Shannon Technology and Energy Park (STEP) Power Plant

Environmental Impact Assessment Report - Volume 2

Chapter 02 Description of the Proposed Development

Shannon LNG Limited

April 2024

Delivering a better world

Prepared for:

Shannon LNG Limited

Prepared by:

AECOM Ireland Limited
4th Floor
Adelphi Plaza
Georges Street Upper
Dun Laoghaire
Co. Dublin A96 T927

T: +353 1 238 3100
aecom.com

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2.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) provides a detailed description of the proposed Combined Cycle Gas Turbine (CCGT) gas-powered Power Plant capable of up to 600 MW of electricity generation, 120 MWh (1-hr) battery energy storage system (BESS), Above Ground Installation (AGI), and associated plant, equipment and infrastructure including a substation (herein referred to as the "Proposed Development"). The Site of the Proposed Development (herein referred to as "the Site") is located in the townlands of Kilcolgan Lower and Ralappane, between Tarbert and Ballylongford, Co. Kerry.

The application Site boundary ('red line') encloses an area of approximately 41 hectares (ha) and is entirely owned by the Applicant.

The main objectives of the Proposed Development are to:

1. Provide 600 MW of fast acting flexible thermal generation capacity to the Irish electricity market.
2. Provide a 120 MWh (1-hr) Battery Energy Storage System (BESS) to participate in the electricity ancillary services market.
3. To ensure that Shannon LNG's award of a capacity contract on 28th March 2023 from EirGrid to deliver 400 MW of electricity generation capacity is delivered at the Site by no later than 1st October 2026, or any subsequent date extension granted by the Regulator.
4. To support the provisions of recent national policies with respect to security of electricity supply, including the *Climate Action Plan 2024*, the *National Energy Security Framework 2022*, the government's *Policy Statement on Security of Electricity Supply 2021* and the recently published '*Energy Security in Ireland to 2030*', which all point to the need for a significant uplift in the delivery of flexible gas-fired power generation capacity to 2030.

The Proposed Development will be fuelled by natural gas (with distillate oil as a secondary fuel back-up, as required under the Grid Code).

The construction phase of the Proposed Development is outlined in **Section 2.7**. A detailed construction programme will be determined by the appointed Contractor. However, an anticipated construction programme is presented in **Section 2.7.1.1**, (refer to **Table 2.7**), including construction phases and key milestones and provides a robust basis for assessment purposes.

At the end of its design life, the Proposed Development will either be upgraded to extend its operational life (depending on system need) or decommissioned. A decision on extension of the operational lifetime or decommissioning of the Proposed Development would be expected to be made after 25 years operation approximately, refer to **Section 2.10**. However, it should be noted that the Power Plant has the capability to operate at a 50% blend of hydrogen by design, offering the potential for the Power Plant to become even more efficient in emission terms over the period to 2050 as and when the required policies and supply chains for hydrogen are implemented.

This chapter of the EIAR describes the design, construction, operation, commissioning and decommissioning of the Proposed Development, as well as the Site and surrounds, together with the proposed design parameters. In accordance with Article 5(1)(a) of the 2011 Directive as amended by Directive 2014/52/EU, as transposed into Irish planning law on 1st September 2018 by the European Union (EU) (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 298 of 2018) ('EIA Regulations'), the description of the proposal should comprise: *'… information on the site, design, size and other relevant features of the project'.*

This chapter of the EIAR is supported by a number of figures which detail the Proposed Development layout and design, refer to **Volume 3** of the EIAR.

A statement of competence of the relevant expertise and qualifications of the author to the EIAR is required by EIA Regulations. In accordance with EIA Regulations, the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, (2018) and Environmental Protection Agency (EPA) Guidelines (2022), AECOM confirms that experts involved in the preparation of this EIAR are fully qualified and competent in their respective fields and details of each relevant expert are presented in **Chapter 01** (Introduction).

2.2 Background to the Site

2.2.1 Site Location

The Proposed Development will be located on the Shannon Estuary, approximately 4.5 km from Tarbert and 3.5 km from Ballylongford, Co. Kerry. The Site of the Proposed Development is 41 ha, refer to **Figure 2.1** below and **Figure F2.2**, of Volume 3.

Tarbert Power Station is located approximately 5 km to the north-east of the Site. Moneypoint Power Station located on the northern shore of the Shannon Estuary, approximately 3 km to the north of the Site.

There are a small number of residential properties located within 500 m of the Site. Residential properties are also located along the existing L1010 road (Coast Road) immediately south of the Site, with additional residential properties, again to the south of the Site, to the east and west along the L1010 road.

The Site is located in the vicinity of existing and permitted energy infrastructure, including power stations at Tarbert and Moneypoint, Kilpaddoge substation, the Kelwin-2 battery energy storage system (BESS), Leanamore Windfarm, the permitted 400 kV electricity transmission cables between Kilpaddoge substation and Moneypoint substation and a permitted grid stabilisation facility at Kilpaddoge substation, all supported by the provisions of the Kerry County Development Plan (CDP) 2022-2028, the Regional Spatial and Economic Strategy (RSES) for the Southern Region, the Shannon Integrated Framework Plan (SIFP) 2013-2020, and the Listowel Municipal District Local Area Plan 2020. It is also close to national gas and electricity transmission grids; 220 kV and 110 kV electrical transmission are available from the Electricity Supply Board Network (ESBN) / EirGrid Kilpaddoge 220 kV substation located approximately 5 km east of the Site and a Gas Network Ireland (GNI) owned gas transmission pipeline located approximately 26 km east of the Site. Planning permission exists for the development of a 26 km natural gas pipeline which will facilitate connection from the Site to the GNI transmission

network at Leahy's, located to the west of Foynes, Co. Limerick. The 220 kV and associated substations will be subject to a separate planning application.

Figure 2.1: Site Location

2.2.2 Site Description

The Shannon Development Landbank on which the Site is located has a total area of 41 ha. Under the Kerry CDP 2022-2028 the Site is zoned for industrial use[1] and supports the progress of strategic energy projects along with the expansion of the gas network (Objective KCDP12-3). It has also been identified as a Strategic Development Location in the Shannon Integrated Framework Plan (SIFP) 2013-2020, the Regional Spatial and Economic Strategy (RSES) for the Southern Region 2020, and the Listowel Municipal District Local Area Plan 2020, and the Shannon Estuary Economic Taskforce, refer to **Chapter 04** (Policy, Energy and Planning) for further details.

The area of the Site to be developed is characterised by predominantly improved grassland in an agricultural setting. The field boundaries predominantly consist of hedgerows with small drainage ditches. The Site is in pasture, comprising primarily improved grassland with some wet grassland adjacent to the Shannon Estuary, as shown on the aerial photograph in **Figure 2.2**.

[1] Kerry County Development Plan 2022-2028 page 177: *"This plan provides 430.6 hectares for industrial related development and employment creation opportunities in the Tarbert / Ballylongford strategic landbank".*

The Site is currently drained by a number of shallow drainage channels. Several longer drainage features cross the southern portion of the Site, generally flowing in a west or north-west direction. The drainage features along the access road all ultimately drain to a single surface water course, the Ralappane Stream, which discharges into the Shannon Estuary. The Site is bordered to the north by the Shannon Estuary and to the south by the L1010 road, connecting Tarbert to Ballylongford. Fields in pasture and forestry lie beyond the eastern boundary and the Shannon Development Landbank extends westward beyond the Site's western boundary.

The topography of the land within the Site is generally undulating. Some of the fields are waterlogged in wet weather and there are pockets of marshy ground. There are a number of old disused farm buildings and structures on the Site.

The Lower River Shannon Special Area of Conservation (SAC) is adjacent to the Site along the northern / north-western boundary and also along part of the eastern boundary, refer to **Figure F7.1**, Volume 3.

The Ballylongford Bay proposed Natural Heritage Area (pNHA) is located adjacent to a part of the north-western boundary of the Site.

The Shannon-Fergus Estuary Special Protection Area (SPA) is to the west of the Site, at a distance of approximately 750 m from the western extremity of the Site.

Figure 2.2: Site of the Proposed Development (Aerial)

2.3 Main Features of the Proposed Development

The Proposed Development will consist of the following main components (as shown on **Figures 2.3** and **2.4**):

- Three (3 No.) blocks of Combined Cycle Gas Turbines (CCGT), each block with a capacity of approximately 200 megawatts (MW) for a total installed capacity of up to 600 MW (**Section 2.3.1.**).
- A 120 MWh (1-hr) Battery Energy Storage System (BESS) (**Section 2.3.2)**.
- High voltage 220 kV Gas Insulated (GIS) Substation (**Section 2.3.3**).
- Auxiliary Boiler (**Section 2.3.4**).
- Raw water treatment and storage (**Section 2.3.5**).
- Firewater storage tanks and fire water pumps (**Section 2.3.7.4**).
- Ancillary buildings (**Section 2.3.7**).
- Secondary Fuel Offloading and Storage (**Section 2.3.8**).
- Above Ground Installation (AGI) compound (**Section 2.3.9**).
- Sewerage drainage system (**Section 2.3.13.2**).
- Process effluent collection system and sump (**Section 2.4.1**).

Figure 2.3: Layout of the Site for the Proposed Development

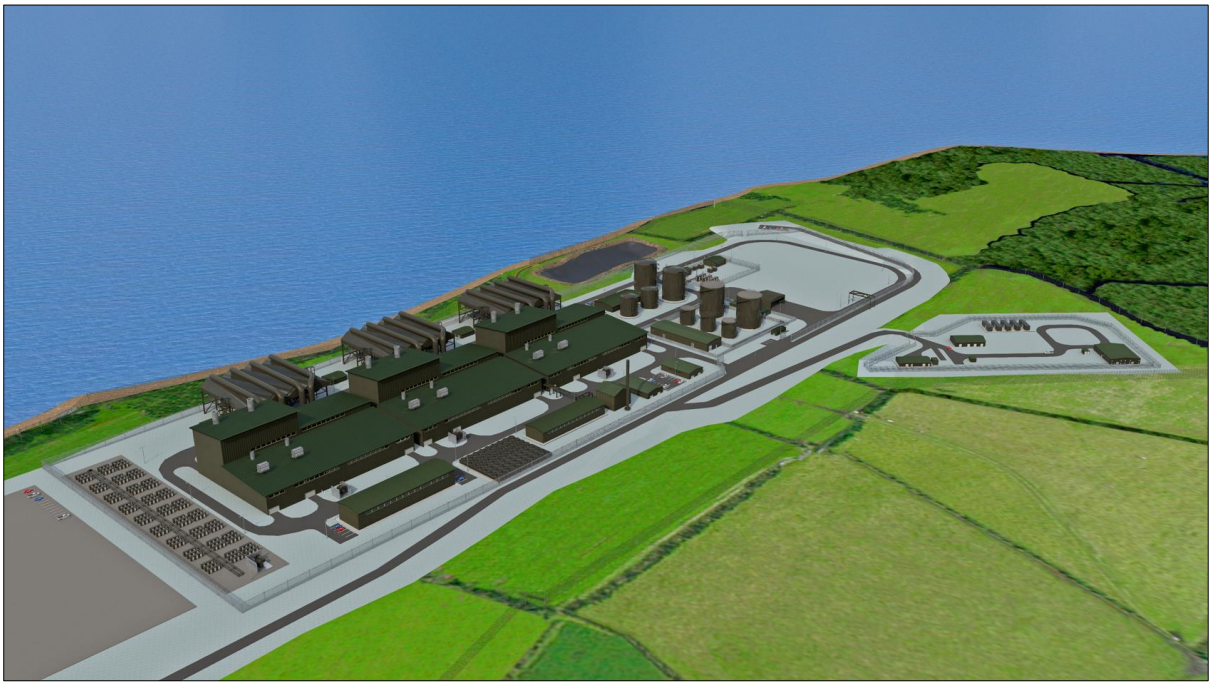

Figure 2.4: Overview of the Proposed Development

The Proposed Development will be operated using natural gas as its primary fuel (delivered to Site via the consented 26 km natural gas pipeline [Planning Reference GA08.GA0003] which will facilitate connection from the Site to the GNI transmission network west of Foynes) and generate power to be exported via the proposed 220 kV connection to the national electricity grid.

The 220 kV connection, which is subject to a separate application, will (subject to approval), be installed prior to commencing operation of the Proposed Development.

The Proposed Development is designed to operate alongside intermittent renewable electricity power generation and is expected to mainly operate at full capacity during periods of low renewable supply, and otherwise to be turned down or turned off. For example, during periods of high wind (renewable) generation it is expected that the Proposed Development will be turned off by the system operator (EirGrid) to give priority to renewable power. Similarly, during periods of sudden low renewable generation, the system operator will call on the Proposed Development to be ramped up to supply electricity. Due to the design of the CCGT with low minimum generation, and its high efficiency giving it an economic advantage relative to other facilities, it is expected that the Proposed Development is likely to be called on earlier by the system operator than other gas fuelled power plants. The operation of the Power Plant is discussed further in **Chapter 03** (Need and Consideration of Alternatives) and **Chapter 15** (Climate).

A BESS will provide electricity into the grid as the Proposed Development is being ramped up, refer to **Section 2.3.2**. Once the Proposed Development is up and running the supply from the BESS will be switched off.

The Proposed Development will have an installed capacity of up to 600 MW and will be designed in accordance with Best Available Techniques (BAT) for large combustion plants, industrial cooling systems, energy efficiency and emissions from storage.

The fuel supply to the Proposed Development will be from the gas grid through the Above Ground Installation connection (AGI) as defined in **Section 2.3.9**.

As required by the Secondary Fuelling Obligation, under the Commission for Energy Regulation's Secondary Fuel Obligations on Licensed Generation Capacity in the Republic of Ireland' (CER/09/001)CER/09/001, Secondary Fuel Obligations on Licence Generation Capacity in the Republic of Ireland, a supply of low sulphur gas oil (*i.e.*, distillate oil) for five days continuous operating will be stored on-site, equating to approximately 11,500 cubic metres (about 9,800 tonnes). The distillate oil will be contained in fuel oil tanks. The distillate oil is required to maintain the running of the gas turbines in the event of a disruption of the gas supply. Unless there is an unexpected interruption to the GNI gas supply, it is not envisaged that distillate oil would be used in the normal course of events other than for testing. Under EirGrid rules, the secondary fuel testing must be completed within five hours twice per annum.

The Proposed Development will use approximately 25.5 GWh/d[2] of natural gas when operating at full capacity. A small amount (approximately 10 MW) of the electricity generated by the Proposed Development will be used in the operation of the Proposed Development itself. The balance of the electricity produced is intended for the market and will be sold into the integrated Single Electricity Market (iSEM).

The electricity generated by the Proposed Development will be exported through a (subject to planning consent ABP-318119-23) new substation to be included in the proposed application for the 220 kV grid connection. The exact route cannot be confirmed until the detailed design is completed. This process is currently underway. The development of the grid connection will be subject to a separate planning application and associated EIAR by the Applicant.

It is anticipated that the new substation will be connected to the 220 kV transmission grid at the ESBN / EirGrid Kilpaddoge 220 kV substation, but the location and precise nature of the connection are subject to further discussions between the Applicant and EirGrid and as such do not form part of the scope of this EIAR (and will be the subject of a separate application). The new substations and grid connection are assessed in the cumulative impact assessment within each technical chapter.

The Proposed Development will use CCGT technology (refer to **Section 2.3.1**), and its design will comply with all relevant national and international codes.

The contract to supply and construct the Proposed Development will be awarded following a commercial tendering process prior to the start of construction. The tendering process will result in a contract for a particular model of electric generation plant. Therefore, the precise size, configuration, performance, and layout of the equipment will be finalised following the award of the contract and a site-specific detailed design process, however this will not affect the design of the buildings or emissions as described in this EIAR. The construction contract will identify a preferred Contractor to construct the Proposed Development, in accordance with the mitigation and monitoring measures set out in this EIAR. The Applicant will administer the construction contract and liaise with the Local Authority (Kerry County Council (Kerry Co. Co.)) to discharge planning conditions as appropriate.

[2] Gigawatt hour per day

Further descriptions of the main features of the Proposed Development are outlined in the following sections.

2.3.1 Combined Cycle Gas Turbines (CCGT)

The Proposed Development will contain three blocks (3 No.) each with one CCGT, and each block with a nominal capacity of up to 200 MW, refer to **Figure F2.4**, Volume 3. The multi-shaft arrangement of each block will provide fast acting response, such as will be required in a system with a low level of stable generation and is therefore ideally suited to support a high level of intermittent renewable power generation.

There are 3 No. CCGT blocks, with each identical CCGT block comprising:

- Two (2 No.) gas turbines with generators.
- Two (2 No.) heat recovery steam generators (HRSG) with exhaust stacks.
- One (1 No.) steam turbine.
- Electricity generator.
- One (1 No.) air-cooled condenser.
- Air-cooled heat exchanger.
- Generator step-up transformer (GSU).
- Natural gas fuel system.
- Turbine Hall.
- Condenser Polisher Equipment Enclosure.
- Air-cooled condenser (ACC) Air Extraction and Equipment Enclosure.
- High voltage electrical switchgear and 220 kV Substation.

Each proposed CCGT block will use the following process:

- The gas turbine burning natural gas will be connected to a generator for electricity production.
- Exhaust gases from the gas turbine will pass through two heat recovery steam generators to generate steam.
- The steam generated will be routed through a steam turbine, which will also be connected to a generator to produce further electrical power.
- The spent steam exiting the steam turbine will then be directed into the air-cooled steam condenser. The resulting condensate will then be pumped back into the heat recovery steam generator to repeat the steam cycle.
- Power from the three generators will be combined and the voltage increased to the export voltage by the generator step-up transformer (GSU).

The electricity generated will be fed to a set of transformers where the voltage will be stepped up to the transmission voltage, specified by EirGrid in the interconnection offer[3].

[3] Shannon LNG executed a Connection Agreement with EirGrid for a 600 MW Maximum Export Connection in April 2023.

2.3.1.1 Gas Turbine Generator

The gas turbine will consist of an air compressor, a combustion chamber and a turbine. The air compressor will take in large quantities of filtered air from the atmosphere and compress it. Fuel gas and compressed air will then be injected into the combustion chamber and the fuel / air mixture ignited. The addition of heat energy and combustion gases in the combustion chamber will raise the temperature of the combined gases to over 1,300°C. The hot gases will expand through the turbine section. The high velocity gas passing through the turbine will spin the main shaft which drives both the air compressor, which will produce the compressed air, and the generator, which will produce the rated electrical power output. The expansion of the hot gases passing through the turbine, and the extraction of mechanical work from them via the turbine will reduce the temperature of the gases to less than 600°C. The gas turbine will be coupled to a generator for power generation at 50 hertz (Hz).

2.3.1.2 Heat Recovery Steam Generator (HRSG)

The gas turbine, as described above, is referred to as operating in open or simple cycle mode. It will be possible to generate approximately 50% more electricity by operating in combined cycle mode. In combined cycle mode the hot exhaust gases leaving the gas turbine will be directed through the Heat Recovery Steam Generator (HRSG), which will extract heat to make steam. The heat recovery steam generator will be multi-pressure type. The temperature of the hot combustion gases will be reduced in this process to less than 100°C.

The HRSG will discharge the exhaust gases to atmosphere through an integral exhaust stack exiting at approximately 35 m above ground.

2.3.1.3 Steam Turbine Generator (STG)

Water supply for the Heat Recovery Steam Generator (HRSG) is discussed in **Section 2.3.1.2**. The water treatment facility will provide demineralized water for steam cycle makeup to each CCGT block.

The high-pressure steam produced by the HRSG will flow through inter-connecting pipework to the steam turbine. The steam turbine will be of a multiple stage type suitable for coupling to a generator for power generation at 50 Hz. The low-pressure exhaust steam will flow out of the steam turbine to the air-cooled condenser (ACC).

2.3.1.4 Air Cooled Condenser (ACC) (48.6 m x 55.8 m)

The ACC will be of a standard design. Steam from the steam turbine will enter the ACC and pass through air-cooled fin tubes. The steam will not be in direct contact with the air. The heat is transferred from the steam to the surrounding ambient air, which leads to the steam condensing. This condensate represents boiler quality feed water. The condensate will then be returned to the HRSG in a closed loop. *i.e.,* condensate will not be discharged to the environment. The key advantage of an air-cooled steam condensers is that cooling water and associated systems are not required.

Non-condensable gases (*i.e.*, air ingress into the ACC) will be removed from the ACC by use of vacuum pumps located in an equipment enclosure near the ACC. The condensed steam will be collected in the condensate collection tank located below the ACC where it is pumped by the condensate pumps back to the HRSG through the condensate polisher (whose purpose is to remove impurities and reduce corrosion in the water / steam cycle). The condensate polisher is located in an equipment enclosure near the condensate pumps.

2.3.1.5 Generator Step-up Transformer (GSU) (10 m x 10.4 m)

Power from the gas turbine and steam turbine generators will be collected at the generator voltage level and will be connected to the 220 kV GIS Substation through one generator step-up transformer for each of the three (3 No.) CCGT blocks.

2.3.1.6 Natural Fuel Gas System

The gas used to fuel the Proposed Development will be supplied from the AGI via the metering and regulating station at a pressure suitable for the specific gas turbine equipment selected. This fuel gas will pass through gas conditioning equipment dedicated to each block / gas turbine that is anticipated to be comprised of:

- Filter separator.
- Performance heater.
- Final pressure control station.
- Gas quantity and quality measurement as required for performance management and environmental protection monitoring.

2.3.1.7 Buildings associated with each CCGT Block

There are 3 No. CCGT blocks and each CCGT block will include the following buildings and enclosures to house the main plant equipment noted above:

- Turbine hall (65.9 m x 93.7 m x 30.145 m) x 3 (*i.e.* one per each 3 No. CCGT block).
- Condenser Polisher Equipment Enclosure (6.3 m x 16.3 m) x 3 (*i.e*. one per each 3 No. CCGT block).
- ACC Air Extraction and Equipment Enclosure (12.8 m x 15.3 m) x 3 (*i.e*. one per each 3 No. CCGT block).
- ACC Electrical Power Distribution Centre (PDC) (8.5 m x 12.2 m) x 3 (*i.e*. one per each 3 No. CCGT block).

These are described in the following sections. The buildings will be constructed using two main building methods:

- **Type 1** will be used for all buildings with the exception of the PDC. These will be steel framed buildings with concrete floor slabs; and
- **Type 2** will be used on the PDC. This building will be a pre-manufactured metal equipment enclosure using a steel base and framing to form an all-weather enclosure. The enclosure will be mounted on steel support legs or concrete piers to elevate the enclosure and allow bottom entry for electrical / control wiring.

Structural and architectural details have been prepared including particulars of the shallow and deep foundations, lifting equipment, steel structures, and protective coatings. The paint colours of the buildings will be selected to minimise the visual impact of the Proposed Development. This is discussed further in **Chapter 10** (Landscape and Visual) of this EIAR and the landscape drawings are provided in **Figures F10.1** and **F10.2**, Volume 3.

2.3.1.7.1 Turbine Hall (65.9 m x 93.7 m)

There are 3 No. CCGT blocks and each CCGT block includes this building.

This building will house the combustion turbine generator (CTG), HRSGs, STG and other balance of plant systems required for a complete CCGT Block. The turbine hall will accommodate the selected Original Equipment Manufacturers (OEM) recommended component layout, including laydown and maintenance requirements within the building. A bridge crane will be provided for steam turbine maintenance while the gas turbines are each supplied with an overhead crane for maintenance and removal of the gas turbine engine. The building will have internal rooms to house the necessary electrical and control equipment required for each CCGT block including a stand-by diesel generator. The diesel fuel tank for stand-by diesel generator will be stored in a bunded area, or in a double walled tank.

2.3.1.7.2 Condenser Polisher Equipment Enclosure (6.3 m x 16.3 m)

There are 3 No. CCGT blocks and each CCGT block includes this enclosure.

The condenser polisher equipment enclosure will house the condensate polisher associated with the ACC, as described in **Section 2.3.1.4**.

2.3.1.7.3 Air-Cooled Condenser (ACC) Air Extraction and Equipment Enclosure (12.8 m x 15.3 m)

There are 3 No. CCGT blocks and each CCGT block includes this enclosure.

The ACC air extraction equipment enclosure will house the vacuum pumps associated with the ACC, as described in **Section 2.3.1.4**.

2.3.1.7.4 ACC Electrical Power Distribution Centre (PDC) (8.5 m x 12.2 m)

Three (3 No.) power distribution centres (PDCs) will house electrical and control equipment necessary to distribute power and control throughout the Proposed Development. Each PDC will be a pre-manufactured all-weather steel enclosure. The enclosure will be mounted on steel support legs or concrete piers to elevate the enclosure and allow bottom entry for electrical / control wiring. This enclosure will house the electrical breakers and motor control centres (MCC) associated with the ACC.

2.3.2 Battery Energy Storage System (BESS) (33.9 m x 163 m)

A 120 MW (1-hr) (120-Megawatt hour (MWh)) BESS is included in the Proposed Development. The BESS will comprise 27 No. battery containers, approximately 4.5 MWh each, containing lithium-ion batteries. Refer to **Drawing 198291-SS-A4079** submitted with this application.

Each battery container is paired with two power conversion system (PCS) skids that contain the electrical systems (inverters, etc.) to deliver the power from the batteries to the grid via a 220 kV generator step-up transformer.

Due to its fast response, the BESS allows the Proposed Development to provide electricity during ‘ramp up’ and supports intermittent renewable generation.

Once the Proposed Development is operating at the necessary capacity the electrical demand is met, the BESS will be shut down and recharged.

The BESS can also charge from the grid. For example, if there were high renewable generation levels on the Irish power system at any one time, the BESS could charge from the grid instead of the power

plant[4]. This might be done as wholesale power prices would be lower than the Power Plant at that instant.

At all times, the BESS will deliver energy and system services in response to instructions from EirGrid. Fast acting power, such as power from BESS systems, will be necessary for the Irish grid in the future as Ireland transitions into a high renewable system. Refer to **Chapter 03** (Need and Consideration of Alternatives) and **Chapter 15** (Climate) for further information on this.

2.3.3 High Voltage 220 kV GIS Substation (18 m x 60.9 m)

A high voltage 220 kV substation is included in the Proposed Development. The substation will be gas insulated (GIS) and enclosed in a building. The substation will accept the 220 kV output from each CCGT block and BESS and connect to the national electricity grid. When the Proposed Development is not in operation, power from the national electricity grid will back-feed to the Power Plant via this same grid connection.

2.3.4 Auxiliary Boiler (within the Auxiliary Boiler Building, 14.3 m x 14.3 m)

The auxiliary boiler will burn natural gas, be of a standard design and be enclosed in a building with a separate 32 m high exhaust stack. Steam from the auxiliary boiler will be used by the Proposed Development to keep the equipment warm which allows for faster start up to support intermittent renewable generation.

2.3.5 Raw Water Storage Tanks (24 m x 18 m)

Water used by the Proposed Development will be supplied from a potable water connection. The Applicant has made a connection request to Uisce Éireann, which will require connection to a mains water system.

This raw water will be stored in two raw / service / fire water storage tanks. The tanks will supply service water to the Proposed Development and raw water to the water treatment facility with reserve storage for fire water. The tanks will be field fabricated welded steel tanks.

2.3.6 Main Buildings

The Proposed Development will also include the following buildings, common to the three (3 No.) CCGT blocks and BESS operations:

- Water treatment building.
- Administration building.
- Central control / operations building.
- Auxiliary boiler building.
- Workshop / stores / canteen building.
- Firewater pumps enclosure.

[4] For the purposes of calculating emissions from the BESS, a conservative assumption was taken that the BESS would charge from the Power Plant only (i.e. from Natural Gas). This is considered conservative in the context of CO2 emissions from the BESS over the stated 25.5-year operational lifetime and Ireland's target of 80% renewable power by 2030.

The other buildings and enclosures are described in **Section 2.3.7**.

2.3.6.1 Water Treatment Building (18 m x 35 m)

The water treatment building will make demineralized water for steam cycle makeup to each CCGT block. The demineralized water will be stored in two (2 No.) demineralized water storage tanks (15.5 m x 13 m) which will be field fabricated welded steel tanks.

2.3.6.2 Administration Building (14 m x 22.7 m)

The administration building will include offices, training rooms and meeting rooms for the administrative personnel stationed at the Proposed Development.

2.3.6.3 Central Control / Operations Building (14 m x 22.7 m)

During operations the Proposed Development will be monitored and controlled from the central control / operations building by the Site operator team. This building will include a control room, meeting room and offices for the operations personnel stationed at the Proposed Development. The Proposed Development will be operated from the main control room (MCR). From the MCR it will be possible to monitor and adjust all of the plant equipment and instrument control systems including all safety control systems.

2.3.6.4 Workshop / Stores / Canteen Building (14 m x 52.3 m)

The workshop / warehouse / canteen building will provide storage for equipment and material spares required to maintain an operational facility. The building will also have maintenance offices, a workshop area and canteen.

2.3.6.5 Firewater Pumps Enclosure (4.5 m x 10.5 m)

The Proposed Development will house firewater pumps that are described in **Section 2.3.7.4.**

2.3.6.6 Proposed Architectural Colour Scheme

A summary of the proposed architectural colour scheme is provided in **Table 2.1**.

Table 2.1: Summary of Proposed Architectural Colour Scheme

Building Unit	Colour
Fencing, enclosure / equipment container sides and tops, racks, evaporators, water tanks	RAL 6006 (Grey-Olive)
Building and enclosure façades	RAL 6003 (Olive green)
Building and enclosure roofs	RAL 6020 (Chrome green)
Doors, window frames, auxiliary boiler and fuel gas stacks and cooler pipes	RAL 7043 (Traffic grey B)
Façade for the turbine halls	RAL 6011 (Reseda Green)
Turbine air intakes and diesel generator/ HRSG exhaust stacks	RAL 9023 (Pearl dark grey)

2.3.7 Ancillary Buildings / Enclosures

The following buildings will also be provided:

- Security building.
- Fuel gas regulating enclosure.
- Fuel gas metering enclosures.

- Fire water storage tanks and water pumps.

The buildings will be steel framed buildings with concrete floor slabs. Structural and architectural details have been prepared including particulars of the shallow and deep foundations, lifting equipment, steel structures, and protective coatings.

2.3.7.1 Security Building (11 m x 5.8 m)

The security building will include a reception area to check in visitors, along with a break area and welfare facilities for security staff.

2.3.7.2 Fuel Gas Regulating Enclosure (12.6 m x 13.2 m)

The function of the fuel gas regulating enclosure will be to regulate the pressure and temperature of the gas used by the Proposed Development.

2.3.7.3 Fuel Gas Metering Enclosures

There will be several small unoccupied enclosures included in the gas metering area (12.6 m x 13.2 m) to house instrumentation, such as a gas chromatograph, to measure the calorific value of the gas for onsite use.

These will include:

- Metering and regulating area kiosk enclosure (3 m x 3 m).
- Metering and regulating area analyzer enclosure (3 m x 4.4 m).
- Metering and regulating area instrument enclosure (3 m x 4.4 m).

2.3.7.4 Fire Water Storage Tanks and Fire Water Pumps

Fire water will be supplied from the municipal water supply system and will be stored onsite in two (2 No.) separate tanks (24 m height x 18 m diameter), which will be field-fabricated welded steel tanks, each with a dedicated capacity representing a minimum of two hours of fire water requirement during firefighting.

In addition, one (1 No.) 100% capacity electrically driven fire pump, one (1 No.) 100% capacity diesel engine driven fire pump, and one jockey pump will be located within the fire water pump enclosure. The pumps will be designed to provide the required volume of firewater needed for any automatic suppression system plus flow for fire hydrants or hose stations. A diesel fuel tank for the diesel driven fire pump will be either located in a bunded area or within a double-walled tank.

In addition to the firewater storage tanks, additional firewater will be stored in the firewater retention pond as described in **Section 2.3.13.3**.

2.3.8 Secondary Fuel Storage

The Proposed Development will be required to store defined quantities of fuel onsite as specified in '*Secondary Fuel Obligations on Licensed Generation Capacity in the Republic of Ireland' (CER/09/001*), was issued by the CER (now CRU[5]) on 12th January 2009.

For power plants, the storage requirement totals five days' worth of fuel consumption, calculated assuming the Proposed Development is operating at its maximum capacity.

[5] Commission for Regulation of Utilities

The secondary fuel will only be used in the highly unlikely event that both the gas connection is unavailable and that other generation on the grid cannot meet demand.

The fuel will be contained in two (2 No.) storage tanks (~5,000 m^3 each) and three-day tanks (~2,000 m^3 each) within a bunded area.

The secondary fuel storage facility and associated equipment will have a footprint of approximately 3,954 m^2.

2.3.8.1 Fuel Offloading

The secondary fuel will be received via road tanker at an unloading station [adjacent to the storage tank area] and transferred to the storage tanks via a set of unloading pumps, refer to **Drawing 198291-SS-A4113A**.

A fuel transfer pump will send the fuel to a centrifuge and then to one of three-day tanks (~2,000 m^3 each). A fuel forwarding pump set will forward the secondary fuel from the day tanks when required, refer to **Drawing 198291-SS- A4112**. A sunken fuel pipe run with covers will carry the fuel forwarding and return lines under the internal access road to the CCGT's.

2.3.8.2 Fuel Storage Tanks

Fuel will be stored in two (2 No.) storage tanks (~5,000 m^3 each) and three-day tanks (~2,000 m^3 each) within a bunded area, site fabricated steel storage tanks. Bunding and associated pipework will be designed in accordance with EPA *Guidance Note on Storage and Transfer of Materials for Scheduled Activities (2004).* The secondary containment (bund) design will allow the greater of 110% of the largest tank within the bund or 25% of the total volume of substance within the bund, whichever is the larger.

The quantity of secondary fuel to be stored on site qualifies as a Lower Tier Seveso III as designated under Council Directive 2012/18/EU transposed in Ireland by the *Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (COMAH Regulations).* The Health & Safety Authority (HSA) will be notified prior to commencing construction of the facility and a Major Accident Prevention Policy (MAPP) will be prepared and reviewed prior to commencement of operation of the facility.

Figure 2.5: Layout of the Proposed Development

2.3.9 Above Ground Installation (AGI) Connection

The AGI will accommodate the valves and control equipment to facilitate the connection to the already consented 26 km natural gas pipeline. It will facilitate the transportation of gas between the national gas transmission network and the pipeline and will include fiscal metering and pressure control of the gas flow. The AGI is located in a separate fenced compound within the Site covering an area of approximately 11,282 m^2.

Access to the AGI will be via a dedicated access road off the main Site access road. Once commissioned, GNI will operate the AGI. The indicative layout of the AGI is shown in **Figure 2.6**. A detailed layout of the AGI is shown in **Figure F2.4**, Volume 3.

Figure 2.6: Layout of the AGI

The details provided on the AGI are based on information provided by GNI and will be typical of existing GNI AGIs on the national gas transmission network. In addition to gas piping and associated valves, the AGI will house the following equipment and buildings:

- AGI Compound Fencing and Access.
- Pig-trap (Bi-directional).
- Filtration.
- Fuel gas heaters / heat exchangers and associated fuel gas skid.
- Metering equipment located in a Metering Building.
- Gas pressure regulation system located in a Regulator Building.
- Gas chromatographs / Chromatograph Building.
- Generator Kiosk.
- Control and Instrumentation building.

The AGI compound will be remotely operated by GNI and will normally be unmanned.

2.3.9.1 Pig-Trap (Bi-Directional)

A bi-directional pig-trap (and associated equipment) will be installed to launch (or retrieve) the pipeline inspection gauge (pig). Pigs are in-line tools which are propelled through the pipeline for two main purposes: namely initially during the gassing-up / commissioning to clean and dewater the pipeline, and later, when the pipeline is operational, to inspect the internal condition such as the wall thickness of the pipeline. This inspection pig is also termed an intelligent pig.

2.3.9.2 Pressure Reduction / Flow Control

The pressure reduction / flow control equipment, which is to be included in a 20.5 m x 12.6 m regulator building, will enable the pressure and flow rate of the natural gas entering the Metering & Regulator (M&R) yard to be controlled as required by the network operator, GNI.

2.3.9.3 Heat Exchangers (31.9 m x 40.5 m)

During times when gas pressure is reduced, the act of reducing the pressure of the gas causes a drop in gas temperature (through the Joule Thompson effect). The gas is therefore passed through a set of heat exchangers to preheat the gas prior to pressure reduction ensuring the gas temperature before it enters the Proposed Development. The heating medium to be used for these heat exchangers will be water heaters in boiler units, refer to sections below.

2.3.9.4 Fuel Gas Heaters

The heating medium (water) combined with Alphi 11 anti-freeze is heated by gas fired boilers planned to be housed in individual buildings (3 No. 18.1 m x 17.1 m).

2.3.9.5 Metering Building (25 m x 20 m)

Fiscal metering of the gas will occur in a metering building.

2.3.9.6 Regulator Building (20.5 m x 12.6 m)

A 20.5 m x 12.6 m regulator building will enable the pressure and flow rate of the natural gas entering the M&R yard to be controlled as required by the network operator, GNI.

2.3.9.7 Chromatograph Building (3.5 m x 4.5 m)

The gas chromatography building will house a gas chromatograph where the calorific value of the gas is determined prior to entering the Proposed Development.

2.3.9.8 Generator Kiosk (4.8 m x 3.5 m)

Generator(s) will be located in the generator kiosk.

2.3.9.9 Control and Instrumentation Building (20 m x 10 m)

The AGI compound will be remotely operated by GNI. An AGI control room will be located in the control and instrumentation building for onsite control of operations when required and when the site is staffed.

2.3.9.10 Pipework

The majority of valves and pipework within the AGI compound will be located below ground level. A short section of the export pipe will extend above ground level to provide the connection for the pig trap (launcher and receiver), which will be required from time to time to allow internal cleaning or inspection of the pipeline.

2.3.10 Internal Roads, Site Access and Car Parking

2.3.10.1 Internal Roads

Internal roadways will be constructed to support delivery of equipment, facility operations, and connection between buildings, refer to **Figure 2.7**. All permanent road works will be designed, constructed and specified in accordance with relevant applicable Irish standards and codes of practice. The minimum road width is provided in **Table 2.2**.

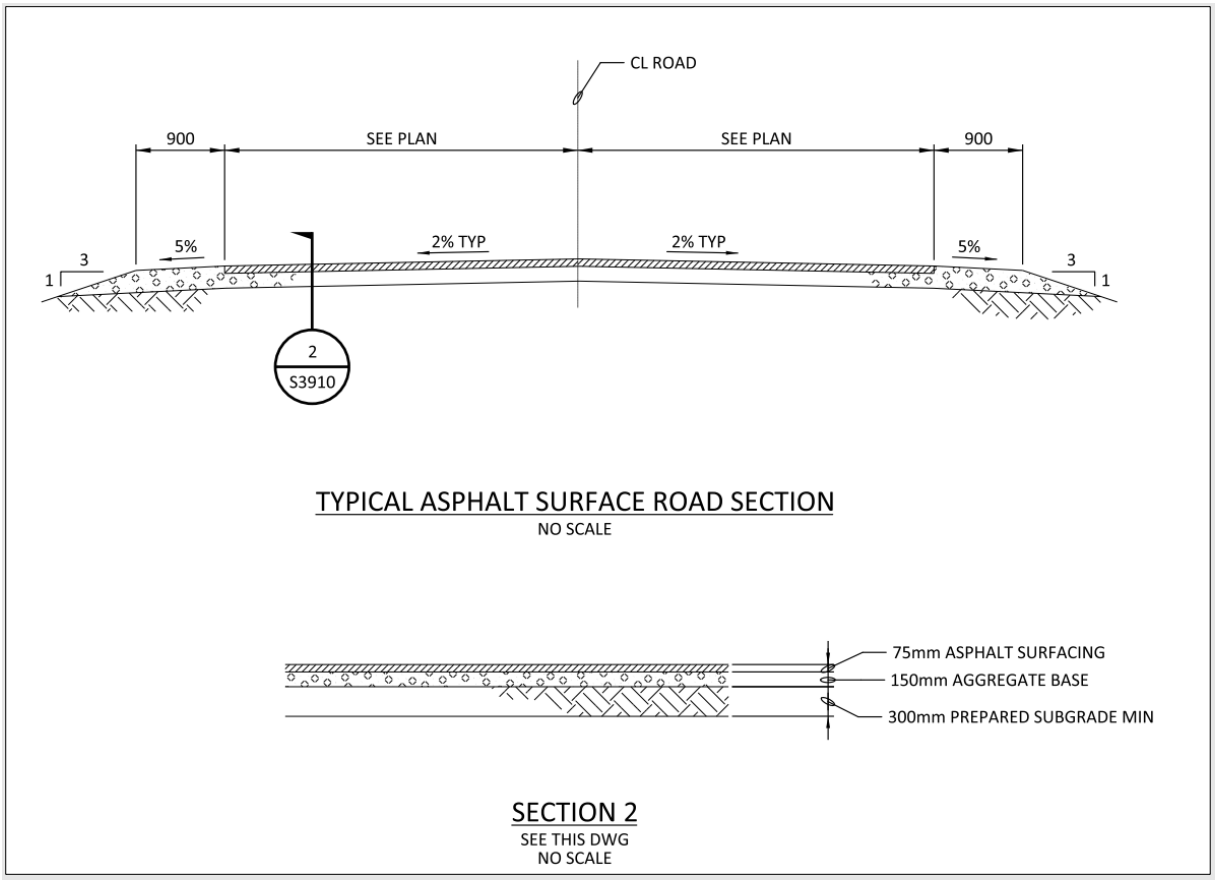

Figure 2.7: Cross Section of Internal Roads

Table 2.2: Internal Road Dimensions

Road	Total Width (m)	Paved Width (m)	Shoulder Width (m)
Paved Interior Roads	7.8	6	0.9

2.3.10.2 Site Access

Access to the Site will be located off the existing L1010 road (Coast Road) to the south of the Site, which is the primary access road to the townlands of Kilcolgan Lower and Ralappane from Tarbert and Ballylongford.

The AGI will be operated remotely by GNI and normally unmanned, but pedestrian access and vehicular access will be required for inspection and maintenance purposes.

Refer to **Section 2.3.11** for details of proposed fencing and security.

There will be three watercourse crossings within the boundary of the Site, as discussed in **Chapter 06** (Water):

- 600 mm culvert.
- 1200 mm culvert.
- Pre-cast concrete bridge over the Ralappane Stream (refer to **Figure 2.8**).

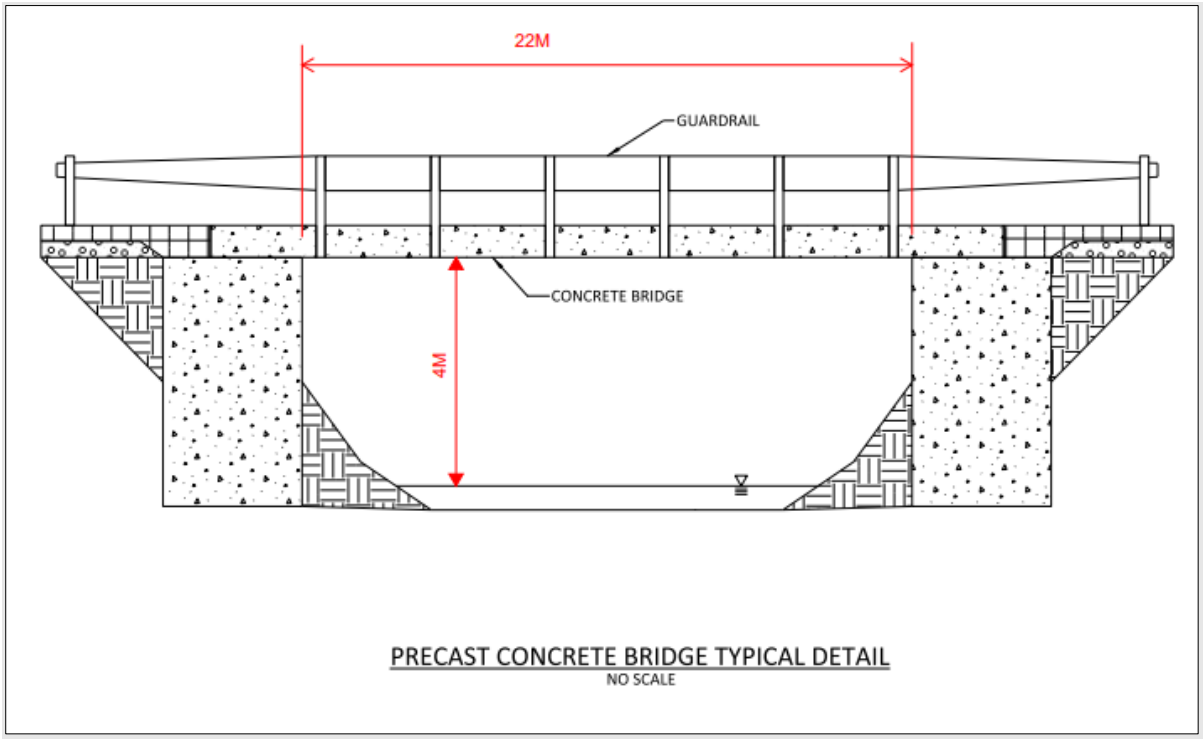

Figure 2.8: Proposed Pre-cast Concrete Bridge over the Ralappane Stream

2.3.10.3 Car Parking

On-site parking is proposed during the operational phase of the Proposed Development which will comprise:

- 42 No. car parking spaces including:
  - A minimum of 2 No. mobility spaces.
  - A minimum of 2 No. Electric Vehicle (EV) charging points.
- A minimum of 40 No. cycle parking spaces provided throughout the Site.

Additional parking is accommodated in the laydown area, which will cover any overflow requirements in the event of maintenance or shutdown, refer to **Drawing 198291-1STA-S3404** submitted with this application.

2.3.11 Site Security and Fencing

There are three separate fence lines around the Site of the Proposed Development:

1. An outer perimeter fence line surrounding the Site (**Section 2.3.11.1**).
2. An inner security fence line surrounding the Proposed Development (**Section 2.3.11.2**).

3. A separate double fence line surrounding the AGI (**Section 2.3.11.3)**.

A closed-circuit television (CCTV) system will also be installed.

2.3.11.1 Outer Perimeter Fence

The outer perimeter fence will comprise a 2.9 m high chain link fence, galvanised and PVC coated in evergreen and topped with three layers of barbed wire, refer to **Figure 2.9**.

For visual impact mitigation the outer perimeter fence line will be set back from the L1010 road to avoid crossing watercourses as far as possible. The fencing is not expected to impact surface water flow where two watercourses are crossed, as there will not be a requirement for this fencing to be extended below the water's surface.

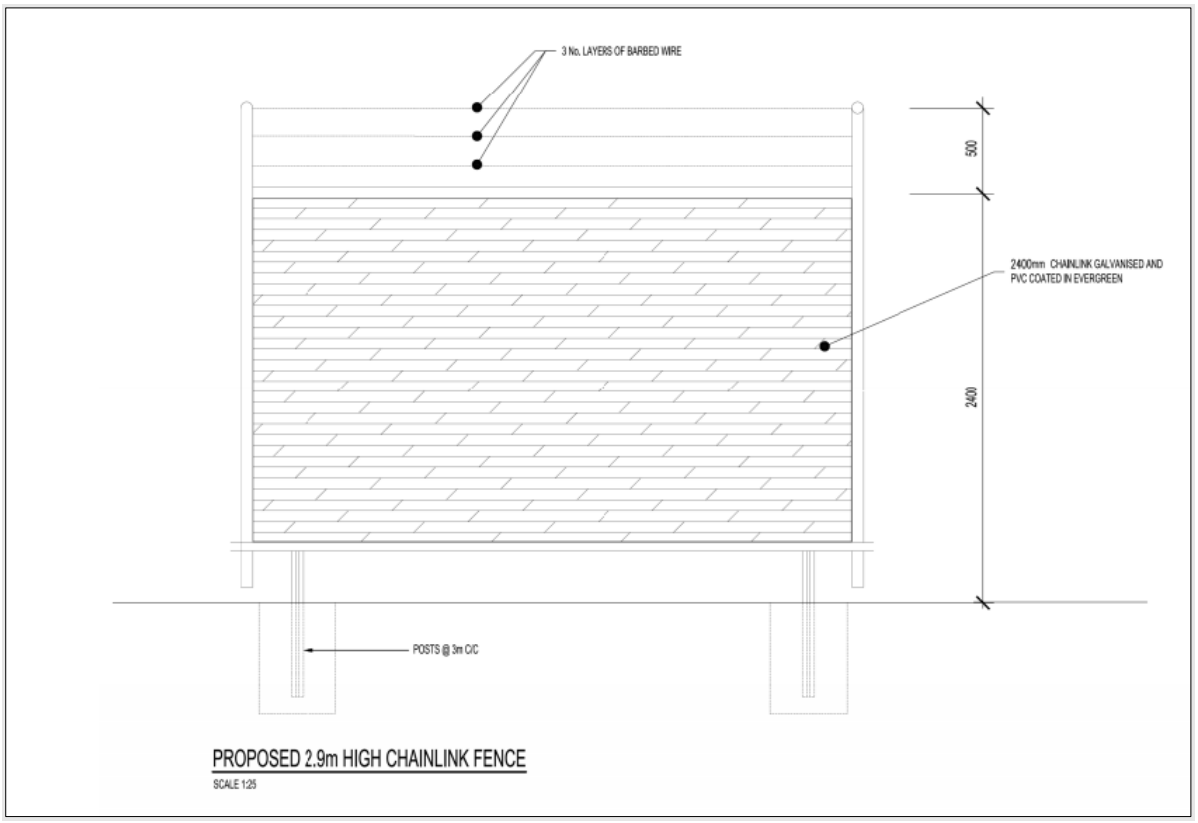

Figure 2.9: Proposed 2.9 m Outer Perimeter Fence

2.3.11.2 Inner Security Fence

A 4 m inner security fence will surround the Proposed Development, refer to **Figure 2.10**. This will comprise a fully galvanised and PVC coated palisade fence in evergreen (2.4 m high), topped with an electric wire fence. The Site will be manned for round-the-clock service for operations and maintenance purposes, although planned maintenance activities will predominantly be conducted during the daytime. The inner security fence line will not cross any watercourses.

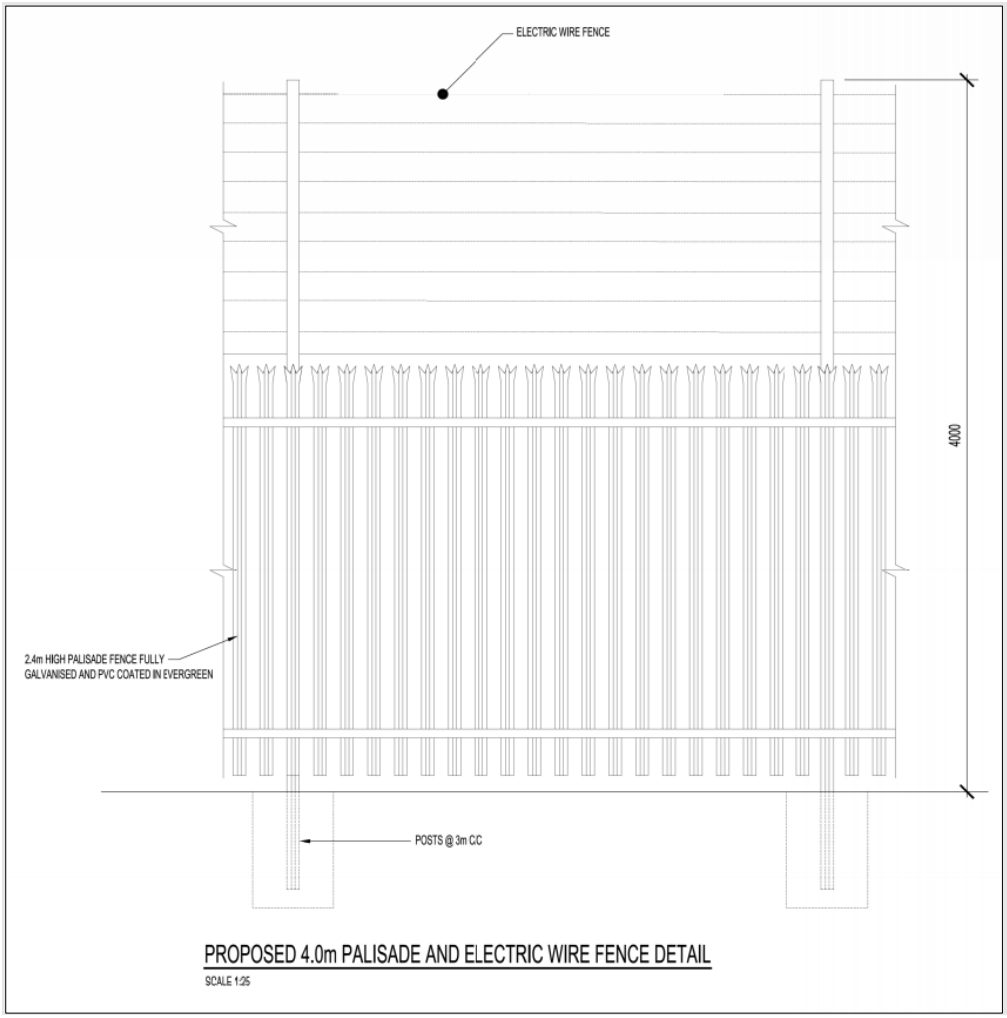

Figure 2.10: Proposed Inner Security Fence (4 m)

2.3.11.3 AGI Fenceline

Two layers of fence will surround the AGI, refer to **Figure 2.11**. This will comprise a spiked palisade fence, galvanised and PVC coated in dark green, with a weld mesh access security gate and a weld mesh fence in the same colour. The AGI double fenceline will not cross any watercourses.

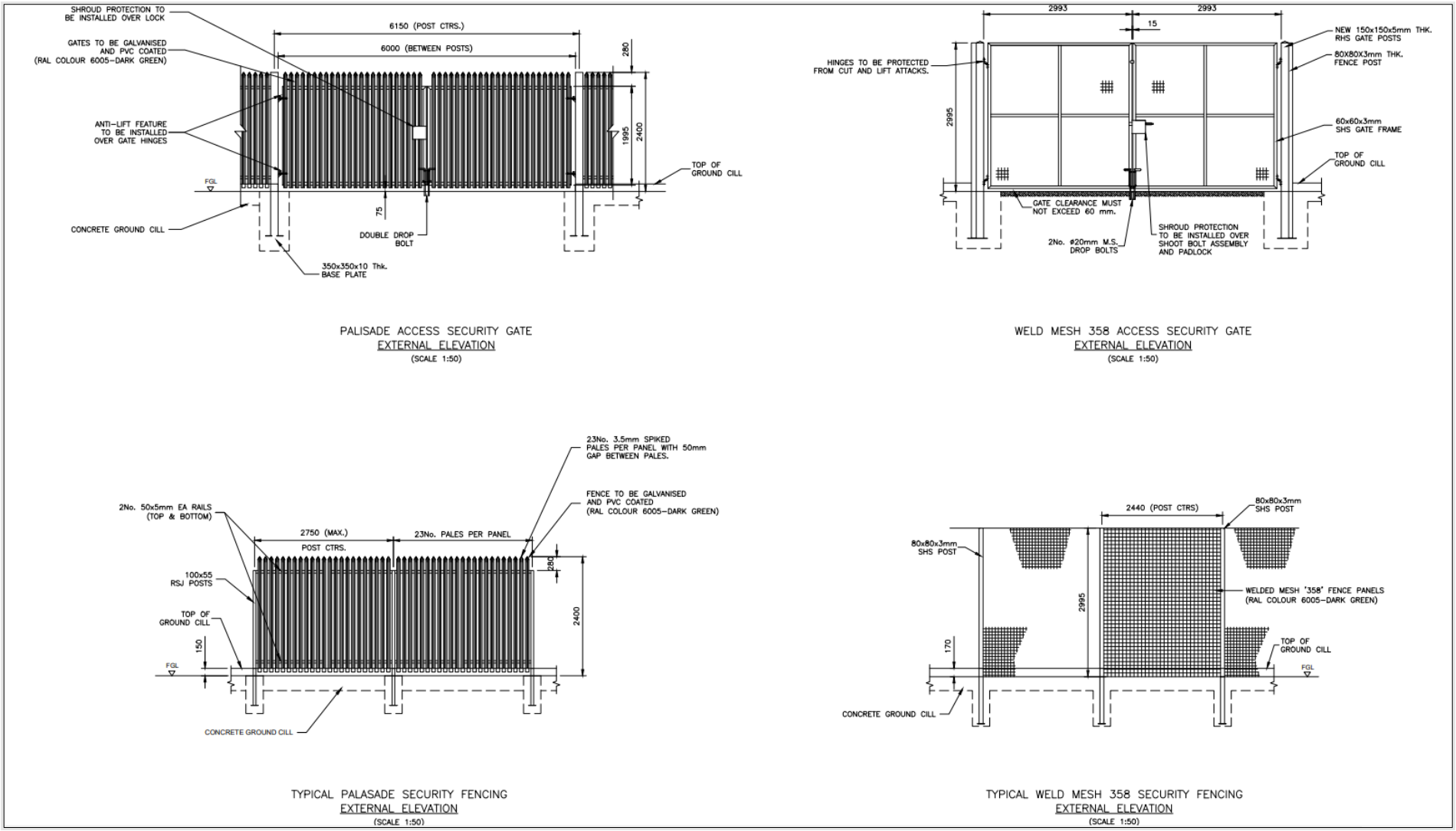

Figure 2.11: Proposed AGI Fenceline

2.3.12 Utilities

The Proposed Development will require connection to the following utilities:

- Electricity.
- Gas.
- Municipal water.
- Telecommunications.

In addition, the Proposed Development will require stormwater and surface water drainage, sewerage drainage and process effluent drainage infrastructure.

2.3.12.1 Electricity

A high voltage (HV) 220 kV grid connection to the national electrical transmission network is required to export power from the Proposed Development Power Plant, when operational.

During periods of high wind (renewable) generation it is expected that the Power Plant elements (the CCGT's) will be turned off by the system operator (EirGrid) to give priority to renewable power. In this scenario, the Power Plant will not be generating power. But the standby power plant needs about 10 MW of power. This power will be imported via the proposed future 220 kV high voltage grid connection.

If the 220 kV grid connection is not available, for example due to a cable malfunction, a medium voltage (10 / 20 kV) grid connection will be used as a backup power supply.

The 220 kV high voltage connection and the medium voltage (10 / 20 kV) will be subject to connection agreements with EirGrid and ESBN respectively. These grid connections will be subject to separate planning applications and do not form part of the Proposed Development.

Additional information on the potential future 220 kV and medium voltage (10 / 20 kV) grid connections are outlined in the following sections.

2.3.12.1.1 High Voltage 220 kV Connection

Shannon LNG executed a 600 MW 220 kV grid connection agreement with EirGrid for the Proposed Development Power Plant on 14th April 2023.

The exact route cannot be confirmed until the detailed design is completed and approved by EirGrid and other stakeholders. This process is currently underway. The development of the grid connection will be subject to a separate planning application and associated EIAR by the Applicant once the precise connection details are known. The aspects and impacts of the construction and operation of the grid connection have been included in the cumulative impact assessments in this EIAR.

The current proposal is that the connection point will be the ESBN / EirGrid Killpaddoge 220 kV substation which is located approximately 5 km east of the Site with connection provided via a 220 kV cable(s) under the L1010 road as shown in **Figure 2.22**. The grid connection will be laid under the L1010 road from the Proposed Development to the entrance road to Kilpaddoge 220 kV substation. At the entrance road to Kilpaddoge substation, the grid route will follow the substation access road and connect to the Kilpaddoge substation. No works are anticipated at Kilpaddoge 220 kV substation. The cable route will be approximately 4.6 km in length and is anticipated to be located entirely under private

and public roadways. Approximately 3.5 km will be installed under public roadway (L1010). Local access will be maintained throughout the cable installation process.

It is anticipated that the 220 kV grid connection will require an onsite EirGrid 220 kV substation. This is currently proposed to be located onsite and approximately 500 m from the Proposed Development main Site entrance. The details of the planned EirGrid 220 kV substation will be included in the future 220 kV connection planning application.

It is expected that the planned EirGrid 220 kV substation will comprise lightning protection masts, cable sealing ends, high voltage disconnectors, circuit breaker, current and voltage transformers all contained within a fenced area, approximately 60 m by 50 m. The electrical equipment is not expected to exceed 9 m in height with the exception of the lightning protection monopoles which are expected to be between 15 – 18 m in height. A single storey control building of masonry block construction, up to 5 m in height, with an estimated footprint of approximately 375 m^2 is also planned within the Site boundary.

The planned EirGrid 220 kV substation will in turn connect to the Power Plant 220 kV GIS substation.

The aspects and impacts of the construction and operation of the grid connection have been included in the cumulative impact assessments in this EIAR.

2.3.12.1.2 Medium Voltage Connection (10 / 20 kV)

If the 220 kV grid connection is not available, for example due to a cable malfunction, a medium voltage (10/ 20 kV) grid connection will be used as a backup power supply.

Therefore, a separate medium voltage (10 / 20 kV) connection to power the facility in the absence of the 220 kV high voltage grid connection will be installed. This medium voltage (10 / 20 kV) grid connection will be reserved as a backup power supply. However, the connection is subject to a connection agreement with ESBN and will be considered under a separate planning application. This will be included in the cumulative impact assessment within each EIAR chapter.

If consented, the medium voltage (MV) connection will be via a new onsite substation and underground cable from the existing ESBN / EirGrid Kilpaddoge 220 kV substation. The onsite substation will be adopted by ESBN post commissioning and will form part of the overall medium voltage (10 / 20 kV) distribution system.

The onsite substation will be located within the Site red line boundary approximately 800 m from the Site entrance. The onsite substation will comprise a single storey building size of 10 m x 4.5 m approximately and will include separate ESBN and Customer MV switch rooms. The proposed underground cable route will follow the L1010 road route in parallel with the 220 kV cables as described above.

2.3.12.2 Municipal Water Supply

The Proposed Development will require water supply for the following:

- Domestic staff: 3.6 m^3/day.
- Process water: ranging between 10 m^3/hr and 33 m^3/hr.

The Applicant has made a connection request to Uisce Éireann, which will require connection to a mains water system. It is anticipated that this will be provided along the L1010 road (Coast Road) from

Ballylongford to the Site, refer to **Figure 2.12**. The water connection does not form part of the scope of this EIAR.

In addition, the fire water supply will come from the potable water supply system and will be stored onsite in two separate firewater tanks, refer to **Section 2.3.7.4**.

Figure 2.12 Proposed Electrical and Water Connections

2.3.12.3 Telecommunications

The Proposed Development will require a connection to a broadband network. It is anticipated that it will be serviced by a new fibre cable which will be supplied via a new duct under the widened L1010 road. The installation of telecommunication utilities does not form part of the scope of the EIAR.

2.3.13 Drainage

2.3.13.1 Stormwater and Surface Water Drainage

It is proposed that stormwater from all paved and impermeable areas, within the Site will be collected and discharged directly to the Shannon Estuary via a discharge pipe with an outfall located 5 m beyond the low water mark at a water depth of approximately 2.4 m. Refer to **Figure F2.5**, Volume 3 for an overview of the proposed drainage at the Site. There will also be two discharge points along the access road at D1 and D2 stream crossings.

Impermeable areas include the following:

- Heater Building, regulator building, electrical substations, heat exchangers, administration and security buildings.
- Laydown and car parking area.

- Access road and footpaths.
- Lined outfall.
- A percentage of the side slope and landscaping areas.

A surface water drainage network comprising piped drainage and swales / catch basins will be constructed to collect, convey, and attenuate the surface water runoff generated.

The access road levels will be profiled to drain road runoff to an engineered swale adjacent to the road, the majority of which will drain to the engineered storm drainage system at the Site and discharge to the shared constructed outfall to the Shannon Estuary.

All stormwater collected from paved and impermeable areas will pass through an attenuation system including Class 1 hydrocarbon interceptors prior to discharge. There will be a stormwater discharge point at the Ralappane (D1) stream crossing located 50 m from the Site entrance (refer to **Drawing 198291-1STF-S3001**), and a second stormwater discharge point will be located at the (D2) stream crossing located 20 m from the construction laydown area (refer to **Drawing 198291-1STF-S3002**).

The discharge to the Shannon Estuary will be via the outfall pipe located 5 m beyond the low water mark and in a water depth of approximately 2.4 m. The stormwater discharge rate has been calculated at 162 L/s/ha. Stormwater collected from roof drains and permeable areas will discharge directly to the Shannon Estuary via the final discharge monitoring station. All bunded areas within the Site will have valved discharge points as part of their connection to the drainage network.

Groundwater seepages from springs or at the toe of cut slopes will be collected via a groundwater drainage network which will then discharge directly to the Shannon Estuary via the same discharge outfall pipe as the surface water.

Silt traps will be incorporated in all groundwater drainage points prior to discharge.

During the operational phase, all drainage from the Site will be controlled and monitored in compliance with the terms of the Industrial Emissions (IE) licence for the Site (which will be applied for post planning consent for the Proposed Development).

2.3.13.2 Sewerage Drainage System

In the Proposed Development, sanitary effluent (foul water) will be generated at the following locations on the Site:

- Administration building.
- Central control / operations building.
- Workshop / stores / canteen building.
- Each turbine hall.
- The AGI Control and Instrumentation Building.

All sanitary effluent from the Proposed Development will be transferred to the dedicated onsite wastewater treatment plant (WWTP) which will treat the wastewater using a biological Wastewater Treatment System prior to discharge to the Shannon Estuary via the storm water outfall pipe. The WWTP will be designed to treat wastewater for up to 67 No. personnel, which is the maximum number

of staff anticipated to be onsite during normal working hours. An average flow of 0.4 L/s (34.5 m^3/day) is expected to be discharged from the WWTP.

Figure 2.13 provides an overview of the treatment process. The treated wastewater will be monitored for compliance with the IE licence limits prior to discharge and will be continuously monitored for pH before discharging to the estuary. The automatic control system associated with the WWTP will sound an alarm if pH falls outside of expected range. This will alert the operator to take corrective action to remedy the problem. If the problem continues to go outside the pre-set range, this will automatically close the discharge valve and effluent will be diverted to a holding tank. **Table 2.3** summarises the characteristics of the WWTP discharge.

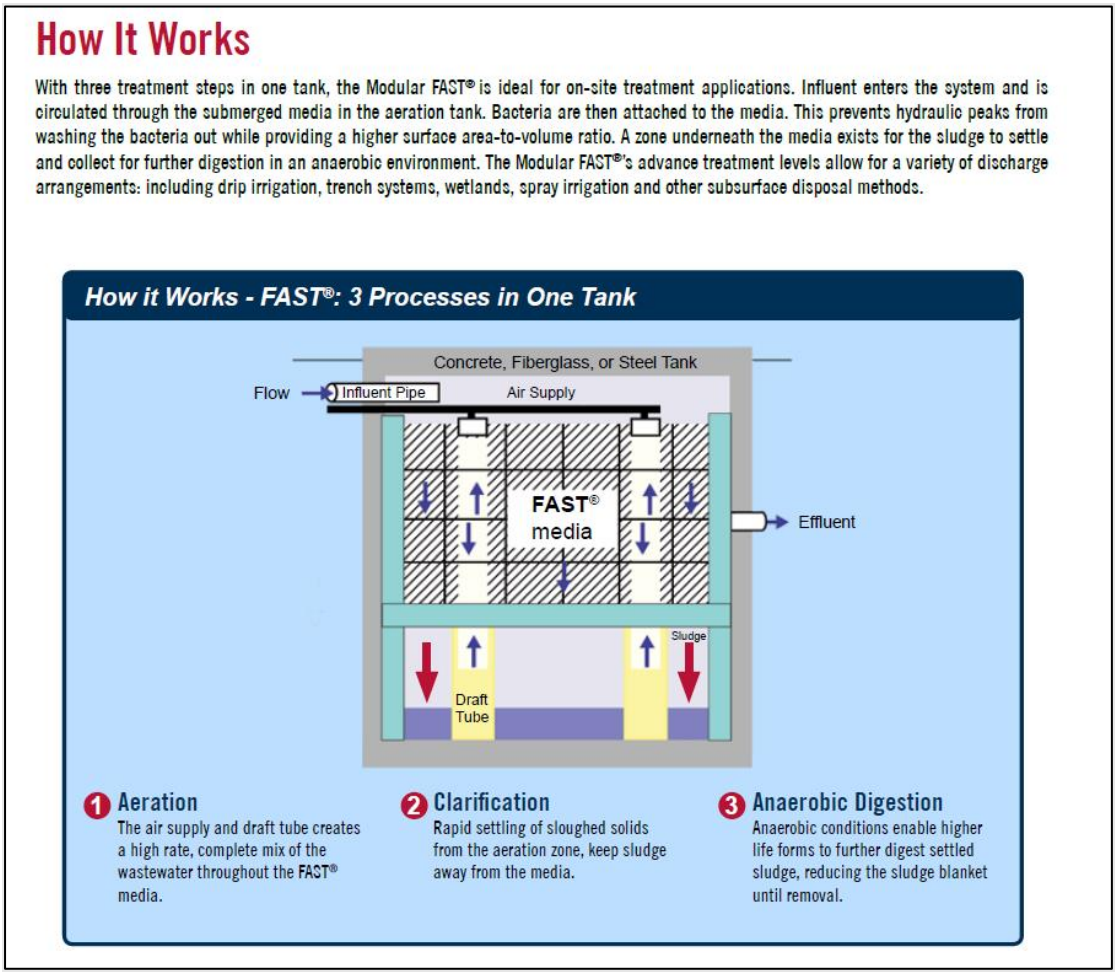

Figure 2.13: Overview of Proposed Wastewater Treatment System

Table 2.3: Characteristic of Wastewater Treatment Plant Discharge

Parameter	Discharge Limit Value
Volume	35 m^3/day
pH	6 – 10
BOD	25 mg/l
Suspended Solids	35 mg/l
Ammonia	5 mg/l as N
Total Phosphorous	2 mg/l as N

Parameter	Discharge Limit Value

Table 2.4 provides estimated of expected operational waste quantities from the Proposed Development operations.

Table 2.4: Estimated Waste Quantities

Waste Type	Waste Classification	Quantity per Year (m^3)	Potential Waste Management Route
General office waste from onshore activities.	Non-hazardous	50	Source segregation of recyclables (e.g., paper / card, plastics, metal & glass). Residual waste transported to licensed waste treatment facility (landfill or energy-from-waste).
Hazardous materials, e.g., chemicals from CCGT.	Hazardous	10	Export to hazardous waste management facility for recycling / recovery or high-temperature incineration – delivery to an approved reception facility offshore.
Sanitary waste from site washrooms.	Not applicable (not subject to Waste Framework Directive).	Faecal wastewater ('black water'): 270 m^3. Other sanitary wastewater ('grey water'): 2,430 m^3.	Treated by onsite wastewater treatment plant (WWTP) and discharged.

2.3.13.3 Firewater Retention Pond

A firewater retention pond is included in the Proposed Development and sized according to the EPA *Guidance on Retention Requirements for Firewater Runoff (2019)*, as the most effective and suitable measure for retaining firewater. The retention pond will be rendered impermeable by use of an appropriate liner, and integrity-tested in line with the requirements of the Site's licence. All drainage will pass through the retention pond. An automatic shut-off valve linked to the site's fire detection system will be installed on the drainage outlet point.

2.4 Discharges and Emissions

2.4.1 Process Effluent Collection System and Sump

The Proposed Development will generate several process water effluent streams. Some of the effluent streams will be collected and transported offsite to a licensed facility and the remaining effluent streams will be pumped or fall by gravity to the effluent sump. Refer to the water flow diagram, **Figure 2.14**.

The wastewater effluent collection for all elements of the Proposed Development will comprise:

- Water treatment process effluent.
- Steam cycle blowdown / drains.
- Auxiliary boiler blowdown / drains.
- Turbine hall drains.
- Gas turbine wash water effluent.

2.4.1.1 Water Treatment Plant Effluent

A wastewater stream will be produced by the Water Treatment Plant (WTP). The effluent streams arising from these activities will contain inorganic dissolved solids as well as negligible traces of dilute solutions of acid, caustic, sodium bisulfite and antiscalant. The WTP effluent will be directed to the effluent sump before discharge into the Shannon Estuary in accordance with the Industrial Emissions (IE) licence for the Site.

2.4.1.2 Steam Cycle Blowdown / Drains

In the case of the Heat Recovery Steam Generator (HRSG), a continuous stream of water approximately 2% of the volume, called blow-down, will be removed from the otherwise closed water systems. It will be necessary to remove this water to maintain the level of dissolved solids in the steam at an acceptable level in order to minimise corrosion and deposition in the boiler water circuits, as well as maintaining steam quality. The boiler water will be dosed to ensure it will stay within the operating limits of the Proposed Development. As a result, the blow-down will contain salts and will be alkaline with a pH typically up to pH 9. The blowdown will be collected in a blowdown tank, cooled with service water to a temperature between 25°C and 40°C, and then pumped to the effluent sump.

Other intermittent effluent streams from the steam cycle are process steam drains and backwash of the condensate filter. During normal operation, superheated steam from the steam turbine will be sent to the HRSG; however, during start-up and shutdown when the steam piping is heating and cooling the steam will condense and be drained to the process effluent sump via the blowdown tank. There will also be intermittent backwash of the condensate polisher that will be sent to the effluent sump.

2.4.1.3 Auxiliary Boiler Blowdown

Similar to the heat recovery steam generator, a continuous stream of water approximately 2% of the volume, called blow-down, will be removed from the auxiliary boiler. It will be necessary to remove this water to maintain the level of dissolved solids in the steam at an acceptable level in order to minimise corrosion and deposition in the boiler water circuits, as well as maintaining steam quality. The boiler water will be dosed to ensure it will stay within the operating limits of the Proposed Development. As a result, the blow-down will contain salts with a typical up to pH 9 (*i.e.,* alkaline). The blowdown will be quenched with service water to a temperature of approximately 60°C and pumped to the effluent sump.

2.4.1.4 Drain Down of Feed Water and Heat Recovery Steam Generator System

During maintenance it may be necessary to drain the feed water and HRSG or auxiliary boiler systems and dispose of the water contained within these systems. This water will be sent to the effluent sump.

2.4.1.5 Turbine Hall Floor Drains

There will be floor drains in the turbine halls to collect water from floor washing and process equipment. The effluent from the floor drains will be collected and sent through an oil water separator. The water discharged from the separator will be sent to the effluent sump. The oil waste will be collected and removed offsite by a licenced waste carrier to an appropriate waste licensed facility.

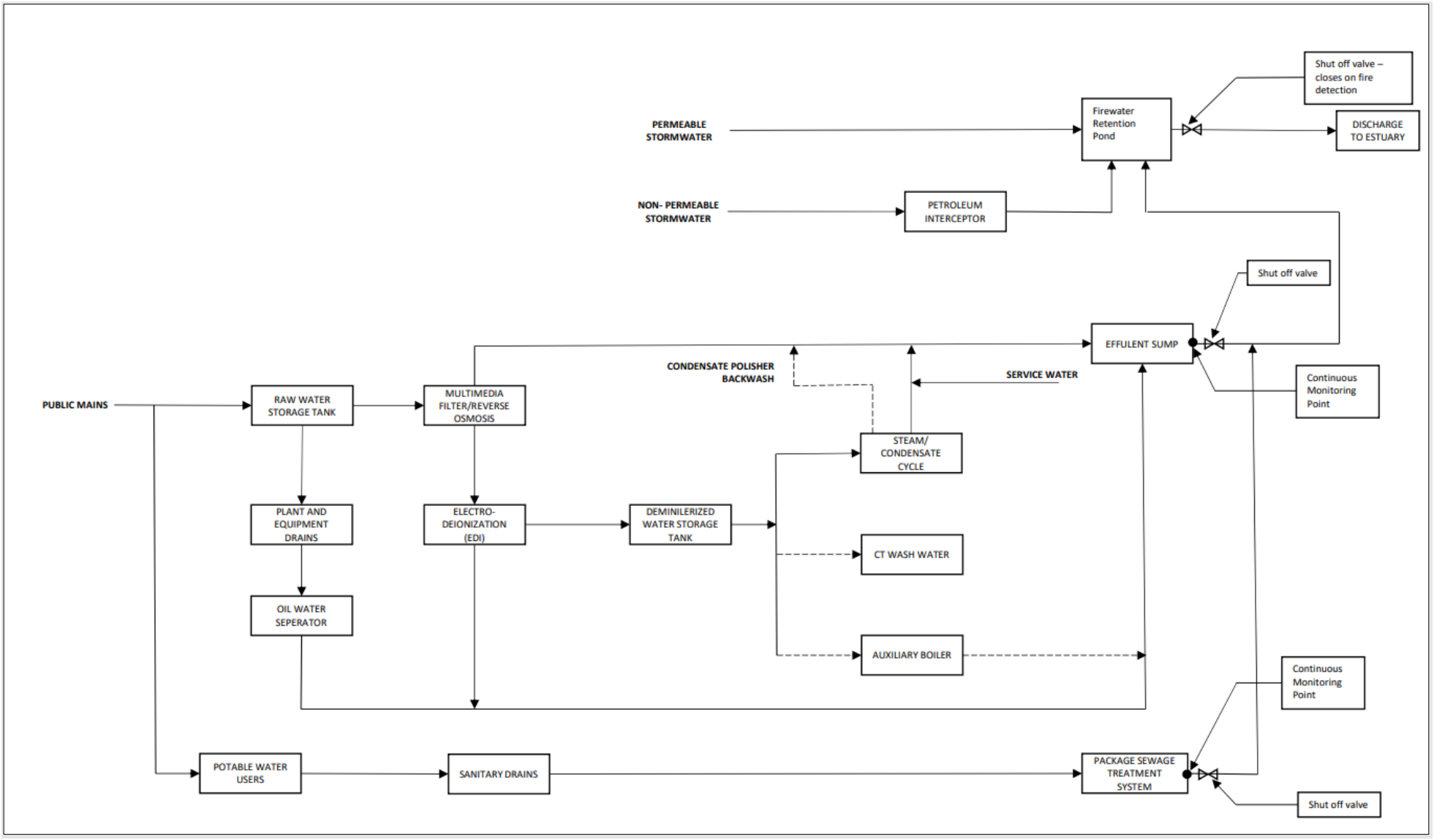

Figure 2.14: Proposed Development Water Flows

2.4.1.6 Other Process Liquid Wastes

There will be other liquid wastes from the process equipment that will not be sent to the effluent sump but will be collected and removed offsite to an appropriate waste licensed facility. These other waste streams are as noted below:

- Gas turbine water wash: collected in wash water tanks one per CTG (~2 m^3 each).
- Closed cycle cooling water system drain down: collected by tanker truck or frac tank.
- Sludges from petroleum interceptors: collected in-situ.

2.4.1.7 Outfall Discharge to Estuary

As noted above, the access road levels will be profiled to drain road runoff to an engineered swale adjacent to the road, the majority of which will drain to the engineered storm drainage system at the Site and discharge to the shared constructed outfall to the Shannon Estuary.

There will also be a stormwater discharge point at the Ralappane (D1) stream crossing located 50 m from the Site entrance and a second stormwater discharge point will be located at the (D2) stream crossing located 20 m from the construction laydown area. Both will be fitted with Class 1 hydrocarbon interceptors.

Process water effluent leaving the effluent sump will be continuously monitored for pH before discharging to the estuary. The automatic control system associated with the effluent sump will sound an alarm if the pH goes outside a pre-set range – typical pH 6 to 9. This will alert the operator to take corrective action to remedy the problem. If the pH continues to go outside the pre-set range, this will automatically close the discharge valve and open the associated re-circulation valve and will then start the re-circulation process during which period the sump will be dosed with either acid or caustic soda to return the pH to between 7 and 8. At this stage the automatic discharge valve will re-open and the re-circulation valve will close.

Regular visual checks will be undertaken for oils and greases in the sump to ensure that the discharge will be free of these contaminants before discharge.

The process effluent in the sump will be monitored for compliance with the IE licence limits and then discharged, via the storm water outfall pipe, to the Shannon Estuary, refer to **Chapter 06** (Water).

Table 2.5 summarises the process effluents generated from the Proposed Development and provides estimated quantities.

Table 2.5: Estimate of Water Discharges

System	Source	Characteristics	Monitoring	Rate
Boiler water treatment plant	Filter effluent. Effluent from treatment plant stages and back wash / regeneration / concentrate as appropriate to system installed.	High/ Low pH prior to treatment. Negligible traces of salt, dilute solution acid, caustic, sodium bisulfite and anti scalant. Effluent treated to give a pH at outlet of 6-9.	Effluent sump. Monitoring of pH and visual checks of oil and grease contamination.	8.6
HRSG and Auxiliary Boiler blowdown	Outlet from blowdown vessel via a cooler. Water from drain header.	High purity water with traces of ammonia, and phosphate. pH 6 to 9. Temperature about 60°C. Trace salt in the form trisodium phosphate 5-6 ppm and silica 3-5 ppm, BOD 20 mg/l.	Effluent sump.	14
Drain down of plant	Occurs during maintenance when necessary to drain feedwater and HRSG system.	High purity water with traces of ammonia, and phosphate.	Effluent sump.	Maintenance activity
Turbine hall floor drains	Wash down of floor drains and equipment process drains form turbine hall.	Traces of oil.	Removed offsite for disposal at licensed facility, approximately once per year.	0.03
Gas turbine washing	At intervals it is necessary to wash the gas turbine compressor blades.	Traces of oil detergent.	Removed offsite for disposal at licensed facility.	N/A
Drain down of closed cooling water system	Occurs during maintenance of these systems (based upon operating hours, typically 2-3 years).	High purity water containing traces of sodium molybdate.	Removed offsite for disposal at licensed facility.	N/A
Disposal of Oil	Various (bunds, site interceptors, oil / water interceptor).	Oil and sludge.	Removed offsite for disposal at licensed facility, approximately once per year.	N/A

Table 2.6 summarises the characteristics of the process effluent discharge.

Table 2.6: Characteristic of Process Effluent Discharge

Parameter	Typical Range of Emissions (min to max)
Maximum flow rate	774 m^3/day
pH	6 - 9
Temperature range	40°C
BOD	20 mg/l
Suspended Solids	30 mg/l
Total Dissolved Solids	5000 mg/l
Mineral Oil	20 mg/l
Total Ammonia (as N)	5 mg/l
Total Phosphorous (as P)	5 mg/l

2.4.2 Air and Noise Emissions

During its operation, the Proposed Development will produce air and noise emissions from a number of different sources.

2.4.2.1 Air Emissions

During the operational phase of the Proposed Development there will be a number of sources with emissions to air associated with combustion plant, to generate heat and power for onsite activity. Emissions to air associated with such plant vary with the type of plant and its purpose, the thermal capacity of the plant and the fuel used to enable combustion.

Natural gas will be the primary fuel source for all non-emergency plant at the Site. Emissions from natural gas-fired plant predominantly include the pollutants NO_X and CO but may also include other pollutants to a lesser extent for some sources, including THC, some of which will comprise of VOC, including CH_2O.

Liquid fuel will also be utilised. This fuel is limited to generators that will only ever be operational in the event of an emergency and for limited periods of testing and maintenance. The Proposed Development will be operated under the conditions of an IE licence, the terms of which will require that any fugitive emissions are controlled at source through appropriate mitigation and monitoring measures, possibly set out as part of an Operational Emissions Management Plan, or a specific Odour Management Plan, refer to **Chapter 08** (Air Quality).

2.4.2.2 Noise Emissions

During the operational phase of the Proposed Development there will be a number of noise emission sources as outlined below:

- Noise generating mechanical plant associated with the Proposed Development including the Air Intake Filter House and Generator Cooling Outlet (air cooled).

In addition, there are a number of noise sources which will operate intermittently, these are:

- Firewater Pumps.
- Firewater Jockey Pumps.

Noise generating plant associated with the AGI will comprises the following:

- Package Boiler Units.
- Gas Fired Generator.
- Pressure Regulating Stream.

The noise levels from the aforementioned sources are outlined in **Chapter 09** (Airborne Noise and Groundborne Vibration).

2.4.3 Emissions from Lighting

The Proposed Development will have area lighting installed on a down angle to cover the facility and the car parking areas while minimising impact to surrounding neighbours.

The height of the proposed light columns has been kept to a minimum throughout the Site, and light temperatures reviewed to minimise the content of blue light. Light columns will be fitted with focused luminaires to avoid glare, sky glow and light spill to the estuary, refer to **Figure F2.6**, Volume 3.

An uninterruptible power supply for emergency lighting shall be provided to allow for safe escape of staff from accessible areas of the plant in the event of a power and essential lighting failure or an emergency.

2.5 Process Control and Monitoring

During operations the Proposed Development will be monitored and controlled by site operational staff from the central control / operations building. This building will include a control room, meeting room and offices for the operations personnel stationed at the Proposed Development, refer to **Section 2.3.1.6.3**.

2.5.1 Integrated Control and Safety System (ICSS)

The ICSS will be a distributed control system that will provide process control, fire and gas detection, event logging, and emergency shutdown (ESD) functions. The functions will be fully integrated and standardised hardware and software will be utilised throughout the system as far as possible. The system is intended to minimise the need for communication gateways or bridges between software systems, thus improving the system reliability and increasing operational flexibility.

The primary objective in the design of the ICSS is to provide high reliability and availability. The system will provide safe, efficient and reliable equipment of proven design. The system will use current technology with modern diagnostic capability to increase failure reporting and reduce maintenance requirements.

Dual redundant architecture will be used to avoid common mode failure points and increase availability.

The ICSS will comprise the following sub-systems:

- Process Control System (PCS).
- Process Safety System (PSS).
- Emergency Shutdown (ESD).
- Fire and Gas System (FGS).

The PCS will function to produce on specification product. It will automatically correct disturbances caused by changing process conditions. The safety system is mainly composed of the ESD, FGS and PSS.

Unsafe process and operational conditions in any part of the Proposed Development (Power Plant) can be detected and will activate the FGS, PSS and / or ESD systems accordingly. The FGS, PSS and / or ESD system will provide a controlled shutdown of the facilities. The shutdown system has the optionally to be initiated manually or automatically. The ESD will provide a reliable response to the process and fire and gas detection systems and will take the necessary executive action to avoid escalation of the event.

2.5.2 Alarm Systems

The alarm system will form an essential part of the operator interface with the ICSS. Within the alarm management framework determining the roles and responsibilities of facility operations and maintenance support personnel is paramount to ensuring that the alarm system is operated, managed and improved to obtain optimum plant efficiency through the management of abnormal conditions. The alarm system will provide vital support to the operators managing complex systems by warning them of situations that need their attention. The alarm system warns the operator that the process is moving from a “Normal” to an “Abnormal” state.

2.5.3 Above Ground Installation (AGI)

The AGI, which is normally unmanned, is operated and controlled from GNI’s central control system which will have a continual data link to the AGI. Refer to **Figure 2.6** for the proposed AGI layout and **Section 2.3.9** for a description of components that will be included in the AGI.

2.6 Health, Safety and Environment

The Applicant recognises and accepts its moral and legal responsibilities for ensuring the health, safety and welfare of its employees, contractors, visitors and members of the public who could be affected by its activities; it is committed to compliance with all applicable Irish health, safety and environmental laws and regulations.

The Directors and Senior Management of the Proposed Development have overall responsibility for the implementation of its HSE policies. These policies will be reviewed periodically to ensure that they remain relevant and appropriate to the Proposed Development’s operations and business.

The Applicant will implement a HSE Management System, which will include setting of objectives and targets, measuring progress, reporting results as a commitment for continual improvement, and fostering a culture where incidents are reported and investigated and lessons learned are shared through the organisation. It will use regular audits to ensure its controls are effective. It will provide appropriate health, safety and environment training and guidelines to employees and contractors to enable them to meet the required standards of performance.

The Applicant aims to minimise the health, safety and environmental impacts of its activities and prevent pollution by utilising a structured risk management approach, which includes emergency preparedness and contingency planning. All new activities will be assessed for environmental impact and appropriate health and safety provision, and ongoing activities will be subject to periodic review. Health, safety and environmental protection will be given equal priority to the business objectives of the company.

The Applicant is committed to effective communication and consultation on health, safety and environmental matters with all interested parties and will make its policies available to them subject to appropriate privacy and business confidentiality protections. The Applicant will routinely monitor, assess and report on its health, safety and environmental performance with data on the rate of lost time injuries and occupational injuries. Fire and gas detection systems and associated alarm processes are summarised in **Sections 2.5.1** and **2.5.2**.

The Applicant will ensure that operating, maintenance, and emergency response procedures and manuals will be subject to regular review and will be updated to reflect best industry practice, or to reflect the addition of new procedures, equipment or other facilities.

2.6.1 Internal Fire and Rescue Plan

Safety is the main consideration in the Proposed Development design. The main fire hazards on the Proposed Development are identified from the Quantitative Risk Assessment (QRA), which was undertaken by Vysus (previously Lloyds Register) for the Proposed Development on behalf of the Applicant, refer to **Appendix A2.4**, Volume 4.

The QRA includes hydrocarbon flash fires, jet fires and pool fires. To limit the consequences of fire scenarios and to cope with any potential domino effects, the Proposed Development will be partitioned into fire zones, which are areas within the installation where equipment is grouped by nature and / or homogeneous level of risk attached to them. The partition of an installation into fire zones will result in a significant reduction of the level of risk. The consequences of a fire, flammable gas leak or an explosion corresponding to the credible event likely to occur in the concerned fire zone shall not impact other fire zones.

In order to mitigate or control these hazards, the proposed ESD coupled with the PCS and the FGS, are crucial to ensure the safety of the plant. Should there be a loss of containment and / or subsequent fire, the FGS will activate. The potential hydrocarbon release to be detected is a clean non-toxic single-phase gas in a well-ventilated area. On confirmed FGS detection, the active fire protection system will operate. A voting logic will be implemented to avoid spurious trips.

The fire hazards associated with the Proposed Development will be mitigated by the use of passive and active fire protection. Passive fire protection (PFP) is aimed to protect personnel and ensure that escape, evacuation and rescue (EER) systems can enable safe evacuation in all scenarios linked to hydrocarbon fire hazards at the Site. PFP is mandatory on equipment and structures that could be exposed to a fire that could lead to loss of integrity.

Active fire protection (AFP) aims to control fires and limit escalation, reduce the effects of a fire to enable personnel to undertake emergency response actions or to evacuate, extinguish the fire where it is considered safe to do so, and limit damage to structures and equipment. The AFP equipment at the Site will include a combination of:

- Fire water mains network, with hydrants and monitors.
- Water spray systems.
- Water curtains / hydro shields.
- Portable dry chemical powder systems.
- Firefighting vehicle(s).
- Portable / mobile fire extinguishers.

An appropriate firefighting and rescue trained crew will be available / provided onsite and ready at all times. Employees will be trained in all emergency response actions including natural gas leak and fire situations. Fire safety certificates will be required from the Chief Fire Officer of Kerry Co. Co. prior to

construction of the facility for each building on the Site. The plant shall be operated in a safe and efficient manner compliant with national health and safety legislation.

The activation of firefighting equipment could be manual by push buttons located locally or control room to initiate extinguishing agent, or automatically through the FGS.

Escape routes will lead to the muster area(s). An alternative muster point will be provided for should access to the main muster point be impaired. Muster areas are safe places where all personnel normally muster while investigations, emergency response and evacuation pre-planning are undertaken. The main functions of the mustering are to protect personnel, to number and identify personnel, to provide first aid and to provide information.

An emergency plan will be drawn up in consultation with the port authority, fire brigade, gardai, etc., and shall integrate with any other relevant plans, such as the port emergency plan. The plan will include as a minimum:

- The specific action to be taken by those at the location of the emergency to raise the alarm.
- Initial action to contain and overcome the incident.
- Procedures to be followed in mobilising the resources, as required by the incident.
- Evacuation procedures.
- Assembly points.
- Emergency organisation, including specific roles and responsibilities.
- Communications systems.
- Emergency control centres.
- Inventory and location of emergency equipment.

The Proposed Development will have an emergency team whose duties include planning, implementing and revising emergency procedures, as well as executing them. The emergency plan, when formulated, will be properly documented in an *'Emergency Procedures Manua*l', which will be available to all personnel whose work relates to the present facilities.

A QRA was undertaken by Vysus for the Proposed Development on behalf of the Applicant. The major accident hazards at the establishment were identified and their consequences and frequences were calculated.

The QRA has been carried out for the purpose of Land Use Planning (LUP) in accordance with HSA guidance on technical land-use planning advice for planning authorities and COMAH establishment operators, version 2, February 2023 (HSA, 2023). The land use planning zone boundaries are defined as:

- Zone 1 (inner): within the 1E-05/y individual risk of fatality contour.
- Zone 2 (middle): between the 1E-05/y and 1E-06/y individual risk of fatality contours.
- Zone 3 (outer): between the 1E-06/y and 1E-07/y individual risk of fatality contours.

The criteria for new establishments according to the HSA guidance are:

- The maximum tolerable risk to a member of the public should not exceed 1E-06/y.

- The maximum tolerable risk to a person at an off-site work location should not exceed 5E-06/y.

The QRA provides a quantification of the risks associated with the reasonably foreseeable major accident scenarios identified. The method involves calculating the frequency of a set of scenarios defined in the guidance.

The physical consequences of these scenarios are modelled as well as the impact on people, considering a range of weather conditions. The information is combined to give a numerical representation of the risk from all considered scenarios, in terms of “individual risk” to members of the public offsite, and also “societal risk”.

The QRA results are compared against tolerability criteria presented above, to demonstrate that the risk levels associated with the operations of the power plant are tolerable.

2.6.2 Pollution Mitigation and Response

As discussed in **Chapter 01** (Introduction), the operation of the Proposed Development will be controlled and regulated by the following bodies:

- Environmental Protection Agency (EPA).
- Commission for Regulation of Utilities (CRU).
- Health and Safety Authority (HSA).
- Local Planning Authority (Kerry Co. Co.).

2.6.2.1 Shannon Estuary Anti-Pollution Team (SEAPT)

The Shannon Estuary Anti-Pollution Team (SEAPT) is a Mutual Aid Group and the primary response organisations for oil and HNS spills within the Shannon Estuary. The SEAPT consists of the Shannon Foynes Port company, Kerry, Limerick and Clare Local Authorities and commercial and industrial entities operating within the Shannon Estuary. SEAPT was initiated to form a unified coordinated response to pollution incidents on the Shannon Estuary. SEAPT is a member’s organisation. Members contribute annually to maintain equipment, carry out exercises and training and purchase new and replacement equipment. SEAPT holds a significant stockpile of equipment. This equipment is available to respond to any pollution incident or threat thereof. The Proposed Development will also be able to avail of spill dispersion modelling capability held by SEAPT. SEAPT are also the custodians of the Shannon Estuary Oil / HNS Contingency Plan developed in accordance with the National Contingency Plan (NCP)and approved by the Irish Coast Guard. Shannon LNG Limited has consulted extensively with SEAPT, and the intention is to join the SEAPT organisation on successfully receiving development consents and prior to commencement of the construction phase. The Proposed Development has (provisional to project go-ahead) been accepted as a member of the SEAPT. Membership of SEAPT will enable the Proposed Development to interface directly with the approved Shannon Estuary Oil / HNS Plan and access additional response equipment to augment that held within the Proposed Development. Through the membership process, the Proposed Development will additionally be contributing to the ongoing development and strengthening of the SEAPT organisation.

2.6.2.2 Incident Response

In accordance with the requirements of the NCP Standard Operation Procedure 05, and the final STEP Oil and HNS Spill Plan, there will be the five operational phases of an incident response:

- Phase 1 – Discovery and Notification, Evaluation, Identification and Activation.
- Phase 2 – Development of an Action Plan.
- Phase 3 – Action Plan Implementation.
- Phase 4 – Response Termination and Demobilisation.
- Phase 5 – Post Operations, Documentation of Costs / Litigation.

The Proposed Development will manage the response to any Tier 1 (Local – within the capability of the operator on site) and Tier 2 (Regional – beyond the in-house capability of the operator) incident for any pollution on the water within their area of jurisdiction with the full cooperation and integration of the response with the Shannon Foynes Port, the SEAPT mutual aid group which includes the three local authorities of Kerry, Clare and Limerick and other agencies as appropriate. The developed plans will identify realistic Tier 1 and Tier 2 scenarios and the resources required to effectively respond to and mitigate these scenarios. The plans will further describe any escalation to Tier 3 (requiring national resources) and as discussed above, interface with the National Marine Oil / HNS Spill Contingency Plan. A training and exercising program forms part of the plans. The completed plans will be submitted to the EPA for appropriate approvals. Further detail can be found in the Oil and Hazardous and Noxious Substances (HNS) Spill Plan Development Framework for the Proposed Development, refer to **Appendix A2.5**, Volume 4).

Additional technical guidance can be found in the NCP and annexes.

2.7 Construction Phase

The Applicant will appoint an Engineering, Procurement and Construction (EPC) Contractor for the duration of the construction phase. The EPC Contractor will appoint sub-contractors to undertake all the specific construction and civil works.

The construction phase of the Proposed Development will comprise:

- Temporary construction and laydown areas (hardstanding).
- Open storage areas, temporary facilities and plant storage areas.
- Construction compound to include the staff office and welfare facilities.
- Temporary parking facilities.
- Security fencing / gates and signage.

This section describes the construction activities associated with the Proposed Development including the following phases:

- Construction Site management *i.e.*, programme and hours.
- Enabling, earthworks and site preparation.
- Construction of the Proposed Development.
- Construction environmental management and protection measures.

There is no requirement for any additional temporary land take to support the construction phase; all laydown areas will be accommodated within the footprint for the Site.

2.7.1 Construction Site Management - Programme, Hours, Staffing

A construction management team will be onsite for the duration of the construction. This team will supervise the construction of the Proposed Development, including monitoring the Contractors performance to ensure that the proposed construction phase mitigation and monitoring measures are implemented, and that construction impacts and nuisance are minimised.

Kerry Co. Co. will be notified of the identified point of contact onsite for the duration of the construction phase. Further details on the construction management structure, environmental management, site audit system, and community feedback arrangements are contained within the Construction Environmental Management Plan (CEMP), refer to **Appendix A2.3**, Volume 4.

2.7.1.1 Construction Programme

Subject to planning consent and other approvals an anticipated start date of January 2026 is taken as a construction start date (however this is subject to change).

The construction programme is anticipated to take 32 months, subject to seasonal and other planning constraints. This is the basis of the impact assessment contained within this EIAR. The whole construction phase is broken into four sections, as outlined in **Table 2.7**.

Table 2.7: Construction Programme

Description	Start On Site	Duration (months)	Completion	Duration From Start Date (Months)
Enabling, Earthworks & Site Preparation	Jan 26	10	Oct 26	10
220 kV and medium voltage (10 / 20 kV) connections[6]	Aug 26 (+ 8 months)	14	Sept 27	21
CCGT - 2 Blocks	Oct 26 (+ 10 months)	21	June 28	30
CCGT - 1 Block	Mar 27 (+ 15 months)	18	Aug 28	32

An additional period of up to six months will be required for commissioning prior to operation as described in **Section 2.8**.

The proposed construction manpower and vehicle traffic profile projections based on the dates above are provided in **Figure F2.7**, Volume 3.

2.7.1.2 Construction Hours

Construction phase works will take place between the hours of 07:30 to 18:00 (Monday to Friday) and 08:00 to 14:00 (Saturday). No works will take place on Sundays or Bank Holidays.

[6] While the 220 kV and medium voltage (10 / 20 kV) connections are outside the Proposed Development, number and traffic from their construction is included in this EIAR. This includes the associated onsite Eirgrid 220 kV and ESBN 20 kV substations.

It is proposed to stagger the various shift starting and ending times within the construction complex (for example civil employees 07:30 to 18:00, or 07:45 to 17:45). This small stagger in shift start and ending times could lessen the impact of traffic peaking, refer to **Chapter 11** (Traffic and Transport).

Construction works outside these hours will only take place in exceptional circumstances (*i.e.*, for specific engineering works e.g., concrete pours etc.). It is likely that a number of continuous construction phase works will also be required outside these hours on a limited number of occasions. These works will be agreed in advance with Kerry Co. Co. Work conducted outside of core hours, will comply with any restrictions agreed with the planning authorities, in particular regarding the control of noise and traffic.

2.7.1.3 Staffing / Employment

Levels of employment will vary throughout the construction phase. It is envisaged that the initial construction phase will last approximately 32 months, with an additional six months commissioning prior to operation. During the initial phase, approximately 1,070 No. people will be employed onsite at peak.

Construction personnel will comprise engineering, management, skilled and semi-skilled workers during the anticipated 32-month construction programme. A number of indirect employment opportunities will be created in a variety of different trades as a result of the construction works.

While some of the construction personnel will be specialists who will travel from outside the area, it is intended that many of the jobs will be filled by personnel recruited locally, with appropriate training provided as necessary. Where required, construction personnel will be accommodated locally in hotels and guesthouses.

2.7.1.4 Site Access and Security

Construction traffic will access and egress the Site via a new priority junction and right turn pocket along the upgraded L1010 road. This new vehicular entrance will serve all traffic arriving to the Site.

All Heavy Goods Vehicle (HGV) construction traffic will only be allowed to travel from the N69 / N67, through Tarbert town and along the upgraded L1010 road to the Site. No HGV traffic will be permitted to travel / from the Ballylongford Village direction to the Site or along the R551. Refer to **Chapter 11** (Traffic and Transport) and the Construction Traffic Management Plan (CTMP), **Appendix A11.1**, and **Section 2.7.2.3** for further details on the Site access establishment.

Fencing, gates and access control measures will be provided for the Site. Access to the Site will be security controlled and all Site visitors will be required to sign in on arrival and sign out on departure. There will be security fencing around the construction compound and specific areas of the Site for access control, safety and security, refer to **Section 2.7.2.4** for further details.

2.7.1.5 Construction Compound

The proposed location of the construction compound will be entirely within the Site of the Proposed Development. The locations and extent of the construction compound are presented in **Figure F2.2,** Volume 3. The construction compound will be secured with temporary fencing and will accommodate employee parking, canteens, offices, medical, changing, and welfare facilities, drying rooms and temporary services on the Site.

The construction compound will not be for long-term storage of materials, and storage but will be for the duration of the construction phase only.

Foul water from welfare facilities during the construction phase will be collected and periodically removed from the Site by road tanker.

For the duration of the construction phase, mobile plant will be returned to a secure overnight plant storage area on the Site, at the end of each shift. Drip trays will be utilised under the various types of plant.

Storage areas will be provided for flammable / toxic / corrosive materials, in a separate location that will be locked, impermeable bunded and fenced off. Material data sheets will be used for all these materials.

2.7.1.6 Parking

As noted above, parking will be available onsite for all construction staff vehicles within the construction compound.

Employment levels will vary throughout the construction phase, and it is expected that peak staffing levels will occur in September 2027, when 1,070 No. staff will be required, equating to 594 No. construction vehicles and 80 No. Light Goods Vehicle (LGV) delivery trips (two-way). Refer to **Chapter 11** (Traffic and Transport).

2.7.1.7 Construction Materials Sourcing and Transportation

Construction materials will be sourced locally from authorised quarries, where possible to minimise the environmental impact of transportation. It is intended that this will include all suitable stone recovered on during the enabling works will be reused as hardcore. For this purpose, rock crushing and screening plant will be provided. Additional rock, stone and sand materials could be procured from local quarries as required including the following:

- Ardfert Quarries, Ardfert, Co. Kerry.
- O' Mahoney Quarries, Tralee, Co. Kerry.
- Roadstone, Foynes, Co. Limerick.
- Liam Lynch, Adare, Co. Limerick.

All the materials will be transported to the Site by road. It is anticipated that up to 26,000 tonnes of imported aggregates will be required for the Proposed Development.

There may be periods in the early stages of construction where onsite haul roads are not surfaced. To reduce dust these routes can be dampened down (including the reuse of water from the wheel washing facilities) and maximum speed limits will be signposted and imposed.

Some of the process equipment and structural elements will arrive onsite as complete units or sub-assemblies, which may be larger than normal construction loads. It is anticipated that all the units will be delivered by ship to Foynes, and from there transported to the Site by road. Some of the units could be 'extra-large loads' / abnormal indivisible load (AIL) and a Garda escort may be required when they are on the road network. The timing of their transport to the Site will be chosen to minimise disruption to other roads users. This will be managed in accordance with the CTMP and the Abnormal Load Assessment, refer to **Appendix A11.1** and **A11.2,** respectively, Volume 4.

2.7.1.8 Construction Traffic

Construction signage will be provided for the Site. Signage at the Site entrance will be provided to outline details of the project and will include a contact telephone number for the public.

Construction phase traffic will be managed such that the impact on public roads will be minimised. This will be achieved by the implementation of the CTMP which will be agreed by Kerry Co. Co. in advance of the works. The traffic volumes on the public road will largely comprise HGV deliveries and arrival of personnel (LGV) to the Site. Refer to **Section 2.7.4.2** for details on the Construction Traffic Management Plan (CTMP).

Traffic management and road signage will be in accordance with the Department of Transport: *Traffic Signs Manual - Chapter 8: Temporary Traffic Measures and Signs for Road Works* and in agreement with Kerry Co. Co. All work on public roads will be subject to the approval of a road opening license application.

2.7.1.9 Construction Waste Management

Construction and demolition waste is the largest 'municipal' waste stream contributing to the current pressure on landfills in Ireland.

During the construction phase, the Proposed Development will generate a range of non-hazardous and hazardous waste (e.g., oils and chemicals) materials during construction. Waste materials will be required to be temporarily stored onsite pending collection by a waste contractor. The Contractor will endeavour to ensure that material is reused or recovered offsite insofar as is reasonably practicable or disposed of at authorised facility.

The Contractor will be required to develop a detailed Resource and Waste Management Plan (RWMP) that complies with the EPA (2021) '*Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition Waste Projects'.*

The Contractor will regularly review and update where required the assumptions on waste arisings and management and record and implement procedures for assessing, managing and recording waste arising onsite. Refer to **Section 2.7.4.3** and **Chapter 16** (Waste Management) for further information regarding waste management.

2.7.2 Enabling, Earthworks and Site Preparation

2.7.2.1 Pre-Construction Surveys

Pre-construction environmental surveys will be undertaken in advance of the enabling works. Following the surveys, licences will be sought from the National Parks and Wildlife Service (NPWS), as appropriate. Exclusion works will be carried out in the appropriate season in line with the information presented in **Chapter 07B** (Terrestrial Ecology).

An extensive programme of pre-development licensed archaeological testing will be undertaken in the areas of the site which will be subject to development. Refer to **Chapter 12** (Cultural Heritage) for more details on archaeological, architectural and cultural heritage. This will include the demolition of a small farm complex and remains associated with a pillbox, refer to **Drawing 60619377-DEM-C-SLNG-0001**, submitted with this application, for the location of all structures to be demolished. It is anticipated that archaeological survey and investigation works will commence in advance of the main enabling works

in accordance with the relevant licenses. Enabling works will only be carried out on areas where archaeological survey and investigation works have been completed, refer to **Chapter 12** (Cultural Heritage).

Prior to the start of works onsite areas to be protected (such as ecologically sensitive habitats or notable trees) will be fenced off to protect from accidental damage. Some hedgerows, bushes and trees, and disused buildings, will also be removed during this phase. It is noted that the seasonality of some of the activities is likely to be limited, for example, by seasonal environmental ecological restrictions and constraints (e.g. bird nesting season), and / or by restrictions on when soils can be placed. Where this is the case, the overall programme will be adapted to limit or prevent the risk of impacts in accordance with the CEMP.

2.7.2.2 Enabling, Site Preparation and Earthworks

Enabling, site preparation and earthworks activities will be required for the Proposed Development and ancillary facilities and will comprise:

- Construction of safe access and temporary Site roads.
- Erection of perimeter and environmental protection fencing.
- Installation of pre-earthworks drainage.
- Establishment of the laydown construction area.
- Earthworks to create level platform at +18 m OD (metres above Ordnance Datum) for the main footprint of the development excluding AGI.

2.7.2.3 Site Access Establishment

The Contractor will begin by setting out the Site entrance as early as possible in the programme consistent with seasonal environmental restrictions and constraints. This operation will begin with the clearance of existing hedgerows and vegetation at the Site entrance on the L1010 road and progress along the route of the access road to the construction laydown area. This will be followed closely by the excavation of vegetation and topsoil for the access road which follows the existing ground levels and then the placement of crushed stone (to create a 6 m wide access road) to create an initial access and roadway to the construction laydown.

All topsoil will be retained onsite for future use. Topsoil will be placed in temporary stockpiles at various locations throughout the Site for re-use on slopes, with any excess material placed in the vicinity of the contractor's compound. Approximately 26,000 tonnes of imported aggregate will be delivered from local quarries along the L1010 road from the Tarbert direction. Refer to Section **2.7.1.7** for details on construction materials and sourcing.

It is anticipated that the creation of this initial access will take approximately two to three months. Apart from the delivery of materials, the operation will all take place within the Site boundary with personnel using mobile plant. Following the construction of the Site access, a perimeter fence will be erected around the Site boundary.

Traffic management measures approved by Kerry Co. Co., Limerick Co. Co. and An Garda Síochána will be implemented prior to the commencement of works to ensure the Site access is safe for all road users.

2.7.2.4 Fencing

Fencing will be erected along the perimeter of the Site as early as possible, refer to **Section 2.3.11**. Particular care will be taken at the boundary between the Site and the SAC, SPA and pNHA so that construction activities do not cause damage to habitats in this area. These habitats will be securely fenced off early in the construction phase. The fencing will be clearly visible to machine operators and include relevant areas in which works are planned, such as utilities. Fencing will be installed to protect the Ralappane stream.

To prevent incidental damage by machinery or by the deposition of spoil during site works, hedgerow, tree and scrub vegetation which are located in close proximity to working areas will be clearly marked and fenced off to avoid accidental damage during excavations and site preparation.

2.7.2.5 Construction Compound Establishment

Refer to **Section 2.7.1.5** for details on the construction compound. The construction compound will be constructed by stripping back the topsoil (to be used later in the landscaping) and placing a layer of stone over a layer of geotextile membrane as required. The construction compound will be suitably drained and any areas which will involve the storage of fuel and refuelling will be paved with bunding and hydrocarbon interceptors to ensure that no spillages percolate into the surface water or groundwater systems.

During the removal of the topsoil and placement of the stone for the laydown areas precautions will be taken to minimise runoff into ditches, drains or the stream, refer to **Section 2.7.3.4**.

Additional mitigation and monitoring measures, as required, will be implemented in CEMP including the RWMP and CTMP, refer to **Section 2.7.4**.

Following completion of construction, the construction compound will be cleared and re-instated, temporary buildings and containers, parking areas and material such as stone, aggregates and unused construction materials will be removed as appropriate. As much of this material as possible will be re used onsite as part of landscaping and construction works.

2.7.2.6 Pre-Earthworks Drainage

To prevent the risk of contaminating surface water and groundwater, temporary surface water drainage (including dewatering measures) and silt ponds will be constructed to control runoff from the earthworks stage. This will flow through a filtration system (such as hay bales) to slow down flow to an acceptable level. Silt traps will be placed at crossing points to avoid siltation of watercourses.

Attention will be paid to preventing the build-up of dirt on road surfaces, caused by lorries and other plant entering and exiting the Site, via wheel washes and road sweepers as required. The layout of the temporary surface water drainage system will incorporate the mitigation and monitoring measures outlined in this EIAR and conform to the requirements of the CEMP, RWMP, CTMP, Natura Impact Statement (NIS) and planning conditions.

Rainwater runoff will be diverted away from the construction areas into the Shannon Estuary. Rainwater runoff will pass through an attenuation system including ponds with straw bales or silt bags to prevent sediment from entering the estuary. Discharge water quality targets will be agreed with Kerry Co. Co. and included in the CEMP. Regular water inspection and sampling regimes will be put in place via the

CEMP on the foreshore during construction activity onsite to monitor compliance with the discharge conditions.

2.7.2.7 Earthworks

The Proposed Development will be constructed to a finish grade platform with an elevation of 18 mOD. In order to create this platform, approximately 475,000 m³ of overburden soils and rock will be excavated and moved within the Site, refer to **Table 2.8**.

Some of the rock will need to be broken up before it can be excavated. This will be done either by percussive rock breaking equipment mounted on tracked excavators or by blasting depending on the hardness and depth of the rock to be removed. The soil and rock will then be excavated using tracked excavators. Excavated material will be stockpiled for use as engineering fill, landscaping and other uses throughout the Site. Stockpiles will be no more than 2 - 3 m high and will be seeded with an appropriate seed mix. All excavated material will be reused onsite within the Site.

Table 2.8: Estimated Material Volumes

	Excavation (m^3)	Backfill (m^3)
Topsoil	35,000*	35,000
Soil (excluding Topsoil)	356,054	437,115
Rock	81,062	
Total	**472,115**	**472,115**

**Excess topsoil will be placed on the laydown area or spread onsite.*
Note: 10,000 m3 imported aggregates.

The overburden will be, in places, quite thin, and to create the level platforms for the facilities. It is expected that limited blasting will be required to excavate some of the rock, which cannot be removed by rock breaking equipment mounted on tracked excavators. The blasting will be carried out in a controlled manner in accordance with a pre-approved plan, and in a controlled manner to minimize the noise and ground vibrations. This is done by designing a blast pattern with a small charge in many holes drilled into the rock at close spacing; the individual charges are then set off in a sequence using an electronic relay so that the maximum charge going off at any instant (this is referred to as the 'maximum instantaneous charge') is only the small amount of charge in any one of the holes. This causes cracks in the rock which allows the rock to be broken up further using mechanical rock breakers; the rock is then excavated using tracked excavators. No more than one blast per day is envisaged to occur in any given day and associated noise and vibration levels will be transient and very short lived, refer to **Chapter 09** (Airborne Noise and Groundborne Vibration).

Excavated material will be stockpiled for use as engineering fill, landscaping and other uses throughout the Site.

Earthworks are expected to be completed within four months, with blasting taking place intermittently over a 2-3 month period in this four month window.

Monitoring of dust, noise and vibration levels will be undertaken during blasting operations at appropriate locations around the boundary in accordance with the measures outlined in the CEMP.

The CEMP will also identify mitigation and monitoring measures required to protect watercourses from pollution associated with the earthworks and set out the specific arrangements for the strict control of erosion and generation of sediment or any other pollutants. It will detail appropriate sediment control temporary works and plant, including silt curtains, settlement lagoons, flow control arrangements etc. to ensure no pollutants are discharged to waterbody, refer to **Section 2.7.4.1** and **Appendix A2.3,** Volume 4.

2.7.2.8 Earthworks Traffic Management

The traffic associated with the earthworks and Site preparation phase will be managed such that the impact on public roads will be minimised. This will be achieved by the implementation of the CTMP which will be agreed by Kerry Co. Co. in advance of the works. The traffic volumes on the public road will largely comprise HGV deliveries and arrival of personnel (LGV) to the Site.

Chapter 11 (Traffic and Transport) outlines how deliveries will be co-ordinated with the planned L1010 road upgrade works, which is anticipated to overlap with the enabling works phase. These activities will be completed at about the same time to allow the main construction phase works to proceed.

2.7.3 Construction of the Proposed Development

2.7.3.1 Proposed Development (Power Plant)

Construction of the Proposed Development (the Power Plant) will begin after the platform level has been excavated to 18 m OD and the surface prepared, as outlined in **Section 2.8.3**.

The construction equipment required for the Proposed Development includes compressors, mobile cranes, tower cranes, generators, hoists, gantries, and various types of excavators, loaders, trucks, trailers, vans, etc. Other equipment required will include diesel fuel tanks, gas storage cages, electric power supply, mechanical repair shops, etc.

A number of tower cranes may be required. Hard standing areas will be required for these and will be located away from environmentally sensitive sites.

The construction works for the Proposed Development will be divided into four sections:

- Civil and structural works.
- Mechanical and electrical installation.
- Gas infrastructure.
- Connection to the EirGrid 220 kV Substation.

Foundation construction will include excavating to a depth of approximately 2 m to 3 m, installation of concrete forms, fixing of steel reinforcing, and the pouring of concrete. Pile foundations are likely to be necessary for parts of the Proposed Development, depending upon soil conditions and design loading.

Buildings to house the Proposed Development are expected to be steel framed with infill construction and cladding. Structural steel for buildings is anticipated to be delivered by road and assembled onsite.

The majority of the plant and building materials for the Proposed Development will be procured as complete units or modular, where practicable, and delivered to the site for installation. Pipe work and ducting will be assembled onsite.

The mechanical activities will include the installation of:

- Gas turbine generators.
- Steam turbine generators.
- Heat recovery steam generator.
- Air cooled condenser.
- Auxiliary cooling water system.
- Feed water / condensate system.
- Fuel gas supply system.
- Water supply / treatment system.
- Fire protection system.

The main electrical activities will include the installation of the following:

- Transformers.
- Distributed control systems.
- Switchgear.
- Low and medium voltage and control and instrument systems.
- Batteries and Uninterruptible Power Supply systems.
- BESS.
- 220 kV GIS Substation.

2.7.3.2 AGI Construction

The construction of the AGI will be undertaken following enabling works over a period approximately 12 months and will encompass the following activities:

- Placement of concrete foundations, drainage system, power and instrumentation conduits.
- Installation and erection of process and utility equipment, piping and instrumentation.
- Construction of buildings.
- Site landscaping.

Buildings associated with the AGI will mostly be steel framed with infill construction and cladding. Structural steel for buildings is anticipated to be delivered by road and assembled onsite.

The majority of the building materials for the AGI will be purchased as complete units, where practicable, and delivered to the Site for installation. Pipe work and ducting will be assembled onsite.

Drainage system power and instrumentation conduits will be installed along with the placement of concrete foundations, followed by the building superstructures (including metal frames, cladding and additional finishes. Later stages of the initial phase will see the installation of the major mechanical and electrical equipment, instrumentation and process piping. Final stages of the initial phase will see the fit out and completion of the buildings, and completion of site access roads, with landscaping. The facilities will be tested and commissioned, and the Proposed Development will commence operations.

2.7.3.3 Drainage Outfall Construction

A drainage outfall into the Shannon Estuary will be constructed, refer to **Figure F2.5**, Volume 3. Within the Site, surface water from paved and impermeable areas and groundwater will be collected by an underground drainage system and will discharge to either, the existing stream and / or drainage ditches within the Site, or to the Shannon Estuary via the drainage outfall pipe which will extend across the foreshore to below the low water mark.

All discharges through the drainage outfall will pass through a Class 1 Hydrocarbon Interceptor. Any bunded areas within the Site will have valve-controlled discharge points as part of their connection to the outfall drainage network. Drainage runoff from these areas will be tested for contamination prior to release to the outfall drainage network.

The drainage outfall pipe will be buried as it crosses the shoreline and will extend approximately 5 m beyond the low water mark. A check valve will be installed at the end of the outfall drainage pipe to prevent ingress of water from the estuary back into the drainage system.

It is anticipated that the construction of the drainage outfall pipe will be an open cut trench technique as follows:

- Excavate a trench across the foreshore to a maximum depth of approximately 2.4 m.
- Install a 900 mm diameter concrete drainage pipe in trench and backfill with concrete.
- Reinstate the foreshore and shoreline.

The outfall trench will be excavated above the low water mark using a hydraulic rock breaker mounted on a tracked excavator. This operation will be carried out in the dry at all times working above the tide during a suitable period of spring tides.

Where the outfall extends beyond the low water mark into the estuary, excavation of rock will be undertaken using an expanding grout placed by divers into drilled holes to pre-split the rock to the required levels and facilitate its removal by long reach excavator bucket. Trenches excavated across the shoreline will be backfilled with concrete suitable for underwater use and the surface will be embedded with cobbles and stone excavated from the trench to minimise the visual impact. The excavated material will be removed from the foreshore and incorporated as part of the earthworks and landscaping for the Proposed Development. Below the low water mark, the trench will remain open, and the sides of the trench will be battered back to avoid creating a pocket for siltation. Additionally, the cliff face will be armoured with rock to prevent erosion and maintain the integrity of the foreshore. Disturbance of the seabed below the low water mark will be small, arising primarily from the excavation of the trench and clearing and levelling of the ground to install the outfall pipe. This will result in temporary habitat loss of approximately 90 m^2 of Annex I habitat above the low water mark and 10 m^2 below the low water. Loss of Annex I habitat ‘Estuaries habitat’ is estimated to be approximately 100 m^2, while the loss of ‘Reef habitat’ is approximately 65 m^2. Installation of the pipe will result in the loss of 0.000041% and 0.000030% of the Annex I habitats ‘1130 Estuaries’ and ‘1170 Reefs’ respectively. This is discussed further in **Chapter 07A** (Marine Ecology) and **Chapter 07B** (Terrestrial Ecology).

All refuelling of equipment and machinery will take place at designated refuelling areas on the Site. No refuelling will take place on the foreshore. Arisings from trenching, or other works, will either be used for reinstatement. Details on this will be outlined in the CEMP, refer to **Appendix A2.3**, Volume 4.

2.7.3.4 Water Management

2.7.3.4.1 Foul Water during the Construction Phase

Foul water will arise from the Site offices, canteens, toilets and showers. The foul water will be collected in tanks and self-contained toilet units for removal by road tanker by a licensed haulier to a licensed facility.

2.7.3.4.2 Stormwater and Surface Water Drainage during the Construction Phase

Surface water and groundwater on or adjacent to the Site could become contaminated with silt or debris during the construction phase. Therefore, temporary surface water drainage and silt ponds will be constructed to control runoff from the earth-works stages. Water will be reused onsite where possible, for example grey water will be used for wheel washing activities.

Surface water will flow through a filtration system (such as hay bales) to slow down flow to an acceptable level. Silt traps will be placed at crossing points to avoid siltation of watercourses. Attention will also be paid to preventing the build-up of dirt on road surfaces, caused by lorries and other plant entering and exiting the Site, via wheel washes and road sweepers as required.

The layout of the temporary surface water drainage system will incorporate the mitigation and monitoring measures outlined in this EIAR and conform to the requirements outlined in the CEMP, RWMP, CTMP and NIS and planning conditions.

2.7.3.5 Utilities Construction

2.7.3.5.1 Electricity

During the construction phase of the Proposed Development, electricity will be supplied via a series of portable site units prior to the medium voltage electricity connection becoming available.

2.7.3.5.2 Water Supply

Water will be required for consumption by the construction personnel, for general construction works, hydrotesting of tanks and pipework, for the construction of the concrete elements, and for wheel wash facilities and dust suppression. It is anticipated that water supply for the construction phase will be obtained from a water main along the L1010 road. The Applicant has submitted a pre-connection agreement application to Uisce Éireann for this supply. If this supply is not available, water will be delivered by road and stored in a temporary tank onsite.

The maximum potable water demand for construction will be 98 m^3/day. The Proposed Development will incorporate water efficiency measures such as collection of grey water to minimise water consumption as far as possible.

2.7.4 Construction Environmental Management and Protection Measures

Works will be undertaken in accordance with the following environmental management technical guidance documents:

- CIRIA (2001). *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532).*
- CIRIA (2006). *Control of water pollution from linear construction projects. Technical guidance* (C648).
- CIRIA (2016). *Environmental Good Practice on site pocketbook (C762).*
- EPA (2021). *Best Practice Guidelines for The Preparation of Resource Management Plans for Construction & Demolition Projects*.

2.7.4.1 Construction Environmental Management Plan (CEMP)

A CEMP has been produced as part of this planning submission, refer to **Appendix A2.3,** Volume 4. A Contractor's CEMP will be produced by the appointed Contractor prior to the main construction works. The CEMP will detail the Contractor's overall management and administration of the works. The CEMP will also include any commitments included within the statutory approvals.

The CEMP will set out the necessary approach to managing the environmental aspects and impacts associated with the construction of the Proposed Development. It will also contain details of the monitoring and reporting system which will be implemented to document compliance with the following:

- Environmental commitments identified in the environmental assessment.
- The conditions of the relevant statutory consents including the planning consent and the foreshore licence associated with the Proposed Development.

The Contractor will be required to include the following information:

- Project details and the scope of works (including the locations of construction compounds and information on construction periods and phasing).
- A summary of relevant policy and project and environmental aims and objectives.
- The planning and currently approved foreshore licence conditions relevant to the construction activities and a summary of how and where they will be addressed within the CEMP.
- Information on the roles and responsibilities of key individuals, including the environmental management and reporting structure (as provided by the Contractor or as available at the time of writing the CEMP).
- An outline communication strategy, making recommendations to the contractors, for example such as the implementation of toolbox talks (environmental discussion on issues encountered onsite) by the Contractor relating to environmental constraints and procedures to be adhered to onsite.
- Methods to identify non-conformances, details of non-conformances and breaches of environmental limits and reporting measures.

- A summary of the potential environmental effects as identified by the EIAR, the schedule of mitigation and other existing documentation.
- The schedule of identified potential environmental impacts, risks and mitigation and monitoring measures.
- Method statements and work programmes for specific tasks such as the management of concrete washout onsite.
- Requirements for and maintenance of concrete washout areas.
- Requirements for fencing off of any protected environmental sites such as areas of ecological or archaeological importance.
- Protection of vegetation including hedgerows and trees etc.
- An environmental monitoring programme and details of monitoring locations as required.
- An outline emergency response plan and procedure for environmental incidents including accidental spills.
- Requirements for inspection and auditing.
- An outline reporting programme and procedure to be updated by the Contractor.

The CEMP will be treated as a 'live document' and periodically reviewed and updated as required during the course of construction.

As a minimum, the CEMP will be reviewed every six months. Notwithstanding the above requirements, the CEMP will also be reviewed at least two weeks prior to the construction phases listed below:

- Start of works.
- Start of each succeeding stage of the works.
- Start of any site activity that may potentially have an effect on sensitive habitats / species.
- Start of the landscaping works.

2.7.4.2 Construction Traffic Management Plan (CTMP)

A CTMP has been prepared as part of this planning application, refer to **Appendix A11.1,** Volume 4. A Contractor's CTMP will then be produced by the Contractor as part of the contractual agreements for the construction of the Proposed Development and will be updated as needed during the construction period.

This CTMP will be agreed with Kerry Co. Co. and Limerick Co. Co. prior to the commencement of works and shall apply to all traffic to and from the Site including those works carried out by the Contractor and any subcontractors, as well as have regard to traffic associated with works associated with the AGI and the gas export pipeline and electricity connections. The plan will include measures to direct construction traffic (including Site access), as much as practicable, along the upgraded road from Tarbert to the Site rather than along the road from Ballylongford to the Site.

2.7.4.3 Resource and Waste Management Plan (RWMP)

The Contractor will be responsible for developing a RWMP related to the construction phase activities. The RWMP will establish a waste recording system to test and track all waste loads going offsite for appropriate disposal. This includes Waste Acceptance Testing (WAC) to determine the appropriate disposal route for the waste.

The RWMP will also contain details of waste permits and hauliers who will be authorised to remove waste from the Site and it will detail waste audits to be carried out. A RWMP has been prepared as part of this planning application, refer to **Appendix A16.1,** Volume 4.

2.8 Commissioning Phase

Following completion of construction and installation of equipment, and before the Proposed Development commences operations, there will be a testing and commissioning phase. The commissioning phase will be similar to the operational phase but may have a greater number of start-ups and shutdowns. This phase will comprise:

- Installation compliance checks.
- Commissioning tests.
- Performance demonstration tests.

2.8.1 Installation Compliance Checks

This will be a process of systematically checking that all systems and equipment have been constructed, assembled, aligned and installed correctly, in accordance with the design specifications and drawings, and that all interconnecting pipe work, cabling and wiring has been installed in compliance with the design specifications and drawings.

2.8.2 Commissioning Tests

The function of each item of equipment and each system will be tested and verified, in a systematic manner, as being in accordance with the design and specifications. All the alarm and control systems and instrumentation will be tested to demonstrate that they are functioning correctly. Following these tests, each system will be checked to ensure that it is ready to be commissioned under operating conditions including using real materials, temperatures, pressure and voltages.

2.8.3 Performance Demonstration Tests

In this commissioning phase the individual items of equipment and systems will be tested under operating conditions using the materials, temperatures, pressure, and voltages to which they will be subjected when in operation. Once the operation of all equipment and systems has been tested and verified individually, they will be integrated and the operation of complete systems will be tested.

The Proposed Development's safety and fire prevention systems and the Operational Emissions Management Plan will be subject to the same rigorous testing protocols as the other systems.

2.9 Operational Phases

2.9.1 Industrial Emissions (IE) Licence

In the operational phase, the Proposed Development will comply with the requirements of the *EU (Large Combustion Plants) Regulations 2012, S.I. No. 566 of 2012*, under an IE licence. The emissions which have the potential to impact to air, soil, surface water and groundwater and human health, will be mitigated against and avoided where possible.

An IE Licence is required for operation of the Proposed Development in accordance with Activity 2.1 of the First Schedule of the EPA Act as amended '*Combustion of fuels in installations with a total rated thermal input of 50 MW or more*'.

An Environment Management System (EMS) which will be implemented by the operator and will set out the requirements and procedures required to ensure that the Proposed Development is operating to appropriate standards. The EMS will be certified to International Standards Organisation (ISO) 14001.

Environmental monitoring (including analysis of pollutants) will be carried out, where required, including monitoring of exhaust emissions levels using Continuous Emission Monitoring Systems (CEMS) prior to discharge from the flue gas emissions stacks, in accordance with the IE Licence.

2.9.2 Fuel Supply

As outlined in **Section 2.3.1.6**, the fuel supply to the Proposed Development will be from the gas grid through the AGI. The Proposed Development will use approximately 25.5 Wz per day of natural gas when operating at full capacity.

Secondary Fuel (Backup Fuel)

To comply with Commission for Regulation of Utilities (CRU) requirements, low sulphur gas oil will be required as a backup fuel in the event of interruption to natural gas supply, *i.e.*, the loss of a flow from the transmission pipeline during a period of high electricity demand. The use of secondary fuel is only expected to occur during an emergency scenario, refer to **Section 2.3.8**.

The Proposed Development will be required to storage a total of five days' worth of fuel consumption, calculated assuming the Proposed Development is operating at its maximum capacity. The fuel will be contained in two (2 No.) storage tanks (~5,000 m^3 each) and three-day tanks (~2,000 m^3 each) within a bunded area. The storage tanks are shown on **Drawing 198291-SS-A4112**, submitted with this application.

2.9.3 Operational Site Management

2.9.3.1 Operational Hours

The Proposed Development will be manned and operational 24 hours, seven days a week outside of outages. During the operational phase, the Proposed Development will be operated, maintained and managed by the Applicant.

2.9.3.2 Staffing / Employment

During the operational phase permanent staff will be employed, some of whom will work in shifts as the Proposed Development will be operational for 24-hours. It is anticipated that a total of 34 No. staff will be required for the operational phase, as follows:

- 26-day staff (08:30 – 17:00).
- 40 No. shift staff: five shifts of eight employees.

Additional contract staff and service personnel will be utilised as needed. Personnel will perform the following functions:

- Management and administration.
- Operations.
- Maintenance.
- Marine operations.
- Health, Safety, Security and Environment.
- Finance and accounting.
- Sales and marketing.

Managerial staff will be experienced personnel from the energy industry, operations, maintenance and support personnel employed for the Proposed Development will be recruited locally to the extent possible.

The Applicant will operate and maintain the Proposed Development to meet or exceed all applicable EU and Irish employment regulations and requirements. The Applicant will prepare, maintain and update a comprehensive set of operations, maintenance, safety, and emergency response manuals for the combined operations. All operations and maintenance personnel will be trained in accordance with the procedures in these manuals.

Maintenance staff will carry out routine inspections, maintenance, and repairs, as well as major equipment overhauls, where applicable, refer to **Section 2.9.3.4**. Security personnel, and catering / cleaning personnel will be provided by third parties. Warehouse personnel are anticipated to be contract staff.

Above Ground Installation Staffing

The AGI will normally be an unmanned facility, operated by GNI. GNI personnel will visit the AGI as and when required for inspection and maintenance purposes.

2.9.3.3 Training

The Proposed Development, through its training regime, will ensure every employee is aware of their responsibility to work safely, adhere to safety rules and work procedures, use safety equipment provided, is environmentally responsible, and play an active role in the Proposed Development's drive for continual improvement in health, safety and environmental (HSE) performance.

Pre-operational training and regular refresher courses, using simulators, will be undertaken, involving all relevant parties, including Kerry Co. Co.'s Fire Department and the employees.

2.9.3.4 Operational Phase Maintenance

Routine maintenance will be carried out in accordance with the maintenance procedures provided by the Contractor and manufacturer.

The Proposed Development will be required to undertake an annual inspection, as per the manufacturer's requirements. During this time the Proposed Development will be shut down to allow the inspection to be completed (by the manufacturer's personnel).

2.9.3.5 Health and Safety (H&S) - Emergency Planning

Measures to prevent the risk of fires, spillages, floods and other major incidents will be embedded in the design of the Proposed Development. Measures to prevent potentially major incidents include:

- Hazardous and polluting liquids such as diesel fuel and transformer oils will be stored in tanks located in bunds.
- Diesel fuel unloading bay will be designed to contain spillages.
- Storage tank level indicators and oil detection sensors in bunds will be provided with alarms.
- Class 1 full retention Oil Water Separator will be provided in the surface water drainage system.
- Measures to isolate the surface water drainage system will be provided to prevent discharge of contaminated water.

The Applicant will ensure that operating, maintenance, and emergency response procedures and manuals will be subject to regular review and will be updated to reflect best industry practice, or to reflect the addition of new procedures, equipment or other facilities.

Operational procedures will be in place that will clearly outline responsibilities and the appropriate communication channels for operational staff / site personnel. Operational measures will be included in the Environmental Management System (EMS) and regulated by EPA through the IE licence.

2.9.3.6 Operational Traffic and Transport

Full details on operational phase traffic movements are detailed in **Chapter 11** (Traffic and Transport).

During the operational phase, there will be no vehicle movements associated with the supply of natural gas for the Proposed Development. Permanent staff will be employed, some of whom will work in shifts as the Proposed Development will be operational for 24-hours, refer to **Section 2.9.3.2**.

However, in an emergency situation - when operating with distillate oil - HGV deliveries will arrive on-site. However, this is not expected to be a regular occurrence. A distillate oil fuel delivery by road will be limited to the hours of 07:00 and 19:00, and no deliveries will take place on Sundays or at night, except in the case of extended emergency operations.

Routine maintenance will be carried out in accordance with the maintenance procedures provided by the contractor and manufacturer, refer to **Section 2.9.3.4**.

2.10 Decommissioning Phase

The Proposed Development is expected to have a design life of 25 years, but this could be extended by maintenance, equipment replacement and upgrades or by the transition of the Site to use hydrogen capability (which will be subject to a future planning application). It is expected that it would be a

condition of the IE licence for the Proposed Development that a closure and residuals management plan, including a detailed decommissioning plan, be submitted to the EPA for their approval.

Decommissioning activities will include, as a minimum:

- All wastes at the facility at time of closure will be collected and recycled or disposed of by an authorised waste contractor, as appropriate.
- Utilities will be drained of all potential pollutants such as lubricating oils or sealed to prevent leakage if being moved offsite or reused elsewhere.
- All raw materials, oils, fuels, etc. onsite at the time of closure will be returned to the supplier, or collected and recycled or disposed of by an authorised waste contractor, as appropriate.
- All buildings and equipment will be decontaminated, decommissioned and demolished in accordance with a phased demolition plan, and either sold for reuse or recycled, or disposed of by an authorised waste contractor, as appropriate. In general, specialist equipment, pipelines and storage tanks will be sold for reuse, where possible, or disposed of offsite.
- Roadways to be broken up and removed and security fences dismantled.
- All hazardous and non-hazardous process substances to be removed.
- All roads and hardstanding areas to be removed and recycled or disposed of by an authorised waste contractor, as appropriate.
- Landscaped will be reinstated in accordance with a landscape reinstatement plan.
- On completion of safe decommissioning of equipment, the potable water, fire water and electrical power supplies could be disconnected, and removed or abandoned in place.

When operations at the Proposed Development have ceased, and assuming confirmation from the monitoring programme that all emissions have ceased, it is expected that there would be no requirement for long-term aftercare management at the Site of the Proposed Development.

The Gas AGI will be managed as part of the national gas networks. At the end of its design life, it is expected that the gas connection may have residual life remaining and the operational life may be extended if appropriate and / or the asset refurbished and retained as part of the national transmission network.

2.11 References

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