrial water is provided from rainwater harvesting (harvested at roof level and stored in a rainwater recovery system), the Uisce Éireann (UÉ) mains supply, and on-site groundwater abstraction.

There are external water tank arrangements dedicated to each ICTF building, each of these provides for; fire mist and sprinkler systems, fire hydrant tanks, domestic water storage, wash down water. ICTF1, ICTF2, and ICTF3 include cooling water storage and break tanks. ICTF1, ICTF2, ICTF3 cooling is provided via free air coolers during normal operations. Adiabatic (wet) cooling is only utilised during peak ambient external air temperatures. During wet cooling operations, water use is optimised through the recirculation of cooling water, with water consumed through evaporation. The volume of water used is related to ambient temperature and will fluctuate accordingly. ICTF4 requires domestic/office water only.

There are external water tanks for clean demineralised water for the Energy Centre that is to be provided via tanker to the site. Additionally, the Energy Centre include external water tanks for the fire mist and sprinkler systems that will be supplied by the UÉ mains supply. The domestic/office water for the Energy Centre will be provided by the UÉ mains supply.

The watermains infrastructure for the Energy Centre and ICTF4 comprises a 180mm HDPE process watermains and a 63mm HDPE potable watermains. Both watermains will be connected to the existing 6-inch Asbestos Cement mains at the southwest entrance to the site on Crag Terrace, water metering is undertaken to UÉ standards. ICTF1, ICTF2, and ICTF3 has established connection to the existing 6-inch Asbestos Cement (AC) located on the estate road entrance to the site from Crag Avenue, water metering is under taken to UÉ standards. Connection agreements have been applied for with UÉ and are ongoing.

2.3.1.2 Foul Wastewater (Sewer) - Domestic

Sanitary effluent from welfare facilities and amenities for staff from the ICTF buildings and the Energy Centre will be collected and connect to the foul sewer system on site.

The site has established connections to the existing 450mm diameter foul sewer which traverses the site in a West-East orientation. The existing 450mm diameter sewer ties into the existing 9B trunk sewer (1350mm diameter) which has previously been diverted to run along the eastern boundary of the site from North to South.

Domestic wastewater will be collected from site and discharged to the off-site foul sewer network (at emissions location SE1) which ultimately discharges to Ringsend Wastewater Treatment Plant (WWTP).

For more information on the on the foul wastewater drainage layout refer to Drawing DWG-007-Foul Drainage included with this application.

2.3.1.3 Foul Wastewater – Process

The Energy Centre necessitates a regular discharge of process wastewater, comprising steam cycle residue and utility wash water. Wastewater is collected from the steam cycle and directed to a wastewater neutralization sump situated to the north of the steam turbines The utility wastewater is directed to the foul sewer located between the GTs via one of 3 no. hydrocarbon separators (Class II) before discharging it into the on-site foul sewer. The Energy Centre discharge is collected within the onsite foul sewer and combines within domestic wastewater culminating in a discharged to the offsite sewer at emission location SE1.

The cooling system for ICTF1, ICTF2, ICTF3 is provided via free air coolers during normal operations. Adiabatic (wet) cooling is only utilised during peak ambient temperatures. Water is recycled within the cooling units and a flushing/dumping of wastewater from the system be required to remove mineral build-up once conductivity set points are reached. In addition, a cleaning purge cycle will occur during maintenance. The cooling water discharge is collected within the onsite foul sewer and combines within domestic wastewater culminating in the offsite sewer at emission location SE1.

In the event of a fire within the ICTF Buildings, there is the potential for a discharge from the internal battery rooms and UPS batteries (foam and sprinklers). This discharge may result in an elevated pH. At the request of UÉ, an off-line balancing skid is installed on the foul sewer. This balancing skid is designed to activate in case of elevated pH, effectively lowering the pH to acceptable levels before the discharge occurs at emission location SE1. This precautionary measure ensures compliance with discharge standards.

For more information on the on the foul wastewater drainage layout refer to Drawing DWG-007-Foul Drainage included with this application.

2.3.1.4 Stormwater Drainage Systems

The runoff from building roofs, yards and roads will be efficiently collected through the newly constructed drainage systems, which have been strategically positioned to optimise the flow of surface water. These systems will channel the collected runoff towards a designated outfall point, denoted as SW1 at the Gallanstown stream, for a controlled discharge. The discharge flow rate will be restricted via a flow control manhole using a proprietary vortex control device with a non-return valve, Tideflex or similar approved. The location of this stormwater emission point is subject to revision as part of the update to the existing IE Licence.

A combination of Sustainable Urban Drainage Systems (SuDS) will be utilised to attenuate flows throughout the site and allow for the calculated reduced discharge. These measures include a swale drain along the edge of the internal road network where practicable. This drainage shall discharge to the surface water discharge network. Swales reduce the runoff flows through the system and providing a level of treatment by trapping sediments prior to entering the surface water network. Stormwater discharge from the Installation is reduced to greenfield runoff rates.

More specifically, two attenuation ponds and two underground attenuation tanks, set out in Table 2.2, are to be provided for water run-off retention. The restricted nature of the site requires the integrated use of attenuation tanks to supplement the attenuation ponds, in order to maintain the permitted run off flow rates.

3 no. full retention hydrocarbon separators (Class II) to capture any spills at the fuel unloading areas and 2 no. bypass hydrocarbon separators (Class II) for other hardstanding areas are designed into the stormwater system. Hydrocarbon separators reduce and remove hydrocarbon/oil contamination from the runoff prior to entering the SUDS feature. The location of these hydrocarbon separators are shown on Drawing Ref.: DWG-006-Stormwater Drainage included with this application. In the event of a fire, run-off would be to the site attenuation ponds or tanks where water would be held until tested and removed off site if required.

The surface water measures have been designed in relation to the requirements of South Dublin County Council and the Design Guidelines of the Regional Code of Practice for Drainage Works and the Greater Dublin Strategic Drainage Study.

For more information on the surface water network layout refer to Drawing DWG-006-Stormwater Drainage included with this application.

Table 2.2 *Volumes of Attenuation Tanks/Ponds*

Description	Water Volume Retained (m3)
Attenuation Pond 1	2230
Attenuation Pond 2	1670
Attenuation Tank 1	656
Attenuation Tank 2	1225

2.3.2 Above Ground Installation (AGI)

The primary fuel source for the Energy Centre is natural gas supplied from the national grid via the Gas Above Ground Installation (AGI)

The Natural AGI is located to the southwest of the Energy Centre within a fenced compound. The AGI is owned and operated by Gas Networks Ireland (GNI), the GNI natural gas transmission pipeline will connect to this AGI.

The AGI consists of several components, pressure regulation equipment, gas meters, and distribution equipment. The pressure regulation equipment is used to reduce the pressure of the natural gas from the main transmission line and enters the site distribution system.

2.3.3 Electricity Supply and 110 kV Substation

The Installation ESB Networks 40MVA connection is provided via a direct connection to the 110 kV Gas Insulated Switchgear (GIS) Substation (owned and operated by ESB) located in the west of the site. The power from the substation will distribute underground via a private network arrangement to service the principal buildings, gate house and office areas.

3.0 BEST AVAILABLE TECHNIQUES AND COMMISSION IMPLEMENTING DECISION

Section 86A(3) of the EPA Act 1992 as amended, requires that the Agency shall apply BAT conclusions as a reference for attaching one or more conditions to an IE Licence. The Installation has principally been assessed against the BAT conclusions contained in Table 3.1:

Table 3.1 *Applicable BAT documents*

Horizontal BREF	Publication date	Attachment
Best Available Techniques (BAT) Reference Document for Large Combustion Plants	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 included assessment attachments have 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.

The Installation combustion plant have been evaluated in accordance with the Best Available Techniques (BAT) Reference Document for Large Combustion Plants (LCP). This document is considered the most relevant sector-specific reference for the assessment. It is crucial to emphasize that the BAT for LCP applies exclusively to plants with a rated thermal input of 50 MW_{th}, whereas the combustion plant are below this threshold.

4.0 EMISSIONS AND ABATEMENT TREATMENT SYSTEMS

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

4.1 EMISSIONS TO AIR

Main Air Emissions

The main emissions to air related to the Installation under this licence review supersede the existing emission points A2-1 to A2-12 of the existing licence P1113-01. The main emission to air sources are listed below:

- 8 no. Combined Cycle Gas Turbines emissions stacks have a maximum height of 33 meters above ground level.
- 2 no. Open Cycle Gas Turbines emissions stacks have a maximum height of 15 m above ground level.

The emission points from each GT are labelled Emission Points A2-1 to A2-10 in Attachment 7-4-1. These emission points are shown in Drawing D10EC-ARC-ZZ-ZZ-DR-A-0203-MAIN AIR EMISSION included with this application.

The GTs in the Installation are required to be available to operate at all times throughout the year. Therefore, at a worst case it must be assumed that they may have to run throughout the year 24/7, 365 days.

The Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193), applies to the individual GT. The emission limit values set down in Medium Combustion Plant (MCP) Regulations apply to the GT.

Minor Air Emissions

The minor emissions to air related to the Installation under this licence review supersede the existing emission points A3-1 to A3-40 of the existing licence P1113-01. The minor emission to air sources are listed below:

- ICTF1 - 18 no. Emergency Generators with associated flues each 25 meters above ground level; and 2 no. emergency landlord generators with associated flues each 22 metres above ground level.
- ICTF4 - 3 no. Emergency Generators with associated flues each 15 meters above ground level.
- Energy Centre - 6 no. Black Start Diesel Generators (BSDG) with associated flues each 5.9 metres above ground level.

The emission points from each generator have been labelled Emission Points A3-1 to A3-27 in Attachment-7-4-2. These emission points are shown in D10EC-ARC-ZZ-ZZ-DR-A-0204-Minor and Potential Air Emission included with this application.

The Emergency Generators located in the ICTF1 and ICTF4, will only be used during abnormal operating in the case of emergencies are classified as minor emission points due to their periodic testing and infrequent use. The BSDG are only required during a site wide power failure, and failure of the incoming ESB supply to the start-up of the Gas Turbine units.

The Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193), applies to the individual Emergency Generators. However, these generators are not anticipated to operate in excess of 500 hours per annum. Therefore, the Emergency Generators as proposed are exempt from complying with the emission limit values subject to Section 13(3) of the Medium Combustion Plant (MCP) Regulations. These generators are fitted with a controller which tracks the number of hours the generators operate.

Potential Emissions

These are emissions which only operate under abnormal process conditions. Typical examples include bursting discs and pressure relief valves. The new potential emission to air sources are listed below:

- 2 no. fire sprinkler pumps

Fire sprinkler pumps are only required to operate in the event of a fire at the Installation. The emission points from each generator have been labelled Emission Points A4-1 to A4-2 in Attachment-7-4-2. These emission points are shown in D10EC-ARC-ZZ-ZZ-DR-A-0204-Minor and Potential Air Emission included with this application.

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 fugitive emissions of principal polluting substances or odour expected from the Installation.

4.1.1 Treatment and Abatement Systems

Main Air Emissions

The main emissions to air from the site have been considered against the Large Combustion Plant (LCP) Regulations (S.I. No. 566 of 2012) which transposed the LCP Directive 2010/75/EU into Irish law and Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the MCP Directive ((EU) 2015/2193).

The LCP Regulations apply to combustion plant with a rated thermal input of which is equal to or greater than 50 MW, irrespective of the type of fuel used (solid, liquid or gaseous). Furthermore, the Industrial Emissions Directive (IED) Directive 2010/75/EU provides that in cases where the waste gases of two or more combustion plants are, or could be, discharged through a common stack, the aggregation rules of Article 29 of the IED define whether and when such a combination of plants shall be considered as a single combustion plant[3]. The stacks for each of the individual Gas Turbines are separate and it is not technically feasible to combine them, therefore the aggregation rules in Article 29 and the special provisions set out in Chapter III of the IED do not apply to the Gas Turbines.

MCP Regulations apply to combustion plant with a rated thermal input equal to or greater than 1 MW and less than 50 MW irrespective of the fuel that they use. The individual GTs are less than 50 MW_{th} and therefore the MCP Regulations apply to the Gas Turbine(s). The Gas Turbine(s) (A2-3 to A2-10) operating on primary fuel (natural gas) are anticipated to operate in excess of 500 hours per annum and thus the emissions will need to comply with the Emission Limit Values (ELVs) outlined in Table 2, within Part 2 of Schedule 2 of the Medium Combustion Plant (MCP) Regulations. The Gas Turbine(s) (A2-1 to A2-2) are not anticipated to anticipated to operate in excess of 500 hours per annum.

The Gas Turbine(s) emissions are controlled through the use of Dry low-NO_X burners (DLN) this incorporates the premixing of air and fuel prior to entering the combustion zone. This premixing process leads to a uniform temperature distribution and a reduced flame temperature, effectively lowering NOX emissions. This technology eliminating the necessity for extra abatement / treatment of the flue gas.

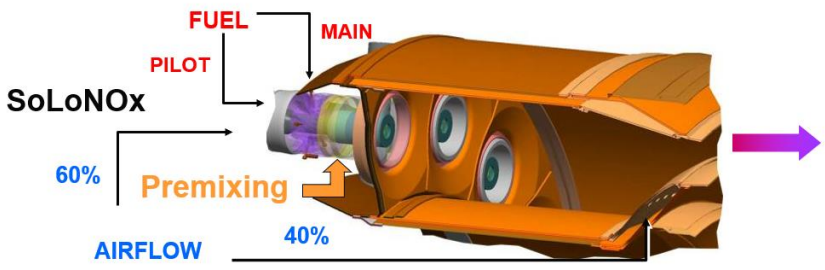

Figure 4.1 Dry low-NO_X burners (DLN) concept

The Gas Turbine(s) can operate on light fuel oil (LFO) as a secondary or contingency

[3] https://environment.ec.europa.eu/topics/industrial-emissions-and-safety/industrial-emissions-directive_en

fuel source. The liquid fuel option is in case of unforeseen or emergency circumstances such as a failure in the incoming natural gas supply. The Gas Turbine(s) are expected to operate using this secondary fuel (LFO) less than 500 hours per year (hr/y). Under Section 13(3) of 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 (ELVs) set out in Part 2 of Schedule 2.

Air dispersion modelling has been undertaken as discussed in Attachment 7-1-3-2 (Air Emissions Impact Assessment) 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.

Minor Air Emissions

The 21 no. individual Emergency Generators are 5.4 MW_{th} and the 2 no. landlord Emergency Generators are 6.8 MW_{th}. The Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193), applies to the individual plant.

Under Section 13(3) of 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 (ELVs) set out in Part 2 of Schedule 2. The Emergency Generators are not anticipated to operate in excess of 500 hours per year; therefore the emission limit values do not apply. There is no abatement or treatment systems proposed or required for the Emergency Generators.

Air dispersion modelling has been undertaken as discussed in Attachment 7-1-3-2 (Air Emissions Impact Assessment) 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.

Potential Emissions

There are no abatement or treatment systems proposed or required for the fire sprinkler pumps.

Fugitive Emissions

There are no fugitive emissions (principal polluting substances) expected from the Installation. There are no abatement or treatment systems proposed or required.

4.1.2 Control and Monitoring

Main Air Emissions

The Advanced Control System (ACS) utilises a highly reliable, fully distributed Programmable Logic Controller (PLC) to automatically optimize the load distribution among ICT Facility Buildings, maximising power production efficiency for each Gas Turbine. The ACS ensures that each machine operates as close to its peak efficiency point as possible, reducing overall fuel consumption. The control system will continuously monitor the live EC energy usage and production data.

The Continuous Emissions Monitoring System (CEMS) will be installed on each Gas Turbine(s) that will operate in excess of 500 hr/yr (A2-3 to A2-10). The CEMS will monitor flow, temperature and pressure, as well as Oxides of Nitrogen (NOx) and Carbon Monoxide (CO) levels in the flue gas. All collected data is stored locally and can be accessed within the Energy Centre control room, enabling real-time monitoring. The CEMS will adhere to EN14181 / EN15267-3 standards and will be implemented following the guidelines outlined in EPA Guidance AG3 (2021). As the Gas Turbine(s) (A2-1 to A2-2) are not anticipated to anticipated to operate in excess of 500 hours per annum, these 2 no Open Cycle Gas Turbines do not include CEMS, and periodic monitoring will be undertaken annually following the guidelines outlined in EPA Guidance AG2 (2021).

The stack heights and emissions control systems of Gas Turbine(s) have been designed to ensure dispersion of the emissions and achieve compliance with the EU ambient air quality standards at all off-site locations.

The Gas Turbine(s) can operate on light fuel oil (Gas Oil) as a secondary or contingency fuel source. The light fuel oil option is in case of unforeseen or emergency circumstances such as a failure in the incoming natural gas supply. The Gas Turbine(s) are expected to operate using light fuel oil less than 500 hours per year (hr/y). Emissions to Atmosphere of Dust (Total Particulates), and Sulfur Dioxide ($SO_{2,}$) will be undertaken as required by the Agency.

Minor Air Emissions

The stack heights of the Emergency Generators for the ICTF Buildings 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 Generators and Black Start Diesel Generators (BSDG) control the air-to-fuel ratio to ensure efficient and complete combustion of fuel. These generators will be equipped with control systems that monitors the generator's performance alerting operators to any potential issues or malfunctions. These generators are fitted with data loggers which track the number of hours each generator operates.

Periodic measurements of emissions from the Emergency Generators and BSDG shall be required for CO and NOx at least every five years for medium combustion plants with a rated thermal input equal to or greater than 1 MW and less than or equal to 20 MW. In accordance with AG11 ISO17025 accredited contractors will be used to monitor the stack emissions. No further control measures are required for emissions.

Potential Emissions

There are no control or monitoring systems proposed or required for the fire sprinkler pumps.

Potential Emissions and Fugitive Emissions

There are no fugitive emissions expected from the Installation. There are no control or monitoring systems proposed or required.

4.2 EMISSIONS TO SEWER (WASTEWATER EMISSIONS)

Sanitary effluent from welfare facilities and amenities for staff from the ICTF buildings and the Energy Centre will be collected and connect to the foul sewer system on site. Domestic wastewater will be collected from site and discharged to the off-site foul sewer network at emission location SE1. This is a new licenced emission location under this review application, and is not included in the existing licence P1113-01.

The Energy Centre necessitates a regular discharge of process wastewater, comprising steam cycle residue and utility wash water. The Energy Centre discharge is collected within the onsite foul sewer and combines within domestic wastewater culminating in a discharged to the offsite sewer at emission location SE1.

The cooling system for ICTF1, ICTF2, ICTF3 is provided via free air coolers during normal operations. Adiabatic (wet) cooling is only utilised during peak ambient temperatures. Water is recycled within the cooling units and a flushing/dumping of wastewater from the system be required to remove mineral build-up once conductivity set points are reached. In addition, a cleaning purge cycle will occur during maintenance. The cooling water discharge is collected within the onsite foul sewer and combines within domestic wastewater culminating in the offsite sewer at emission location SE1.

The site wastewater emissions are set out in Attachment-7-3-1-Emissions-to-Sewer, Attachment-7-3-2 Equivalent-Protection-Sewer.

The discharge will enter the public off-site foul sewer at emission point SE1. The emission / offsite discharge point is labelled SE1 on DWG-007 Drainage Plan-Foul included with the application. The wastewater emissions ultimately discharges to Ringsend Wastewater Treatment Plant (WWTP).

4.2.1 Treatment and Abatement systems

The Energy Centre wastewater is collected from the steam cycle and directed to a wastewater neutralization sump situated to the north of the steam turbines. The utility wastewater is gathered in the foul sewer located between the GTs and diverted via a hydrocarbon separator(s) (Class II) before discharging it into the on-site foul sewer.

The discharge of cooling water from ICTF1, ICTF2, ICTF3 is essentially clean water, albeit with the addition of treatment chemicals, has passed through cooling systems. There is no requirement for onsite treatment or abatement.

In the event of a fire within the ICTF Buildings, there is the potential for a discharge from the internal battery rooms and UPS batteries (foam and sprinklers). This discharge may result in an elevated pH. At the request of UÉ, an off-line balancing skid is installed on the foul sewer. This balancing skid is designed to activate in case of elevated pH, effectively lowering the pH to acceptable levels before the discharge occurs at emission location SE1. This precautionary measure ensures compliance with discharge standards.

All wash water coming from the canteen area will discharge via a non-biological grease trap prior to joining the site wide sanitary drain. Additional off-site treatment will be undertaken at the Ringsend Wastewater Treatment Plant.

4.2.2 Control and Monitoring

The combined domestic and process wastewater is tested at monitoring locations SE1-1 , SE1-2, and SE1-3 (to be agreed with the Agency). The monitoring points locations are shown on Drawing Ref: DWG-007 Drainage Plan-Foul included with this application. The monitoring of parameters will be undertaken by agreement with Uisce Éireann. Continuous monitoring will take place for Flow, pH, and Temperature.

4.3 STORMWATER EMISSIONS

The stormwater, rainwater from building roofs, yards and the road network, will be discharged to the Gallanstown stream located to the south of the Installation. Emission Point SW1 is shown in DWG-006-Stormwater Drainage. This is an existing licenced (P1113-01) emission location, however the location is under review as part of this application.

This is a new Installation, and foul wastewater is separated from all stormwater lines in accordance with BAT. The Installation contains storage tanks for light fuel oil (diesel) that poses the potential risk of contaminating stormwater if a spill occurs on site. The site layout and infrastructure include impervious surfaces, such as concrete and asphalt, which can contribute to increased stormwater runoff. Due to the treatment and abatement systems, control and monitoring measures listed below, there is a low risk of contamination of stormwater, this would only be from complete containment failure resulting in a major leak or spill or emergency situation such as fire.

4.3.1 Treatment and Abatement Systems

In the unlikely event of a leak or spill at the site there are mitigations and designed containment measures in place. The following stormwater management measures will be in place on site:

- Containment Measures: The Installation will implement a comprehensive containment strategy for all storage tanks, loading/unloading areas, and fuelling stations. Secondary containment structures, such as double walled light fuel oil (diesel) tanks for the Emergency Generators, and integral bunds within the generator enclosers, will be in place to prevent spillage and leakage from reaching stormwater drainage systems.
- Hydrocarbon Separator: Hydrocarbon separators (Class I) are designed to separate and retain hydrocarbons, such as light fuel oil (diesel), lubricating oils, and grease from the stormwater runoff are included within the stormwater network design as shown on Drawing Ref.: DWG-006-Stormwater Drainage. These hydrocarbon separators are equipped with an automatic closure mechanism that activate when they are full and require maintenance, when this happens oil level warning and alarm systems activate. The hydrocarbon separations treat rainfall and prevent hydrocarbon spillages entering the stormwater system. The hardstanding areas that drain surface water from the loading dock(s) and fuel delivery area(s) pass through full retention hydrocarbon interceptor(s) (Class II) prior to entering the on-site surface water drainage network. The carparking areas pass through bypass separators (Class I) prior to entering the on-site surface water drainage network.
- Spill Response Protocol: A detailed spill response protocol will be established to address any accidental releases of light fuel oil (diesel). Trained personnel will promptly respond to spills to minimize environmental impact.

- Good Housekeeping Practices: Strict housekeeping measures will be enforced to ensure that spill-prone areas are kept clean and free from potential contaminants. Regular inspections and maintenance will be conducted to prevent leaks or spills, in addition to tegular inspections and maintenance of the hydrocarbon separators to ensure its proper functioning.

Potentially contaminated stormwater (e.g. in the event of a fire) that enters the stormwater attenuation ponds will be contained and tested prior to discharge to the Gallanstown Stream. Any stormwater of unacceptable quality will be pumped out of the attenuation ponds and disposed of appropriately.

There is no further requirement for abatement of the stormwater from the site.

4.3.2 Control and Monitoring

The Stormwater Monitoring Plan (Attachment-7-7-Stormwater Discharges and Attachment-7-7-1 Stormwater Monitoring) sets out weekly sampling, daily visual inspection and corrective actions in the event of pollutant exceedances or contamination. The Stormwater Monitoring Plan ensures that the Installation takes proactive measures to prevent stormwater pollution and protect the surrounding environment. Due to the robust control measures outlined above it is considered that no further monitoring or control methods are required for stormwater. It is anticipated that only clean stormwater will be discharged to the Gallanstown stream, appropriate trigger levels (warning limits, and action limits) for stormwater discharge will be agreed with the Agency after the Installation is operational.

4.4 NOISE EMISSIONS

In the operational context of the Installation, various sources contribute to outward noise emissions. The existing licence (P1113-01) anticipated the generation of noise from the installation and set noise limits, the secures of noise are altered under this review application. The primary sources of outward noise have been identified as follows:

- Building Services Noise: Building services refer to the mechanical and electrical systems within the Installation that provide essential functions such as heating, ventilation, air conditioning, and electrical distribution. These systems can produce noise during their normal operation, which may contribute to the overall noise profile of the Installation.
- Energy Centre Plant Noise: The Energy Centre, and housing the GT, constitutes a significant source of noise emissions. As the engines operate to generate electricity for the Data Centre's energy infrastructure, they produce sound due to their combustion processes and mechanical components.
- Emergency Site Operations: During emergency situations or power outages, the Emergency Generators will operate to provide power to the ICTF.
- Additional Vehicular Traffic on Public Roads: The transportation of personnel, equipment, and supplies to and from the Installation may involve vehicular traffic on public roads adjacent to the site. This traffic can contribute to external noise levels, particularly during peak operational periods.

To ensure compliance with environmental regulations and best practices, a comprehensive assessment of the noise emission impacts has been conducted. This assessment aligns with the guidelines outlined in the Environmental Protection Agency

(EPA) Guidance Note for Noise: Licence Applications, Surveys, and Assessments in Relation to Scheduled Activities (NG4).

The results of the noise impact assessment are detailed in Attachment-7-1-3-2 (Noise Impact Assessment). This document summarizes the findings and implications of the assessment, including measurements of noise levels at various locations around the Installation during different operational scenarios.

4.4.1 Treatment and Abatement Systems

The Installation plant items (equipment and machinery) have been carefully chosen to meet specific noise level requirements. This means selecting machinery and devices that inherently produce lower noise levels during their operation. By incorporating low noise equipment, the overall noise impact of the plant is reduced. The main objective is to ensure that the noise generated by the Installation during its operations remains within acceptable limits as stipulated in the permitted developments Environmental Impact Assessment (Attachment 6-3-23 EIAR Planning September 2023 of the IE Licence application).

To further control noise emissions, the following measures will be implemented:

- Plant items will be selected in order to achieve the required noise emission levels.
- Appropriate attenuation will be specified in order achieve the required noise emission levels.
- Any air intake or exhaust points will incorporate suitable atmosphere side attenuation in order that overall site noise emissions comply with the adopted noise criteria.
- The Gas Turbines and Emergency Generators are enclosed within an acoustic container. The enclosures are constructed using specialised sound-absorbing materials that dampen noise, ensuring that noise levels are kept at acceptable limits.

The ultimate goal of these noise abatement measures is to ensure that the plant's noise levels comply with *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).* It is expected that the combination of acoustic containers, acoustic louvres, and low noise equipment will be sufficient to maintain noise levels below the stipulated limits at the nearest noise-sensitive receptors, such as residential areas or other noise-sensitive locations near the plant.

4.4.2 Control and Monitoring

To sustain the effectiveness of the noise control measures over time, a comprehensive maintenance and inspection schedule will be implemented. This includes regular checks of the acoustic enclosure, ventilation system, and vibration isolation mounts to identify and address any potential issues that could impact noise reduction.

Annual day time, evening and night-time monitoring will be undertaken in accordance with the IE licence requirements.

4.5 EMISSIONS TO GROUND

There are no process emissions to ground from the Installation.

5.0 MANAGEMENT OF RAW MATERIALS, INTERMEDIARIES OR PRODUCTS, AND WASTES

A list of all raw materials in use on the site is provided in Attachment-4-6-2.

5.1 RAW MATERIALS

5.1.1 Light Fuel Oil (Diesel)

Light Fuel Oil, commonly known as Diesel, is strategically stored in diverse vessels throughout the Installation. The stored Light Fuel Oil acts as a reliable contingency measure, ensuring the continued operation of the GTs and emergency systems. In summary the Installation includes:

- Energy Centre Bulk Fuel Oil Storage
  - 4 no. 255,000 litre fuel storage tanks
- Energy Centre Black Start Diesel Generator Fuel
  - 6 no. day tank within the enclosure each 1 m^3
  - 6 no. external belly tanks each 10 m^3
- Energy Centre Fire Sprinkler Pumps Fuel
  - 2 no. belly tanks each 0.5 m^3
- ICTF1 and ICTF4 Emergency Generators Fuel
  - 23 no. double walled belly tanks (each 16.1 m^3

The total fuel storage capacity the site is 1,456.3 m^3. Therefore, the total fuel stored is approximately 1,197.2 tonnes (assumed density of 820 kg/m^3 (at 15°C)). The sections below describe the above storage tanks in further detail. The risk of accidental discharge from the bulk storage of light fuel oil (LFO) has been adequately addressed through design and operational management procedures.

Energy Centre Bulk Fuel Oil Storage

The GTs in the Energy Centre have dual-fuel functionality and can be operated on light fuel oil (LFO). The Energy Centre includes 4 no. 255,000 litre fuel storage tanks, these steel tanks are single walled, and located within a single bund that is 110% capacity. high and low alarms, breather vents, leak detection alarms.

The fuel tanks will be contained within a bunded area in line with the requirements of the *Guidance to Storage and Transfer of Materials for Scheduled Activities* (EPA, 2005). The fuel tanks include level transmitters and level gauges to monitor fuel levels within that will identify any sudden loss of fuel. All tanks are single walled to contain any leaks and monitored by a leak detection system.

There is a designated HGV fuel unloading bay located next to the fuel storage tanks. The fuel delivery trucks will drive onto containment areas before commencing to unload fuel. Fuel unloading is a highly controlled process and a standard operating procedure (SOP) for fuel unloading will be implemented. In the unlikely event of a fuel spill incident, the spill will be contained within the unloading station which is surrounded by concrete upstand and directed to the site stormwater system via an appropriately sized full retention hydrocarbon separator (Class I).

Fuel oil pumps, which will be used to unload fuel arriving on site and forward it to the bulk storage tanks, will be located in individual dedicated enclosures built on a skid with a fuel containment solution in the unlikely event of a fuel spill incident. Transfer

pipelines are in place to transfer fuel from the bulk tanks to the generators, these are on an above ground pipe rack. There are no below ground pipelines.

Energy Centre Black Start Diesel Generators and Fire Sprinkler Pumps

The required fuel to operate the BSDG and fire sprinkler pumps will be stored in individual day tanks located within the enclosure, and single walled 'belly tanks' located underneath the generator enclosure. The BSDG have day tanks that are 1 m^3 and the belly tanks are 10 m^3. the fire sprinkler pumps have 0.5 m^3 belly tanks.

These tanks are bunded integrally within the enclosure to 110% capacity and include leak detection systems. The tanks are equipped with mechanical overfill protection systems, monitoring and alarm systems, and internal level gauge sensor (high-high, high, low, and low-low) these are connected to the onboard controller. The onboard controller is programmed to raise an alarm in case of overfilling or a sudden drop in fuel levels. These measures mitigate the risk of environmental contamination and potential hazards.

A dedicated tanker unloading area will direct fill the individual tanks. Pipelines exist only within the containerised generators to transfer from the belly tank / day tank to the generator. Surface water drained from the loading dock areas, fuel delivery areas and fuel unloading area shall pass through a Class 1 hydrocarbon separator prior to entering the surface water drainage system.

ICTF1 and ICTF4 Generators Fuel

The required fuel to operate the Emergency Generators at ICTF1 and ICTF4 will be stored in individual double walled 'belly tanks' located underneath the generator enclosure. These steel belly tanks are 16.1 m^3 each and have an integrated double wall with 110% capacity and leak detection systems within the fuel tank (between the primary and secondary walls). The tanks are equipped with mechanical overfill protection systems, monitoring and alarm systems, and internal level gauge sensor (high-high, high, low, and low-low) these are connected to the onboard controller. The onboard controller is programmed to raise an alarm in case of overfilling or a sudden drop in fuel levels. These measures mitigate the risk of environmental contamination and potential hazards.

A dedicated tanker unloading area is provided and fuel filling cabinets located at ground level with an individual supply pipe to each belly tank. The deliveries of fuel to site are undertaken by HGV deliveries an SOP for fuel unloading will be in place at the Installation. Drip trays are strategically placed at the light fuel oil (diesel) fill point to capture any potential spills. Surface water drained from the loading dock areas, fuel delivery areas and fuel unloading area shall pass through a Class 1 hydrocarbon separator prior to entering the surface water drainage system.

Transfer pipelines are in place to transfer fuel from the filling cabinets to the belly tank to the generator. There are no below ground pipelines.

Turnover of fuel for the Emergency Generators, and hence re-fuelling, will be low as the Energy Centre and electrical utility supply is very reliable.

5.1.2 Water Treatment Chemicals

The chemicals required for the water treatment process are stored in Intermediate Bulk Containers (IBCs) with a capacity of 1 m^3 located either external self-bunded chemical

stores or designated areas with continuous hardstand. These chemicals are fundamental for several key functions in water treatment, including screening and filtration pre-treatment, scale and bacteria prevention, pH adjustment, and the incorporation of a corrosion inhibitor.

External self-bunded chemical stores provide a secure and isolated environment for storing the water treatment chemicals. These self-contained units are designed with bunded walls to prevent and contain any potential spills or leaks, enhancing safety measures and minimizing environmental impact. The external placement allows for convenient access while maintaining a dedicated space for chemical storage.

Treatment rooms are specifically designated and equipped to accommodate the storage requirements of water treatment chemicals. Placing the chemicals within maintenance rooms ensures accessibility for authorized personnel while providing an additional layer of protection against external elements.

The continuous hardstand areas, whether internal or external, contribute to a controlled environment for the storage of chemicals.

5.1.3 Maintenance Chemicals

Any other maintenance, water treatment, or cleaning chemicals/substances are in smaller quantities (> 2,500L) and are either stored in external self-bunded chemical stores, or areas of continuous hardstand i.e. internally within maintenance rooms.

Lubricating oils and greases are securely housed in an enclosed and ventilated area equipped with a sump to capture any potential leakage. This setup ensures not only the containment of any spills but also directs run off or to the hydrocarbon separator(s) (Class I).

Maintenance rooms are specifically designed to accommodate the storage requirements of maintenance and cleaning chemicals, providing a controlled environment for their safekeeping.

5.2 WASTE

The site is designed and operated in a manner that promotes the generation of minimal waste. This approach is environmentally conscious and helps reduce the overall environmental impact of the Installation.

There will be minimal solid waste produced from the Energy Centre and ICTF Buildings. Small amounts of domestic waste will be produced at staff areas within the Installation.

A more detailed description of waste generation, including estimated waste volumes, types of waste generated, and the methods of disposal or recovery, are provided in Section 8 of the application.

To ensure proper handling and disposal of waste, the Installation will employs appropriate waste segregation practices. Different waste streams will be separated to prevent contamination and facilitate recycling or proper disposal and waste will be managed in compliance with relevant regulations and industry best practices.

5.3 INTERMEDIATES OR PRODUCTS

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

6.0 MANAGEMENT AND PROCESS CONTROL SYSTEMS

The existing licence (P1113-01) has not commenced, and several modifications have been made to the Installation since the initial license application. The following section outlines the management and process control systems that will be developed for the Installation once the Industrial Emissions Licence Review is granted.

6.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

The Environmental Management System (EMS) for the Installation will be developed once the site is operational and the IE License Review is granted. The EMS will align with the principals of ISO14001 and the BAT 1 of the Commission Implementing Decision (EU) 2021/2326 establishing best available techniques (BAT) for large combustion plants. The EMS will encompass the following key features:

- Environmental Policy and Commitment of Management
- Planning and implementation of procedures including training, communication, employee involvement, and documentation.
- Performance Monitoring and Corrective Action
- Periodic review
- Quality assurance/control programs
- Management plans for emissions during non-standard operating conditions
- Waste management plans,
- Systematic identification and management of potential uncontrolled emissions, and noise management plans

This EMS will aim to ensure comprehensive environmental management and continuous improvement in performance across the Installation's lifecycle.

6.2 ENERGY EFFICIENCY MANAGEMENT SYSTEM (ENEMS)

The Energy Efficiency Management System (EnEMS) for the Installation will be developed once the site is operational and the IE License Review is granted. The EnEMS form part of the overall site environmental Management System (EMS) and will include:

- Energy Efficiency Policy and Management Commitment
- Setting of Objectives and Targets
- Planning and implementation of procedures including training, communication, employee involvement, and documentation.
- Benchmarking, power use effectiveness, and energy audits
- Performance Monitoring and Corrective Action
- Review and Evaluation

The EnEMS enables the Installation to identify opportunities for energy efficiency improvements, reduce energy consumption, cut costs, and contribute to environmental sustainability goals.

6.3 ACCIDENT PREVENTION PROCEDURE (APP)

The Accident Prevention Procedure (APP) for the Installation will be developed once the site is operational and the IE License Review is granted. The APP will include an initial environmental risk assessment and scoping exercise will be undertaken in order to encompassing all likely accident scenarios specific to the site. The primary objective of the APP is to proactively mitigate on-site hazards before they escalate into accidents or emergencies.

The prevention procedure will include the following key elements:

- Identification of on site hazards and risks and mitigation measures to prevent accidents with adverse environmental impact and minimise consequences when accidents occur.
- Details on the storage and transfer of all raw materials in accordance with EPA's guidelines for the storage and transfer of materials for scheduled activities (EPA, 2004).
- Procedures for the management of both Hazardous and non-Hazardous waste, covering segregation, labelling, and secure containment in alignment with the Waste Management Act 1996 (as amended).
- Clear and effective procedures for the safe handling of chemicals and hazardous materials, aimed at preventing spills or accidental leaks.
- Detailing essential design components for the secure containment of chemicals and raw materials. This encompasses specifics on the location and features of stormwater hydrocarbon separators (Class I), bunds, pipelines, and protocols for ongoing maintenance to ensure effectiveness.
- Specifying protocols for the regular integrity testing of tanks, pipelines, and designated chemical storage areas in accordance with EPA's guidelines for the storage and transfer of materials for scheduled activities (EPA, 2004).
- This procedures link to related organisational documents and Standard Operating Procedures (SOP), Environmental Management Systems (EMS) as required.
- In the event of an emergency situation or accident at the Installation, the Emergency Response Procedures (ERP) will be strictly followed including notification to the EPA as required.
- A structured procedure to investigating any on-site accidents or incidents. This includes documenting the event, determining its root cause, summarising response actions, evaluating environmental impact, and extracting lessons for prevention and future response.
- Annual review process to ensure its continued effectiveness. The review process will be documented and will consider any corrective actions identified from accidents since the previous review.
- All relevant staff members will undergo annual training on the procedure. Records of staff training will be maintained and accessible for review.

The APP will be designed to ensure that all staff members have a clear understanding of the prevention measures in place on site and the standard operating procedures related to high risk activities. It will be structured to facilitate ongoing review, improvement, and refinement. Provision of digital and physical copies of the APP will be available to guarantee its accessibility at all times.

6.4 EMERGENCY RESPONSE PROCEDURE (ERP)

The Emergency Response Procedure (ERP) for the Installation will be developed once the site is operational and the IE License Review is granted. The ERP will serve as a comprehensive guide outlining the necessary steps and protocols to effectively address potential emergency situations. It will provide a comprehensive guide for addressing potential emergencies, covering scenarios like fire, spills, floods, etc. Key components include:

- Environmental impact minimisation measures and specific response procedures for various scenarios.
- Clear communication plans for the Emergency Response Team (ERT) and staff alerts, especially during non-standard hours.
- Identification of external support, including emergency services.
- Safety protocols, linking to related documents and Standard Operating Procedures.
- Update to date chemical inventory with safety data sheets.
- An inventory of all incident response and pollution prevention equipment on-sit).
- Site plans for equipment and drainage,
- EPA notification details in accordance with licence requirements.
- Scheduled testing and maintenance of response equipment.
- Annual document review and staff training, covering roles, equipment use, and communication.

The ERP will be designed to ensure that all staff members are equipped to respond effectively and efficiently to any potential emergency situation. It will be structured to facilitate ongoing improvement and refinement, aligning with best practices in emergency response management. Provision of digital and physical copies of the ERP will be available to guarantee its accessibility at all times.

The ICTF Buildings and the Energy Centre will be equipped with automated fire detection systems (heat and smoke) as well as natural gas detection systems in the Energy Centre. These will be connected to a main fire panel in the security office which is manned at all times. In the event that a fire is detected, the fire panel will display the location of the detected fire. Once detected the location of the potential fire will go into an alarm state. The fire detection and alarm systems will be connected to the sprinkler system and these will be triggered in the event of a fire. To ensure the effectiveness of the fire alarm system on site, the component parts will be tested and verified on a regular basis. Records of all tests, faults and remedial actions will be maintained and stored.

A firewater retention risk assessment will be completed for the Installation as and when requested by the Agency.

6.5 BUILDING MANAGEMENT SYSTEM (BMS)

Once the Installation is constructed, it will incorporate a Building Management System (BMS). This sophisticated automation system will be responsible for controlling, monitoring, collecting data, and reporting on all aspects of the site's processes and conditions, encompassing both electrical and mechanical systems.

The BMS will play a pivotal role in overseeing and regulating the engineering systems and services. Its key functions will include:

- Control and monitoring of various plant operations, ensuring efficient performance;
- Continuous monitoring of system performance to optimize efficiency;
- Condition-based monitoring of plant and components for predictive maintenance;
- Detection of faults and triggering alarms for immediate attention; and
- Monitoring and metering of energy, water, and fuel consumption for efficient resource management.

The BMS will individually manage and monitor each item of services plant or system. This design ensures that each plant or system can operate independently in case of a network failure, guaranteeing continuous functionality.

6.6 PREVENTATIVE MAINTENANCE PROGRAMME

The Preventative Maintenance (PM) is crucial to ensure the reliable and efficient operation of critical infrastructure. It helps identify and address potential issues before they turn into major problems, minimizing downtime and costly repairs. The following maintenance programme will be developed for the site:

- A comprehensive inventory of all critical equipment and systems will be developed.
- Regular inspections of all equipment and systems will be undertaken in accordance with manufacturer's recommendations, industry best practices.
- Periodically test equipment to ensure they can handle the expected load during emergencies or high-demand periods.
- For equipment with lubricants or fluids, regular oil analysis to detect early signs of wear or contamination will be conduct. Replace fluids as recommended by the manufacturer.
- Electrical distribution systems will be inspected to identify and resolve any potential issues with power distribution and protection.
- Detailed records of all maintenance activities will be kept, including dates, tasks performed, and any identified issues.

The specific details of the PM program will be implemented depending on the size, complexity, and criticality of the equipment, and manufacturer's recommendations, industry best practices.

6.7 WASTE MANAGEMENT PROCEDURES

Waste Management Procedures will be put in place for the operation of the Installation. These procedures will ensure the proper management and recycling of of all wastes generated within the Installation. The goal is to establish a systematic and environmentally responsible approach to waste handling.

These Waste Management Procedures will align with the outlined targets and policies in the Eastern-Midlands Region Waste Management Plan 2015-2021. By adhering to the guidelines set forth in this regional waste management plan, the Installation aims to enhance its environmental performance and sustainability.

The overarching management procedures (Attachment-8-2-1-Waste-Hierarchy), and estimated waste generation (Attachment-8-1-Waste-Generated) has been provided in Section 8 of this application.

7.0 CESSATION OF ACTIVITY

7.1 SITE CLOSURE

A certain amount of environmental risk is associated with the cessation of any licensable activity (site closure). An outline Site Closure report (Attachment 9-2-3 Site Closure) has been provided in Section 9 of this application.

The basis of the closure plan is to ensure that, upon completion of implementation of the plan, the Installation would be in a suitable state for future industrial use and would not pose a risk to public health and safety or the environment.

7.2 BASELINE REPORT

A Complete Baseline Report (Attachment 4-8-3 Complete Baseline Report) for the site has been produced and included in Section 4 of this application. The complete baseline report provides conditions of the site prior as it existed prior to the construction and operation of the Installation.

8.0 ENVIRONMENTAL IMPACT ASSESSMENT

8.1 ASSESSMENT OF THE PROJECT AGAINST SCHEDULE 5

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 as amended. This list was developed from Annex I and Annex II of the EIA Directive. The proposed activity is not directly listed under Annex I of the EIA Directive, or Part 1, Schedule 5, or Part 2, Schedule 5.

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

> *10(b)(iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.*

The development is development in an urban area. The total site area is c. 13.49 hectares and so exceeds the limit, quantity or threshold set out in Part 2, Schedule 5 Class 10(b)(iv) (10 hectares in the case of other parts of a built-up area).

8.2 ENVIRONMENTAL IMPACT ASSESSMENT REPORT

This section presents an overview of the Environmental Impact Assessment Report(s) (EIAR) prepared in relation to the activity under this licence review that have previously been summitted to South Dublin County Council.

The EIAR related to the Energy Centre and ICTF Buildings under this Licence Review are as follows:

- An EIAR relating to a revised design of the data centre, replacing the data centre with 4 no. Information and Technology Communications Buildings was prepared by AWN Consulting Ltd, dated November 2020 and submitted to

SDCC as part of the planning application Reg. Ref. SD20A/0309. This EIAR is included with the licence documentation as Attachment 6-3-22 EIAR Planning May 2021 of the IE Licence application.

- An EIAR relating to a revised design of the Energy Centre was prepared by AWN Consulting Ltd, dated July 2023 and submitted to SDCC as part of the planning application Reg. Ref. SD23A/0158. This EIAR is included with the licence documentation as Attachment 6-3-23 EIAR Planning September 2023 of the IE Licence application.

In respect of the Installation site 2 no. further EIAR have been prepared that are now effectively superseded by the above more recent assessments. The below EIAR have been previously provided to the EPA as part of the existing P1113-01 Licence Application and are available on the EPA website or on the SDCC website:

- An EIAR relating to the installation, comprising the energy centre and a data centre was prepared by AWN Consulting Ltd, dated February 2014 and submitted to South Dublin Conty Council (SDCC) as part of the planning application Reg. Ref. SD13A/0271.
- An EIAR relating to a revised design of the installation was prepared by AWN Consulting Ltd, dated May 2018 (updated October 2018) and submitted to SDCC as part of the planning application Reg. Ref. SD18A/0068.

8.3 CONSIDERATION OF ALTERNATIVES

8.3.1 Alternative Locations and Layouts

The Installation has obtained planning permission, the applicant possesses the land and construction has commenced, eliminating the possibility of a 'do nothing' scenario. There is no option for the site to continue in its previous use as an Eircom cable depot as the site has been demolished.

During the planning stages, alternative project locations with suitable zoning and access to utilities were evaluated. However, most of these sites were found to be insufficiently spacious to accommodate the Installation.

Throughout the planning stages, multiple site layout variations were explored, including the revision of the Energy Centre and ICTF buildings leading, to the current proposed arrangement of buildings and site infrastructure.

Site layout considerations were primarily made based on the following factors:

- Minimising potential impacts on the environmental and visual impact sensitivities associated with the surrounding land uses, particularly the Grand Canal pNHA; and
- Orientation of the main buildings to optimise the use of the space available and minimise visual and noise impact.

8.3.2 Alternative Processes/Technologies

The design evolution for this Installation has involved exploring various technologies employed by other operators in Ireland and worldwide. The design reflects the adoption of cutting-edge, state-of-the-art technology.

Alternative processes and technologies have been considered by the project design team based on many factors including technical feasibility, environmental impact, efficiency, security, reliability, and cost.

Several alternative energy efficiency measures have been considered to achieve overall CO_2 reduction targets in the final design. These are:

- Use of best available technology regards prime mover for the power generating Installation based on efficiency. All forms of generators were considered, including open cycle GTs, reciprocating engines and combined cycle GTs. The power generating design has been complete to facilitate the most efficient prime mover, which is technically feasible.
- Consideration has been given to the compatibility of EC turbines with renewable fuels. The turbines will be selected to be able to run with renewable, low carbon fuels such as Hydrotreated Vegetable Oil, where available.
- The feasibility of either roof mounted or standalone wind turbines at the EC is not an option for renewable power generation due to the distance to nearby buildings, the wind resource available and the urban character of the site location.

The previous Energy Centre was designed to generate from natural gas only (consisting of 8 no. spark ignited natural gas fired engines, 7 no. running continuously, and 1 no. on standby).

The revised design for the EC incorporates 2 no. technologies, Gas Turbines (GT) and steam turbines (ST). The GTs chosen are more efficient than the permitted design for reciprocating engine dual fuel gas power plant. This technology type, CCGT, is very efficient as heat captured at the exhaust of the GT is used to generate electricity. When the resulting heat recovery is considered, the GTs result in a much higher overall cycle efficiency than other technologies such as CHP, Open Cycle, direct drying etc.

The use of both the GTs and STs in the Closed Cycle configuration makes use of Best Available Techniques (BAT) as a more efficient way of generating electricity, with significantly higher efficiency levels. As with the previous EC design, having multiple smaller engines also enhances redundancy and resilience in the system. In the event of any maintenance or technical issues with one generator, the others can continue to supply power, reducing the risk of complete power outage compared to relying solely on a limited number of larger units.

In addition to the efficiency considerations, the higher power density (>40%) of the CCGT solution allows for lower environmental impact on the ICTF Buildings compound and the environment, specifically in relation to natural resource consumption and hence the effects of climate.

8.3.3 Alternative Mitigation

The proactive approach to mitigating potential environmental impacts has been a key focus from the early stages of the design. During the planning application stage, the design team diligently assessed and incorporated appropriate mitigation measures tailored to the environmental setting of the project.

The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction and offsetting (not required in this development). Mitigation measures have also been considered based on the effect on quality, duration of impact, probability and significance of effects.

The design revisions for both the Energy Centre and the ICTF Buildings and implementation of mitigation measures reflect the best practices in the field, emphasising the goal of achieving minimal impact on the receiving environment. The selection of these measures is based on comprehensive assessments of their effectiveness, taking into account factors such as the potential impact's quality, duration, probability, and overall significance.

The proactive measures and strategic planning demonstrate the applicant's commitment to responsible and sustainable development, ensuring that the Installation operates harmoniously with the surrounding ecosystem and communities.