# 2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

## 2.1 INTRODUCTION

The applicant is proposing to develop six data storage facilities, an energy centre an Above Ground Installation (AGI) building, vertical farm, a substation compound and associated ancillary development on a greenfield site (previously used for agriculture and hosting power transmission infrastructure) in the townlands of Tooreen and Cahernalough, Co Clare. The land is zoned as Enterprise (ENT3) and zoned to accommodate a data centre campus which consists of one or more structures, used primarily for the storage, management and dissemination of data and the provision of associated power electricity connections and energy generating infrastructure (ref Clare County Development Plan 2017-2023).

This chapter presents the description of the project comprising information on the site, design, size and other relevant features of the project as required by the 2011 EIA Directive (2011/92/EU), as amended by the 2014 EIA Directive (2014/52/EU) (herein referred to as the EIA Directive) and the Draft EPA "*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*" (2017) (herein referred to the as the EPA Guidelines 2017) and the EPA Draft "*Advice Notes for Preparing Environmental Impact Statements*" (2015) (herein referred to as the EPA Advice Notes 2015). The European Commission guidance '*Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report*" published by the European Union in 2017 was also considered in the preparation of this EIA Report.

This chapter summarises the proposed development and the lifecycle of the facility (construction, operation and decommissioning). The EIAR should be read in conjunction with the planning package that includes complete elevations and floor plans site, layout plans including utilities and building drawings and accompanying reports.

## 2.2 DEVELOPMENT SITE

The development footprint is c. 60 hectares (ha) and is located to the east of Ennis in the townland of Tooreen and Cahernalough with small sections extending west into the townlands of Ballymacahill and Knockanean. The lands are bordered to the south by the R352 (Tulla Road) and to the west by the M18. The lands are traversed by a gas pipeline and overhead powerlines connecting to the existing Ennis 110kv Substation that adjoins the western boundary.

Figure 2.1 below presents the lands subject to this planning application (red line boundary) and land ownership area (blue dashed line).

The site is currently in predominantly agricultural use and comprises a series of irregularly shaped fields divided by hedgerows and ditches typical of its agricultural setting. The site contains a number of existing dwellings and eight farm outbuildings. A number of these will be retained and some (one house and eight farm buildings) demolished as part of the proposed site redevelopment. Further information is included in the demolition report provided with this planning submission and also addressed in Chapter 13 (Waste) and the Construction Environmental Management plan (CEMP).

The site gradient is quite variable but overall falls from east to west/southwest with elevation c.15 meters ordinance datum (mOD) in the West and 46 mOD in the East Regional surface water drainage comprises the Ballymacahill River to the north/ west of the development site boundary and which flows in a NE to SW direction. The river is also known as the Spancilhill (EPA, 2021) and converges with the River Fergus farther to the SW which ultimately discharges into the Shannon Estuary.

Local drainage within the development boundary is less defined. Surface water features within the site boundary comprise a series of ponds to the north with variable seepage to ground, and Toureen Lough to the south near the R352. Spring discharges have been identified mainly to the west of the site and include a spring to the immediate east of Toureen Lough discharging to this feature, and a spring to the northwest of the lough which, it likely receives groundwater from a known swallow hole located farther east and south of the R352 road. Toureen Lough also discharges into the Ballymacahill River observed at a spring discharge.

## 2.3 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development comprises:

- 6 data centres buildings.
- A gas powered energy centre and Above Ground Installation (AGI).
- A new 110kV substation, two drop down masts and underground grid connection.
- Fibre connection,
- Connection and upgrade of foul sewer and mains supply extending along the existing R352.
- Undergrounding of two of the existing overhead 110kv circuits.
- Associated Infrastructure; roads, attenuation pond etc.
- Demolition of a single house and 8 farm buildings

Figure 2.1 presents the site layout for the proposed masterplan. The site layout reserves c. 10 ha of lands as ecological and archaeological buffer zones. The buffer zones were delineated following assessment undertaken as part of the area assessment within the Clare County Development Plan 2017 – 2023 (Variation No. 1). Further assessment has been undertaken by the project ecologist to protect ecology during construction and operation of the proposed development. The redline boundary includes c. 2.1 km of the existing Tulla Road for connection to sewer.

Two of the 110kV overhead circuits which currently traverse the site will be brought underground to the Ennis substation as they come onto the east side of the site.

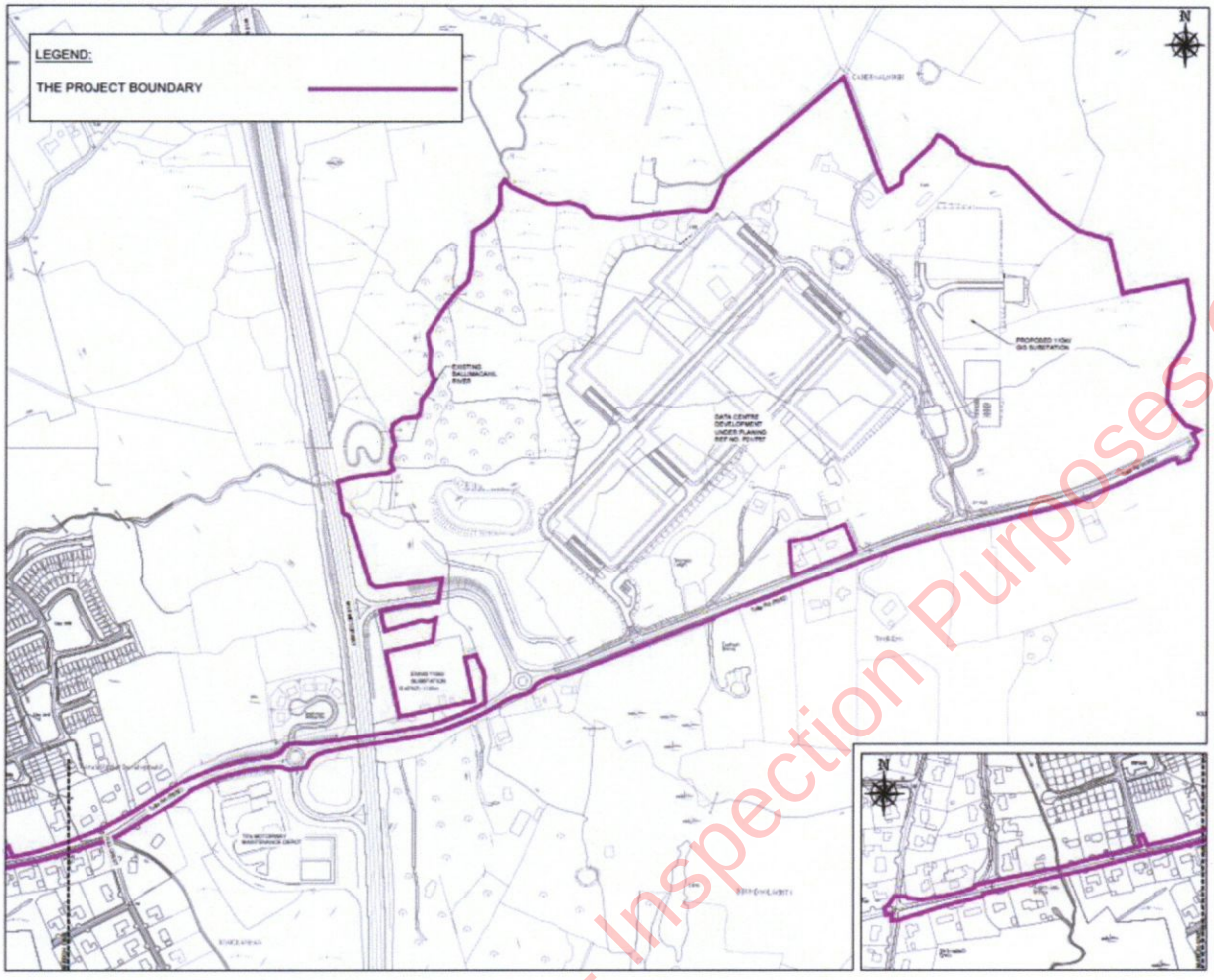



***Figure 2.1*** *Proposed layout.*

The redline boundary including the works along the Tulla Road required for the sewage and water pipeline upgrade .

*Proposed Development Phasing*

A 10-year permission is sought due to the nature of this specific development and to match market demand over that period. The proposed development will respond to current and future use demands in the area. The logistics of the site and use of the buildings mean that their delivery must be programmed on a phased basis over the duration of a 10-year planning permission. The site will host six data storage facilities with associated energy supply facilities and the commercial reality is that the overall orderly development of the site will take longer than 5 years. Subject to planning approval, construction works are due to commence in June 2023. Three phases of construction are proposed with construction works completing by July 2029. Landscaping is proposed to commence in Oct 2022.

The anticipated phased development is set indicatively in Table 2.1 below.

***Table 2.1*** *Phasing of the Proposed Development*

| Phase | Building Name | Construction Start | Duration (months) | Construction End |
|---|---|---|---|---|
| 1 | Primary Infrastructure | June 2023 | 27 | September 2025 |

| | | | | |
|---|---|---|---|---|
| | Substation<br>Datacentre 2 & 3. | | | |
| 2 | Energy Centre<br>Vertical Farm<br>Datacentre 4 & 5. | September 2025 | 25 | October 2027 |
| 3 | Energy Centre (Engines 7-18)<br>Datacentre 1 & 6. | June 2027 | 25 | July 2029 |

The expected construction phasing is shown in Figure 2.2 below.


***Figure 2.3*** *Intended Construction Phasing for the proposed Masterplan (ART-ARC-SP-00-DR-A-0003).*

### 2.3.1 Proposed Data Centre Development

A data storage facility is a centralised hub for the secure storage, management and distribution of electronic information to individual businesses and organisations. With the levels of online activity increasing rapidly this facility will enable the Applicant to meet its clients growing demands. The proposed data storage facilities offer clients the latest in power, and connectivity with hardened security to control access to client information.

Each data storage facility, when completed, will allow the Applicants' clients store their information at a secure and reliable facility off their premises more efficiently than traditional forms of in-house data storage systems. Data storage facilities are typically constructed on a relatively large scale which results in significant benefits in terms of economies of scale and energy efficiency.

Each data storage facility will require up to a maximum of 27 MW IT load (circa 34 MW total load). With 6 data storage facilities operating the total load will be 200 MW.

Data storage facilities have;

- high levels of reliability with built in redundancy systems;
- 24/7 monitoring of the facility and its systems by staff;
- lower network latency and higher bandwidth at lower cost;
- specialist network and facilities engineers typically not viably employed by individuals, businesses or organisations, and;
- high levels of energy efficiency.

Irish climatic conditions generally allow for data storage facilities to be cooled using air cooling however there will be an occasional requirement to use evaporative cooling. Typically, evaporative cooling is required when temperatures exceed 27°C (Approximately 2% of the year). When evaporative cooling is required the average rate of demand for the proposed development is estimated to be less than 1,000m$^3$ /day for the whole site. It is proposed to store the equivalent of 48 hours of rainwater at each data storage facility for the purpose of supplying the evaporative coolers prior to using the public water supply. Of the water supplied, only 40% will be discharged to the surface water system as the remainder will be lost to evaporation in the cooling process. This results in an average daily discharge of 400m$^3$/day. The peak rate of discharge for the proposed development will be 205 l/s. As the cooling water will only be required during periods of hot dry weather (i.e. temperature exceeds, 27°C), the discharge to the surface water network will not coincide with any rainfall events

As evidenced by the numerous other data storage facilities recently developed in Ireland, our temperate climate is ideally suited to data storage facilities. The naturally cool ambient temperature means the data halls require less cooling than if the facility were located in regions of the world subject to greater temperature and humidity variation.

A summary of the data storage facility is as follows:

- 6 no data halls. These are 86 x 105 x 18m high and will consist of multi levels 9m slab to slab for the data halls and air handling units and 4.5m slab to slab for offices and ancillary plant and support.
- Data halls are intended to have backup (standby) generators for emergency use only () situated along one elevation of the building. These will provide the necessary power to ensure the data halls operate optimally even in the event of a failure of supply. The diesel generators will have associated 8m high flues to meet air quality standards (Chapter 8 Air & Climate).
- For three of the six data centre storage facilities, fuel oil for the emergency generators is required. Each of these datacentres in their service yard, will have up to 7 bunded above ground bulk storage tanks for fuel oil (440m$^3$ per data storage facility), distribution pumps, overground delivery pipeline to the belly tanks for diesel fired standby generators within each data storage facility. The service yards are hard stand and located adjacent to the datacentre buildings.
- Storm drainage from the loading area at each service yard will discharge through an oil interceptor.

- Solar Panels and Rainwater harvesting included in the design.
- Warm air emissions partly used within the on site vertical farm.
- Provision of a proposed Substation and associated electricity transmission line connections, and the undergrounding of two existing overhead 110kv circuits and ancillary development (subject of a separate Strategic Infrastructure Development application).
- Admin area – for limited office and support services. These occupied areas will be provided with heating and cooling systems and hot water generation, using air source heat pumps to reduce energy and carbon emissions. If heat recovery can be used from the heat generated in the data halls, then this will be used. In addition, wherever possible natural light will be provided via roof lights or "borrowed light".

A total of c. 450-475 staff will be employed on site on the completion of the Art Data Centre Campus.

### 2.3.2 Proposed Substation Development, undergrounding of overhead lines and grid line.

A new substation will be created on the site, partly for extending Eirgrid's substation (the existing has no additional space) and for transforming down to 10kV / 20kV for distribution to the data centres. Dual feeders will be provided to each data centre via a set of underground ducts that will be created in the service roads. The proposed substation development will comprise two elements, firstly an extension to Eirgrid's existing Ennis Substation using 110kV Hybrid Gas Insulated Switchgear (GIS) (circa 2,400 square metres and 15 m high) and secondly a 110kV transformer substation compound (circa 3,200 square metres and 6 m high) dedicated to the Art Data Centre site. The two compounds will be separated and have their accesses for the Client and Eirgrid and will be afforded 24/7 access.

In more detail the two compounds will incorporate the following:

*New Eirgrid Compound*

- 1 no outdoor hybrid Gas Insulated Switchgear (GIS) switchboard with 8 no. 110kV bays and rated for the system voltage of 110 kV;
- Two 110kV underground cables which will connect to a new above ground end tower (termination).These will connect to the existing circuits to Agannygal and Ardnacrusha via
- Two 110kV underground cables for feeding to the Art Data Centre substation
- Internal access roads and turning head;
- A circa 2.6-metre-high palisade fence;
- Drainage infrastructure; and
- All associated and ancillary site development works.
- It is intended that all of the above will be provided and adopted by Eirgrid.

*Art Data Centre Compound*

- 2 no. Midel oil-filled 100MVA step-down double wound 110/20/10kV power transformers positioned within bunded enclosures; (height circa 6 metres);
- 8 no. lightning protection masts (height circa 15 metres);
- One single storey buildings used for 20/10 kV switchgear control and ancillary (each approx. 70m x 6m x 6m height)
- Internal access roads and turning head

- A circa 2.6-metre-high palisade fence;
- Drainage infrastructure; and
- All associated and ancillary site development works.

The proposed substation development will be supplied from two drop down masts located on the east of the site.

*Undergrounding of existing overhead lines*

As part of the provision for power, for the development, there will be two overhead cables rerouted underground to the new substation and subsequently routed to the existing Eirgrid substation via the Tulla Road.

New end masts will be built on the north east of the site, breaking into the existing lines and diverting the circuits via underground ducting to Ennis Substation. The route of the proposed grid line is partly within the site and along the Tulla road.

The 110 kV underground cable feeders will comprise 110 kV circuits installed underground in HDPE ducting in a trefoil arrangement. The 110kV cables will be a standard XLPE (cross-linked polyethylene) copper cable. XLPE does not contain oil, therefore there is no risk of migration of oil into ground in the event of a failure. The installation of the HDPE ducting will require the excavation of trenches along the final connection route. The trenches will typically run either side of the roadway along the length of the route, the separation of the 2 circuits will ideally be at least 3m depending on the existing ground conditions and existing underground services. The typical optimum depth of excavation required to facilitate installation of the ducting is 1.25m below ground level (bgl) but may increase to up to c. 3.0m at utility crossings. The typical optimum width of each trench is 0.6m, however this may vary depending on ground conditions and existing services.

Typical cross section of the trench utilising trefoil duct arrangement for the 110 kV cables is illustrated in Figure 2.4.

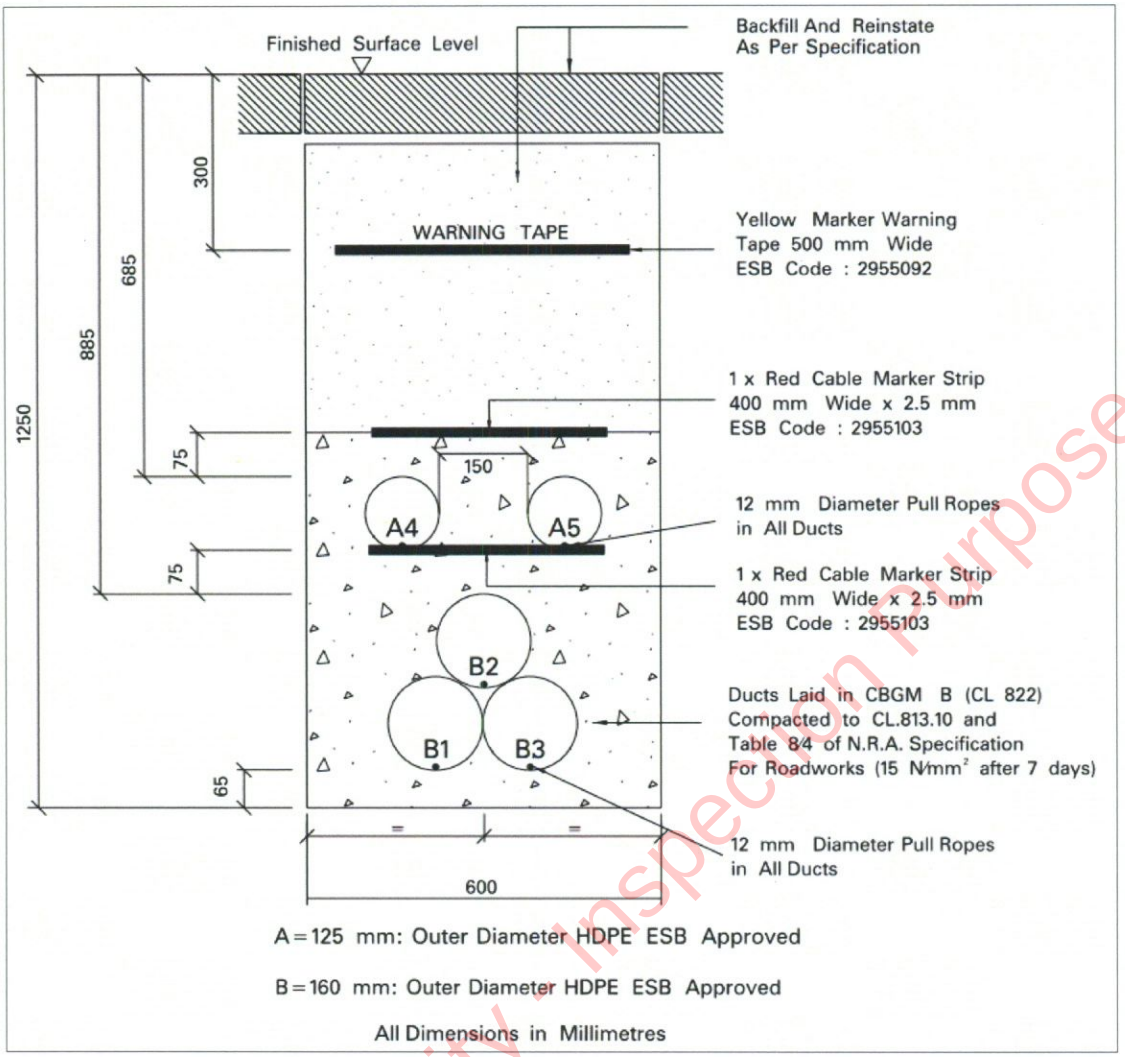



***Figure 2.4*** *Typical Cross Section of Trench Trefoil Duct Arrangement for 110 kV underground cables*

### 2.3.3 Proposed Energy Centre and Above Ground Installation Development

The energy centre will primarily comprise 18 no. lean-burn natural gas engines which are the most efficient form of internal combustion engines. Each generator will have its own flue of 25m height. These will be aggregated into 3 groups of flues to meet air quality requirements. Air modelling has been undertaken to confirm the flue discharge will meet air quality standards with selective catalytic reduction (SCR) abatement (Chapter 8 Air & Climate).

The energy centre will be fully self-sufficient in terms of its power and cooling requirements. Cooling is provided through roof mounted attenuated dry air coolers which will be behind a plant screen. The energy centre is to be connected to the adjacent national high pressure gas network. A pressure reduction station is included in the design to reduce the gas pressure for use in the energy centre.

The energy centre will be on a 110m x 100m plot and buildings within the compound will be 8 m high. The building will house an office and welfare facilities and associated parking.

For the energy centre where there will be continuous running generators, fuel oil and urea are the only required bulk chemicals required. The fuel oil will be used as back-up to the normal gas supply for the energy centre and will be located withing the service yard adjacent to the energy centre. Oil will be stored in bunded above ground bulk storage tanks for fuel oil (total of 1,440m$^3$ of fuel oil), distribution pumps, overground delivery pipeline to the day tanks for dual fuel fired generators. In addition, within the energy centre it is proposed to store up to 18m$^3$ of urea for use with the SCR mitigation in the exhausts of the generators.

### 2.3.4 Proposed Vertical Farm Development – Heat Recovery Use

It is proposed to recover the heat from the data halls in the datacentre buildings for use in the "Vertical Farm" for growing high value plants etc. These farms require heating to the water and air used to support the plants to promote growth internally, and so the heat from the data centres would be ideal and would not require the temperatures to be elevated any further, so no additional energy input.

The vertical farm will be c. 50 x 50 x 12m high. It will comprise c. 60% growing space and 40% office area. The farm will provide high value crops such as herbs.

The vertical farm will employ 40 full time roles and 10 additional part time. The farm will operate a single shift. Deliveries of raw materials and removal of product will result in c. 5 HGVs per day with pick up times likely to be 6.30 to 9 am.

### 2.3.5 Overall Site Design and Landscaping

The buildings have been located on the site to take maximum use of the undulating nature of the land by siting structures at lower levels to take advantage of topography to reduce visual impact of structures. The structures are set back from the Tulla Road and dwellings by c. 100m (closest residence is 107 m) and will be screened by the introduction of new landscaping and woodland. The buildings have also been positioned outside of ecological and environmental protected areas with suitable buffer zones. The site will operate as a "dark site" in order to minimise light spill impacts.

The site perimeter will consist of berming and landscaping incorporating local species discussed further in Chapter 11 (Landscape) and required security infrastructure . Although the proposed development will incur loss of existing hedgerows, the proposed landscaping design, once established, will include new hedgerows planting in the order of three times the current extent. The proposed landscape design will focus on enhancing local biodiversity by incorporating native species and pollinator planting. As outlined in Chapter 10 and the CEMP, landscaping will commence ahead of the main construction works to ensure early establishment.

## 2.4 SITE UTILITIES AND INFRASTRUCTURE

### 2.4.1 Electricity

The six data storage facilities will require up to 200 MW load. This requirement will be provided by power from the national grid, an energy centre with gas generators and emergency backup provided by diesel generators.

A power application with Eirgrid for 83.5MVA is in their Pre-planning Stage 1 Process.

The six data storage facilities will be powered by a combination of power from the grid

via the existing Ennis Substation adjoining the site and the energy centre, which is proposed to be constructed adjacent to the high pressure gas line that runs through the site. The applicant intends to construct the energy centre to respond to flexibility to the evolving energy market, in particular to ensure there will be sufficient capacity to have the security of supply and also respond to any future grid capacity constraints.

A maximum of three data storage facilities will also have diesel powered back-up generators, as a contingency power measure in the event of a loss of electrical power supply loss from the Ennis primary substation. The likelihood of all of these generators being required to run is extremely low, no more than once in 10 years, however each set will require to be tested typically for up to 2 hours, once a month. Each set will have strict acoustic attenuation to ensure that overall noise levels on the site are not increased. These data storage facilities will have 84 backup generators which will be lined along one elevation of each datacentre building. These will provide the necessary power to ensure the data halls operate optimally even in the event of a failure of supply from the energy centre. The diesel generators will have associated circa 8m high flues to meet air quality standards. Each diesel generator will be served by a double lined belly tank. With the main oil storage within the service yards of each datacentre. An overground fuel line will extend from the bunded fuel storage within the service yard provided for each building.

In the event of the gas supply failing, the three data storage facilities which are provided with power by the gas powered engines will continue to be provided with power resupplied with on-site stored diesel as the engines with have a dual fuel capability. The engines which will typically be of between 5 and 10MW per set, will have flues combined together with an expected height of circa 8m high to meet air quality standards.

### 2.4.2 Water Demand

A 450 diameter mains runs along the Tulla Road and following a proposed upgrade for connection (within the existing road), has capacity to supply adequate water for the proposed development. Peak daily usage will be 48 l/s and average demand 11.2l/s (Adiabatic Cooling System) during high temperature condition) plus 1.2 l/s for domestic use. On the rare occasions that evaporative cooling is required ( temperature of 27$^{o}$C) the requirement is 1,000 m$^3$ /day for the whole site.

Consultation with CCC has confirmed that sufficient water capacity is available and a PCE application has been submitted to Irish Water (IW).

### 2.4.3 Site Drainage

*Foul water*

A temporary trench excavation along the Tulla road will be undertaken to facilitate pipe laying for connection with the existing pumping station of Gort Na mBlath located approximately 550 m west of the main site. The wastewater ultimately discharges to Ennis North (Clonroadmore) WWTP Reg D0048.

There is no trade effluent proposed for this development. Consultation with CCC has confirmed that sufficient wastewater capacity is available and a pre-connection enquiry PCE application form has been submitted to Irish Water (IW). The designed Dry Weather Flow DWF of the development is 20.9 m$^3$/day. The proposed foul drainage service will incorporate a foul pumping station and associated rising main which will

also include a 24-hour emergency storage tank (in the unlikely event that the proposed foul pump malfunctions).

*Surface water*

The proposed surface water drainage service to the development comprises various drainage components including positive stormwater networks, attenuation systems and several Sustainable Drainage Systems (SuDS) elements. The proposed surface water drainage was designed in accordance with the SuDS Manual 2015.

The hardstand area of the site is 17.3 ha and attenuation has been designed on site for the 1:100 yr. flood event including consideration of a 20 % allowance for climate change. An over flow sub-surface pipeline will discharge at current discharge rates (greenfield) to the Ballymacahill River. Drainage will be from a single lined attenuation pond.

Rainwater run-off from the roofs of the six datacentres will be collected and will feed water harvesting tanks with any excess overflow into the common road drainage network. This water will be available as cooling water. Other SuDs measures will include permeable paving and swales. These drains and swales will discharge to a surface water attenuation pond where the discharge will be controlled using a "Hydrobrake Optimum" vortex flow control device to limit the maximum discharge to 50 l/s during the 1/100 year storm ( the calculated Qbar value attributed to the site is 61l/s). The attenuation pond to be constructed to retain a constant volume of water to promote settling and reduce conveyance of suspended solids and other particles to the receiving waters. An attenuation volume of 9293 $m^3$ is designed as part of the proposed development. A Class (I) bypass separator with a suitable capacity will be installed downstream of the proposed hydrobrake. The function of the separator is to intercept pollutants (any petroleum /oil) and prevent their entry to the Ballymacahill River. As such there is no potential for increase or flooding or impact on water quality as a result of the proposed development. Further details are provided in Chapter 7 of the EIAR and within the CSEA engineering report prepared for planning.

### 2.4.4 Telecommunications

Fibre will be provided from a number of sources for security of supply. No above ground works are required as internet providers have infrastructure already in place. In addition, as statutory undertakers, such fibre providers do have separate legal powers to extend their networks as required.

Three of these fibre connections are already available for the development; PiPiper in the Tulla Road, Aurora in the Gas line alignment, ESB Telecoms in the substation adjoining the site. These three are presented in Figure 2.1 (above). The minimal works required for connection to these fibre connections are included in the assessment undertaken for construction and operation of infrastructure in relation to the proposed development.

Open Eir and BT have existing infrastructure in the Tulla Road. Provision of these services will require negligible groundworks or any impact on environmental criteria as they utilise existing service ducts along public roadways. As such no further environmental assessment is required. A summary of the fibre route connections is provided below for clarity.

Open Eir have confirmed that they can offer fibre based services delivered from their Ennis Point of Access at Drumbiggle to the site with existing Open Eir networks

existing Open Eir duct infrastructure route as highlighted in the drawing below (route in magenta, site highlighted in red). Their existing network runs along the Tulla Road out to the site at Junction 13 and they will insert any new services in the existing ducts on the Tulla Road.

***Figure 2.5*** *Existing Open Eir Broadband Infrastructure ( Source: Open EIR, 2022)*

BT have confirmed that they can access the site over existing roads utilising existing Eircom ducts subject to resolution of issues currently being decided by Courts relating to Com Reg.

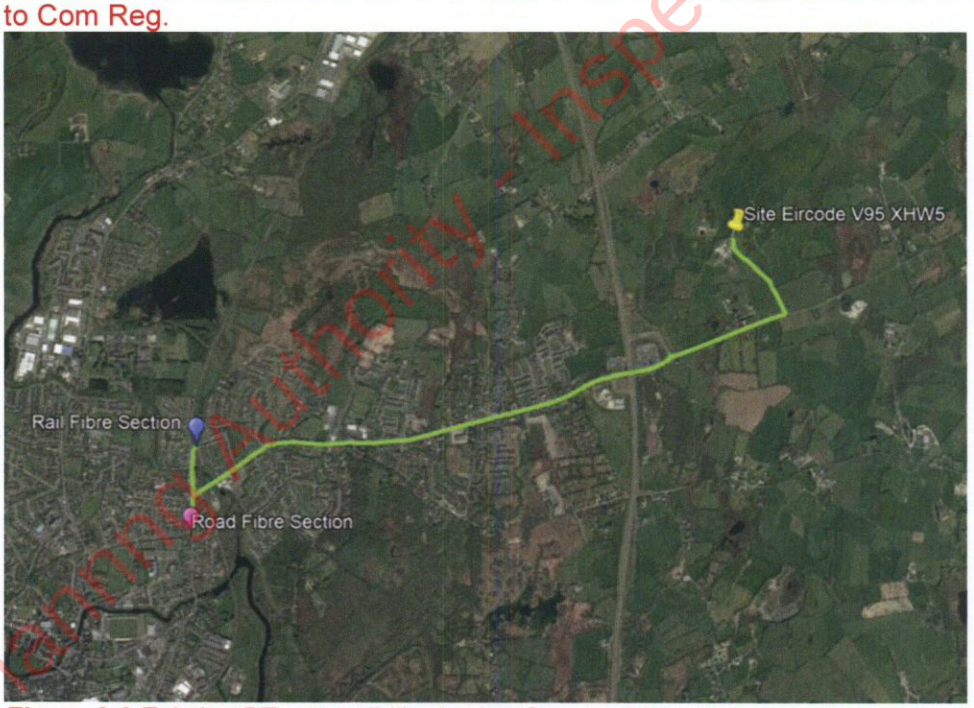



***Figure 2.6*** *Existing BT accessibility to site (Source: BT, 2022)*

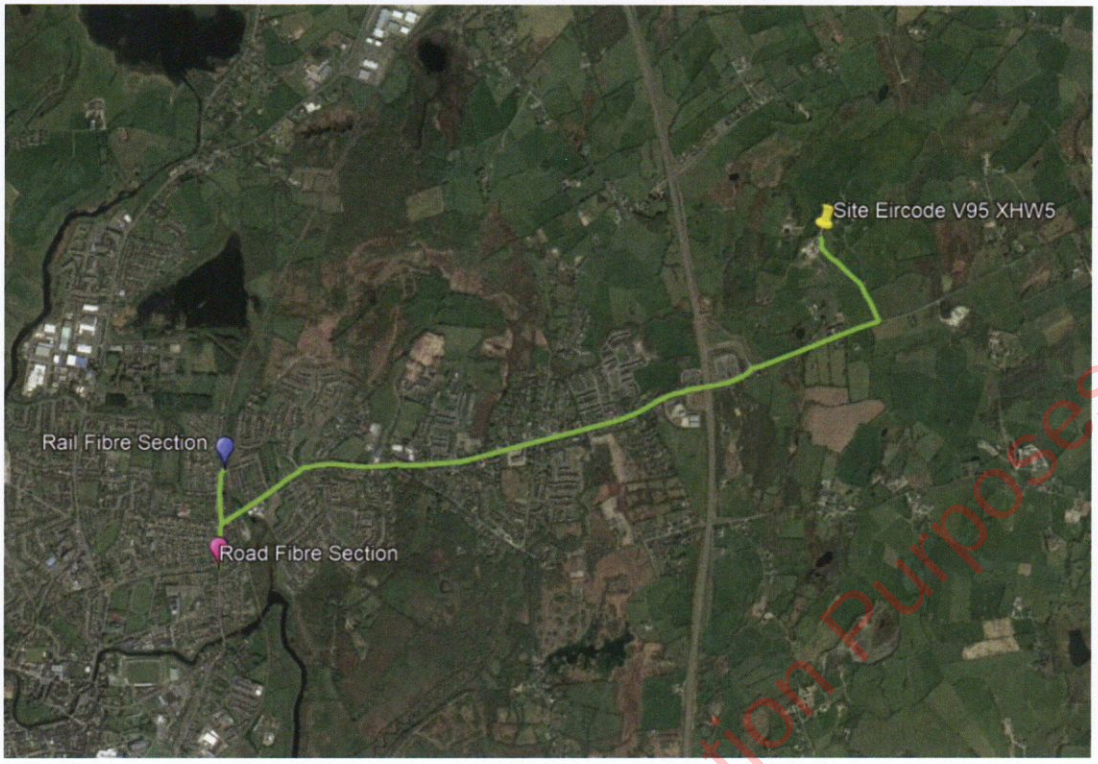



***Figure 2.7:*** *Potential BT accessibility to site (Source: BT, 2022)*

### 2.4.5 Natural Gas

The site is traversed by a high pressure Gas Networks Ireland gas pipeline. An AGI will be constructed to facilitate supply for the energy centre.

### 2.4.6 Roads and Site Access Road Infrastructure

The development site is currently accessed from Tulla Road directly to the south. The site has good connection to the M18/N18 national motorway that connects the cities of Limerick and Galway.

The main access to the proposed development site will be off the Tulla Road along the southern boundary, with a secondary access and egress for emergency use only off the Tulla road to the west of the main entrance. These entrances will connect to an internal road network that will serve two purposes public 24/7 access to the Vertical Farm, Sub stations, Energy Centre, and Gas AGI; and to provide a secure private road network circumnavigating the Data Centres for staff access, connection between buildings and for the delivery of equipment and materials.

The proposed access arrangements and potential traffic safety impacts are considered in Chapter 12 (Traffic and Transportation).

*Off Site Traffic Movements*

The proposed development will result in an increase in traffic owing to staff movements and the delivery of materials to and from the site during construction and the operational phase.

During the construction phase it is estimated that up to a maximum of 115 deliveries will be made to and from the site in any one day, with a daily average of 32 daily HGV

trips to and from the site forecast. At any one time it is estimated that up to 800 daily car trips will be generated by construction staff, with an average of approximately 400 forecast for the duration of the construction period. While these trip rates were adopted for the purpose of the assessment, it is intended that a significant proportion of construction staff will travel to the site by buses provided by the contractor, which will form one element of a construction traffic management plan, aimed at minimising traffic impacts during construction.

Data centres have a comparatively low level of traffic e.g. it is forecast that a total of 493 staff members will travel to/from the site each day when fully operational. With staff working shifts throughout the 24-hour period, it is forecast that a maximum of 256 staff will be on site at any one time. When fully operational it is forecast that 32 HGVs will visit the site per day.

The wider area has excellent links to the national primary routes. Further details in relation to the potential impact of the proposed development (construction and operation) in terms of traffic are presented in Chapter 12 Traffic and Transportation.

### 2.4.7 Fuel Oil

In the event of a loss of power supply, the emergency generators are designed to automatically activate and provide power to the data storage facility. The generators will be supplied by low sulphur diesel.

Fuel oil for the emergency generators is the only required bulk chemical required on site. Three of the six datacentres in their loading bay, will have up to 7 bunded above ground bulk storage tanks for fuel oil (440m$^3$ for three data storage facilities), distribution pumps, overground delivery pipeline to the belly tanks for diesel fired standby generators within each data storage facility.

All bunds will be capable of containing 110% of the volume of the largest drum/tank within the bund or 25% of the total volume of the substance stored and will designed in accordance with the EPA's guidelines for the storage and transfer of materials for scheduled activities (EPA, 2004). Fuel oil will be delivered to the site by HGV road tankers, with an average of three tankers expected to be travelling to and from the site per month. A dedicated tanker unloading area will be provided at each of these service yards which will be surrounded by a drainage channel to capture any run-off. A class 1 oil-water full retention separator will be installed to capture any oil in the run-off from the pad. Tanks will be fitted with high level alarms to reduce the potential for overfilling.

The energy centre will have back up fuel storage with up to 20 bunded above ground bulk storage tanks for fuel oil (total of 1,440m$^3$ of fuel oil). The total fuel store will be 2900 m$^3$ or 2,494 tonnes.

### 2.4.8 Lighting

External lighting – all of the service roads and pathways will be provided with low illumination levels of downward only lighting for use on an occasional basis, they will not be turned on normally and controlled from the gate house for specific usage. Vehicles coming to the site will use headlights to access the buildings. External plant areas will also be fitted with external lighting and task lighting sockets, but again these will be used for emergency maintenance support. There will also be lighting to the admin areas of each data centre building, so some limited spill of lighting will occur to the admin area facades, but this will be limited and all lighting

will be PIR controlled. In terms of security, the whole site will be covered by CCTV cameras but will not require external lighting to be on to operate, instead they will use infra-red coverage to allow the cameras to operate. Lighting is for safety reasons and not operational at night unless in an emergency and for site evacuation. There will be no light spill on any features suitable for bat foraging and commuting

## 2.5 SUSTAINABILITY MEASURES TO REDUCE ENERGY AND PROMOTE A LOW CARBON MODEL

The measures that are being proposed to reduce energy usage, promote a low carbon model and support sustainability are outlined in the Energy and Sustainability Statement prepared by Hurley Palmer Flatt and provided with planning. A summary is provided below.

*Data Centre Buildings*

- Cooling – the cooling systems are to be based on direct or indirect air handling plants which will maximise the use of external air to cool the internal areas of the data centre. This technique is recognised in the data centre industry as being one of the best and more efficient methods for cooling resulting in low Power Usage Efficiency (PUE) levels of below 1.2. During summer periods, it is recognised that temperatures could increase above allowable internal environmental limits, thereby requiring a peak lopping process using adiabatic cooling. This will require a water supply to each air handling unit, water demand will be dependent on the external wet bulb temperatures, which is only likely to be required for a few weeks in the summer periods. Extensive rainwater storage will be provided adjacent to each data centre building to meet as much of this peak demand, supplemented by town water supplies as required.
- Solar panels – PV panels will be installed on the roofs of each of the data centre buildings. Final proposed layout and quantum are being worked on now, but each system of PV panels will directly feed the electricity being consumed in each building
- Admin areas – each data centre building will have an admin area for limited office and support spaces. These occupied areas will be provided with heating and cooling systems and hot water generation, using air source heat pumps to reduce energy and carbon emissions. If heat recovery can be used from the heat generated in the data halls, then this will be used. In addition, wherever possible natural light will be provide via roof lights or "borrowed light".

*Site Wide Systems*

- Heat recovery use – this has been considered carefully. Recovery of the heat from the data halls in the data centre buildings is possible but it has to be recognised that the heat is relatively low grade at temperatures of around 30 to 40 degrees C. At these temperatures, transporting the heat any significant any distance (e.g. off-site) would further reduce the quality of the heat. To export heat off-site to say a local district heat network, the temperatures would need to be lifted to at least 60 degrees, this would require water based heat pumps (reverse cycle), but these will require further energy (electrical input) to allow the compressors to run to lift the temperatures. Given that there is no current or proposed use for the heat nearby to the site, alternative uses of the heat have been considered, this includes the inclusion of a "Vertical Farm" for growing high value plants etc. These farms require heating to the water and

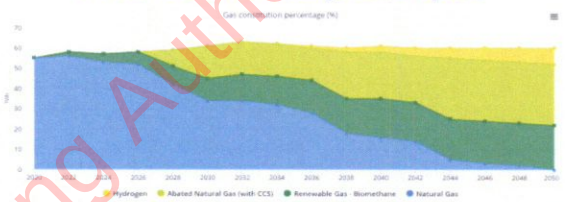
air used to support the plants to promote growth internally, and so the heat from the data centres would be ideal and would not require the temperatures to be elevated any further, so that no additional energy input is required.

- As outlined in the HDR Energy and Sustainability Statement (section 4.6.2 and 4.6.3), an assessment of the high-grade heat from the gas powered generators has been undertaken. This assessment shows that high grade heat could be exported to a local development such aas residential or other uses in need of heat such as residential or other uses. Given that there are no known exact locations selected for future district heating networks in the vicinity of the proposed development, a connection to a district heat network has not been included in the final proposals. However, what is proposed is to provide a set of flow and return pipes from the Energy Centre to the edge of the Art Data Centre to allow for onward connection by others to either a local user for heat or a future heat network.
- External lighting –Dark site as described above.
- SuDs systems are implemented throughout the site.

*Low Carbon Infrastructure*

- Initial Energy / Power Source – the site is to be provided with an 80MW+ connection to the existing Ennis Eirgrid substation, this will still leave capacity at the substation for growth of the Ennis town over at least 25 years. To facilitate this connectivity, the substation will be extended onto the data centre site as the existing site has insufficient space to be extended (it is islanded by the road network).
- Hydrogen Usage – the initial provision of generation on site will be based on using Natural Gas from Gas Networks Ireland (GNI). GNI have announced that they are already looking at injecting green or blue hydrogen into their network to improve their carbon impact, as per their Vision 2050. The graph below shows how the use of natural gas will reduce to 0% by 2050. The engines on-site will be specified to work on Natural Gas or Hydrogen or any mix in between in order to future proof the plant and to take the opportunity to reduce the carbon impact.

Our vision for a net zero carbon gas network by 2050



- Low Carbon Energy – Connecting to the Eirgrid network gives the opportunity to use low carbon energy that is now generated across the island of Ireland through wind generation and photo voltaic solar farms. These renewable sources of energy currently provide up to 40% of the total supply at any one time. This will increase significantly over the next decade or so as more and more renewable capacity is added to the network.
- On Site Generation – the connection to the existing Ennis substation is to be supplemented by gas powered generation in the energy centre to bring the total capacity to circa 200MW. The energy centre will be constructed as the data centre buildings come onstream, with the usage of the first 80MW supply being the priority. All of the gas engines will have SCRs fitted to their exhausts to reduce emissions to very low levels.

## 2.6 EXISTENCE OF THE PROJECT

Under the current Draft EPA Guidelines on the information to be contained in EIA Reports, the description of the existence of the project is required to define all aspects of the proposed lifecycle of the facility under the following headings:

- Description of Construction;
- Description of Commissioning;
- the Operation of the Project;
- Changes to the Project (including Decommissioning); and
- Description of Other Related Projects.

The following sections present a description of each of these aspects.

### 2.6.1 Description of Construction

The construction of the data storage facilities will comprise four main stages, namely;

- Site preparation works;
- Building Structure Construction;
- Building Envelop Construction; and
- Internal Fit Out (including Mechanical & Electrical (M&E)) and commissioning.

A brief description of the construction works proposed is set out below.

*Working Hours*

The construction of the facility will be completed during normal construction hours i.e. 8am to 6pm Monday to Friday. Work outside these hours will only occur in exceptional circumstances for specific tasks and subject to obtaining the agreement of the Planning Authority in that regard.

Staffing and traffic

The construction population on site will be c. 600 staff with an estimated peak of 1200 staff in year 2027 due to the overlap of phases of development. Site staff will include management, engineers, construction crews, supervisors and significant maintenance contractor employment. Based on a modest estimate that the average car occupancy will be 1.5 and no transport by bus, this will result in a maximum number of 800 cars generated by construction staff on site at any one time. It is estimated that 40% and 5% of the daily total will arrive at, and leave from the site during the AM peak hour from 08:00 to 09:00, with the reverse applying to the PM peak hour from 17:00 to 18:00. An Outline Travel Plan is provided with Chapter 12.

For each phase a maximum of 115 HGV trips will be generated to / from the site, with a daily average of 46 trips per day for Phase 1, 13 trips for Phase 2 and 23 trips for Phase 3, as set out in Chapter 12, Table 12.6.

#### 2.6.1.1 Site Preparation Works

The primary activities required during site preparation will be establishment of the contractors' compound and cutting and filling of various parts of the site to provide the necessary base level for construction. It is estimated that this will take approximately

6 months. Landscaping will be undertaken during the initial phase of construction to reduce visual impact.

The contractor compound and car parking for contractors will move as the development proceeds through the different phases. Planned locations are outlined in the CEMP and drawing ART-ARC-SP-00-DR-A-004. No off site parking is required. The compounds will provide office, portable sanitary facilities, equipment storage, parking etc for contractors for the duration of the works. The construction compounds will be fenced off for health and safety reasons so that access is restricted to authorised personnel only. Other works required will include surveying and setting out for structures, rerouting of services, vegetation removal, archaeological recording works and setting up of the construction site with fencing, site compounds etc.

In advance of site preparation, a strategy will be developed in order to efficiently move spoil generated from cutting excavations and soil imported to locations where landscaping is required around the facility Approximately 111,424 $m^3$ of material will need to be excavated and it is planned that all of the excavated material will be able to be retained and reused onsite for landscaping and fill. Landscaping will occur upon completion of the data centres and will include seeding of the construction car parks and hedgerow planting of the gaps that provided access to the car parks.

The contractor will be required to comply with the CEMP (surface water management and pollution prevention plan) provided with planning. Measures including fencing off and installation of silt fences around ecological buffer zones will be undertaken to prevent any works being undertaken in these areas or the discharge of silty water from works areas.

#### 2.6.1.2 Noise, Vibration and Dust Nuisance Prevention

With regard to construction activities, reference will be made to BS5228: Noise control on construction and open sites, which offers detailed guidance on the control of noise and vibration from demolition and construction activities. Mitigation measures will include the following:

- limiting the hours during which site activities are likely to create high levels of noise are permitted, e.g. soil/rock excavations (if required);
- establishing channels of communication between the contractor/developer, Local Authority and residents;
- appointing a site representative responsible for matters relating to noise, and;
- monitoring typical levels of noise during critical periods and at sensitive locations.

Noise control measures will be employed. These will include:

- selection of plant with low inherent potential for generation of noise;
- erection of barriers as necessary around items such as generators or high duty compressors, and;
- siting of noisy plant as far away from sensitive properties as permitted by site constraints.

The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these

locations. The majority of dust produced will be deposited close to the generated source.

In order to ensure that no dust nuisance occurs, a series of measures will be implemented.

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only.
- If required, any area/road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. Indeed, on any un-surfaced site road, this will be 15-20 kph, and on hard surfaced roads as site management dictates.
- In dry conditions vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust.
- Wheel washing facilities will be provided for vehicles exiting the site in order to ensure that mud and other wastes are not tracked onto public roads.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- If required, topsoil mounds will be seeded with grass to prevent dust blow off.
- At all times, these procedures will be strictly monitored and assessed. In the event of dust emissions occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

### 2.6.1.3 Water Discharges

Welfare facilities will be provided for the contractors on site during the construction works. These facilities may be connected to the existing foul drainage system on site or portable sanitary facilities will be provided with waste collected and disposed of appropriately.

Any surface water run-off collecting in excavations will likely contain a high sediment load. This will be diverted to settlement ponds and will not be allowed to directly discharge directly to open water courses.

### 2.6.1.4 Material Sourcing, Transportation and Storage

*Materials*

Key materials will include steel, concrete, glass, composite cladding, piping, electrical cabling, process equipment and architectural finishes. A 'Just In Time' delivery system will operate to minimise storage of materials on site.

*Sourcing*

Where possible it is proposed to source general construction materials from the local area to minimise transportation distances. Specialised data storage facility and energy centre equipment will likely be imported from abroad.

*Storage*

Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent contamination. Liquid materials will be stored within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage.

*Transportation*

Construction materials will be brought to site by road. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway. A description of likely transport routes is included in Chapter 12 traffic and transportation.

### 2.6.1.5 Building Construction Works

Once site preparation is completed, building construction and commissioning for construction and commissioning of each data storage facility will take up to 24 months with the total campus being developed based on client requirements over an estimated 7-year construction period.

*Foundations and Structure*

Following the completion of site preparation, all structures will require shallow spread foundations. The proposed depth of the excavations is anticipated to be 2-5m with piled foundations where required. Building structures will comprise structural steel frames with concrete floors on metal decks.

*Cut and Fill*

An estimate of the cut and fill requirement are as follows:

***Table 2.2*** *Cut and Fill*

| | Volume ($m^3$) |
|---|---|
| Cut | 107,376 |
| Fill | 211508 |
| Net imported material (granular material, concrete, capping, asphalt, topsoil ) | 104,131 |

Much of the excavated material will be re-used for landscaping works. Infill materials for construction will comprise clean inert fill and capping material etc.

*Waste Management during Construction*

Chapter 14 contains a detailed description of waste management relating to construction of the proposed development. An outline construction and demolition waste management plan is provided with planning. A more detailed Construction and Demolition Waste Management Plan will be prepared prior to construction by the contractor to ensure best practice is followed in the management of waste from the proposed development.

*Power Supply*

Power supply for the purposes of construction will be provided by a temporary grid feed of 10-15 MVA.

*Roads, Services and Landscaping*

The internal road system will initially be composed of hard cored material, rolled and compacted sufficiently to support initial construction including civil/structural sub grade works.

An early phase of landscape planting will be undertaken following the initial cut and filling works to include planting of trees in selected sensitive areas. Early growth and development in these areas will promote a good screening of construction works into operational phase.

Planting will be with native species and includes wild flower meadows to maximise opportunities for protecting biodiversity. There will be a loss of some existing hedgerows to facilitate development but the landscaping design will result in replacement of c. three times the existing extent of hedgerows. Details of the landscaping is provided In chapter 10

### 2.6.1.6 Construction Impacts and Mitigation Measures

Each of the following EIAR chapters (Chapters 3 to 15) include an assessment of the potential impact of construction works on the relevant aspects of the environment and set out the relevant mitigation measures relating to that aspects.

A detailed contractors Construction Environmental Management Plan (CEMP) will be put in place to ensure mitigation outlined in the CEMP and EIAR accompanying the application are implemented by the contractor during construction works. The CEMP will also include emergency response procedures in the event of a spill, leak, fire or other environmental incident related to construction. A copy of the CEMP is included with planning. The CEMP includes a Flood Risk Assessment, a surface water management and pollution prevention plan and a construction traffic management plan.

The primary potential impacts from construction which require mitigation are;

- Management of run-off water in terms of silt;
- Effects on the road network (due to construction workers and other staff attending site during preparation, construction and commissioning phases;
- Impacts on the flora and fauna of the site i.e. changes to site for construction resulting in loss of habitat, and;
- Impacts on human beings in terms of nuisances relating to the air quality of the environs due to dust and other particulate matter generated from excavation works and impacts on the noise environment due to plant and equipment involved in construction.

Mitigation measures to address potential impacts and are included in the CEMP and presented in each individual EIAR chapter.

### 2.6.2 Description of Commissioning

Once the physical structures are in place, specialist contractors will be mobilised to complete the commissioning of the data storage facility and energy centre. Commissioning is expected to take approximately 4 weeks per 4MW of IT Infrastructure. As the construction phase will be complete prior to commissioning, site construction staff will be demobilised.

### 2.6.3 Operation of the Project

The majority of this detail is provided in sections 2.3 to 2.5 above.

Once operational, each data storage facility will "go live" and serve data customers on an ongoing basis. The server systems and the supporting infrastructure will be monitored by site staff and faults identified and remedied as required. Staff are primarily required onsite for security, ongoing monitoring and maintenance of electrical equipment.

*Vertical Farming*

One of the primary outputs from the data centre buildings will be excess warm air which will be removed continually by motorised fans in the AHU system. All fans will have variable speed controls on fan motors. This warm air will be partially used to support the on-site vertical farm. The farm will generate 700 tonnes per year ( 13 per week) of products – mostly high value crops such as herbs.

*Operational Hours and Employment*

It is proposed that between 400- 450staff (and maintenance engineers) will be on site each day when the data centre and Energy Centre is fully operational. The vertical farm will have an additional 40 staff.

It is anticipated that the data centre facility will operate on 2 no. 12 hour shift basis (7am to 7pm, 7pm to 7am). Working hours are expected to be 24 hours a day, 7 days a week. The farm will operate on a single shift only.

*Waste Generation*

Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion into recycled products (e.g. paper mills and glass recycling). A more detailed description is provided in Chapter 14 Waste.

Chapter 14 contains a description of waste management relating to the proposed development. A detailed Operational Waste Management plan will be prepared in advance of the commencement of the activity at the site to ensure best practice is followed in the management of waste from the proposed development.

*Noise Generation*

Acoustic modelling has been undertaken to ensure compliance with noise guidelines. Mitigation is incorporated in the building structure (Chapter 10, Noise).

*Emissions to Air*

The Proposed Development (Data Centre and Energy Centre) will have a data centre with a total of 84 no. back-up generators with associated stacks which will be built to a height of 8 m above ground level. The energy centre will have 18 no. lean-burn natural gas engines, with the associated stacks built to a height of 25 m above ground level.

It is anticipated that the back-up diesel generators for the data storage buildings will rarely be used, however they will be maintained for emergency readiness by being tested once a month, two at a time sequentially i.e. each generator will be turned on once per month for one hour to maintain operational readiness when required waste exhaust gases will be vented to air via the stacks along the edge of the buildings. The diesel mode for the energy centre engines will also be tested. Each one will be turned on for a maximum of one hour, once per month.

Air dispersion modelling has been undertaken using the United States Environmental Protection Agency's regulated model AERMOD. The modelling of air emissions from the site was carried out to assess concentrations of pollutants at a variety of locations beyond the site boundary.

A number of modelling scenarios were investigated for the purposes of this assessment. Both normal day-to-day testing operations were considered as well as emergency operations. The assessment of the impact of these emissions and the modelling scenarios is presented in (Chapter 7 Air & Climate).

### 2.6.4 Changes to the Project (including Decommissioning)

It is intended that the proposed development will have a long lifespan. Regular maintenance and upgrading of the facility over time will enable it to continue to meet future demands.

Upon closure it is anticipated that the facility will be suitable for re-use or sold to a third party as would any other industrial site. All plant and equipment would simply be decommissioned, removed and recycled/disposed as appropriate.

At present, there are no changes anticipated to the proposed development over its expected lifetime.

### 2.6.5 Description of Other Related Projects

A list of the other developments in the vicinity of the Proposed Development is provided in Chapter 3 (Planning and Development Context) of this EIA Report. There are no identified significant projects which would result in a significant cumulative impact on the receiving environment

## 2.7 SUSTAINABILITY ENERGY EFFICIENCY & RESOURCE USE

The applicant is committed to running its business in the most environmentally friendly way possible. The proposed development has been designed to take into account these policies with energy efficiency central to the decision-making process, minimising power and water consumption. The measures that are being proposed to reduce energy usage, promote a low carbon model and support sustainability are outlined in the Energy and Sustainability Statement prepared by Hurley Palmer Flatt and provided with planning. A summary is provided above in section 2.4

## 2.8 HEALTH AND SAFETY

### 2.8.1 Design and Construction Health and Safety

The facility has been designed in accordance with the Safety Health and Welfare at Act 2005 and the Health and Safety and Welfare at Work (General Application) Regulations SI 299 of 2007 and associated regulations.

The plant has been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice and experience.

### 2.8.2 General Operational Health and Safety

Prior to start up a comprehensive set of operational health and safety procedures will be established (based on those used at other similar facilities). This will ensure a smooth roll out of operations at the facility.

## 2.9 MAJOR ACCIDENTS/DISASTERS

The 2014 EIA Directive and associated Draft EPA EIA Guidelines requires that the vulnerability of the project to major accidents, and/or natural disasters (such as earthquakes, landslides, flooding, sea level rise etc.) is considered in the EIA Report. The site has been assessed in relation to the following external natural disasters; landslides, seismic activity and volcanic activity and sea level rise/flooding as outlined below. The potential for major accidents to occur at the facility has also been considered with reference to Seveso/COMAH.

*Landslides, Seismic Activity and Volcanic Activity*

There is a negligible risk of landslides occurring at the site and in the immediate vicinity due to the topography and soil profile of the site and surrounding areas. There is no history of seismic activity in the vicinity of the site. There are no active volcanoes in Ireland so there is no risk of volcanic activity. Further detail is provided in Chapter 6 Land, Soils, Geology & Hydrogeology.

*Flooding/Sea Level Rise*

The potential risk of flooding on the site was also assessed. A Stage 1 Flood Risk Assessment was carried out and it was concluded that the area proposed for the data centre development is not at risk of flooding. Furthermore, it is not expected that the proposed development would adversely impact on flood risk for other neighbouring properties. Further detail is provided in Chapter 7 Hydrology The Flood Risk Assessment provided with planning ( Engineers Report).

*Seveso/COMAH*

The only substance stored on site controlled under Seveso/COMAH will be diesel for generators. The quantity of diesel which qualifies a given establishment for the application of lower-tier and upper-tier requirements under Directive 2012/18/EU is 2,500t and 25,000t respectively.

The development is proposed to store less than 2500t of diesel at any time and therefore the facility will not be a Seveso/COMAH facility. The only substance stored on site controlled under Seveso/COMAH will be diesel for generators and the amounts

proposed do not exceed the relevant thresholds of the Seveso directive. There are no SEVESO sites within the zone of Influence of the proposed development.

An Emergency Response Plan will be developed and implemented at the energy centre in consultation with local emergency services.

*Minor Accidents/Leaks*

There is a potential impact on the receiving environment as a result of minor accidents/leaks of fuel/oils during the construction and operational phases. However, the implementation of the design and mitigation measures set out in Chapters 6 and 7 and the CEMP will ensure the risk of an accident is low and that the residual effect on the environment is imperceptible.

## 2.10 POTENTIAL IMPACTS OF THE DEVELOPMENT

The proposed data storage development is to be located on lands zoned for a datacentre development.

The development, when operational, will generate limited additional traffic, air, noise and water emissions, wastes generation from activities etc.

During construction, there is the potential for nuisance impacts from traffic, dust, and noise, if not carefully managed. The Applicant will require contractors to undertake works in compliance with a Construction Environmental Management Plan (CEMP) provided with planning to ensure each of these potential impacts are minimised. The CEMP will include mitigation measures included in this EIAR.

Each chapter of this EIA Report assesses the potential impact of the construction and operation of these developments on the receiving environment. Please refer to each specialist EIA Report chapter respectively

### 2.10.1 Residual Impacts

The residual impacts of the proposed development following the implementation of mitigation measures have been addressed in each of the chapters.

### 2.10.2 Do Nothing Scenario

Each of the chapters addresses the Do-Nothing scenario as required in the EPA 2017 guidelines. The Do-Nothing scenario is to retain the site as greenfield and also considers future development due to zoning.

## 2.11 RELATED DEVELOPMENT AND POTENTIAL CUMULATIVE IMPACTS

The proposed development is for six data storage facilities and single storey energy centre on a greenfield site. These will be built on a phased basis to meet customer demand. On completion, the current site area will be fully built out. In each of the chapters, the impact of the entire planned development has been considered.

Cumulative impacts are those impacts that relate to incremental / additive impacts of the planned development in addition to historical, present or foreseeable future actions. Cumulative impacts can be considered as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second,

through the compounding effects as a result of the coming together of two or more effects.

The EPA guidelines (2017) defines cumulative impacts as "*The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects".* The guidance is clear this assessment is required because a single activity can have a minor impact on its own, however, when combined with other impacts (minor or significant), it can have a cumulative impact that is collectively significant. It may also be relevant to consider the possible potential environmental loadings resulting from the development of zoned lands in the planned project's immediate vicinity.

European Union guidance (2017) states that *"It is important to consider effects not in isolation, but together; that is, cumulatively."* Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from:

- *the interaction between all of the different Projects in the same area; and*
- *the interaction between the various impacts within a single Project*

Each specialist chapter considers the potential cumulative impact of the Proposed Development with the any future development (as far as practically possible) on the site and the cumulative impacts with developments in the locality (including planned and permitted developments). A list of the other developments considered is provided in Chapter 3 (Appendix 3.1) Planning and Development Context.