CLIENT: RED ADMIRAL DC LIMITED

PROJECT NAME: ADMIRAL

PROJECT DETAILS: PROPOSED DATA CENTRE FACILITY AND DECENTRALISED ENERGY RESOURCE, AT GNEEVEBANE, OLDTOWN, FARTHINGSTOWN, CASTLELOST, AND KILTOTAN & COLLINSTOWN CO. WESTMEATH

DOCUMENT: ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) (VOLUME 2)

DATE JULY 2025

PROJECT REF. SEP-0374

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1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared by Halston Environmental & Planning Limited (Halston) on behalf of Red Admiral DC Limited to support both a planning application to Westmeath County Council under Section 34 of the Planning and Development Act 2000, as amended, hereafter referred to as "the Act") and a planning application to An Coimisiún Pleanála (formerly An Bord Pleanála and hereafter referred to as "the Board") under Section 182A of the Act.

1.1 PROJECT OVERVIEW

The proposed project includes two main elements contained with an overall development boundary area of 243 hectares (ha), namely:

1. The Data Centre (DC) facility, comprising six two-storey Data Centre buildings, car parking, landscaping, drainage and other associated works. The DC facility will be constructed and secured within a secured 39ha campus. Each DC building will have a footprint of 13,978 m^2 (sqm) and have a gross floor area of 28,561 sqm. Each DC building will contain:

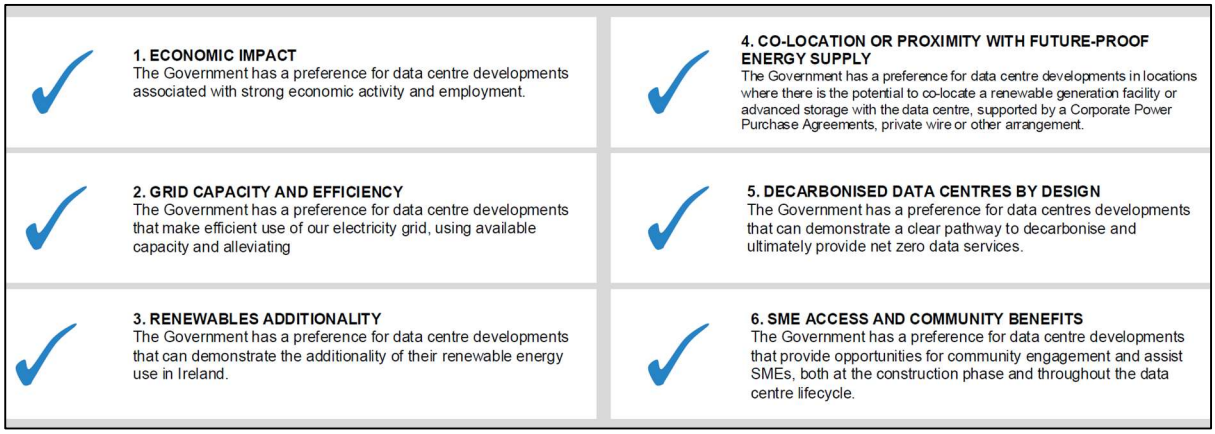
    (a) Data halls fitted with server racks and distribution units,
    (b) Mechanical and electrical (M&E) plant rooms /spaces which will house advanced cooling equipment, pumps, piping and medium voltage (MV) and low voltage (LV) switchgear, and
    (c) Administration and support areas including, reception, offices, meeting rooms and welfare facilities.

2. Decentralised Energy Resource (DER), which will be constructed on lands adjoining the DC facility. The DER incorporates several power assets which will generate, store and manage electricity close to the DC facility. The DER comprises the following assets:

    (a) Solid Oxide Fuel Cell (SOFC) Power System (hereafter referred to as Fuel Cell) – nominal capacity of 160MWe
    (b) Battery Energy Storage System (BESS) - nominal capacity of 250MWe
    (c) Solar PV farm - nominal capacity of 180MWp
    (d) Grid connection to the 220kV Castlelost GIS substation which adjoins the proposed development site.

The DER will optimise the use of these assets to support operations at the DC facility and provide clean, dedicated power that tracks the DC facility's load requirements. The project has been designed to conform with the Irish Government's *Principles for Sustainable Data-Centre Development*[1] which details a set of national principles that should inform and guide decisions on future data centre development.

Figure 1.1 Principles for Sustainable Data Centre Development



1.2 APPLICANT COMPANY

The Applicant Company, Red Admiral DC Limited, is part of the Lumcloon Energy group of companies which was established in November 2008 as a project development company which specialises in innovative and scalable clean energy and low carbon solutions. Based in Tullamore, County Offaly, Lumcloon Energy has become a pivotal developer, applying a practical approach to advancing transformative clean energy projects in Ireland. The company develops, owns, and operates some of Europe's largest clean energy resources. and is focused on new pathways between clean electricity and the broader economy.

1.3 PLANNING FRAMEWORK

Under the provisions of Section 37B of the Planning and Development Act 2000, as amended, (hereafter referred to as "the Act") the applicant made a pre-application request to the Board) to determine whether the proposed development constitutes Strategic Infrastructure Development (SID).

The Board decided that the proposed development does not meet the threshold set out in the Seventh Schedule of the Planning and Development Act 2000, as amended, and

[1] Government of Ireland, Department of Enterprise, Trade and Employment (2022) *Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy: Principles for Sustainable Data-Centre Development*. Dublin: Department of Enterprise, Trade and Employment.

therefore does not fall within the scope of section 37A (1) of the Act and that the planning application should be made to Westmeath County Council under section 34 of the Act.

Due to the fact that components of the DER include high voltage (HV) lines (where the voltage is 110 kilovolts or more) and associated electric plant, a separate statutory development consent process for this element pertains. Accordingly, the applicant made a pre-application request to the Board under section 182E of the Act and intends to submit a planning application to the Board for this element of the project.

This approach is expressly required by the Act and is standard practice where a single project combines both Section 34 (permission for development) and section 182A (electricity transmission lines) development.

The DC facility and DER together constitute the "project" for the purposes of Environmental Impact Assessment (EIA) and Appropriate Assessment (AA), and references to the "Project" in this EIAR should be read as references to the two components taken together as one project.

Figure 1.2 and Figure 1.3 below illustrates the extent of proposed development work associated with each planning application. Because the two components are physically interlinked, the same red-line planning boundary is used for both applications, and a single Environmental Impact Assessment Report (EIAR) has been prepared to address the effects of the entire project as proposed within the redline boundary.

1.4 SCOPING AND CONSULTATION

Pre-application planning consultation meetings in relation to the project were undertaken with the Board on 12 February 2025 (Case No. Ref. PC25M.321564) and 22 May 2025 (Case No. Ref. VC25M.322430) and with Westmeath County Council on 26 February 2025. Consultation, where appropriate, with relevant private and public agencies was undertaken by the various EIA specialists preparing each Chapter of the EIAR. Details of this consultation is provided within each Chapter of the EIAR.

In addition to the pre-application consultations with the planning authorities, consultation and statutory notification of the application to prescribed bodies (by letter and email) has been undertaken prior to the lodgement of the SID planning application.

Figure 1.2 Development Layout (Section 34 planning application)

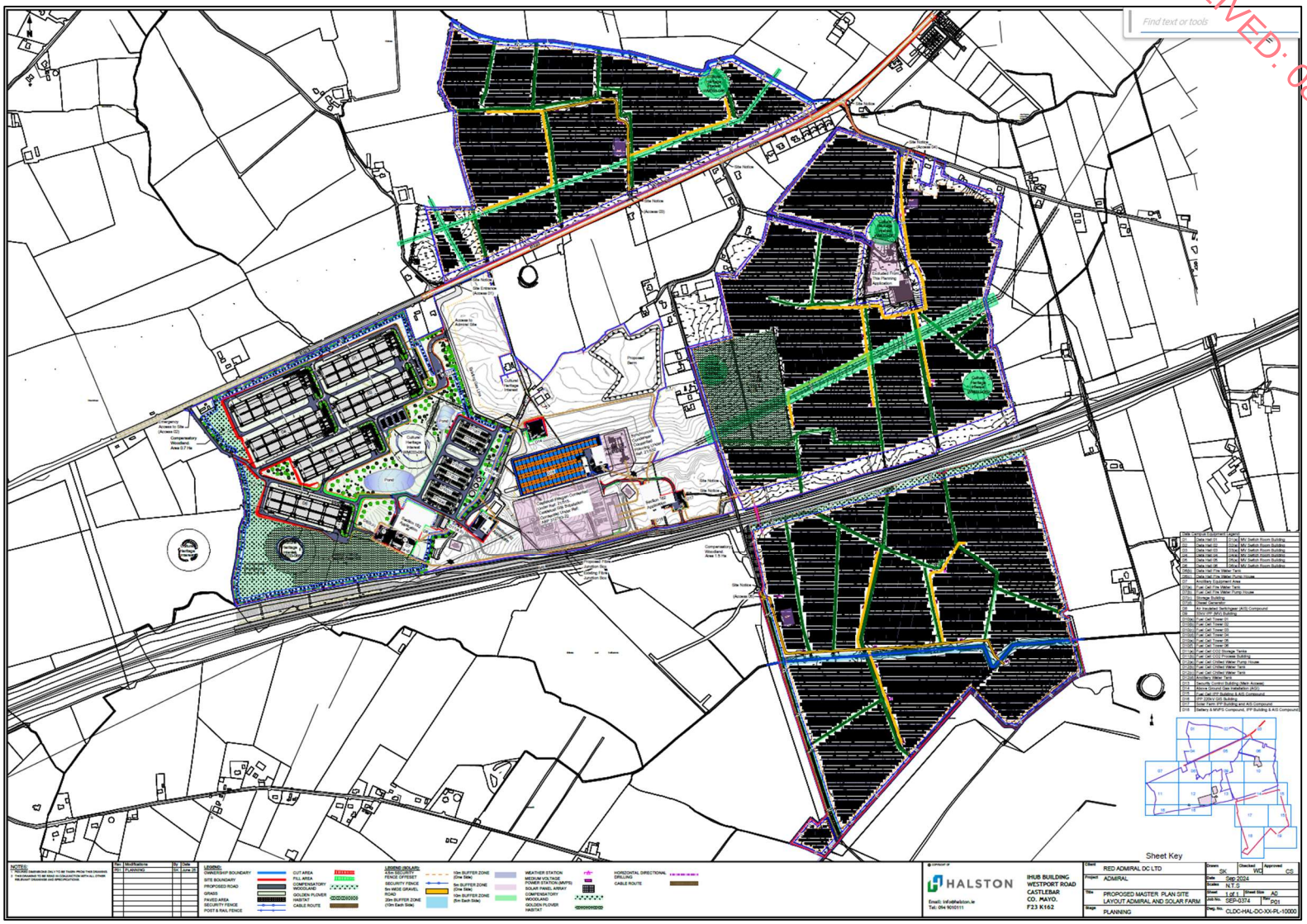
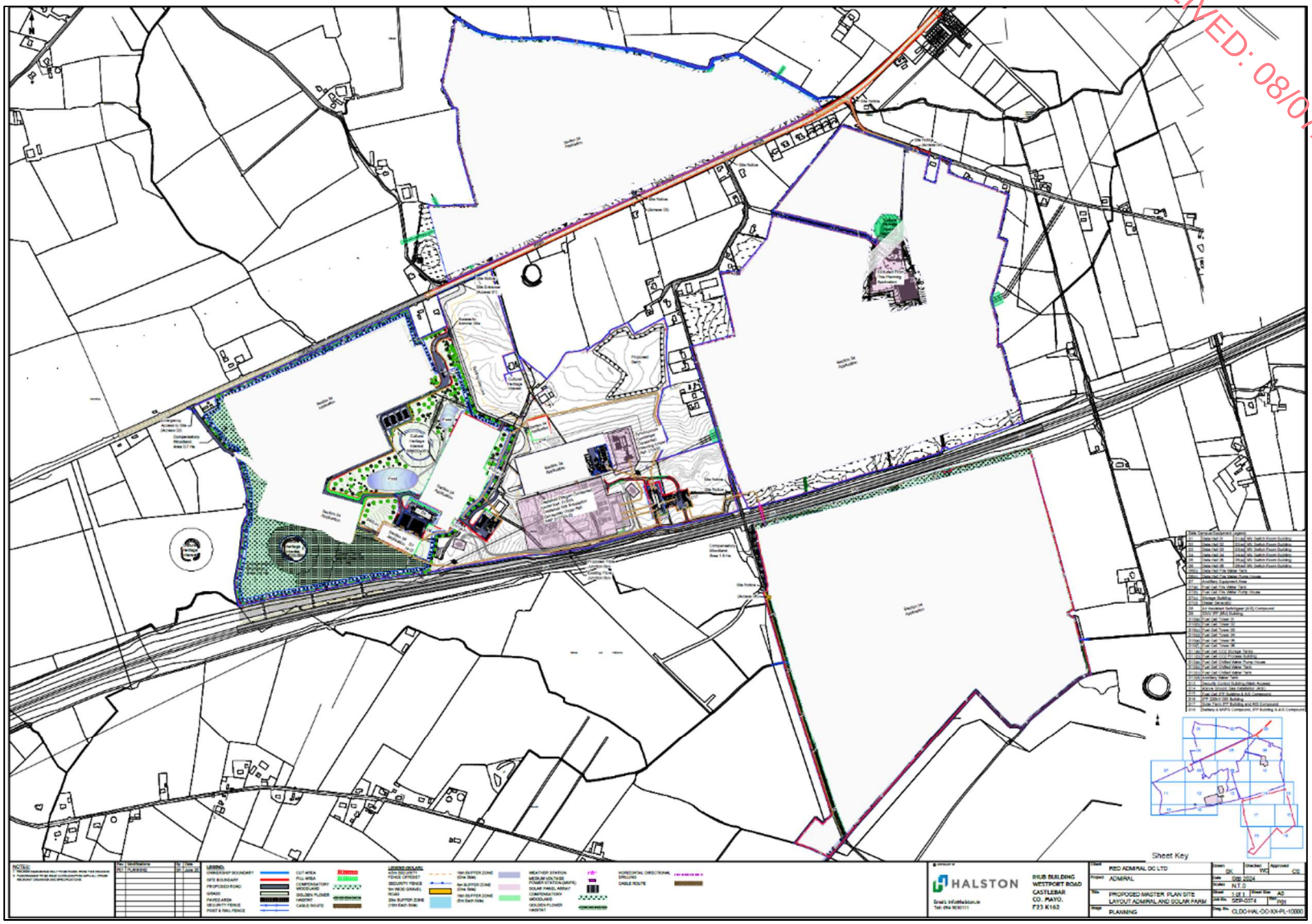


Figure 1.3 Development Layout (Section 182A planning application)



1.5 ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

1.5.1 THE REQUIREMENT FOR EIA

In Irish legislation, Section 172 of the Act establishes the requirement for an Environmental Impact Assessment (EIA), stating that:

"An environmental impact assessment shall be carried out by the planning authority or the Board, as the case may be, in respect of an application for consent for proposed development where either—

(a) the proposed development would be of a class specified in—

(i) Part 1 of Schedule 5 of the Planning and Development Regulations 2001, and either—

(I) such development would equal or exceed, as the case may be, any relevant quantity, area or other limit specified in that Part, or

(II) no quantity, area or other limit is specified in that Part in respect of the development concerned,

or

(ii) Part 2 of Schedule 5 of the Planning and Development Regulations 2001 and either—

(I) such development would equal or exceed, as the case may be, any relevant quantity, area or other limit specified in that Part, or

(II) no quantity, area or other limit is specified in that Part in respect of the development concerned,

or

(b) (i) the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 but does not equal or exceed, as the case may be, the relevant quantity, area or other limit specified in that Part, and

(ii) it is concluded, determined or decided, as the case may be by a planning authority that the proposed development is likely to have a significant effect on the environment."

The classes of development where an EIA is mandatory are specified in the Planning and Development Regulations 2001, as amended ("the Regulations") pursuant to Section 176 of the Act. The Regulations outline the regulatory framework for planning and development activities in Ireland and provide detailed procedures and requirements for various aspects of planning and development, including the need for Environmental Impact

Assessments (EIAs). Specifically, Schedule 5 of these regulations sets out specific thresholds for various types of projects. If a project exceeds these thresholds, an EIA must be carried out as a mandatory requirement. Where a project is of a type listed in the regulations but does not meet or exceed the applicable threshold then the likelihood of the project having significant effects on the environment should be assessment. Criteria to evaluate whether significant effects on the receiving environment will arise from a proposed development are listed under Schedule 7 of the Regulations.

Data-centre projects are not identified as a standalone class of development in Annex I or Annex II of the EIA Directive, nor in Schedule 5 of the Planning and Development Regulations 2001. Instead, they are treated as "urban development" within Class 10(b)(iv) of Part 2 of Schedule 5, which covers:

> *"Urban development that occupies more than 2 hectares in a business district, more than 10 hectares in the other parts of a built-up urban area, or more than 20 hectares elsewhere."*

For this project the relevant threshold is 20 hectares. As the site area exceeds that figure, the project automatically falls within the category of EIA development and requires a mandatory Environmental Impact Assessment.

1.5.2 THE ASSESSMENT APPROACH AND METHODOLOGY

EIA is the process of assessment of the effects of a project or development proposal on the environment. In the planning area, it is undertaken by a Planning Authority or the Board during the consideration of applications for planning permission, taking account of an Environmental Impact Assessment Report (EIAR).

The main objective of an EIA, as set out in Article 3(1) of the 2014 EIA Directive, is to identify, describe and assess the direct and indirect significant impacts of a proposed project in relation to the following environmental factors:

a) population and human health,
b) biodiversity, with particular emphasis on species and habitats protected under EU Directives,
c) land, soil, water, air and climate,
d) material assets, cultural heritage and the landscape, and
e) the interaction between the factors mentioned in (a - d).

This EIAR has been completed fully in accordance with Article 5(1) and the Directive 2014/52/EU and this is set out as follows in the 2022 EPA *"Guidelines on the information to be contained in Environmental Impact Assessment Reports"*,

a) *description of the project comprising information on the site, design, size and other relevant features of the project;*
b) *a description of the likely significant effects of the project on the environment;*
c) *a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*
d) *a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;*
e) *a non-technical summary of the information referred to in points (a) to (d); and*
f) *any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.*

Accordingly, this EIAR is a report or statement of the effects, if any, which the proposed project, if carried out, would have on the environment. The EIAR reports on the findings of the EIA process and informs the Planning Authority, statutory consultees, other interested parties and the public in general about the likely effects of the project on the environment.

As required by the EIA Directive, electronic notification was provided to the Department of Housing, Local Government and Heritage about the applications for inclusion on the EIA portal. A copy of the EIA notification receipts is provided in support of each of the planning applications.

1.5.3 FORMAT AND STRUCTURE OF THE EIAR

The EIAR has been prepared to satisfy the requirements of Schedule 6 of the EIA regulations – *"Information to be contained in EIAR"*. This EIAR is presented as three volumes:

- Volume 1 EIAR Non-Technical Summary (NTS)
- Volume 2 EIAR (Main Text)
- Volume 3 Appendices

Further details of this set out below:

1) **Volume 1 Non-Technical Summary**
2) **Volume 2 Environmental Impact Assessment Report (EIAR)**
   - Chapter 1 Introduction
   - Chapter 2 Description of the Proposed Development
   - Chapter 3 Need for the Development and Alternatives
   - Chapter 4 Planning and Policy
   - Chapter 5 Population and Human Health
   - Chapter 6 Biodiversity
   - Chapter 7 Soils and Geology
   - Chapter 8 Water Environment
   - Chapter 9 Material Assets
   - Chapter 10 Air Quality
   - Chapter 11 Noise and Vibration
   - Chapter 12 Landscape and Visual
   - Chapter 13 Traffic and Transport
   - Chapter 14 Archaeology and Cultural Heritage
   - Chapter 15 Climate
   - Chapter 16 Interactions

3) **Volume 3 Environmental Impact Assessment Report (EIAR) Appendices**
   - Appendix 1.1 Landowner Consent Letters
   - Appendix 1.2 An Bord Pleanála SID Pre-application Consultation Letters & EIA Portal Confirmation
   - Appendix 1.3 Applicant Consent Letters to Agent
   - Appendix 1.4 Uisce Éireann COF Letter
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1.5.4 EIAR PREPARATION AND CONTRIBUTORS

This EIAR has been prepared by Halston Environmental & Planning Limited (Halston), Unit 2, IHub Building, Westport Road, Castlebar, Co. Mayo Ireland, F23 K162, on behalf of the applicant. The Planning Application Stage Works were managed and coordinated by Mr Colm Staunton (Halston). Table 1.1 provides details of the author of each EIAR Chapter, and a statement of authority is provided below.

Table 1.1 List of EIAR Contributors

Chapter No.	EIAR Chapter[Note 1]	Contributor
1.	Introduction	Halston Environmental & Planning Ltd, IHub Building, Westport Road, Castlebar, Co. Mayo Ireland, F23 K162
2	Description of the Proposed Development	Halston Environmental & Planning Ltd, IHub Building, Westport Road, Castlebar, Co. Mayo Ireland, F23 K162
3	Need for the Development and Alternatives Examined	Halston Environmental & Planning Ltd, IHub Building, Westport Road, Castlebar, Co. Mayo Ireland, F23 K162
4	Planning and Policy	Halston Environmental & Planning Ltd, IHub Building, Westport Road, Castlebar, Co. Mayo Ireland, F23 K162

Chapter No.	EIAR Chapter[Note 1]	Contributor
5	Population & Human Health	Halston Environmental & Planning Ltd, IHub Building, Westport Road, Castlebar, Co. Mayo Ireland, F23 K162
6	Biodiversity	Moore Group and Eire Ecology 3 Gort na Rí, Athenry, Co. Galway
7	Soils and Geology	TMS Environment Ltd 53 Broomhill Drive, Tallaght, Dublin 24
8	Water Environment	TMS Environment Ltd 53 Broomhill Drive, Tallaght, Dublin 24
9	Material Assets	Halston Environmental & Planning Ltd IHub Building, Westport Road, Castlebar, Co. Mayo Ireland, F23 K162
10	Air Quality	TMS Environment Ltd 53 Broomhill Drive, Tallaght, Dublin 24
11	Noise and Vibration	Redkite Environmental Huntersmoon, Ballykeane Road, Redcross Co. Wicklow
12	Landscape and Visual	Macroworks Hibernia House, Cherrywood Business Park, Loughlinstown, Dublin 18
13	Traffic and Transport	Traffic Transport and Road Safety Associates Barran, Blacklion, Co. Cavan
14	Archaeology and Cultural Heritage	Archaeological Consultancy Services Unit (ACSU) 21 Boyne Business Park, Greenhills, Drogheda, Co. Louth, A92 DH99
15	Climate	TMS Environment Ltd 53 Broomhill Drive, Tallaght, Dublin 24
16	Interactions	All Contributors inputted and coordinated by Halston.

Note 1 Further information provided in Table 1.2

Other supporting specialist reports have been prepared in addition to, and in support of, certain Chapters of the EIAR.

Table 1.2 Supporting Specialist Reports

Chapter No.	EIAR Chapter	Assessment Report	Author
2	Description of the Proposed Development	Preliminary Construction Environmental Management Plan (CEMP)	Halston Environmental & Planning Ltd, IHub Building, Westport Road, Castlebar, Co. Mayo Ireland, F23 K162
		Decommissioning Plan	Halston Environmental & Planning Ltd, IHub Building, Westport Road, Castlebar, Co. Mayo Ireland, F23 K162
3	Need for the Development & Alternatives	Energy Statement and Approach to Sustainable Data Centre Development	Bitpower Energy Solutions, Dublin 7, D07 P9T0
		LEED and Life Cycle Assessment	Meehan Green, 15 Clanwilliam Terrace, Grand

Chapter No.	EIAR Chapter	Assessment Report	Author
			Canal Dock, Dublin, D02 AK51
5	Population and Human Health	Economic Assessment report	PMG Consult, Castlebar, Co. Mayo
		Outdoor Lighting Report	Daramack Exterior Lighting Design 21 Burandell Manor, Lisburn, Co. Antrim, BT28 3AX
6	Biodiversity	Bat and Bird Surveys	Eire Ecology Moyglass, Loughrea, Co. Galway
7.	Soils & Geology	Ground Investigation	Ground Investigations Ireland Ltd, Catherinestown House, Hazelhatch Road, Newcastle, Co. Dublin, D22 YD52
8	Waters	Flood Risk Assessment	Envirologic Unit 49 Baldoyle Industrial Estate, Baldoyle, Dublin 13
9	Material Assets	Telecommunications	Lumcloon Energy, Axis Business Park, Tullamore, Co. Offaly
10	Air Quality	Air Quality Dispersion Modelling Report	TMS Environment Ltd 53 Broomhill Drive, Tallaght, Dublin 24
12	Landscape and Visual	Glint and Glare Report and Photomontages	Macroworks Hibernia House, Cherrywood Business Park, Loughlinstown, Dublin 18

Article 5(3)(a) of amended Directive requires that the developer (applicant) shall ensure that the environmental impact assessment report (EIAR) is prepared by competent experts and that sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality.

This EIAR was prepared by Halston on behalf of the applicant. In accordance with EIA Regulations, Halston confirms that experts involved in the preparation of this EIAR are fully qualified and competent in their respective fields. Each expert has extensive proven expertise in the relevant field concerned, thus ensuring that the information provided herein is complete and of high quality. Details of the assessment team (including a short biography for each team member) and relevant company, as well as their respective inputs to the EIAR is presented below.

The EIA team was led and managed by Mr Colm Staunton, BSc., is the owner and founder of Halston Environmental & Planning Limited. Colm is a member and Certified Project Management Associate with the International Project Management Association (IPMA®).

Colm's experience predominantly relates to Environmental Planning, Project Management of Environmental Impact Assessments (EIA) and Environmental Due Diligence (EDD). Colm has a long track record of ensuring projects are delivered to a high quality and he has worked as an environmental consultant in Ireland for over 23 years of professional experience and is currently finishing a MSc in Spatial Planning at TUD. Through his professional career, Colm has gained the required expertise and project specific technical knowledge from working as lead consultant and a specialist within multidisciplinary teams, dealing with high profile planning applications and providing expert witness testimony at public enquiries, oral hearings, planning appeals and under oath in courts of law.

Colm has prepared and project managed environmental planning and licensing components for various types of large-scale development including, Powergen projects, Solar Farms, Power-to-Gas (P2G) projects, Biogas and Anaerobic Digestion (AD) projects, Biomass fuelled power plants, and grid connected Energy Storage System (ESS) projects. His academic and professional qualifications and ongoing academic studies in Spatial Planning coupled with his experience gained of delivering planning and licensing consents for small and large-scale complex projects ensures that he has sufficient; (a) knowledge of the specific tasks to be undertaken, (b) understanding of the project type and impacts which may arise, and (c) the experience and ability to fulfil the role and responsibilities required in carrying out duties and actions under the EIA Directive.

1.5.4.1 Biodiversity

This chapter was compiled by Mr Ger O'Donohoe M.Sc. of Moore Group providing information on habitats in the study area. Ger is the principal ecologist with Moore Group and has 30 years' experience in ecological impact assessment. He graduated from ATU Galway in 1993 with a B.Sc. in Applied Freshwater & Marine Biology and subsequently worked in environmental consultancy while completing an M.Sc. in Environmental Sciences, graduating from Trinity College, Dublin in 1999. (He also has over 15 years' experience of carrying out bat surveys and has completed the Bat Conservation Ireland, Bat Detector Workshop which is the standard training for the carrying out of bat surveys in Ireland and follows the Bat Conservation Ireland 'Bat Survey Guidelines' - Aughney *et al*., 2008'. In addition, Ger is an active member of the Galway Bat Group and Bat Conservation Ireland, which monitors bat populations in Ireland, and facilitates the education of bat communities to the public.

Éire Ecology was commissioned to carry out preliminary Bat and Bird Surveys. The work was undertaken by Mr John Curtin of Éire Ecology. John Curtin B.Sc. is the principal ecologist with Éire Ecology and has over 10 years of experience in ecological impact

assessment having conducted plant, habitats, birds, bats and mammal surveys since 2010 including at windfarm and solar sites. John conducted bird, bat and badger surveys. Shane O'Neill is an experienced ornithologist (Co-author Hen Harrier Survey, NPWS 2015) with a broad knowledge of breeding birds, waders and all aspects of ornithology. Shane has previously conducted I-WeBS surveys and taken part in the Shannon estuary wintering wader surveys. Laura Hynes has a degree in Wildlife Biology from MTU Kerry and has worked as an ecologist since 2022. Laura has worked as a Curlew officer for the NPWS.

1.5.4.2 Soils & Geology and Waters

The Soils & Geology and the Waters chapters have been prepared by Dr Nick Owen (B.Sc. Hons., M.Sc., Ph.D.), TMS Environment. Nick has over 15 years professional experience for various different types of development and has a doctorate in Geology along with over 15 years of postdoctoral experience in Earth and Environmental science.

These chapters of the EIAR were supported by a ground investigation assessment carried out by by Ground Investigations Ireland Ltd (GII) located at Catherinestown House, Newcastle, Co. Dublin. GII has a team of engineering geologists, geotechnical engineers and drillers who deliver intrusive ground investigations and environmental due-diligence services nationwide. Core field techniques include trial pitting, slit trenching, cable-percussion and rotary coring (Geobore-S), dynamic probing, window sampling, groundwater/gas monitoring and in-situ testing; samples are processed in the company's own laboratory for full geotechnical and contamination suites.

The Flood Risk Assessment report, supporting the waters chapter, was undertaken by Dr Colin O' Reilly, who is the founder and owner of Envirologic. Colin has over ten years of professional experience as a hydrogeologist, coupled with a doctorate degree (awarded by the Centre for Water Resources Research, School of Architecture, Landscape and Civil Engineering, University College Dublin) and academic research at postdoctoral level. Colin is an active member of the International Association of Hydrogeologists (Irish Group), having sat on the conference sub-committee between 2009-2012 and served as Conference Secretary in 2013 and 2014. Envirologic has key competencies in hydrogeology (groundwater) hydrology (surface water) and Flood Risk Assessments.

1.5.4.3 Material Assets and Population & Human Health

These Chapters of the EIAR were prepared by Colm Staunton (Details are provided above).

1.5.4.4 Need for the Development & Alternatives

The Energy Statement and Approach to Sustainable Data Centre Design was prepared by Bitpower Energy Solutions. Founded in 2017 by Mr David McAuley, a former SEAI energy specialist, Bitpower has worked with Industry and government over the past decade to bridge Ireland's fast-growing data-centre sector with the country's power and sustainability goal. Bitpower provides advise and guidance to various stakeholders including decarbonisation strategies and energy analysis and research reports for industry in Ireland.

The LEED Assessment and Life Cycle Assessment (LCA) was prepared by Meehan Green (MG), an accredited LEED Provider who specialise on high-performance LEED certification and whole-building life-cycle assessment (LCA). MR Cathal Heneghan, an Associate Director with MG, LEED AP BD+C & O+M, MSc, and Ms Kat Mazur a LEED and WELL AP were responsible for preparing the assessments. Both are experienced practitioners in a diverse range of projects have n-depth knowledge of sustainable design focusing on the three key areas of embodied energy (LCA), climate resilience and designing to achieve certification through the LEED (Leadership in Energy and Environmental Design) green building rating system.

1.5.4.5 Air Quality

This Chapter of the EIAR was prepared by Dr Imelda Shanahan TMS Environment Ltd who has over 30 years professional experience in preparing assessments of this type for various different types of development. Imelda has a BSc (Hons) in Chemistry from University College Dublin and a PhD in Physical Chemistry, she is a Chartered Chemist and a Fellow of the Institute of Chemistry of Ireland and a Fellow of the Royal Society of Chemistry. Imelda was assisted in the preparation of this chapter by Nathaniel Blue, also of TMS Environment Ltd who has four years of post-qualification experience in environmental assessment and holds a BS Environmental Science Seattle University and MSc Environmental Sciences Trinity College Dublin.

1.5.4.6 Noise and Vibration

This Chapter of the EIAR was undertaken by Ms. Siobhán Maher whose qualifications include a B.Sc. in Analytical Science, M.Tech. in Environmental Management and a post graduate Diploma in Acoustics and Noise Control Engineering. Siobhán is a full Member of the Institute of Acoustics (MIOA) since 2002, is a committee member since 2020 and is also a Member of the Association of Acoustic Consultants Ireland (AACI). Siobhán is the Managing Director of Redkite Environmental with over 20 years of experience providing

environmental consultancy and environmental assessment services to business, industry and public sectors. In acoustics, she has experience in a range of areas but primarily specialising in noise and vibration impact assessment for new and proposed developments, environmental noise monitoring and prediction modelling and development of mitigation measures for noise abatement and control.

1.5.4.7 Population and Human Health

The economic assessment report was prepared Mr Padraic McGuinness Bsc Econ, MPA, of PMG Consult who is experienced practitioner in the fields of economic and business consultancy. An Economist by profession, Padraic has worked across Ireland and the UK for the past 24 years on a variety of projects in the areas of economics, sector development, feasibility studies, strategy development and project management. Prior to setting up PMG Consult in 2005 Padraic worked for a number of major economics and management consultancy practices including DTZ Pieda Consulting and Strategem Ltd as well as some small niche players such as New Media Partners Ltd. Since establishing PMG Consult Padraic has concentrated mainly on Strategy development and Implementation and Project Management contracts for both the private sector and partnership-based clients in the public and community sector.

1.5.4.8 Landscape and Visual

This LVIA was prepared by Mr Cian Doughan, Associate Director at Macro Works Ltd of Cherrywood Business Park, Loughlinstown, Dublin 18; a consultancy firm specialising in Landscape and Visual Assessment and associated maps and graphics. Macro Works' relevant experience includes a broad range of infrastructural, renewable energy, industrial and commercial projects since 1999, including numerous urban, residential, and mixed-use development projects.

1.5.4.9 Traffic and Transport

This Chapter of the EIAR was undertaken by Mr Matthew Steele BA (Hons) MSc FCILT FRGS MCIHT, company director of Traffic Transport and Road Safety Associates Ltd (TTRSA) and an established specialist traffic and transportation consultant based in Ireland. Matthew: graduated from the University of Westminster in 1998, with a master's degree in Transport Planning and Management; is a Chartered Fellow of the Chartered Institute of Logistics and Transport; a fellow of the Royal Geographical Society; and a member of the Chartered Institution of Highways and Transportation. Matthew has extensive national and international experience, working on numerous traffic, transport and development related projects in the public and private sectors, including access studies; specialist input into

Strategic Environmental Assessments; and preparation of traffic and transportation related sections of Environmental Impact Assessments for specific schemes including extractive industries and energy related developments.

1.5.4.10 Cultural Heritage and Archaeology

This chapter was prepared by Mr Donald Murphy and Ms Magda Lyne of Archaeological Consultancy Services Unit. Donald Murphy (BA(Hons), MA, MIAI) is the founder and Managing Director of Archaeological Consultancy Services Unit Ltd, with over 30 years of experience as an archaeological consultant. Donald has completed EIARs for a variety of projects across Ireland and has managed the archaeological work in advance of several large infrastructural schemes, such as the M3 and M4 motorways. Magda Lyne (MA, MIAI) is an Archaeologist with over 15 years of experience. She specialises in research and report production, with extensive experience in preparing cultural heritage impact assessment chapters for Environmental Impact Assessment Reports (EIARs).

1.5.4.11 Climate

This Chapter of the EIAR was prepared by Mr Tom Ryan of TMS Environment Ltd who has over 20 years professional experience in environmental monitoring and consultancy. Tom specialises in Air Quality and Climate Impact Assessment, Noise and Vibration Impact Assessment and also works in Environmental Risk Assessment and Waste Management. Tom has an MSc. in Environmental Science, University College Cork (1995), a BSc. in Chemistry, University College Cork (1993) Certificate of Competency in the measurement and assessment of Occupational Noise (2000).

1.6 APPROPRIATE ASSESSMENT

Appropriate Assessment (AA) is an assessment carried out under Article 6(3) of the Habitats Directive. Article 6(3) of the Habitats Directive states:

> *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

Stage 1 AA screening of the projects was completed. A report for the purposes of Appropriate Assessment Screening has been completed for the project and is provided under separate cover in support of the planning applications.

1.7 PLANNING STAGE DESIGN AND ENGINEERING DRAWINGS

Design of the proposed development has been undertaken by Halston in association with the applicant company and with inputs from, but not limited to, all EIA specialists, Lally Engineering and various technology manufacturers and suppliers.

1.8 AUTHORISATIONS AND LICENSES

1.8.1 CRU AUTHORISATIONS AND LICENCES

The Electricity Regulation Act, 1999 as amended (the Act) gives the Commission for Regulation of Utilities (CRU) the necessary powers to licence and regulate the generation, distribution, transmission, and supply of electricity in Ireland. One of the functions of CRU under the Act is to grant or refuse Authorisations to Construct or Reconstruct generating stations and issue generation licences. Therefore, the applicant will, will in due course, apply to the CRU for the necessary authorisations and licences associated with the project.

1.8.2 EPA INDUSTRIAL EMISSIONS LICENSING

In accordance paragraph 2.1[2] of the First Schedule to the EPA Act 1992 as amended, the Reserve Gas-Fired Generator will require an Industrial Emissions Licence. When applying to the Environmental Protection Agency (EPA) for an Industrial Emissions licence a number of legislative requirements must be fulfilled. These are largely set out in:

- EPA (Industrial Emissions) (Licensing) Regulations, 2013 (S.I. No. 137 of 2013),
- European Union (Industrial Emissions) Regulations, 2013 (S.I. 138 of 2013),
- The EPA Act 1992, as amended.

The applicant will consult and apply, if necessary, to the EPA for an Industrial Emissions (IE) licence should the planning application for consent be successful.

1.9 GREENHOUSE GAS PERMIT

The EU emissions trading system applies to certain types of activity which produce greenhouse gases. The EPA has been given the responsibility for implementing the Emissions Trading Directive in Ireland. The Directive establishes an allowance-trading

[2] Combustion of fuels in installations with a total rated thermal input of 50 MW or more.

scheme for emission to promote reductions of greenhouse gases, in particular carbon dioxide. These activities are listed in Annex 1 of the EU ETS Directive. Annex 1 includes activities which involve combustion of fuels in installations with a total rated thermal input exceeding 20MW. Therefore, the applicant will consult and apply to the EPA for a greenhouse gas permit should the planning application for consent be successful.

1.10 ENERGY STATEMENT & APPROACH TO SUSTAINABLE DATA CENTRE DEVELOPMENT

An Energy Statement and Approach to Sustainable Data Centre Development has been prepared by Bitpower Energy Solutions to support this planning application. The study acknowledges the scale of the site which allows for development of a collocated decentralised energy system (DER). The report presents the results of modelled operational scenarios and calculates the annual energy and emissions characteristics based on grid and solar data for 2023. The model has inputted into design of the project and provides a rationale for making technology decisions and assisted with optimising the design. Key attributes of the project as outlined in the report are as follows:

1. The project is proposed by a proven utility developer with experience in the Irish energy system.
2. The project is designed to have no adverse impact on the national electricity grid.
3. The project is not in a constrained grid location and because of its proximity (adjoining) the Castlelost Flexgen Power Plant and GIS substation, no new powerlines are needed beyond the site boundary.
4. The proposed DER can help reduce national curtailment of renewables by offering flexibility – It can draw and store electricity at times of high wind generation using the 500 MWh Battery Energy Storage System (BESS) and it can operate off-grid.
5. The project provides at least a 9.7% improvement on emissions per kWh of electricity used, with up to 62.9% improvement at lower demand levels. The project is designed so that hourly emissions data can be monitored and reported.
6. The DER includes a 180 MWp of on-site renewable generation commercial-scale solar photovoltaic farm collocated at the DC facility site
7. The low emissions[3] Fuel Cell ensures efficient electricity generation (58.5%) on site using electro chemical conversion, which converts chemical energy into electricity without combustion. Total efficiencies are further increased (~80%) when exhaust heat is recovered and used for cooling functions at the DC facility. The Fuel Cell

[3] Eliminates NOx, SOx and particulate matter emissions that arise from combustion-based generation and produces lower CO_2 emissions than conventional natural gas turbines or other fossil fuel base generators.

technology allows for a smooth transition for integration and use of renewable gas (such as biomethane) and blends of hydrogen in the gas network.

1.11 LEED AND LIFECYCLE ASSESSMENT (LCA)

To inform the design, project undertook LEED pre-assessment to assist with LEED certification under the LEED BD+C v4 Rating System for Data Centres. The project pursues LEED Campus Approach, which is tailored for the projects involving multiple buildings within a single development site. Campus approach allows for efficiency in certification process as shared site features (e.g., stormwater management, landscaping, renewable energy, parking) can be documented once and applied across multiple buildings. The LEED assessment report is contained in Appendix 3.2. To alignment with the project's commitment to evaluate every design alternative against technical feasibility, environmental performance, efficiency, security, reliability and cost, a dedicated piece of embodied-carbon modelling was undertaken. The exercise complements the Energy Statement and Sustainable Data-Centre Development Plan which supports this this planning application and, together with the DER strategy, provides a full picture of how the scheme will minimise greenhouse-gas (GHG) emissions across both construction and operation.

1.12 ECONOMIC STATEMENT

An Economic Assessment report has been prepared by PMG Consult to support this planning application. The project will provide between 600-650 monthly construction jobs over the five-year construction period and up to 440 workers will be directly employed during operations across the DC facility and DER. The report forecast project will deliver a significant economic contribution to the Local and Midlands regional economy including annual gross value added (GVA)[4] of €118m to the economy.

1.13 AVAILABILITY OF INFORMATION & DIFFICULTIES ENCOUNTERED

There were no significant difficulties encountered in the preparation of the EIAR.

[4] Gross Value Added (GVA) represents the project's total annual economic contribution, including the additional circulation of investment throughout the local and regional economy. By capturing these spending "multiplier" effects, GVA also serves as a proxy for the indirect and induced jobs sustained during the scheme's operational phase.

Figure 1.4 Site Layout showing DC Facility and DER

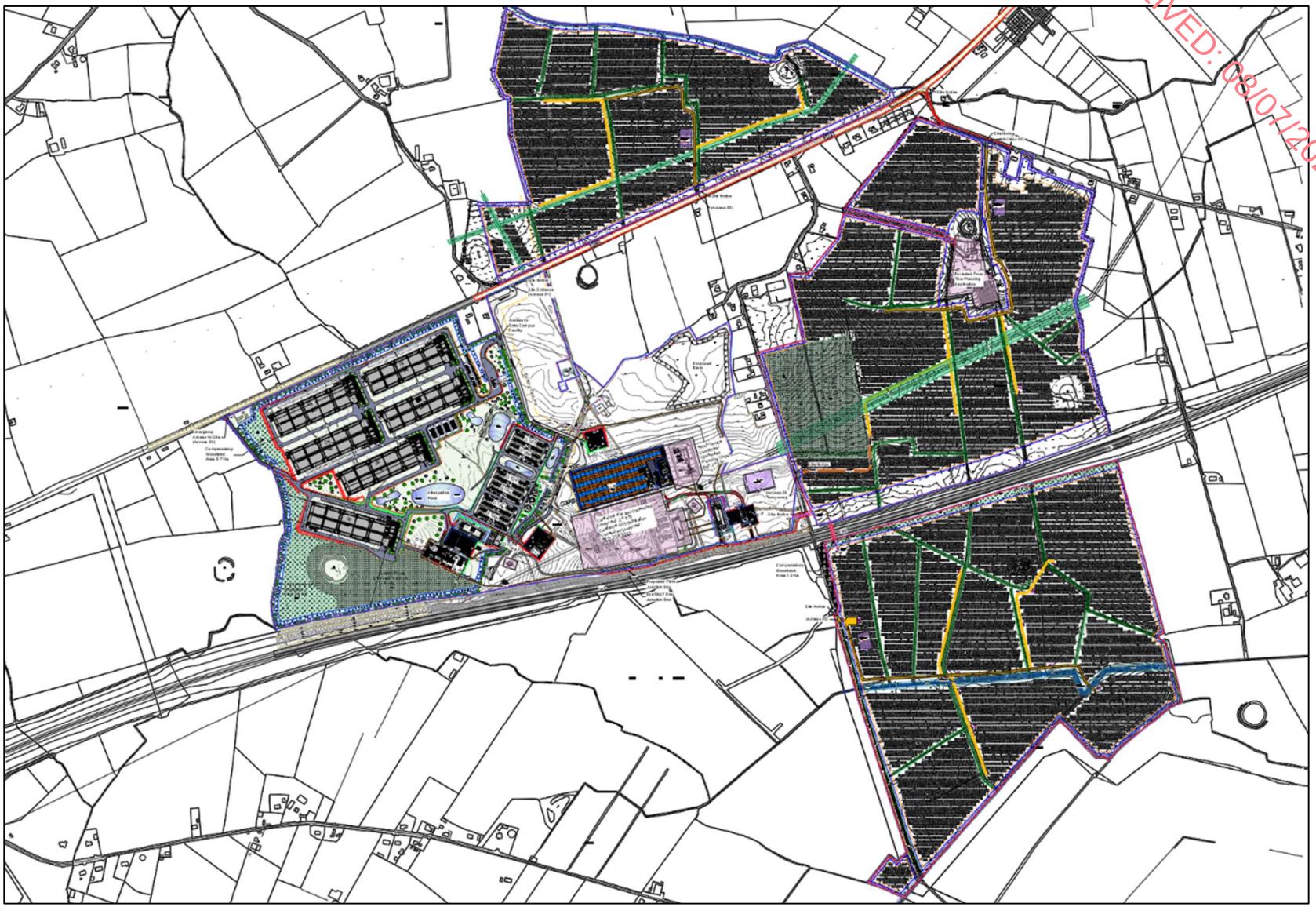


Figure 1.5 Landscape and Biodiversity Mitigation Plan – DC Facility and Western Part of DER)

Figure 1.6 Landscape and Biodiversity Mitigation Plan – Solar Farm

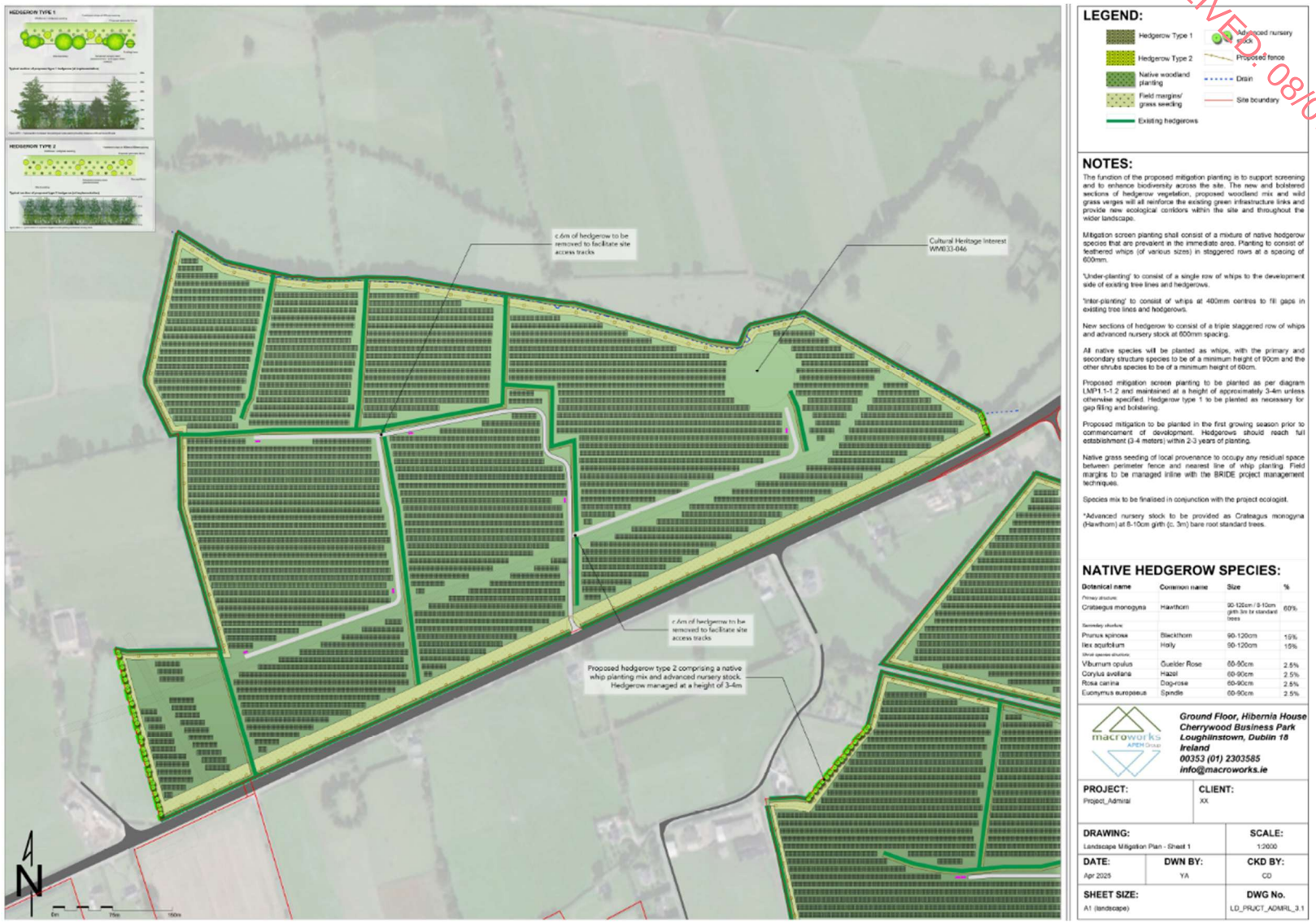


Figure 1.7 Landscape and Biodiversity Mitigation Plan – Solar Farm

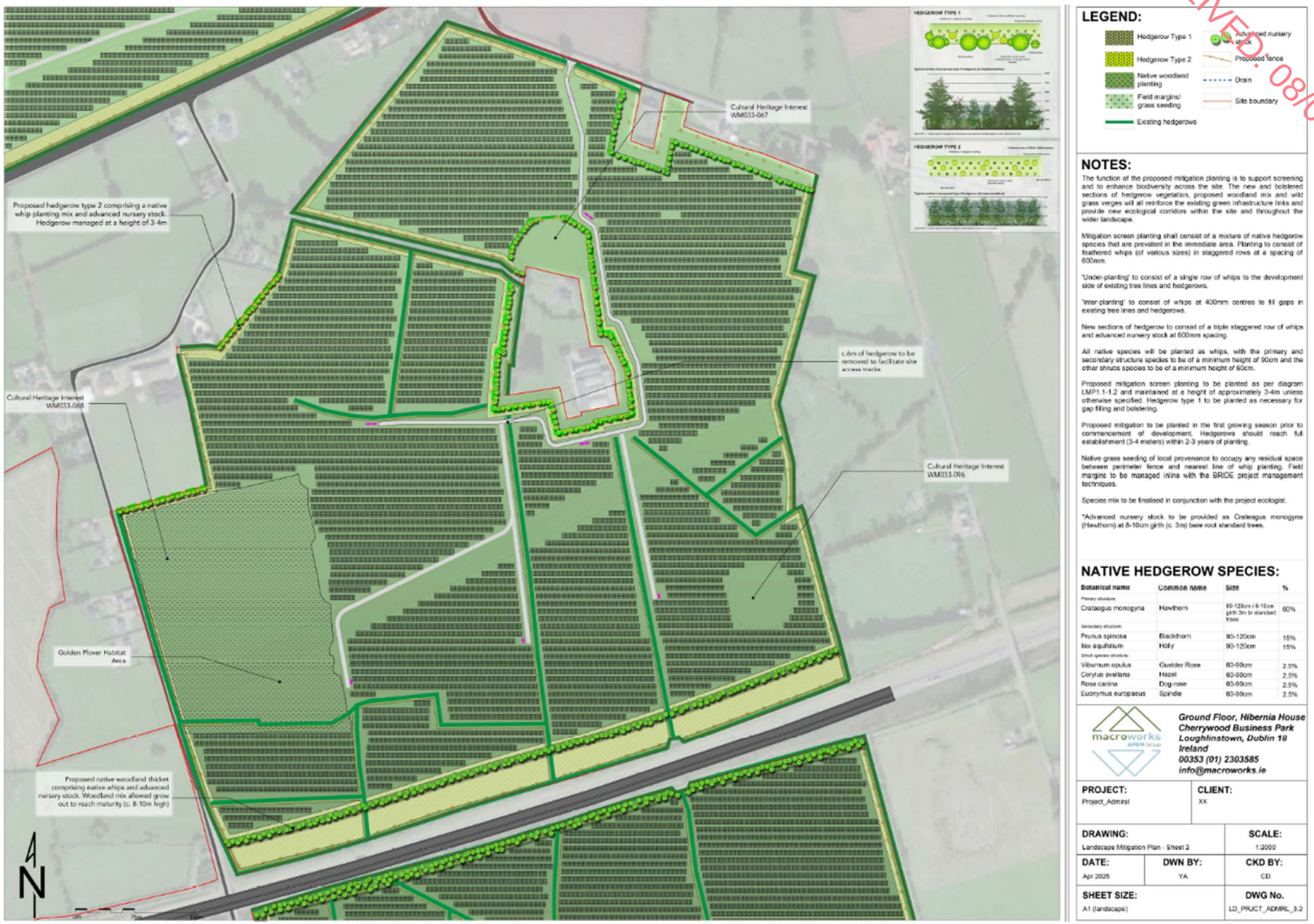


Figure 1.8 Landscape and Biodiversity Mitigation Plan – Solar Farm

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 INTRODUCTION

This chapter of the EIAR provides of a description of the Project in line with the requirements of the EIA Directive and implementing regulations, and the Environmental Protection Agency (EPA) *Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)* (May 2022).

This chapter should be read in conjunction with the design drawings included in Volume III which comprise of selected design drawings of the Project. Furthermore, the EIAR should be read in conjunction with the planning application submission(s) including all documentation, supporting materials and full drawing pack.

As set out in Chapter 1, the Admiral Project includes two main elements, namely:

1. The Data Centre (DC) facility, comprising six two-storey Data Centre buildings, car parking, landscaping, drainage and other associated works. The DC facility will be constructed and secured within a 39ha campus. Each DC building will have a footprint of 13,978 m^2 (sqm) and have a gross floor area of 28,561 sqm. Each DC building will contain:

    (a) Data halls fitted with server racks and distribution units,

    (b) Mechanical and electrical (M&E) plant rooms /spaces which will house advanced cooling equipment, pumps, piping and medium voltage (MV) and low voltage (LV) switchgear, and

    (c) Administration and support areas including, reception, offices, meeting rooms and welfare facilities.

2. Decentralised Energy Resource (DER), which will be constructed across approximately 200ha of lands adjoining the DC facility. The DER incorporates several power assets which will generate, store and manage electricity close to the DC facility. The DER comprises the following assets:

    (a) Fuel Cell Power System – 160MW,

    (b) Battery Energy Storage System (BESS) – 250MW,

    (c) Solar PV farm (nominal 180MWp), and

    (d) Grid connection to the 220kV Castlelost GIS substation, which adjoins the proposed development site.

The DER will optimise the use of these assets to support operations at the DC facility and provide clean, dedicated power that tracks the DC facility's load requirements. The project has been designed to conform with the Irish Government's *Principles for Sustainable Data-Centre Development*[5] which details a set of national principles that should inform and guide decisions on future data centre development.

The DC facility and DER together constitute the "project" for the purposes of Environmental Impact Assessment (EIA) and Appropriate Assessment (AA), and references to the "Project" in this EIAR should be read as references to the two applications taken together as one project.

2.2 DESCRIPTION OF LOCATION AND CONTEXT

The proposed project location occupies a strategic position in the Eastern and Midlands region of Ireland. The project site lies midway between the villages of Rochfortbridge and Tyrrellspass and within the Eastern and Midland Regional Assembly's "*Dublin Hinterland*" growth belt. The overall c.243ha project site incorporates lands in the townlands of, Gneevebane, Oldtown, Farthingstown, Castlelost and Kiltotan and Collinstown in the south of County Westmeath, approximately 76km from Dublin city centre and 100km from Galway.

The M6 provides direct motorway access from the development to Dublin and Galway (Junction 3 Rochfortbridge and Junction 4 Tyrrellspass /N52). The R446 regional road (former N6) runs parallel and north of the M6 linking the village of Tyrrellspass and Rochfortbridge. The road was downgraded to a regional road after the M6 was opened and offers an alternative route between Galway and Dublin. The N52 national secondary road routes north from Junction 4 Tyrrellspass (2km west of the development site) connecting Dundalk to Nenagh. It is an important link between the northeast and mid-west of Ireland, providing a route through the midlands. The R400 regional road connects Rochfortbridge to Edenderry and the M4.

The project location and relationship to the regions principal towns as summarised below fits comfortably within the spatial hierarchy of the Eastern and Midlands Regional Assembly (EMRA) Regional Spatial & Economic Strategy (RSES), enabling balanced regional growth.

- Athlone (Regional Growth Centre) lies 50 km west: a key node between Dublin and Galway on the River Shannon, Athlone has direct national connectivity to

[5] Government of Ireland, Department of Enterprise, Trade and Employment (2022) *Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy: Principles for Sustainable Data-Centre Development*. Dublin: Department of Enterprise, Trade and Employment.

towns such as Longford, Mullingar, Tullamore, Maynooth, Portlaoise, Ballinasloe and Roscommon. Due to its scale of population, employment and services, Athlone acts as a key regional centre for an extensive catchment that extends into the Northern and Western Region.

- Mullingar (Gateway Region Key Town), the county town of Wesmeath, is 16km to the north-east and operates as a strong economic driver in the region covering a relatively wide catchment. Mullingar is strategically located on the N4/M4 from Dublin to Sligo, with a national road the N55 to Athlone in proximity. The town is located on the Dublin to Sligo rail line.
- Tullamore (Gateway Region Key Town) is 25km to the south-east and acts as a key population and employment centre for the surrounding hinterland. It is located on the Dublin to Galway rail line, in close proximity to the M6 Dublin/Galway Motorway. The town has a high ratio of jobs to resident workers, reflecting its role as an employment centre and the extent of its area of influence. Continued employment and population growth coupled with placemaking and regeneration are key priorities for Tullamore, as identified in the EMRA RSES, 2019-2031.
- Maynooth (Gateway Region Key Town), is 52km east of the site and extends the corridor to the edge of the Dublin Metropolitan Area, reinforcing the logic of locating new "step-out" investment along high-capacity, multi-modal corridors.
- Kinnegad (Self-Sustaining Growth Town) is 16km east of the site and is strategically located at the junction of the M4 and M6, Kinnegad has witnessed a significant increase in population in recent decades

The development lands are greenfield and described as agricultural farmland laid out in medium to large-sized, geometric fields enclosed by dense, mature hedgerows. The development lands share the gently undulating topography typical of the Midlands low plateau, ranging from c. 90m OD in the south-east and rising to c. 120m OD in the north-west (close to the R446). The highest feature in the general area of the site is Croghan Hill (234 m OD), which is located approximately 6.3km southeast of the site.

According to 2022 Census data, the population of the village of Rochfortbridge is 1,511 and a population of 524 was recorded in the village of Tyrrellspass. Outside these villages, settlement is dispersed and linear, comprising single dwellings and small clusters strung along the R446, R400 N52 and a network of local roads.

The M6 motorway runs defines the southern boundary of the DC facility campus and the R446 regional road defines the northern boundary of campus. The Fuel Cell and BESS power assets of the DER extend east from the DC facility and are positioned on lands surrounding the Castlelost Flexgen Plant and GIS Substation. The Solar PV asset is located

east of the L51251 public road and contains solar photovoltaic (PV) panels on ground mounted frames /support structures positioned with existing field boundaries. The Solar PV farm extends to lands south of the M6 motorway and to lands north of the R446 regional road.

The Castlelost Flexgen Plant, which adjoins the development lands, comprise five (5no.) open cycle gas turbine (OCGT) electrical generating units, totalling approximately 275MWe (megawatts electrical), ancillary plant, buildings and infrastructure. The Flexgen Plant, which is under construction and due to be completed in Q3 of 2025, is designed to operate intermittently and provide generating capacity by combusting natural gas and provided power to the electricity system during periods of high demand or when renewable energy cannot meet demand. The Flexgen Plant is connected to the electricity system via the newly constructed Castlelost 220kV Gas GIS substation.

Figure 2.1 Aerial View of the Castlelost Flexgen and GIS Substation (June 2025)

The development site includes for the demolition and removal of minor agricultural buildings and associated outhouses and farm sheds (see Figure 2.2 to Figure 2.6) within the site.

Figure 2.2 Drawing of sheds and outhouses to be demolished

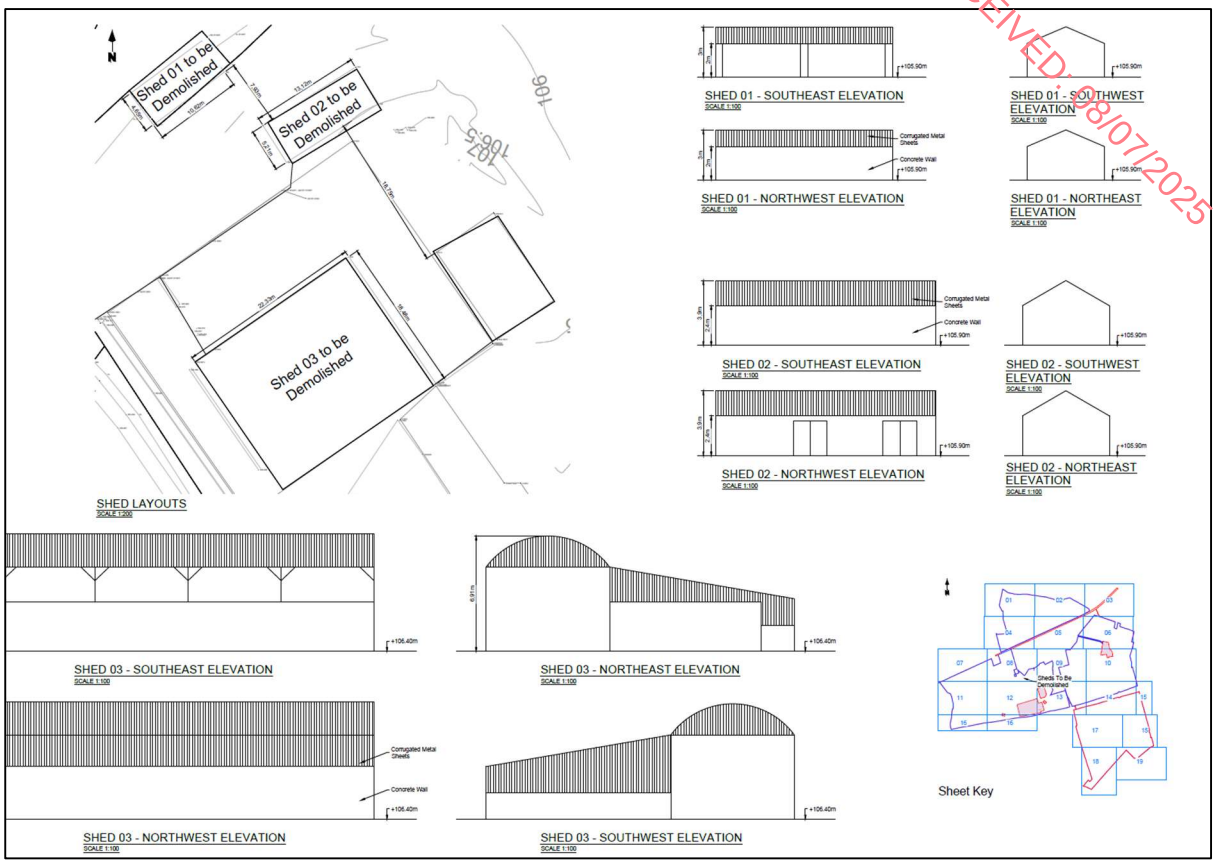


Figure 2.3 Photograph of sheds and outhouses to be demolished

Figure 2.4 Drawing of Derelict dwelling to be demolished

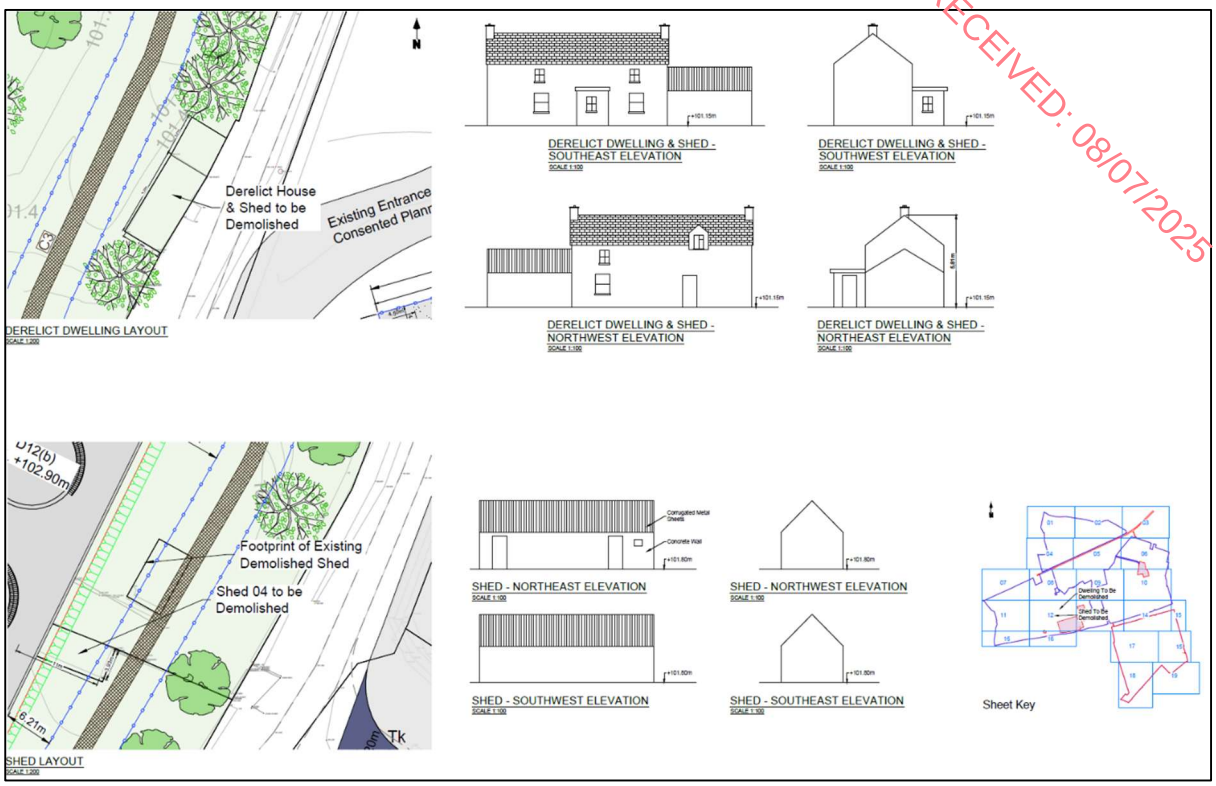


Figure 2.5 Photograph of derelict dwelling to be demolished

Figure 2.6 Photograph shed and derelict structure to be demolished

Figure 2.7 Site Location (1:50,000)

Figure 2.8 Site Location Map (1:2,500)

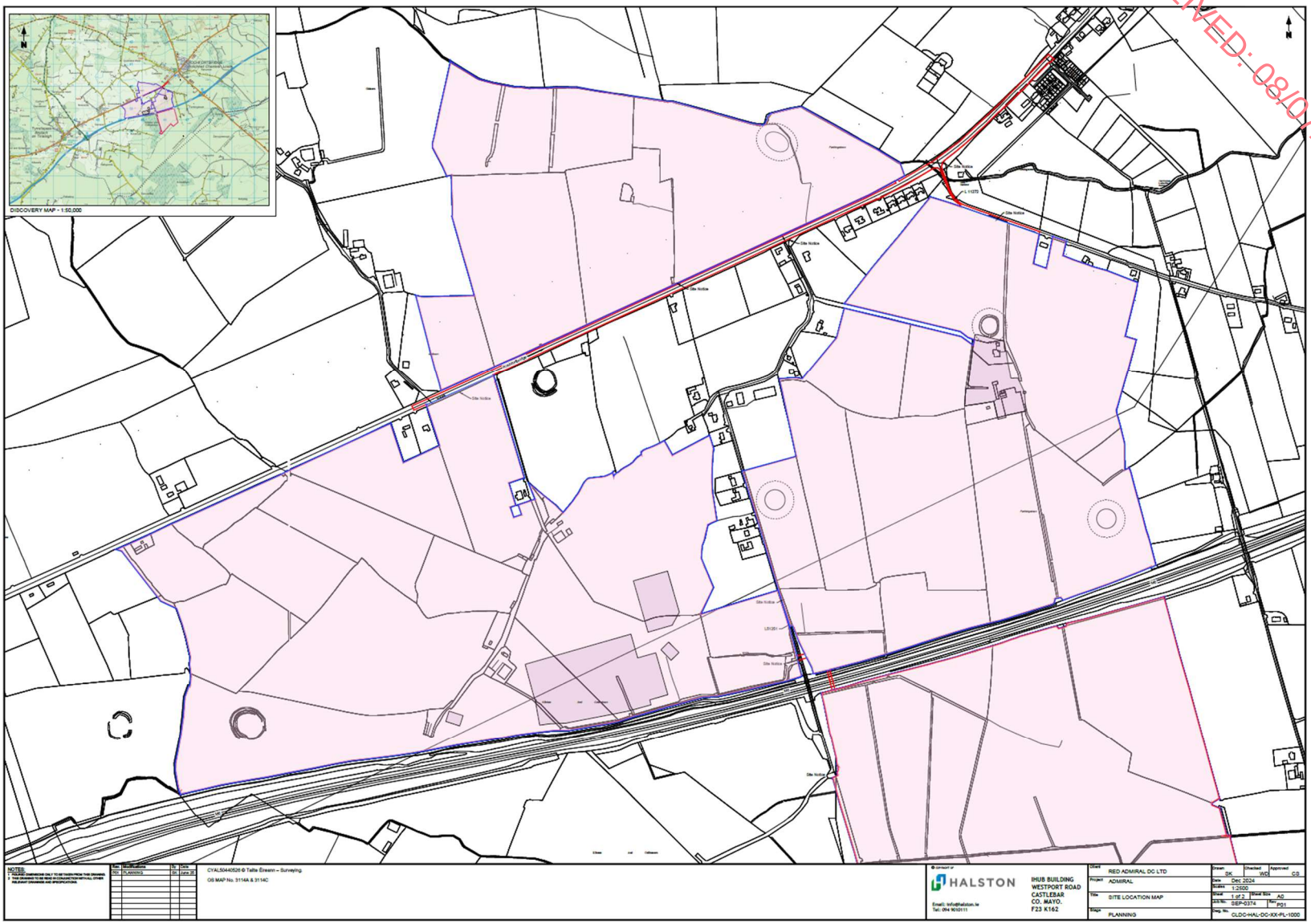
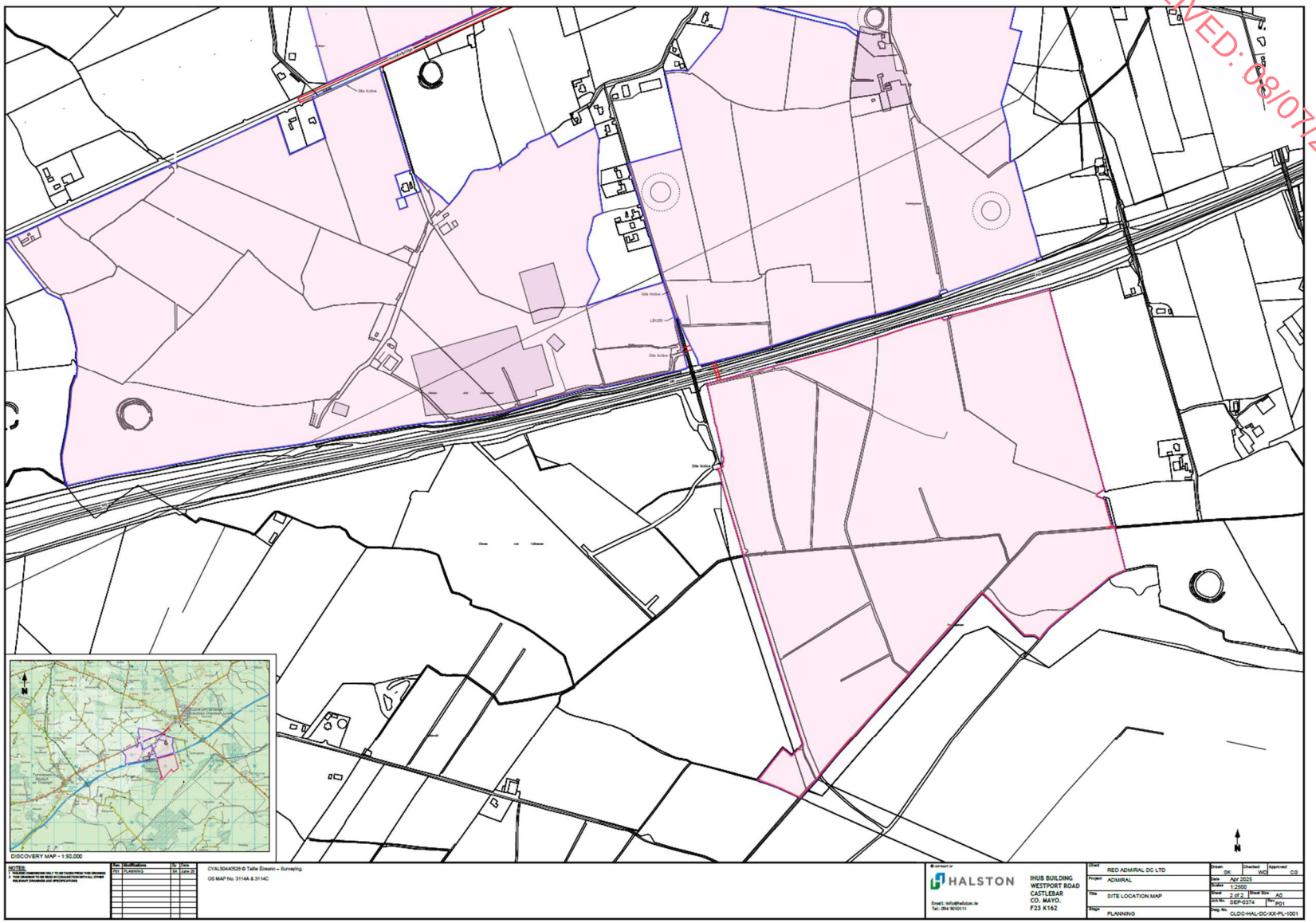


Figure 2.9 Site Location Map (1:2,500)



2.3 DESCRIPTION OF DEVELOPMENT

Red Admiral DC Limited propose to develop a DC facility and DER on lands in the townlands of Gneevebane, Oldtown, Farthingstown, Castlelost and Kiltotan and Collinstown in the south of County Westmeath. The project includes two main elements, namely:

1. The Data Centre (DC) facility, comprising six two-storey Data Centre buildings, car parking, landscaping, drainage and other associated works. The DC facility will be constructed and secured within a 39ha campus. Each DC building will have a footprint of 13,978 m^2 (sqm) and have a gross floor area of 28,561 sqm. Each DC building will contain:

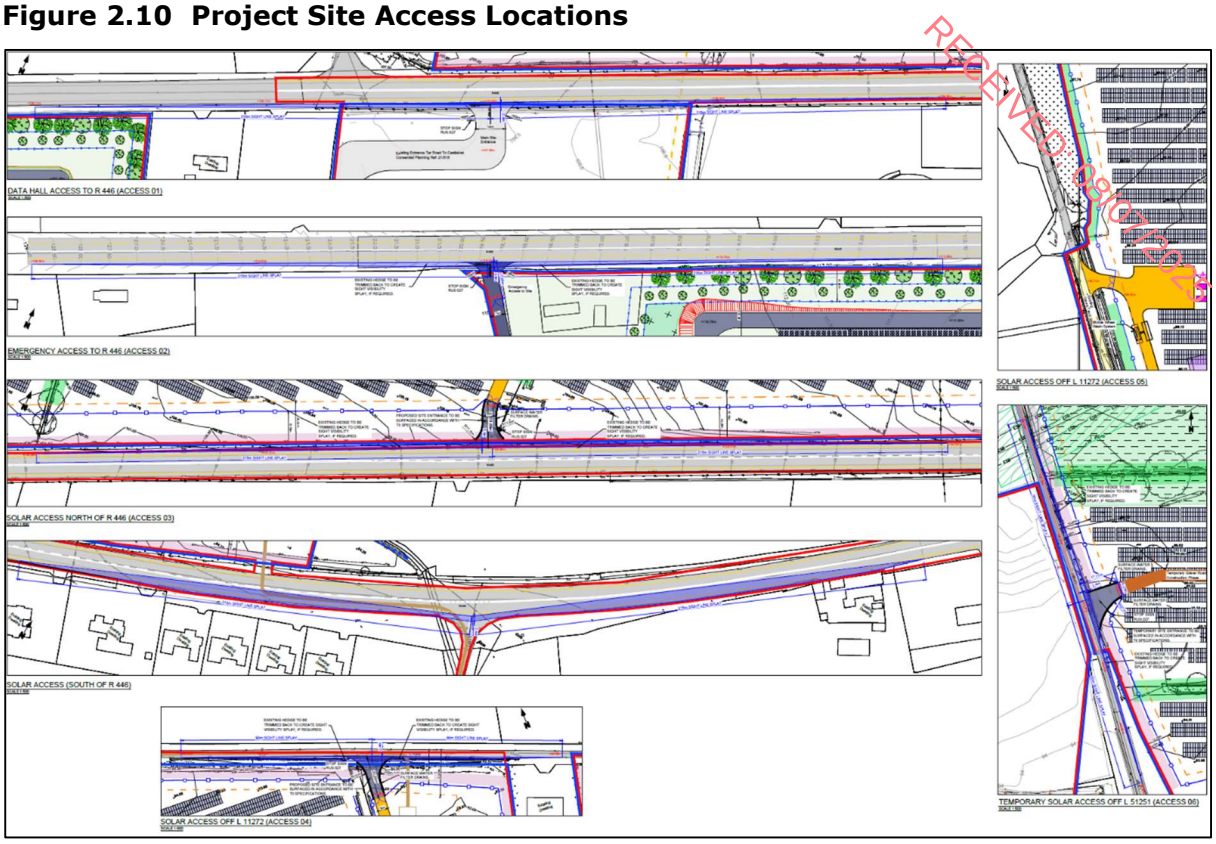
    - Data halls fitted with server racks and distribution units,
    - Mechanical and electrical (M&E) plant rooms /spaces which will house advanced cooling equipment, pumps, piping and medium voltage (MV) and low voltage (LV) switchgear, and
    - Administration and support areas including, reception, offices, meeting rooms and welfare facilities.

2. Decentralised Energy Resource (DER), which will be constructed across approximately 200ha of lands adjoining the DC facility. The DER incorporates several power assets which will generate, store and manage electricity close to the DC facility. The DER comprises the following assets:

    - Fuel Cell Power System – 160MW,
    - Battery Energy Storage System (BESS) – 250MW,
    - Solar PV farm (nominal 180MWp), and
    - 220kV IPP GIS Grid connection to the 220kV Castlelost GIS substation which adjoins the proposed development site.

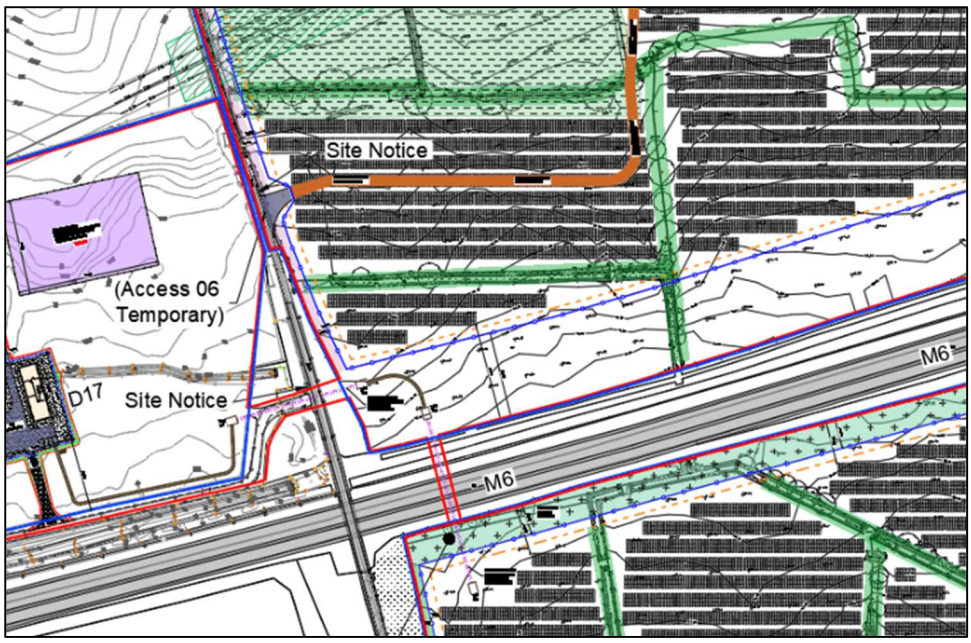
The DC facility and components of the DER (Fuel Cell, BESS and 220kV IPP) project will be accessed from the R446 regional road via an existing private lane, which currently provides access to the Castlelost Flexgen Power Plant and Castlelost GIS. An emergency access to the DC facility in the northwestern corner of the development lands is also provided but will remain closed, i.e. it is designed for fire-service use and will be subject to security inspections. It therefore has no material impact on local traffic, noise, or residential amenity. Three separate entrances are proposed providing access to the Solar Farm (from the R446 for the northern parcel, from the L11272 for the middle parcel and from a private laneway south of the publicly owned L51251 for the southern parcel).

Figure 2.10 Project Site Access Locations



Rather than routing construction traffic south along the L51251 from the R446, it is proposed to provide an access way through the middle parcel (Phase 1) of the solar farm exiting onto the L51251 (shown as temporary access point 06) south of residential properties further north. No construction traffic will be permitted to route from or to the R446 from the proposed new access point along the L51251.

Figure 2.11 Temporary Access 06 to L51251

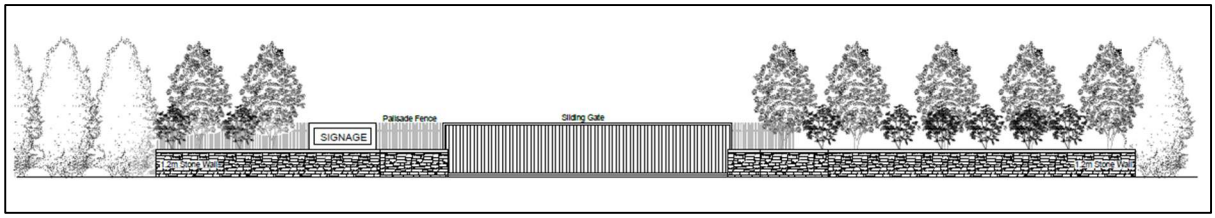


2.4 DATA CENTRE FACILITY

The Data Centre (DC) facility comprises six (6no.) two-storey Data Centre buildings, car parking, a 33kV IPP Building and AIS Compound, ancillary compound, landscaping, drainage and other associated works. The DC facility will be constructed within a 48ha site. The DC buildings are laid out as a campus and are positioned within a secured area of c. 39ha.

The entrance to the DC facility will be manned from the Security Control Building.

Figure 2.12 DC facility entrance



This building contains a small office /admin room for security personnel, an IT room and a WC room. The security control building is the primary point of ingress and egress for all personnel, visitors and vehicles. Although compact in footprint, the building is a critical node in the overall layout of the campus. The building is positioned on the inner side of the secure perimeter fence, centred between two dedicated carriageways, one inbound and one outbound. Each lane is controlled by an electrically actuated rising-arm barrier with LED boom lighting and induction-loop anti-tailgate logic. The area will also contain control access /egress point or pedestrians. During normal conditions one worker occupies the operations room around the clock, with a second worker present during peak-delivery periods.

Figure 2.13 3D illustration of Security Control Building

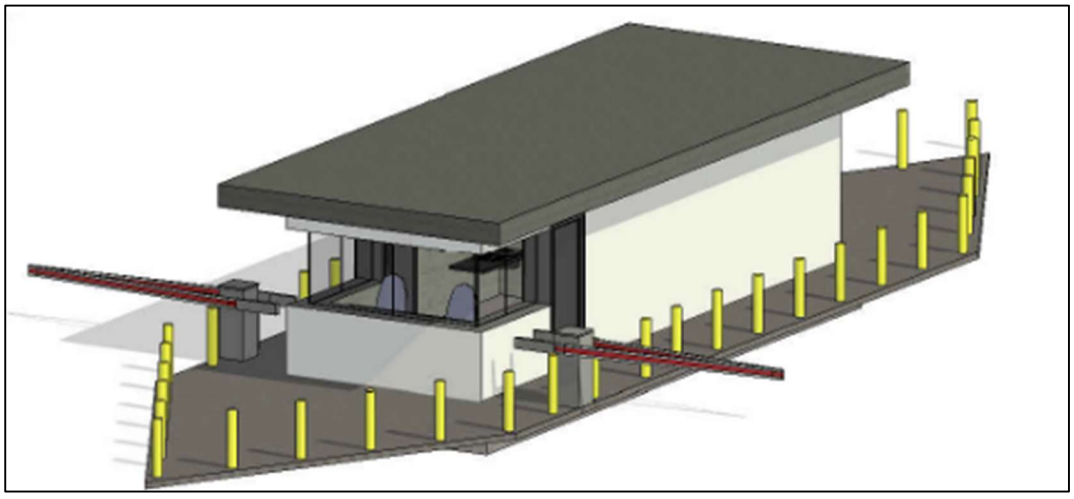


Figure 2.14 DC Facility Layout

2.4.1 DATA CENTRE BUILDINGS

The DC facility consists of six (6no.) identical data centre buildings (labelled D1-D6 on the site layout drawing) and share the same layout. Each building is 228.19m long and 62.2m wide and are 18.0m high to roof parapet level and have dedicated car parking. A medium voltage (MV) switchroom building is collocated with each DC building.

The DC buildings have a footprint of 13,978m^2 (sqm) and a gross floor area of 28,561 sqm. The buildings will be steel frame construction with metal deck first floor and proprietary insulated metal cladding. The buildings will be fitted with loading docks. Proprietary engineered acoustic louvres are incorporated into the facade of the (mechanical, electrical and plumbing (MEP) areas) and at roof level to provide for air flow and ventilation from air handling units (AHU) and electric chiller units positioned internally.

Each data centre building will contain the following:

- An administration block with a height of 13.75m, split across two floors and providing; reception offices, kitchen, welfare, toilets, security, stores, loading /receiving area, mechanical rooms and stairwells. The gross floor area of the administration block on each DC building is 2,478sq.m. The administration block's facade will combine curtainwall glazing, selected brickwork, and insulated metal cladding in complementary dark and light tones.
- Data Halls are split across two floors (10no. on each of the ground floor and first floor) and have a combined floor area of 16,403 sqm. The data halls are separated by a central circulation corridor which runs from the administration block to the opposite end of the building. Electrical (ground floor) and ventilation (first floor) rooms separate the data halls across the building's width.
- MEP plant rooms are incorporated within the shell /superstructure of the building (gross floor area of 4,772sqm) and run either side along the full length of the building interrupted by stair cores providing access between floors. The MEP areas will house advanced cooling equipment, (AHU), pumps, piping and electrical equipment.
- Single storey MV switchroom building (15.95m long x 4.95m wide x 4.1m high) will contain two room and house electrical switchgear associated with each DC building.

Figure 2.15 DC Building Elevations; Drawing Ref CLDC-HAL-DC-XX-PL-1102

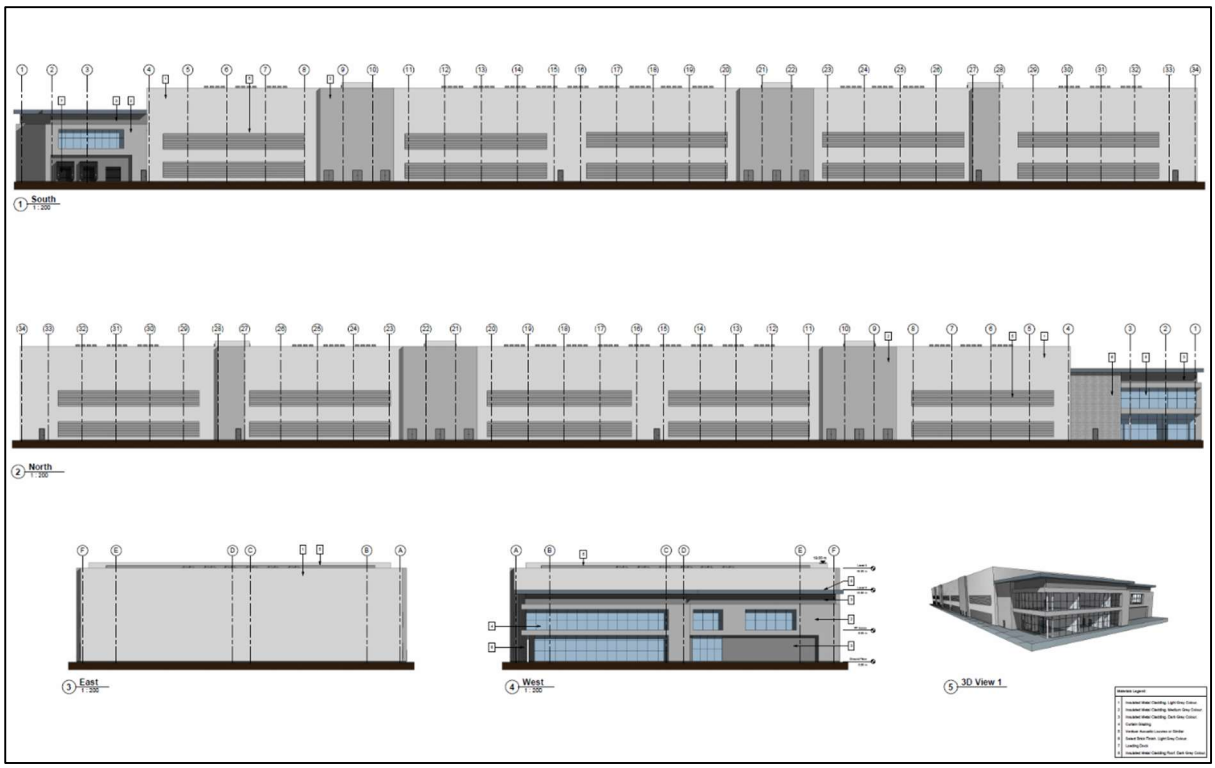


Figure 2.16 DC Building Ground Floor Layout

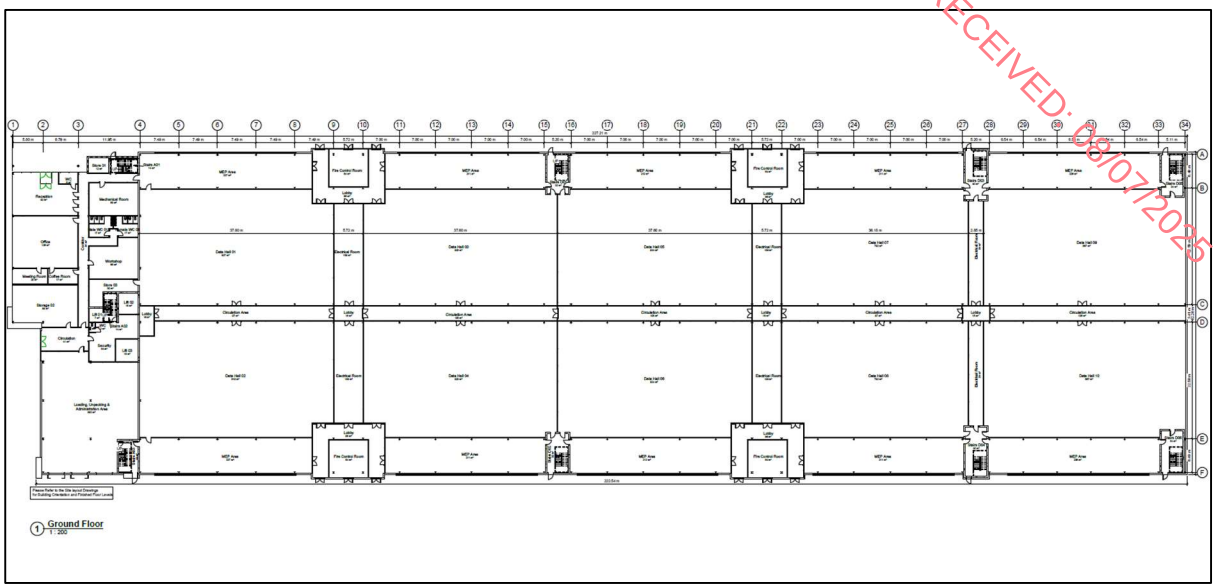
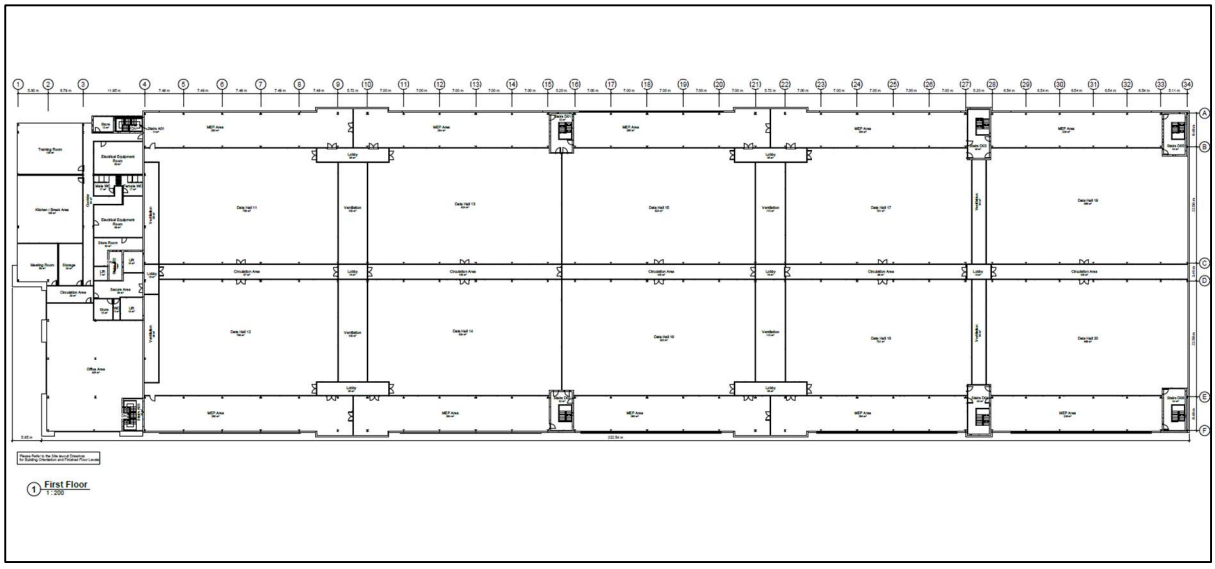


Figure 2.17 DC Building Ground Floor Layout



2.4.1.1 DC Cooling

The cooling system on for the DC facility comprises non-evaporative fresh-air cooling, closed-loop variable-speed electric chillers, and SOFC-driven absorption chillers, achieves high thermodynamic efficiency with minimal water footprint.

Under prevailing Irish climatic conditions, the data halls will be conditioned almost exclusively by a non-evaporative fresh-air system. Ambient air is filtered, temperature-controlled via modulating dampers and heat-exchange matrices and supplied to the cold aisles; return air is extracted through electronically commutated fan arrays. Annual water usage will be negligible because no adiabatic or spray evaporation is employed. This

translates into a considerably lower Power Usage Effectiveness (PUE) and Water Usage Effectiveness (WUE) aligning with the principles of sustainable design.

As ambient temperatures rise during summer months, or when transient high-density computational workloads occur, the data centre facility will use mechanical cooling. Each data centre building will house electric chillers capable of supplying 7°C chilled water to the air-handling units. The chiller condenser circuit is entirely closed-loop and rejects heat to dry coolers equipped with variable-speed fans; consequently, the process introduces no significant evaporative or blowdown water demand. Variable-frequency drives on both primary and secondary pumps will minimise parasitic power consumption.

The Fuel Cells will generate high-grade thermal energy concurrent with electrical output. When available this heat will be transferred to a double-effect lithium–bromide absorption chiller, producing chilled water at 7–10 °C. The absorption chiller is hydraulically coupled to the chilled-water header downstream of the electric chiller array. During fuel cell operation, recovery of waste heat using absorption chillers will displace mechanical compression needs associated with the electric chillers. Integration of the absorption stage raises overall fuel-utilisation efficiency to approximately 80%.

The proposed cooling is designed in accordance with:

- Climate Neutral Data Centre Pact- WUE and PUE requirements,
- LEEDv4 (EA and WE credits) through reduced process water and advanced energy recovery and,
- Ireland's Climate Action Plan 2025, circular-economy resource efficiency and large-user demand mitigation.

The design ensures operational resilience under variable climatic and computational conditions while substantiating compliance with sustainability frameworks for design of data centres.

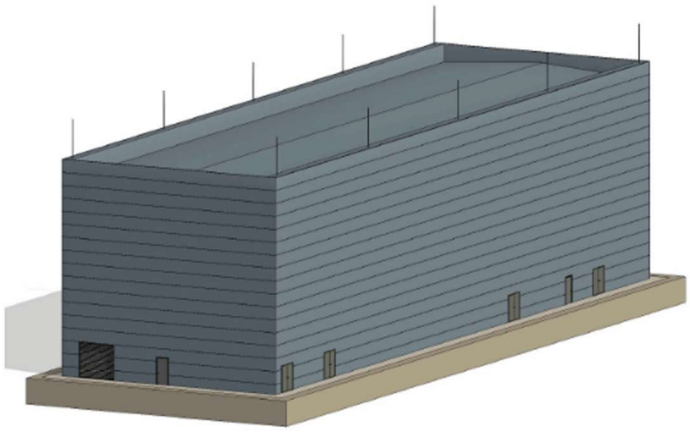
2.4.2 33KV IPP BUILDING AND AIS COMPOUND

This component of the project will provide the point of common coupling between the proposed 220kV IPP GIS Building and the DC facility. To achieve gird redundancy three independent power feeds will route underground from the proposed 220kV IPP GIS Building to the 33kV IPP Building and AIS Compound located on the DC facility.

The 33kV IPP will supply and route double redundant feeders to each of the six (6no.) DC buildings. The two-storey (16.8m high) 33kV IPP Building and adjoining AIS compound will be owned and operated by the DC facility but designed and run in accordance with

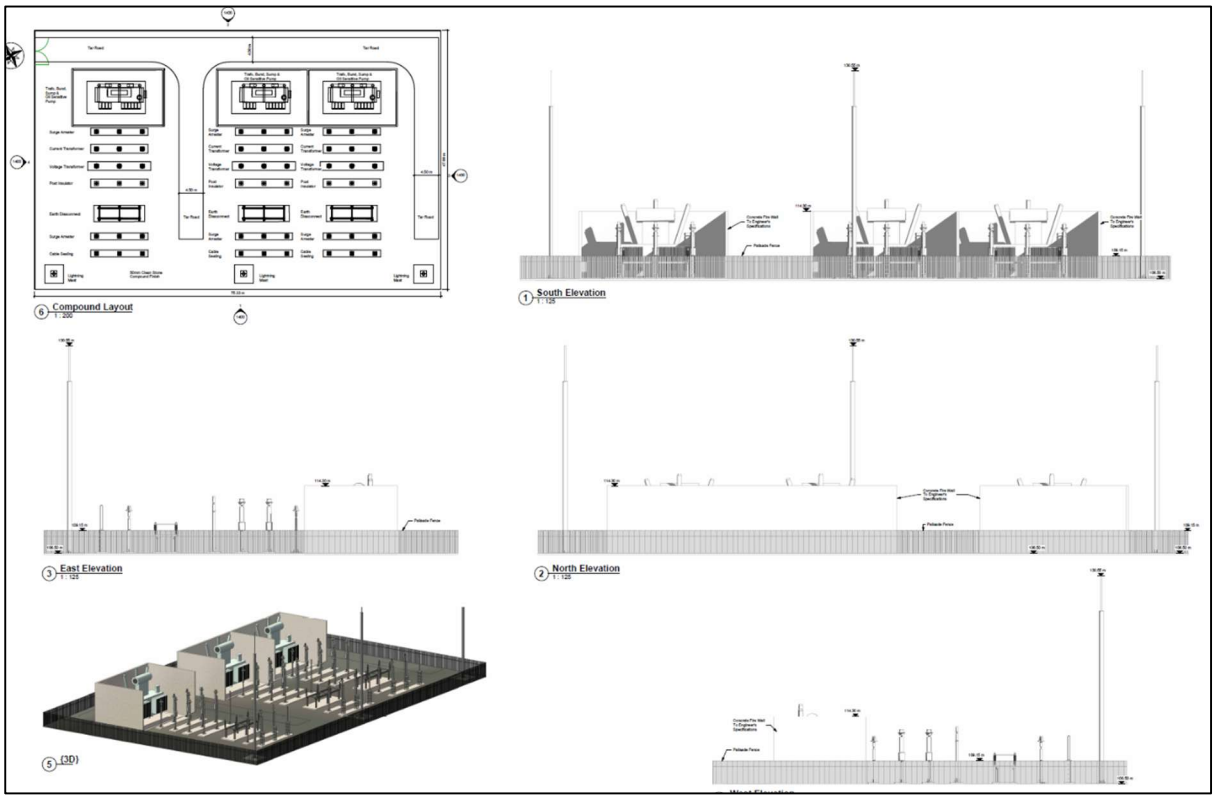
EirGrid Grid Code and ESB Networks specifications. The compound accommodates metering, protection and control equipment for import and generation synchronisation from the DER.

Figure 2.18 3D impression of 33kV IPP Building



The AIS Compound is positioned to the south of the 33kV IPP building and measures 75.33m x 48.00m. The compound will contain three (3no.) bunded transformers with drainage (to oil water separator) and associated above ground electrical cabling.

Figure 2.19 – Layout showing 33kV IPP Building and AIS Compound



2.4.3 ANCILLARY EQUIPMENT COMPOUNDS – DC FACILITY AND DER

An ancillary equipment compound is proposed south of the DC facility and Fuel Cell. The overall ancillary equipment compound is subdivided in two providing independent ancillary supporting equipment to the DC facility and DER. A description of the equipment and plant contained in each compound is outlined below.

2.4.3.1 Ancillary Equipment Compound (DER)

2.4.3.1.1 Diesel Generators

Two (2no.) emergency generators will be installed in the compound to provide electricity instantly and reliably and allow the operator to put components of the DER into a verified *failsafe* state and keep safety systems alive until mains power returns. Both generators will be capable of starting unassisted and will be configured to accept essential loads and hold voltage /frequency within equipment limits.

2.4.3.1.2 Package Water Treatment Plant

A single-container water treatment module incorporating aeration, filtration, pH correction, softener and UV/chlorine disinfection will be positioned in the compound to supply potable water to welfare facilities across the DER. The water will be supplied from a proposed groundwater abstraction well[6] which will be drilled close to the ancillary equipment area.

2.4.3.1.3 Fire Water Tank and Pump House

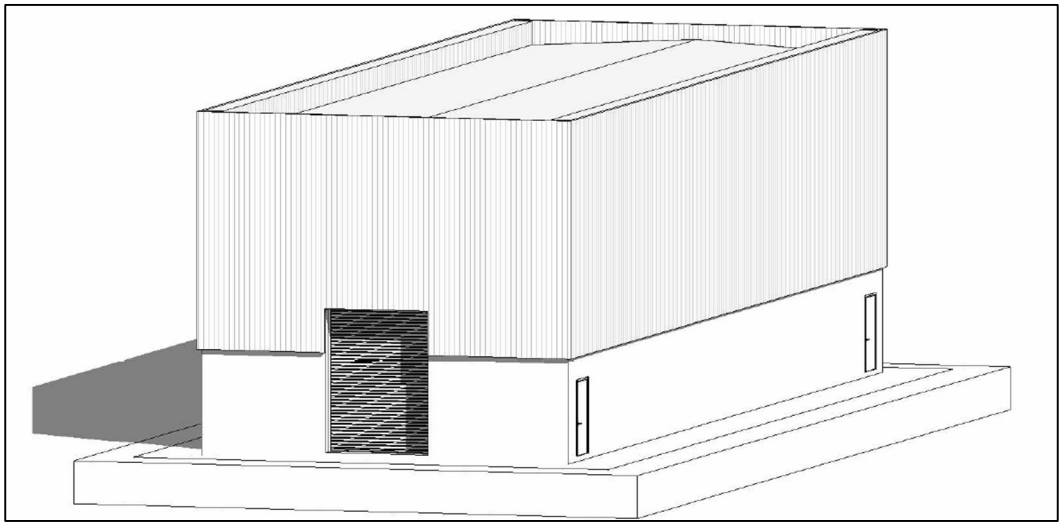
A 2,000m^3 firewater storage tank will be located in the compound which will be filled from the proposed groundwater well. Once filled, the normal demand for water arising from its existence is insignificant; the tank will be topped up automatically from the site's groundwater bore whenever the level falls below 90 %, ensuring that the strategic reserve is never eroded by routine testing or minor call-offs.

Together, the fire water reservoir, redundant diesel pump sets and valved ring main form a robust, self-contained fire-water infrastructure. They guarantee that, even during the worst-case scenario, hydrants and fixed suppression systems are fed with steady pressure and ample flow for the full duration of the emergency, independent of mains supply or site power conditions.

[6] An existing well with a reported depth of 60.9m within the project lands has a reported source yield of 76.30m^3/day – classed as moderate (GSI unique ID IE_GSI_GW_Well_32279).

2.4.3.1.4 Storage Building

A storage building (30.7m long x 10.74m wide x 9.65m high) will be constructed in the ancillary equipment compound. This building will be used to store materials, spares, small chemicals (in volumes <1m^3) and service equipment.



2.4.3.2 Ancillary Equipment Compound (DC facility)

2.4.3.2.1 Package Water Treatment Plant

A single-container water treatment module incorporating, filtration, pH correction, softener and UV disinfection will be positioned in the compound to supply potable water to DC facility. The water will be supplied from a proposed groundwater abstraction well[7] which will be drilled within the DC facility. The treated water will be stored in a 70m^3 tank which provides at least 1.5 days treated water storage.

2.4.3.2.2 Fire Water Tank and Pump House-

A 2,000m^3 firewater storage tank will be located in the compound which will be filled from the proposed groundwater well. Once filled, the normal demand for water arising from its existence is insignificant; the tank will be topped up automatically from the site's groundwater bore whenever the level falls below 90%, ensuring that the strategic reserve is never eroded by routine testing or minor call-offs.

Together, the fire water reservoir, redundant diesel pump sets and valved ring main form a robust, self-contained fire-water infrastructure for the DC facility. They guarantee that, even during the worst-case scenario, hydrants and fixed suppression systems are fed with

[7] An existing well with a reported depth of 60.9m within the project lands has a reported source yield of 76.30m^3/day – classed as moderate (GSI unique ID IE_GSI_GW_Well_32279).

steady pressure and ample flow for the full duration of the emergency, independent of mains supply or site power conditions.

2.4.4 INTERNAL ACCESS ROADS AND PARKING

The internal roads within the development will be privately owned and will be maintained by the operator /owner. The main internal road network through the DC comprises a 7.0m wide network. Autotrack analysis has been undertaken for the site access road and the internal roads. Road arrangements have been provided at the security entrance (additional road width of 25m) so that there is no queuing of vehicles so that any rejected traffic (including HGV's) can safely turn and exist the site without blocking or causing a road safety issue.

Internal access road with separate pedestrian footpath, provide a safe and uncomplicated access to building within the campus. Car parking is located at each DC building (80no. spaces including EV and disabled spaces) near each administration block for all visitors and staff arriving by car. Bicycles shelters are also located for each DC building.

An emergency entrance is located to the north-west corner of the site the 7.0m wide internal road (185m in length) is secured with gates at two locations which will be permanently closed except in emergency circumstances. The internal road layout has been configured for security to be able to patrol this part of the site.

2.4.5 LIGHTING

The project has been designed where minimal lighting is only used when required in order to avoid *light spill* beyond the site boundary and disturbance of receptors including wildlife. Internal road lighting at the DC facility is designed to the recommendations of BS5489-1:2020 and Lighting Class P4 for roads. This is based on a safe movement of traffic level for motorised and pedestrians in an Environmental Zone 3 (sparsely inhabited rural areas), speed limit <30mph, quiet traffic flow, occasional vehicles which can be applied to the site roads.

Lighting columns are arranged to achieve the required minimum lighting levels while avoiding excessive light spill onto the site perimeter. These lighting columns are installed with luminaires mounted at 6m, with factory fitted rear shields, a 0° tilt angle and a G3 rating. This is a rating (G1 -G6) of the control of obtrusive light and upward light output with G6 being the highest.) Glare is controlled by the use of glare rated luminaires (G3). Therefore, Back-light, upward light and Glare (BUG) has been considered to a high level.

2.5 DECENTRALISED ENERGY RESOURCE

The Decentralised Energy Resource (DER), which will be constructed across approximately 200ha of lands adjoining the DC facility. The DER incorporates several power assets which will generate, store and manage electricity close to the DC facility. The DER comprises the following assets:

(a) Fuel Cell Power System – 160MW,

(b) Battery Energy Storage System (BESS) – 250MW,

(c) Solar PV farm (nominal 180MWp), and

(d) Grid connection to the 220kV Castlelost GIS substation which adjoins the proposed development site.

2.5.1 FUEL CELL

The project includes a fuel cell that will generate low-carbon electricity, chilled water and recoverable heat and carbon dioxide from natural gas without combustion. Natural gas will be delivered to the fuel cell power system from a proposed above ground installation (AGI) /gas receiving station which will be located within the site[8].

The proposed use of natural gas is in line with recent EU and Irish Government direction on the use of gas for generation as a transitional fuel. The proposed generation of electricity using collocated utility scale fuel cell power system at the site avoids any negative impact from the Project on the public electricity system.

The fuel cell is designed to provide variable power to the DC facility. Generation from the fuel cell will be delivered by 330kW modular energy units (energy servers) positioned and stacked in a compact steel frame structure (power tower). Six power towers located east of the DC facility will deliver utility-scale output (160MW) of electricity as and when required. Control and electric equipment will be positioned at ground level and energy servers will be positioned on levels 1 and 2 of each structure. Absorption chillers will be positioned on Level 3 and used for recovering waste heat arising from the process.

[8] The proposed AGI will connect to the gas transmission supply serving the adjoining Castlelost Flexgen Power Plant.

Figure 2.20 Modular Energy Servers positioned at ground level[9]

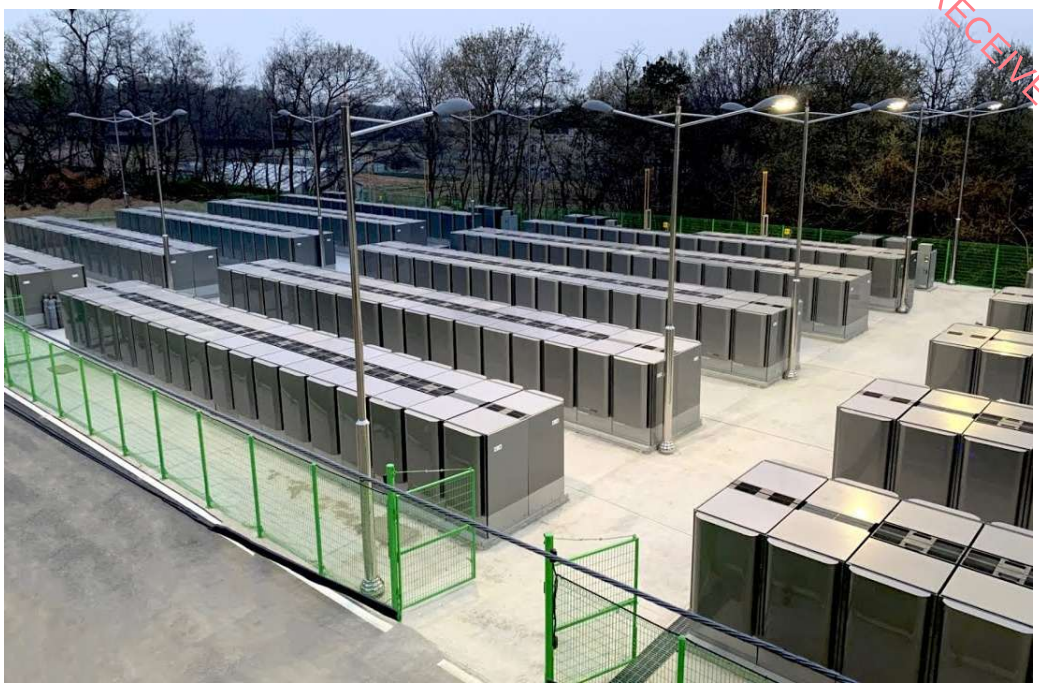
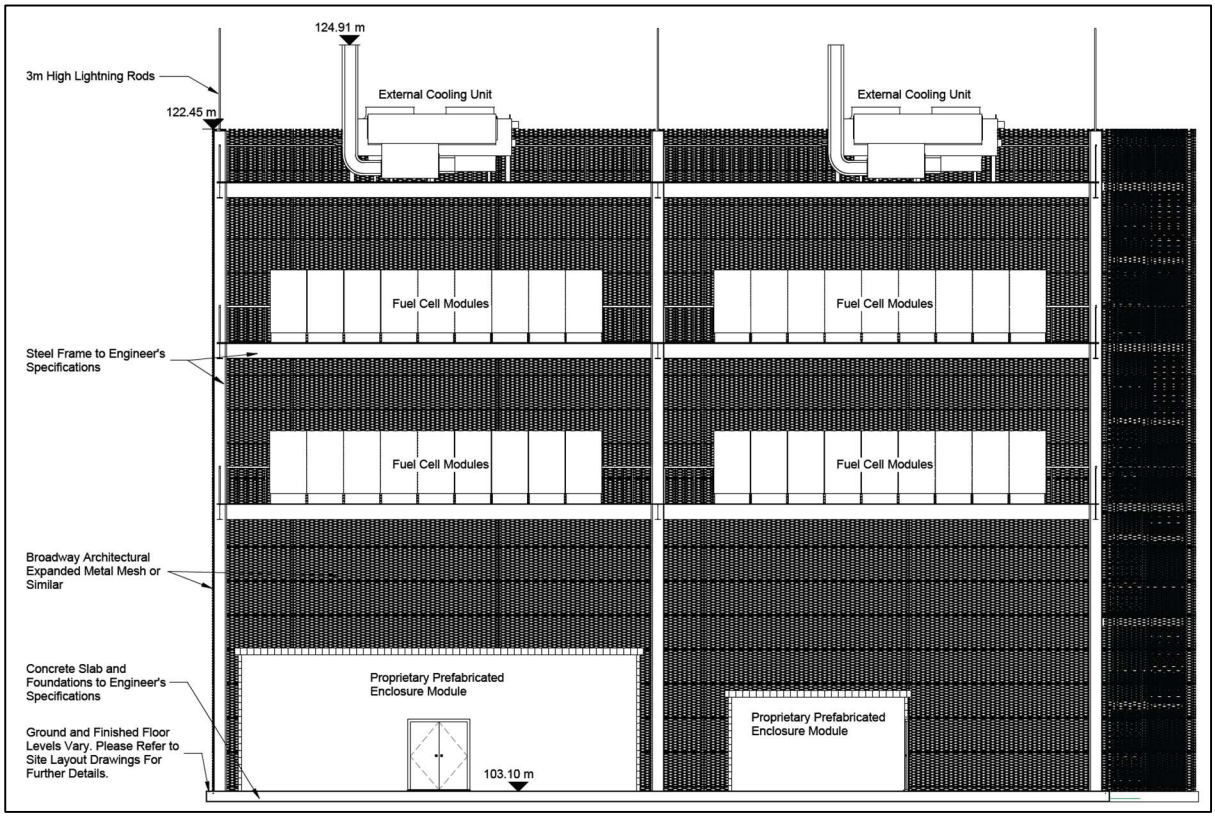


Figure 2.21 Section of Power Tower



[9] Source: https://www.bloomenergy.com/technology/

2.5.1.1 Fuel Cell Operating Principle

Fuel cells convert natural gas into electricity without combustion. Ambient air is first drawn through a recuperative heat-exchanger that raises the temperature to roughly 700°C before it reaches the cathode. Simultaneously, natural gas supplied from the proposed AGI on site enters the anode side of the fuel cell, where catalyst generate a hydrogen-rich fuel stream. Within the cell, hydrogen is oxidised at the anode electrolyte interface and the electrons released flow through an external circuit to the cathode, creating direct current. The accompanying oxygen ions migrate through the ceramic electrolyte and react with the hydrogen to form water vapour and carbon dioxide (CO_2)[10]. Integrated power electronics then invert the direct current to alternating current and step it up to the required voltage. The high temperature waste heat will be recovered to drive absorption chillers during periods where increased cooling is required at the DC facility. The fuel cell power system will be capable of simultaneously producing electricity, usable heat and chilled water and increasing overall efficiencies to approximately 80% (up from ~60%).

2.5.1.2 Resiliency, Predictability, Flexibility and Sustainability

Each energy server is an electrically independent string, so if a single unit is taken off-line for maintenance, the remaining energy servers continue to operate uninterrupted, yielding availability in excess of 99.5 per cent. Because generation is co-located with the primary electrical load, power is delivered without the losses or outage risks associated with long transmission routes and overhead lines. The energy servers are designed and future proofed to run on biomethane or green hydrogen in future, without wholesale redesign of the balance-of-plant.

High-grade exhaust heat from the fuel-cell stacks will be captured to drive double-effect lithium-bromide absorption chillers, yielding chilled-water capacity and increasing trigeneration efficiency of the power system. At the same time the anode exhaust provides a single high-purity CO_2 stream, free of nitrogen contaminants, that will be captured and dried using proprietary technology. Carbon dioxide recovery and purification equipment will be contained within a CO_2 process building and compressed CO_2 will be temporarily stored in 16no. insulated and vertically aligned proprietary tanks prior to being transported off site as a valuable product to end-users.

2.5.1.3 Carbon Dioxide Process Building and Storage

It is proposed to recover, purify and store carbon dioxide generated by the fuel cells during periods of operation. Recovery of the by-product reduces emissions and provides a value

[10] Ranging from 15-30% less CO_2 than produced by a gas turbine

product to down-stream users (food grade CO_2). The CO_2 recovery process will operate in a dedicated steel-framed structure measuring 15.67m in width, 30.74m in length and 11.25m in height. Once purified (desiccant and carbon beds) and condensed, the liquid carbon dioxide is transferred to a bank of sixteen vertical, vacuum-insulated tanks. Each vessel stands just over fifteen metres tall and 3.6 m in diameter, with an internal design pressure of 22 bar(g). The tanks are arrayed in two rows on a reinforced concrete plinth. Over-pressure protection is provided by dual relief valves.

2.5.1.4 Fuel Cell Chilled Water Storage and Pump House

A Fuel-Cell chilled water reservoir consists of two (2no.) 1,000m^3 well-insulated cold-water tanks. The chilled-water tanks, pumps and pipework form a fully closed-circuit (closed-loop) system: the same inhibited water continuously recirculates between the fuel-cell chillers, the stratified storage tank and the campus distribution ring-main, with no direct exchange to atmosphere or potable supplies. The function of this is to support the chilling function during period of warm weather.

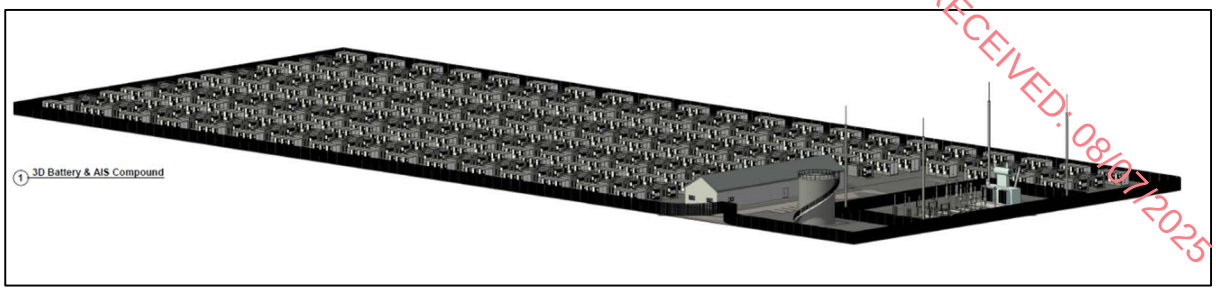
2.5.1.5 Above Ground Installation

Natural gas will be supplied from the Gas Network Ireland transmission system located within the development site at a minimum guaranteed pressure of 19 bar gauge (bar(g)) and 15^oC via an Above Ground Installation (AGI). The pressure of the gas will be conditioned and regulated to approximately 35 bar(g) in the proposed on-site AGI. The Fuel Cell will use natural gas to produce electricity.

2.5.2 BATTERY ENERGY STORAGE SYSTEM (BESS) FACILITY

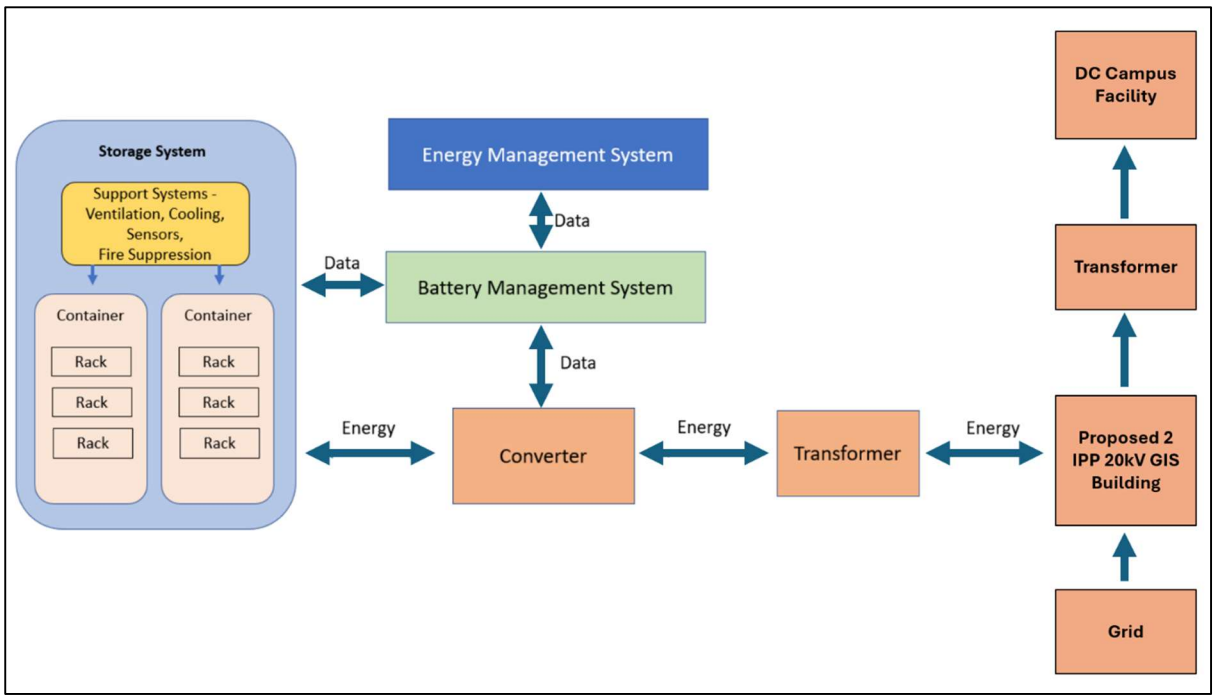
The BESS facility comprises a total of 276no modular single storey battery enclosures and medium voltage power stations (MVPS). The IPP building and AIS compound (containing transformer) will electrically connect the BESS to the proposed 220kV IPP GIS substation using underground HV cables. The proposed 138no. battery enclosures (7.0m long x 2.6m wide) and 138no. MVPS enclosures (6.1m long x 2.4m wide) will be positioned on concrete plinth foundations. Once positioned the top of the battery enclosures will be a height of 3.1m above the finished ground level (FGL) of the BESS compound and the top of the MVPS enclosures will be a height of 2.94m above the compound FGL. The enclosures will be connected by underground ducts and cables.

Figure 2.22 3D impression of BESS including IPP and AIS Compound



The battery enclosures will house the modular array of lithium-ion (Li-ion) battery units. Li-ion battery units will be assembled to form modules and will be self-contained and certified for intrinsic safety. The battery cell is the smallest subpart of the BESS system, and the cells store the energy. The cells are aggregated into modules which has a positive and negative terminal and are contained in hard casing with a battery management system (BMS-analyser that continuously checks module parameters such as voltage, current, temperature and State of Charge (SoC)). The modules are then aggregated into a pack (or string), again with one positive and one negative terminal. MVPS (or Power Control System (PCS)) units and small transformers will be positioned in self-contained weather-proof enclosures. The plant will absorb and inject energy as demanded by the system numerous times over short-duration events. The MVPS units on each pack deliver information on the state of the pack to the superior control system for the battery ESS. A high-level diagram of a BESS is illustrated in Figure 2.23 below.

Figure 2.23 High-Level Diagram of a BESS



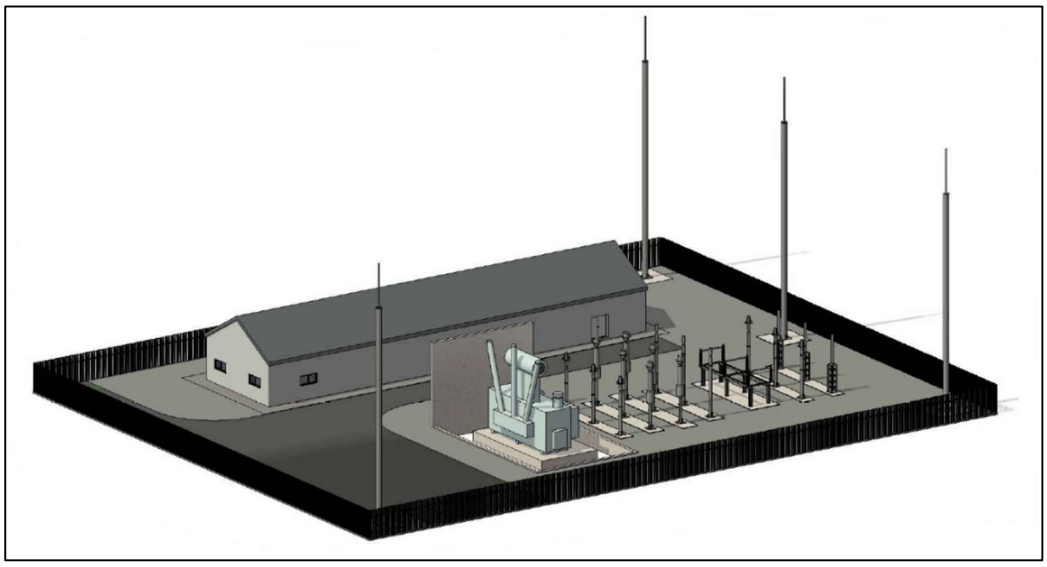
Source: Adapted from https://www.energystorageireland.com/

Battery energy storage systems are designed to prevent a problem in one battery cell from spreading to others in the system. The safety systems for a battery storage project operate on multiple layers from the individual battery cell right up to the whole storage system and this is managed by the battery management system (BMS). As soon as the BMS detects that a specific battery cell, or group of cells, is acting in a way that it should not it can instantly reduce the flow of electricity through the cell, switch it off or disconnect it from the power supply completely depending on the severity of the problem. This minimises the risk of a problem escalating in a cell or group of cells and spreading to others. These techniques help to dissipate heat in the event of a cell failure, and subsequent overheating, and prevent adjacent cells or modules from being affected.

The batteries for energy storage are housed in separate enclosures (containers) to prevent the risk of a problem in one container spreading. Sufficient clearance between enclosures is included within the design to provide for this and it also allows for safe access and replacement of modules. Each module includes control equipment, to provide for ventilation, air conditioning and fire suppression equipment (inert gas and detectors). A firewater tank (500m^3) is also contained in the BESS facility as an additional safeguard. In the event of a fire within an enclosure the water can be applied to nearby enclosures as a cooling agent to prevent escalation.

An IPP control building and AIS compound will be east of the battery and MVPS enclosures. The IPP building (40.0m x 9.79m) will contain a control room, stores, switchgear room and WC. The AIS compound will contain a bunded transformer with fire wall, lightning masts and a series of electrical equipment supported on plinths (e.g. surge arresters, post insulator, disconnects, cable sealing.).

2.5.2.1 BESS IPP Building and AIS Compound



Surface finishes within the BESS compound will comprise clean 50mm permeable stone fill. Stormwater collected from impervious areas such as the IPP building and limited bitumen macadam roads will be directed to a below ground oil interceptor and attenuation structure (volume of c.90m^3) before being discharged via a hydrobrake to the open drain /stream which runs to the southeast of the compound. Foul wastewater generated from welfare facilities within the BESS compound will be discharged to a sealed foul holding tank. The holding tank will be emptied and suitably disposed of periodically by a local waste permitted contractor. A foul holding tank is recommended due to low occupancy of the facility once operational. There is no requirement for the use of water in the process.

2.5.3 SOLAR PV FARM

2.5.3.1 Layout

The development footprint is entirely confined within existing fields structures with no hedgerow removal required. Every effort has been made to align tables parallel to field margins to reduce visual intrusion. The solar panels array themselves account for approximately 72ha of the total 168ha with the remaining solar lands fallow. The design embeds the following set-back corridors:

- ≥ 10 m from all third-party boundaries (public roads, adjoining landholdings);
- ≥ 5 m from internal hedgerows and drainage ditches;
- ≥ 10 m from named streams and rivers.

These buffers will be managed as uncut grassland or sown with native wild-flower mixes, creating continuous ecological corridors that enhance habitat connectivity, pollinator forage and small-mammal cover. A suite of ecological enhancement measures, including hedgerow gapping-up with native species, will be implemented in line with the project's Biodiversity Management Plan.

It is proposed to develop a ground-mounted photovoltaic (PV) installation with a nominal of up to 180MWp. Generation will be provided by high-efficiency, PV modules rated at 620 watt (W) each, secured in portrait orientation on galvanised steel support frames. The PV panels will be grouped into three standardised "table" formats so that the plant can be efficiently replicated across the agricultural landholding while respecting existing field boundaries, hedgerows and watercourses.

Table type	Configuration (modules)	Footprint (W × L)	Notes

Type A	27 × 3	6.910 m × 30.618 m	Primary building block in larger, fields
Type B	18 × 3	6.691 m × 20.412 m	Used where field geometry or buffers shorten the available run length
Type C	9 × 3	6.691 m × 10.206 m	Employed adjacent to hedgerows, field corners or buffer zones

Each table carries three portrait strings of modules inclined at 25 degrees from horizontal and faces due south. Row-to-row spacing ranges from c. 3–4 m, providing safe access for maintenance personnel and preventing inter-row shading. Across the site, existing topography undulates gently. Finished PV table heights will therefore vary, not exceeding 3.85m at the rear edge, while the lowest leading edge of any panel will maintain a minimum ground clearance of 800mm to preserve vegetation, allow grazing and facilitate air circulation beneath the array.

Figure 2.24 Solar PV Elevation

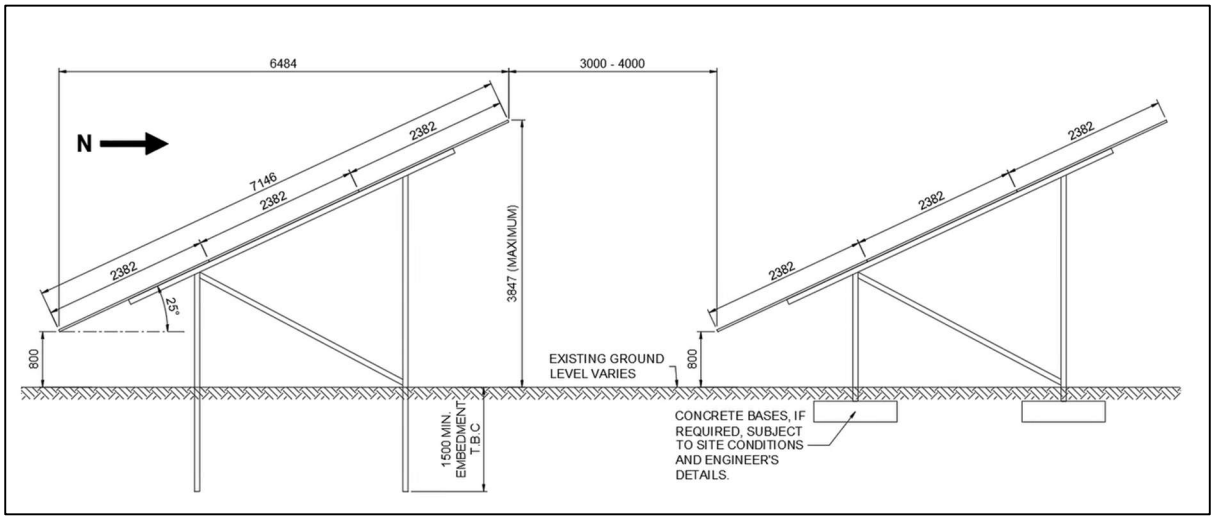
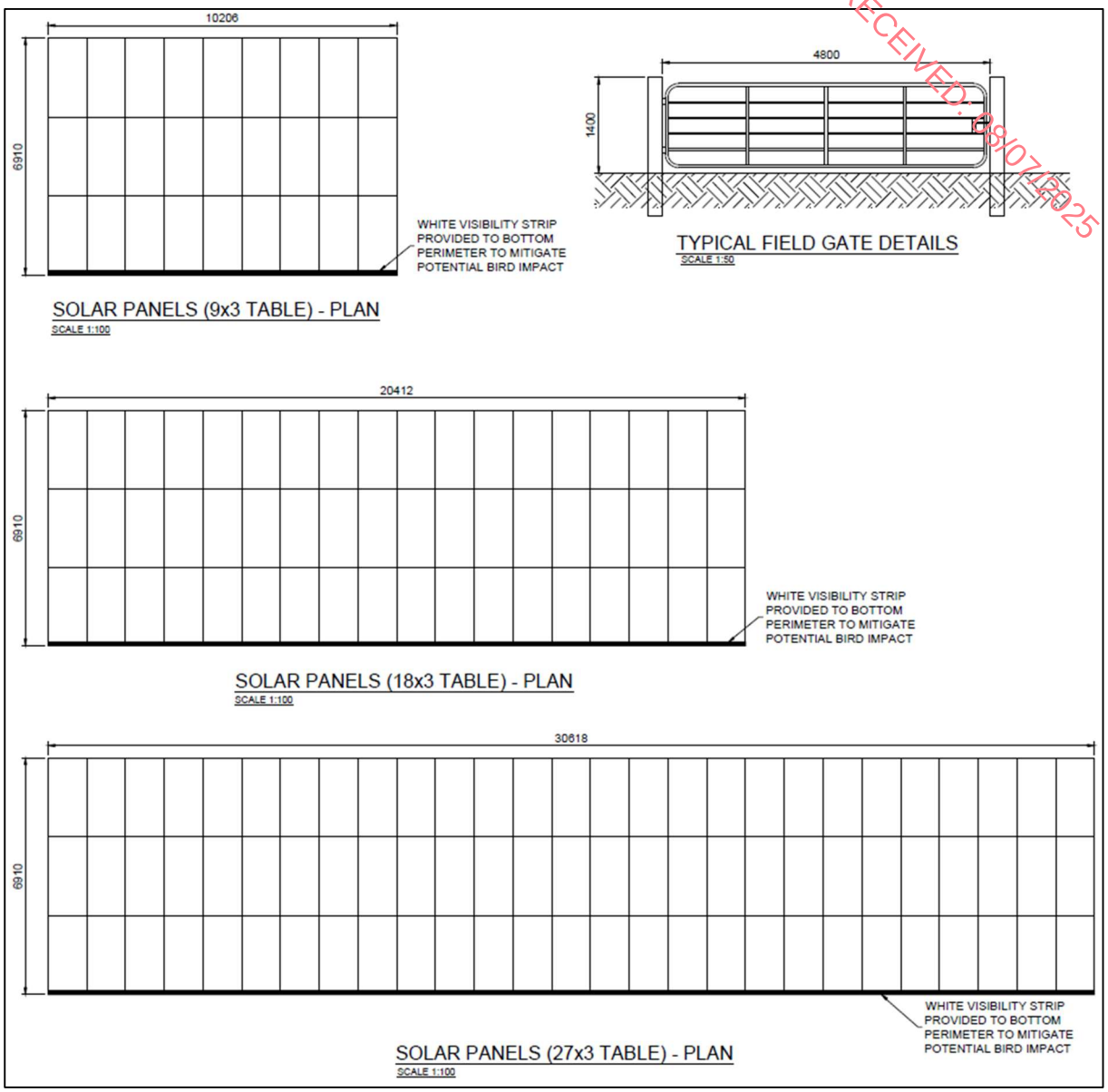


Figure 2.25 Solar PV Table Plan Details



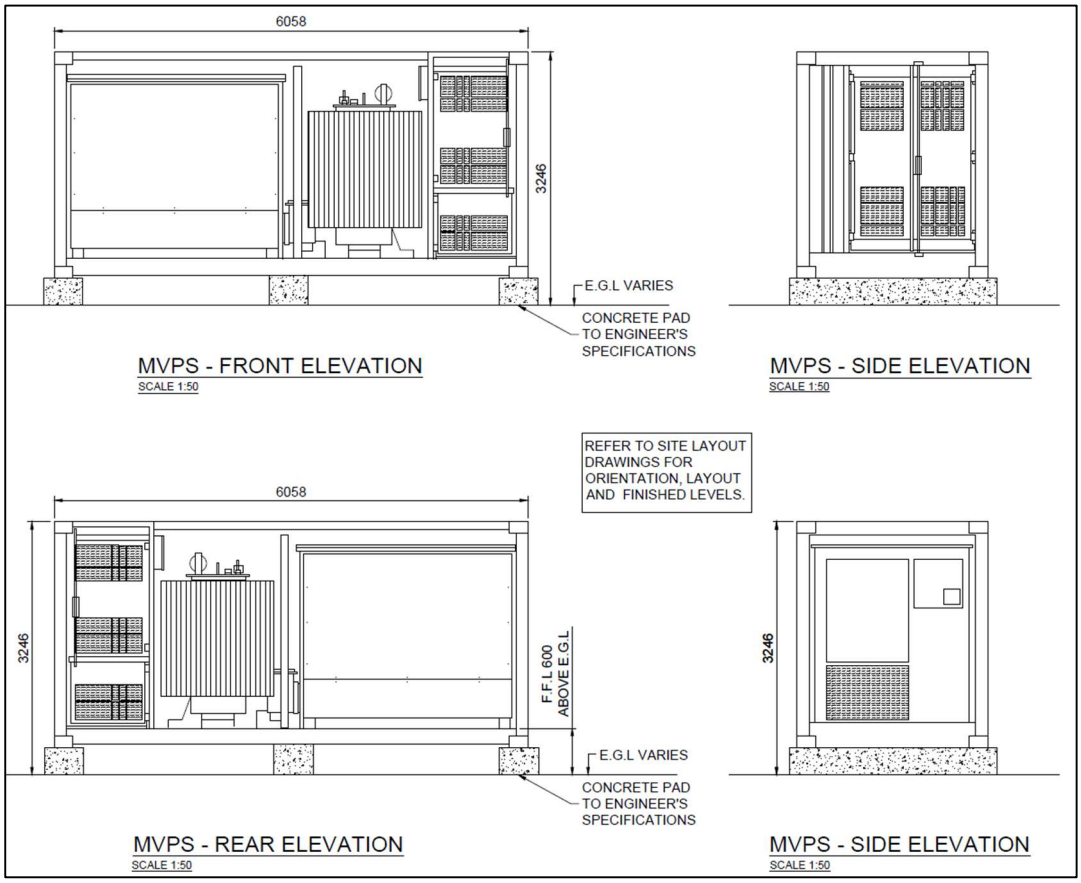
2.5.3.2 Foundations and Support Structure

PV tables will be mounted on a lightweight steel racking system consisting of vertical posts (hot-dip galvanised, typically SHS or C-section) driven or screwed to a depth of c. 1.5 m, avoiding deep excavations and enabling straightforward decommissioning. Where sub-surface obstacles such as shallow bedrock are encountered, pre-cast concrete shoes may be used. These ballast blocks sit on the surface, negating the need for intrusive groundworks. Transverse rail assemblies and mid/end clamps secure the modules and provide structural grounding continuity.

2.5.3.3 Electrical

Array LV cabling will run in cable trays fixed to the rear of each table and then in shallow trenches (typically 600 mm deep) to the nearest MV Power Station (MVPS) enclosure. Forty-five (45no) MVPS units are distributed across the site to minimise DC cable runs. Each MVPS enclosure measures 6.055 m (L) × 2.348 m (W) and stands on a reinforced concrete pad with a finished roof height of approximately 3.25 m above existing ground levels.

Figure 2.26 MVPS Details



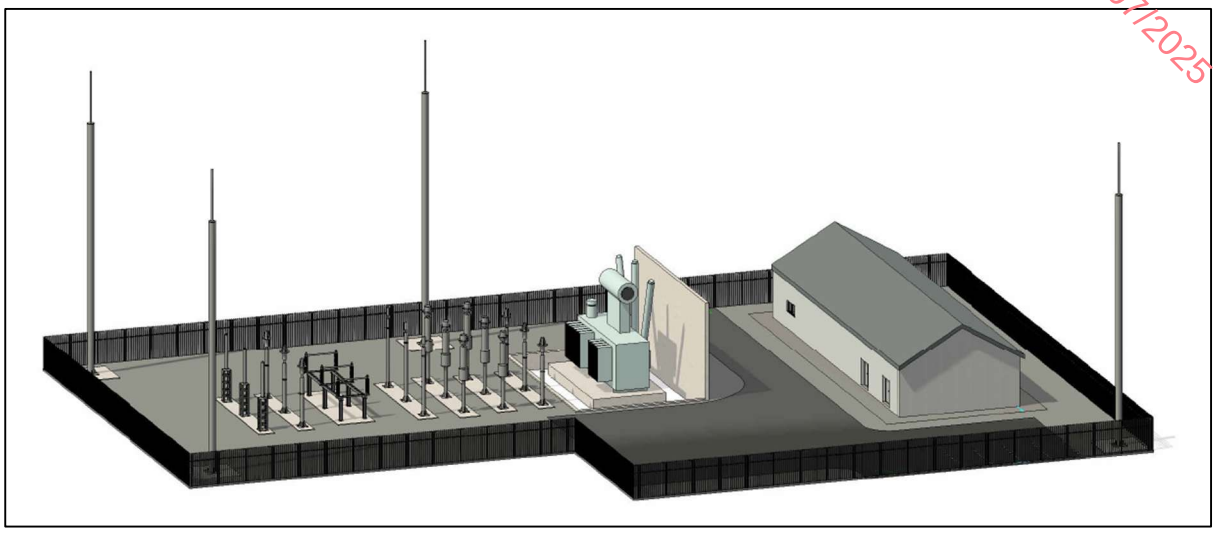
Within each MVPS, string inverters convert the panel output from direct current (DC) to low-voltage alternating current (LV AC), after which a step-up transformer raises the voltage to the medium-voltage (MV) collection network. The MV network is routed in underground ducts to the Solar PV AIS compound, containing a transformer and switchgear interface, located east of the proposed 220kV IPP GIS substation.

2.5.3.4 Solar IPP Building and AIS Compound

The output of the PV installation is firstly delivered to an Independent Power Producer (IPP) Building. It is then exported through an air-insulated switchgear (AIS) compound

that contains the main 220 kV step-up transformer where it exports the power to the proposed 22kV IPP GIS Building via AIS switchgear (this provides HV isolation, protection and metering).

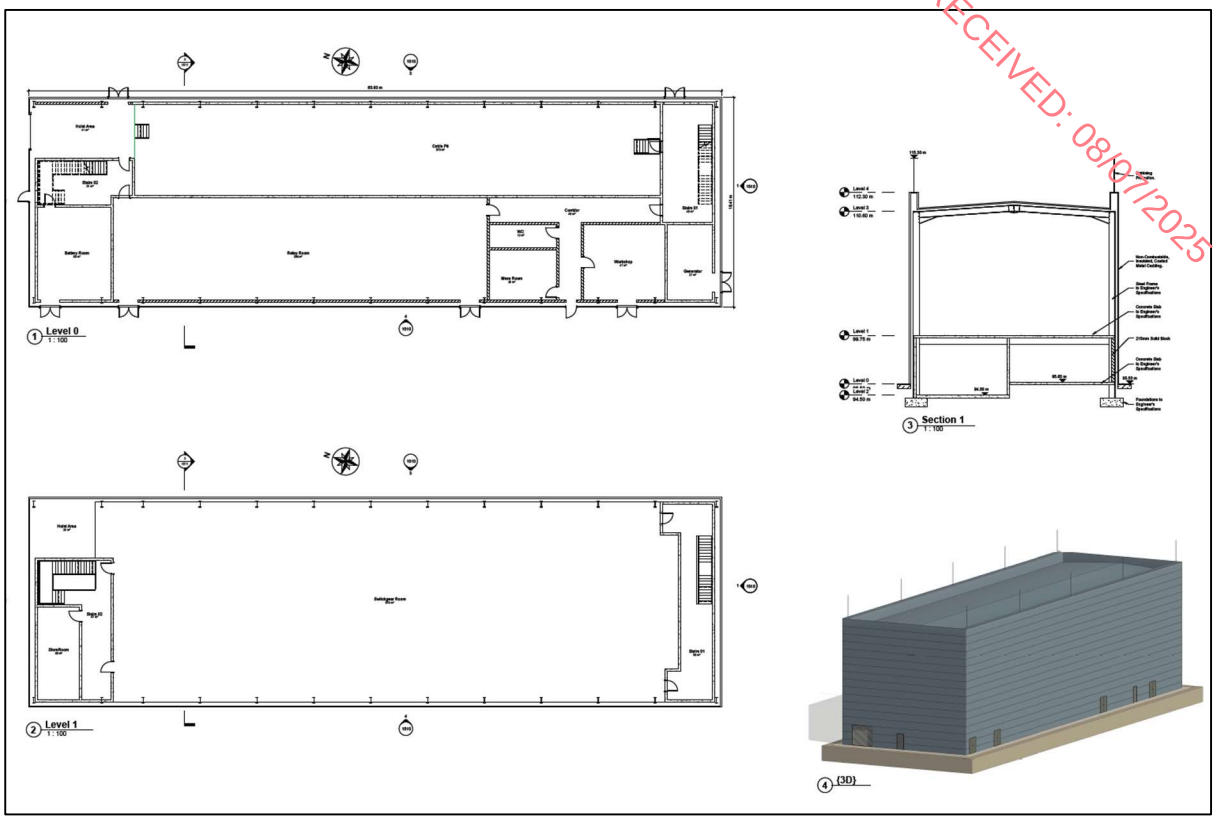
Figure 2.27 3D impression of Solar IPP Building and AIS Compound



2.5.4 GRID CONNECTION

The proposed 220kV IPP GIS will be located east and adjacent to the existing Castlelost 220kV GIS substation (an existing node on the electricity transmission system. Its connection to the national grid facilitates the use of renewable energy from the grid through commercial power purchase agreements (CPPAs) when abundant. Because of its proximity to the Castlelost node, the extent of the necessary grid connection infrastructure works, and potential associated impacts are limited.

Figure 2.28 220kV IPP GIS



2.6 DRAINAGE

2.6.1 FOUL EFFLUENT

2.6.1.1 Data Facility

Foul effluent generated on the data-centre campus, principally from welfare facilities for an anticipated workforce of 400 persons will be managed by a new, site-wide foul drainage system designed in accordance with the Uisce Éireann Code of Practice for Wastewater Infrastructure IW-CDS-5030-03, Revision 2 (July 2020), I.S. EN 752:2017 Drain and sewer systems outside buildings, I.S. EN 12056 (Parts 1-5, 2000) Gravity drainage systems inside buildings and the Building Regulations Technical Guidance Document Part H – Drainage & Waste Water (current edition).

Each data-centre building will have its own local foul network that conveys flows by gravity to a centrally aligned sewer. This then discharges to a pumping station positioned adjacent to the security building near the campus entrance. The duty/standby submersible pumps in the pumping station are sized to limit the off-site discharge to 13.3l/s. Flow is lifted by rising main that tracks towards the main entrance of the project and then east towards Rochfortbridge along the public road (R446). The private network will terminate in a new stand-off manhole from which gravity flow enters the existing Uisce Éireann public foul

sewer. All works within the public domain will be carried out under a Road Opening Licence and to Uisce Éireann Standard Details IW-CDS-5030-01.

2.6.1.2 DER

Foul wastewater generated from IPP Buildings spread across the DER will be discharged to individual sealed holding tanks (each 32m^3) collocated with associated IPP buildings (proposed due to low occupancy of the plant when operational). The list of locations where foul holding tanks are located across the project's lands are as follows:

- Fuel Cell IPP
- BESS IPP
- Solar IPP
- 220kV IPP
- 33kV IPP

The holding tanks are proposed due to the low occupancy nature of the IPP buildings (essentially substations). The low volumes of foul waste and low biological loading, associated with this type of building, may impact the successful continual operation of a conventional septic tank and any polishing filter system reliant on bacterial action. The foul drainage proposals will cater for the wastewater generated by the toilet and wash hand basin provided in each of the IPP buildings. The IPP building will be unmanned save for infrequent inspections and routine maintenance resulting in low rates of foul flow. The holding tanks will be fully watertight with no inlet settlement chamber, no biological treatment and crucially no discharge to ground or water. The system includes a single inlet pipe from the building's gravity drain and are fitted with an air vent and high-level alarm as standard. The alarm will connect back to a control centre in each IPP. Effluent from the tanks will be emptied biannually by a licensed wastewater contractor and taken to a municipal treatment plant.

2.6.2 SURFACE WATER DRAINAGE

The surface water drainage system is designed to collect and attenuate, as far as practically possible, surface water from impervious surfaces within the DC facility and DER and discharge this into an existing field drain serving the lands. This field drain routes south and discharges into an open drainage channel which runs alongside the M6 (northern side) before flowing south through a culvert beneath the M6 and alongside a local access road before turning east and discharging to the Mongagh River (EPA Name: Kitotan & Collinstown).

2.6.2.1 Data Facility

Combined attenuation /fire retention ponds are proposed with a total capacity of 11,630m^3 (southern pond [Pond 1] being 8,513m^3 & the northern pond [Pond 2] being 3,117m^3).

Pond 2 will receive and attenuate all surface water from DC Building 1, DC Building 2 and associated impervious features (the DC campus access road, internal roadways and associated car parking areas). Pond 1 will collect and attenuate all surface water from DC Buildings 3-6, along and associated impervious areas. Both attenuation ponds will be paired with a hydro-brake vortex flow control to restrict and limit discharge to 2.76l/s/ha. The water will flow in open channels to a rip-rap aprons[11] and then enter a 450mm culverted section followed by a second rip-rap apron before entering an existing 450mm pipe currently receiving drainage from the lands.

Figure 2.29 Surface Water Drainage Features (Data Centre)

[11] A rip-rap apron is a pad of interlocking quarried rock, laid downstream of an outlet to soak up flow energy and shield soil from scour. Sized correctly, it is a low-maintenance and ecologically sympathetic way to protect SuDS outfalls, culverts, and small spillways across Ireland's varied soils and rainfall intensities.

Each DC Building includes a 20m^3 underground rainwater harvesting tank which will be used to supplement grey water and /or firefighting water supplies. Below ground bypass separators are provided to control discharge from car parking areas. Transformer bunds have been designed utilising a water displacement system which negates the requirement for a pump to remove stormwater from within the bund. This system will be connected directly to the piped underground gravity drainage system upstream of the SUDS management train elements. This bund design can accommodate a pumped solution if required.

Both drainage catchments also incorporate bespoke shallow wildlife ponds (843m^2 and 1,025 m^2) each with undulating, low-pitch margins and water depths shallower than 2m to provide for biodiversity enhancement. Both wildlife ponds adopt a kidney-shaped, undulating perimeter. This breaks up wind fetch, creates quiet embankments and maximises the edge effect that supports most pond-life. Retaining banks are graded no steeper than 1:3.

Pond 1 and Pond 2 have also been designed as firewater retention basins. Actuated valves penstock valves will be fitted to the outlets and will close in the event of a fire. This will retain contaminated fire wastewater from discharging to the downstream receptors. Similarly actuated penstock valves will be fitted in manholes upstream of the wildlife ponds to divert fire wastewater away from the wildlife ponds and into the Ponds 1 and 2.

The carefully modelled design which incorporates open waterbodies along with the associated controls, delivers a surface-water drainage system that

- limits discharge to 2.76l/s/ha in line with GDSDS;
- creates over 1.8ha of new, high-quality freshwater habitat;
- provides a straightforward design which is easy to maintain.

The design reinforces the site's sustainable credentials by managing rainfall at source and providing a clear biodiversity gain. The drainage system on site will be further developed as part of detailed design stage works.

2.6.2.2 DER

2.6.2.2.1 Fuel Cell and Ancillary

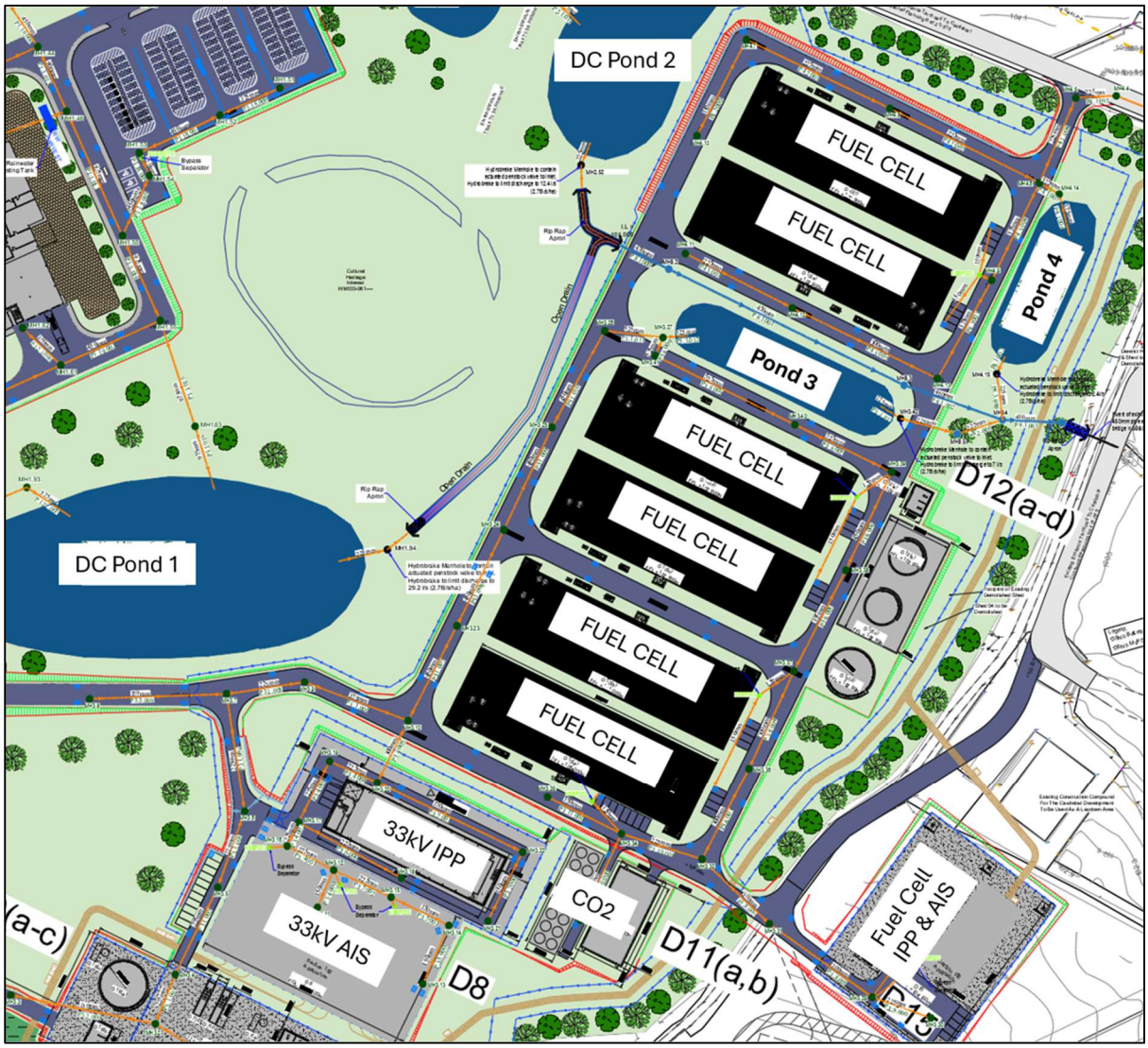
Combined attenuation /fire retention ponds are proposed with a combined capacity of 2,450m^3 (Pond 3 being 1,450m^3 & Pond 4 being 1,000m^3).

Pond 3 will receive and attenuate surface water from impervious areas in part of the Fuel Cell compound (four most southerly positioned power towers), associated areas such as

the carbon dioxide compound and chilled water storage areas, the 33kV IPP and AIS and the Ancillary Equipment Compound. Pond 4 will collect and attenuate surface water from remaining impervious areas of the Fuel Cell compound (two most northerly positioned power towers) and the nearby AGI.

Both attenuation ponds will be paired with a hydro-brake vortex flow control to restrict and limit discharge to 2.76l/s/ha. The water will be conveyed in an underground pipe to a rip-rap apron before entering an existing 450mm pipe currently receiving drainage from the lands. Pond 3 and Pond 4 are designed as firewater retention basins. Actuated valves penstock valves will be fitted to the outlets, and these will close in the event of a fire. This will retain any contaminated fire wastewater from discharging to the downstream receptors.

Figure 2.30 Surface Water Drainage Features (Fuel Cell & Ancillary)



Below ground bypass separators are provided to control discharge from the fuel cell compound, car parking areas and the 33kV AIS compound. Transformer bunds have been designed utilising a water displacement system which negates the requirement for a pump to remove stormwater from within the bund. This system will be connected directly to the piped underground gravity drainage system upstream of the SUDS management train elements. This bund design can accommodate a pumped solution if required.

2.6.2.2.2 BESS

Finished ground conditions with the BESS compound will provide for direct infiltration of rainfall to ground. All enclosures will be elevated on support plinths and the compound will be finished with clean free-draining stone eliminating the need for drainage collection and disposal infrastructure. Hardstanding and roofed areas associated with the Solar IPP building, internal roads and AIS will be served by surface water drainage infrastructure. The collection system will be fitted with a below ground bypass separator and the discharge will route through a 750m^3 firewater retention tank. The outlet pipe from the tank will be fitted with an actuated penstock valve and this will close to retain fire contaminated wastewater which may arise in the event of a fire. Clean water will route from the firewater retention tank to a below ground class 1 bypass separator and cellular storage attenuation structure. A controlled discharge of 0.7l/s will discharge via a hydrobrake to a rip-rap apron which outflows to an existing ditch within the development lands.

2.6.2.2.3 220kV IPP GIS Building

Surface water drainage from 220kV IPP GIS Building will discharge via a below ground class 1 bypass separator to a cellular storage attenuation structure before being discharged via a hydrobrake manhole (limiting discharge to 0.7l/s) to an existing open drain within the development lands.

2.6.2.2.4 Solar

Due to the fact that solar farms contain little impervious areas and cover less than 45% of the fenced compound, rainfall will be allowed to run of the panels and infiltrate straight back into the vegetated ground. The widely adopted approach for this type of development is low-maintenance, ecologically positive and fully aligned with the SuDS hierarchy set out in national and local guidance.

Surface water drainage from the Solar IPP and AIS compound will discharge via a below ground class 1 bypass separator to a cellular storage attenuation structure before being discharged via a hydrobrake manhole (limiting discharge to 0.4l/s) to an open drain which connects to an existing open drain.

2.7 TELECOMMUNICATIONS

The Project site is comprehensively served from a fibre and telecoms perspective, providing the opportunity for a straightforward and secure fibre and telecoms connection, whilst also limiting the works and associated impacts of the same.

Several dark fibre options are available near the site which meet the capacity and performance requirements for the DC facility. These include the following

- The project site has direct access to low latency (<1ms) high-capacity (>1 TB/s) dark fibre network which runs alongside the gas pipeline serving the existing AGI at the Castlelost Flexgen Power Plant. The ring network provides diverse fibre routes feeding the Dublin datacentre cluster and multiple designated fibre pairs are available.
- The project site has direct access to low latency high-capacity network which is planned along the M6 motorway to the south of the proposed development. This ring networks provides diverse fibre routes feeding the Dublin datacentre cluster and multiple designated fibre pairs are available.

Figure 2.31 Dark Fibre Network Map at the Proposed DC Facility

2.8 FIRE FIGHTING STRATEGY

2.8.1 DC FACILITY

The proposed DC facility (containing six identical buildings), each housing twenty data halls and a two-storey administration block has been laid out and specified to safeguard life in what are, by design, sparsely populated buildings, and protect critical ICT infrastructure. The design has been developed in full recognition of the duties imposed by Part B of the Building Regulations 1997-2014 (as amended) and the supporting Technical Guidance Document B (TGD-B). Specific reference to the following documents has also been considered:

- TGD-B 2006 + A1:2024 – fire safety guidance document
- IS 3218:2013 + A1:2019 – fire detection and alarm systems
- NFPA 13:2013 – automatic sprinkler systems (property protection)
- IS 391:2020 – hydrants and water supplies for fire-fighting

The following summarises the passive and active precautions, the fire-fighting facilities and the managerial arrangements that together will secure compliance and provide a robust platform for the Fire Safety Certificate applications. Key data for each building is presented in Table 2.1.

Table 2.1 DC Building Description

Parameter	Value (per DC Building)
Footprint	13,978 sqm
Gross Floor Area	26,781 sqm (13,326 (GF) + 13,545 sqm (FF))
Data Hall Area	16,403 sqm
Administration Block	2,478 sqm (1,223 sqm (GF) + 1255 sqm (FF))
Structure	Steel Frame with metal deck floor (or similar) and proprietary insulated metal cladding

Although the fire load of server racks is modest when compared with a typical industrial occupancy, the consequences of even a localised fire are serious, so each data hall is treated as a discrete fire compartment. A central circulation spine runs the length of every DC building; on either side, pairs of halls are bounded by fire-resisting walls and floors (exact details to be determined as part of detailed design). Mechanical-plant corridors (housing the air-handling units ad chillers) and ground-floor electrical galleries are likewise enclosed, preventing lateral or vertical fire spread between halls. All load-bearing elements will meet the fire-resistance periods set out in Appendix A, Tables A1 and A2 of TGD-B. To avoid expensive facade fire-rating, the six buildings have been staggered to

respect the separation distances (in this instance minimum separation of 37m) prescribed by TGD-B for their cubic capacity, thereby curtailing external fire spread without sacrificing density on the site.

Means of escape have been planned on the same conservative basis. A grid of protected corridors connects every room to perimeter stair cores such that no point in any hall requires a travel distance greater than 18m in single direction or 45m where a choice of direction exists, mirroring clause 1.2 of TGD-B. The protected stairways discharge directly to the open air; because all cores are placed at the building edge, escaping occupants cross no higher-risk zones on their way out. While the normal staff complement in a hall is low, the campus will adopt a full-building evacuation policy on confirmation of fire. This simplifies staff training and avoids the uncertainty that can arise with phased or progressive evacuation in a lightly staffed environment.

Where passive defence finishes, active fire systems are employed. Every building will be fitted with an addressable fire-detection and alarm installation meeting Category L2/L3 of I.S. 3218. In data halls and main plant spaces this conventional point detection is backed up by early-warning aspirating detectors, providing the earliest practicable notice of cable overheating or failed power supplies. All halls, plantrooms and the administrative block are further protected by automatic sprinklers designed to NFPA 13:2013. Because accidental water discharge is almost as unwelcome as fire in a data suite, the halls and critical plant areas use double-interlock pre-action valves: two independent signals (heat or smoke detection and open sprinkler head) must coincide before water enters the pipework. The pre-action releasing solenoids are cross-zoned to the detection system, giving clear first and second-knock indications to building management and to the responding fire-service crews.

To ensure and guarantee pressure and flow at the duty side the site demands, a campus-wide 2,000m³ sectional steel fire-water reservoir served by fire pumps (contained in a pump house) on a resilient ring main. External hydrant coverage is calculated from TGD-B's formula of one hydrant per 1,000m² of ground-floor area, yielding a requirement for 13-14 hydrants per data-centre building. These will be set on the perimeter access road, which in turn affords fire appliances 100% coverage around every façade. This satisfies the appliance-access criteria for a structure of this volume.

The campus will be staffed 24/7 by trained security personnel who double as the first-response team. They investigate alarms, liaise with the fire service and, where safe to do so, operate manual fire-fighting equipment. All fuel stocks, cleaning agents and other combustibles will be stored in dedicated, ventilated compartments, and routine

maintenance of UPS batteries, switchgear and cooling modules is scheduled against the recommendations of NFPA 75 and EN 50600, so that latent ignition sources are kept in check. A master fire-safety manual will couple standard operating procedures with live computer monitoring. Any trend towards abnormal temperature or current triggers both an engineering alert and a pre-emptive fire-risk review.

Finally, each building will make its own Fire Safety Certificate submission, demonstrating point-by-point compliance with Part B. Drawings which will be prepared as part of detailed design work which will mark compartment lines, protected routes, stair cores and external access. Engineering calculations will justify the sprinkler and hydrant provision, while a fire-engineering report will document the evacuation time analysis, the designed smoke-layer interface heights and the measures taken to preserve server continuity during and after a suppression event.

The firewater storage volume is more than normally required based on 60 litres per sec (4 bar pressure) over 120 minutes. The additional capacity provides for automatic refill and reduces instantaneous pressure on water supplies (i.e. the reserve can be refilled over a longer time period than 8 hours as the stored water volume will be greater than the required water volume).

In the event of a fire, any fire wastewater generated will drain through the system and be held in either combined attenuation ponds and /or below ground fire wastewater tanks, which are designed and sized in accordance with EPA requirements[12]. An actuated penstock valve will be positioned on the outlet of each pond /tank which will be activated to close upon the initiation of the fire alarm within the development. This will allow the fire water to be retained within the attenuation feature so that it can be pumped out and disposed of offsite in an appropriate manner. Gaseous extinguishing systems will also be provided for use on electrical systems.

2.8.2 DER

2.8.2.1 Fuel Cell

The Fuel Cell Power Towers (6no.) will delivers 160 MW of resilient electricity generation to the DC facility. Level 0 contains the transformers, switchgear, local UPS, SCADA panels and fire-pump set. Levels 1 and 2 each accommodate 40no. 330kW energy servers which are fed by low-pressure natural gas from the proposed AGI. Level 3 completes the heat-recovery cycle with two-stage absorption chillers that dump surplus thermal energy into the campus cooling system. Each of the six fuel cell towers are enclosed with broadway

[12] 2019 EPA Guidance on Retention Requirements for Firewater Run-off

architectural expanded metal mesh (or similar) to mitigate visual impact. Accordingly, the strategy focuses on passive fire protection. The steel framed structure will receive 90-minute intumescent coatings for fire protection purposes. Separation distances between towers range from 5-52m with towers arranged in blocks of two and separated by internal site roadways (thereby providing a minimum separation distance between blocks of 16.7m). Three separate stairs are provided on each tower along with an internal lift.

To provide for firefighting, the fuel cell area separately contains a 2,000m³ sectional steel fire-water tank served by fire pumps (contained in a pump house) on a resilient ring main. Isolation valves at every riser mean that maintenance on one tower does not compromise protection elsewhere. The towers will also be fitted with a sprinkler system. On Level 0 electrical plant is served by local extinguishers. An internal perimeter road network is designed to provide 360-degree access to the three fuel cell blocks

All control and indication panels, alarm, gas, mist, pump status and fuel-isolation, are repeated in the campus security hub, so that the arriving brigade receives an immediate schematic of whichever tower is in alarm, the floor of origin, the state of the fuel-isolation valves and the gas readings.

Fire safety ultimately rests on people as well as hardware, and the management regime is therefore built around continuous monitoring and rehearsed response. Written procedures mandate tower-by-tower evacuation on any confirmed fire, immediate closure of the automatic gas valves, and discussion with the statutory fire service at a clearly signed point. Each tower will make a standalone Fire Safety Certificate application. That dossier will present drawings, structural fire-resistance schedules, hydraulic calculations for mist, gas and hydrant systems, and computer modelling to show that tenable conditions for egress are maintained. Exact details will be determined as part of detailed design works.

2.8.2.2 BESS

Grid-scale battery energy storage systems have become a key component for balancing renewable electricity in modern power networks. The proposed BESS will play a central role in enabling the Red Admiral Datacentre Campus to operate on a fully optimised, net-zero carbon energy mix. The proposed BESS will comprise a series of (i) battery and (ii) medium voltage power system (MVPS) enclosures.

The major safety aspects which are considered in the design of the proposed BESS facility are categorised as electrical and electrochemical. Hazards are controlled through design, spacing, fixed protection and an evidence-based fire-fighting strategy that aligns with

internationally recognised standards. There are numerous international standards which regulate the design, manufacture and distribution of lithium-ion batteries to ensure they are adequately tested for safety, reliability and durability. The proposed BESS has been designed in accordance with the following regulatory and standardisation framework and has layered controls built in for its fire-fighting strategy.

- UL 9540A (2019); *"Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems"*
- NFPA 855 (2023); Standard for the Installation of Stationary Energy Storage Systems
- NFCC (2024) *"Grid-scale BESS Planning – Guidance for FRS"*
- Energy Storage Ireland, (July 2021) *Safety of Grid-Scale Battery Energy Storage Systems - Information Paper*

The proposed BESS facility is designed as a series of independent enclosures. The steel ISO compliant enclosures incorporate deflagration vents sized by the installation-level UL 9540A test so that an internal over-pressure event jets upwards and away from walkways. Fixed inert gas suppression systems will be provided within enclosures in order to help prevent or limit propagation between modules. Upon detection of abnormal cell temperature, smoke, or vapour concentrations, the BMS will:

- Initiate an immediate safety-shutdown sequence by opening charge and discharge contactors and de-energising the power-conversion system, thereby preventing further energy flow into the affected string.
- Transmit a suppression-release command to the fixed gaseous-agent system, ensuring agent discharge occurs only after electrical isolation is confirmed.
- Close all motorised dampers and halt mechanical ventilation to preserve the agent's design concentration and comply with NFPA 855 in conjunction with the parent suppression standard (e.g., NFPA 2001 or NFPA 2010).
- Activate audible and visual alarms locally and via SCADA to notify plant operators and first responders of the event sequence and container status.
- Log all parameters and event timestamps for post-incident analysis and verification of compliance with the site's Hazard-Mitigation Analysis.

This fully integrated control logic ensures that detection, electrical isolation, ventilation shutdown and agent discharge occur in the correct order and timeframe, satisfying both the functional requirements of NFPA 855 (2023) and the performance criteria of the applicable clean-agent standard.

All enclosures (BESS and MVPS) will be UL9540A (2024) tested and certified. Spacing of battery enclosures to each other and MVPS units will be 3.99m (greater than the 0.9m minimum spacing specification detailed in NFPA 855. Accordingly, the BESS facility will be NFPA 855 (2023) compliant.

A 500m^3 sectional steel fire-water tank and pump set is positioned within the BESS facility which will serve hydrants thereby delivering site-wide cooling for nearby enclosures and boundary areas. The water tank is positioned near the entrance to the BESS facility (40m from BESS enclosures) and safe access to hydrants is provided in the event of a fire. The reservoir will be capable of delivering a minimum of 1,900 litres per minute for just over 4 hours (minimum 2 hours normally required). The additional capacity provides for automatic refill and reduces instantaneous pressure on water supplies (i.e. the reserve can be refilled over a longer time period than 8 hours as the stored water volume will be greater than the required water volume).

In the event of a fire, any fire wastewater generated will drain through the system and be held in a proposed below ground fire wastewater retention tank, which is designed and sized in accordance with EPA requirements[13]. An actuated penstock valve will be positioned on the outlet of the tank which will be activated to close upon the initiation of the fire alarm at the BESS facility. This will allow the fire water to be retained within the attenuation feature so that it can be pumped out and disposed of offsite in an appropriate manner.

2.9 EXTERNAL BOUNDARY TREATMENTS AND LANDSCAPING

The project site is located in a robust part of the surrounding landscape with limited highly susceptible landscape or visual designations. The project lands incorporate an area of approximately 243ha. The immediate site context is influenced by the existing recently constructed Castlelost Flexgen Power Plant, the M6 motorway corridor, the R446 regional road, and typical rural land uses including pastoral farmland and conifer forest plantations. In this regard, the site and immediate study area is not considered highly distinctive or susceptible to change.

In addition to mitigation by avoidance measures, retention of existing hedgerow boundaries will visually screen and maintain the existing field pattern across most of the project lands. In this respect, whilst there will be requirement for removal of some hedgerow vegetation and trees (predominantly within the 39ha DC facility).

[13] 2019 EPA Guidance on Retention Requirements for Firewater Run-off

The DC facility includes an area of approximately 39ha. The supporting 33kV IPP and AIS compound will occupy an area of 0.76ha. Of the total 39ha, soft landscaping and boundary treatments amounts to 23.5ha including 0.7ha of compensatory native woodland planting (northwestern area of the site) and freshwater features (1.8ha). The Fuel Cell (and ancillary infrastructure) adjoining the eastern boundary of the DC facility will be set out on 5.7ha of land. An additional 4.6ha of compensatory native woodland will be provided to the south of the DC facility along with 3.6ha of golden plover habitat.

The solar farm component of the DER will span across 168ha of lands to the east of Castlelost Flexgen and the proposed BESS (footprint of 2.65ha). The footprint of solar panels arrays (ground coverage ratio) is 40-45% of total fenced area (approximately 72ha). Furthermore, the layout incorporates suitable buffers to third party boundaries, internal hedgerows, drainage ditches, streams and rivers. The solar scheme includes 6.7ha of golden plover habitat and 1.5ha of compensatory native woodland.

Landscape tender drawings and specifications will be produced to ensure that the landscape work is implemented in accordance with best practice and conforms with the proposed landscape and biodiversity plan. This document will include tree work procedures, soil handling, planting and maintenance. The contract works will be supervised by a suitably qualified landscape architect.

Planting works will be undertaken in the next available planting season after completion civil engineering and building work for each phase and will integrate and form the overall landscape and biodiversity plan for the project. All tree protection requirements will be installed on commencement of the development and removed on a phased basis as stages of the development are completed.

2.10 DESCRIPTION OF CONSTRUCTION AND COMMISSION STAGES

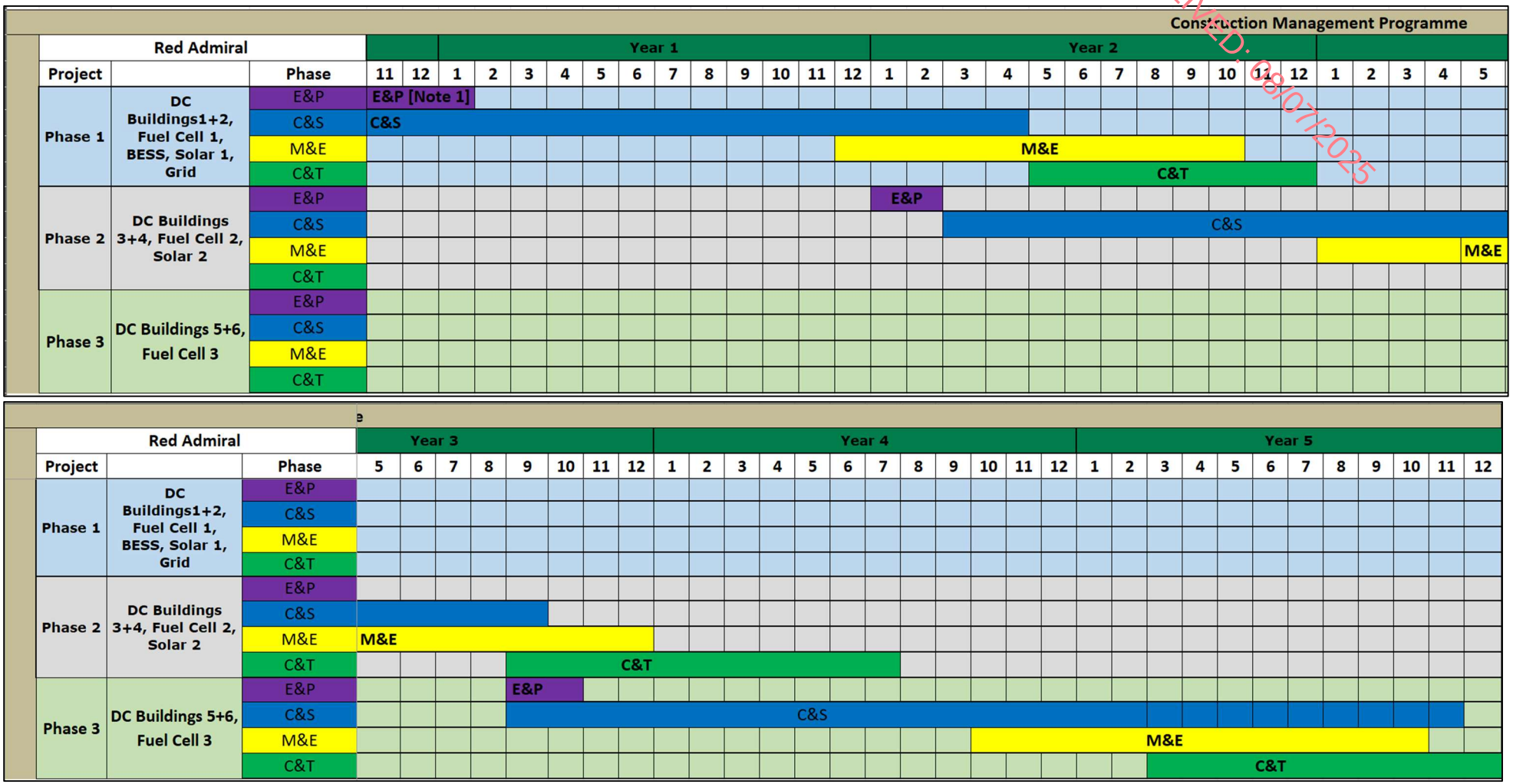
This section details the construction works associated with the proposed development and outlines general construction methods and associated mitigation measures to be implemented to ensure that potential environmental impacts are minimised.

It is envisaged that the project will be constructed over an estimated 60-62-month period across three phases. After the construction period, it is expected that all elements of the project will be fully constructed, commissioned and capable of operating as designed. The specific details of the construction programme are not currently known as such this programme will be developed under Engineering Procurement and Construction (EPC) contract as part of the detailed design phase. The EPC contractor will prepare a detailed Construction Environmental Management Plan (CEMP) which will be submitted for agreement with the planning authority. It is expected that the EPC contractor will appoint subcontractors to undertake all the specific construction and civil works. A preliminary CEMP has been prepared and is contained in Volume 3 of the EIAR (Appendices) and is lodged in support of the project.

It is therefore difficult to assess the staffing and delivery levels for the development. However, it is considered that the design and proposed layout of projects has developed sufficiently to discuss the potential environmental effects of proposed construction methods. An estimate of construction traffic volumes has been made for a site of this size and is described in Chapter 13 (Traffic and Transport).

The timing of the commencement of construction is subject to planning, design, tendering and ecological constraints. Any works associated with site clearance and removal of soils and internal hedging would be seasonally limited to mitigate against any adverse ecological effects. The impact of construction activities on Biodiversity and Roads and Traffic are assessed separately in this EIAR. The CEMP will provide a framework under which construction activities, which have potential for environmental impact (e.g., generation of dust, ecological impacts, surface water discharge, etc.), will be managed. Mitigation measures as outlined in the EIAR shall be included within this plan. An indicative construction schedule for each phase is outlined below (Figure 2.32). It should be noted that the timing and phasing of projects and activities are approximate and are indicative rather than a definitive programme of works.

Figure 2.32 Indicative Construction Programme



Notes:

1. The construction timelines are for each project are indicative and will be finalised at detailed design stage of the projects.
2. E&P = Site Evaluation and Preparation (Works)
   C&S = Civil & Structural (Works)
   M&E = Mechanical & Electrical (Works)
   C&T = Commissioning and Testing (Works)

Equipment to be used during the construction of the facility will be typical for a project of this scale. In general, the following machinery will be used:

- Tracked excavators,
- Wheeled Excavators,
- Bulldozer,
- Vibrator Rollers,
- Trucks, Dump trucks /Dumpers,
- Mobile Crane,
- Backhoe,
- Grader,
- Breakers,
- Generators /pumps,
- Hoists,
- Concrete pump – Lorry Mounted,
- Loaders,
- Compressors /compactors,
- Rollers,
- Road surfacing plant,
- Delivery vehicles for concrete, steel and other construction materials,

Heavy vehicle movements to the site will consist predominantly of plant and material deliveries. The extent of HGV movements will vary at different stages of the construction works in response to the activities taking place at any given time. The majority of machinery associated with the construction phase is likely to remain onsite for the duration of the construction process. Therefore, the traffic associated with heavy plant will be limited to their delivery and removal, with the intervening period comprising internal movements within the site.

The intensity of traffic will vary over the course of the construction programme. The values referenced are only anticipated during peak periods and therefore representative of the worse-case scenario. Further details on estimated and predicted traffic (LGV and HGV) trip generation figures are assessed in Chapter 13 (Traffic) with supporting data provided in Appendices 13.2. Deliveries during the construction phase will occur on weekdays and will be spread over the over the course of the working day.

2.10.1 DURATION AND PHASING

It is expected that the project will be constructed over an approximate 60-month construction period. Construction works will be carried out over 3 phases (overlapping).

Phase	Period	Items
Phase 1	26 months	DC Buildings 1 & 2, Fuel Cell Power Tower 1, BESS facility, Solar Farm (parcel 1), Grid Connection (including 220kV IPP GIS Building)
Phase 2	31 months	DC Buildings 3 & 4, Fuel Cell Power Tower 2, Solar Farm (northern and southern parcels)
Phase 3	28 months	DC Buildings 5 & 6, Fuel Cell Power Tower 3.

Prior to commencement of construction, geotechnical investigations such as trial pits and boreholes will be conducted to verify foundation designs and road construction. All investigations required prior to enabling works will be carried out in accordance with BS 5930 (Code of Practice for Site Investigations).

No land acquisition is required prior to construction, as the applicant has put in place agreements with the relevant landowners with respect to the entire development lands. Phase 1 of construction will not commence until the main construction contract is awarded and will initially comprise, fencing, excavation, re-grading and berming /soil deposition. The site clearance works will be undertaken in accordance with best practice. Removal of any bird habitats will be undertaken outside the bird breeding season to mitigate disturbance to birds. Mitigation measures to avoid and limit impact to biodiversity include implementation of an environmental management plan which will address water run-off, noise and dust generation, implementation of a suitable landscaping strategy to compensate for habitat loss and to benefit the wildlife of the local area, retention of hedgerows and treelines along the boundary of the site, etc. Also, site clearance will proceed only after cognisance is made to the ecological mitigation measures as detailed in this EIAR.

Where cutting or excavation is carried out, this material will then be reused in areas of the site where fill is needed or in areas requiring landscaping. If any additional material is required this will be imported into the site in a safe and controlled manner, so as to minimise the potential for nuisance and disturbance.

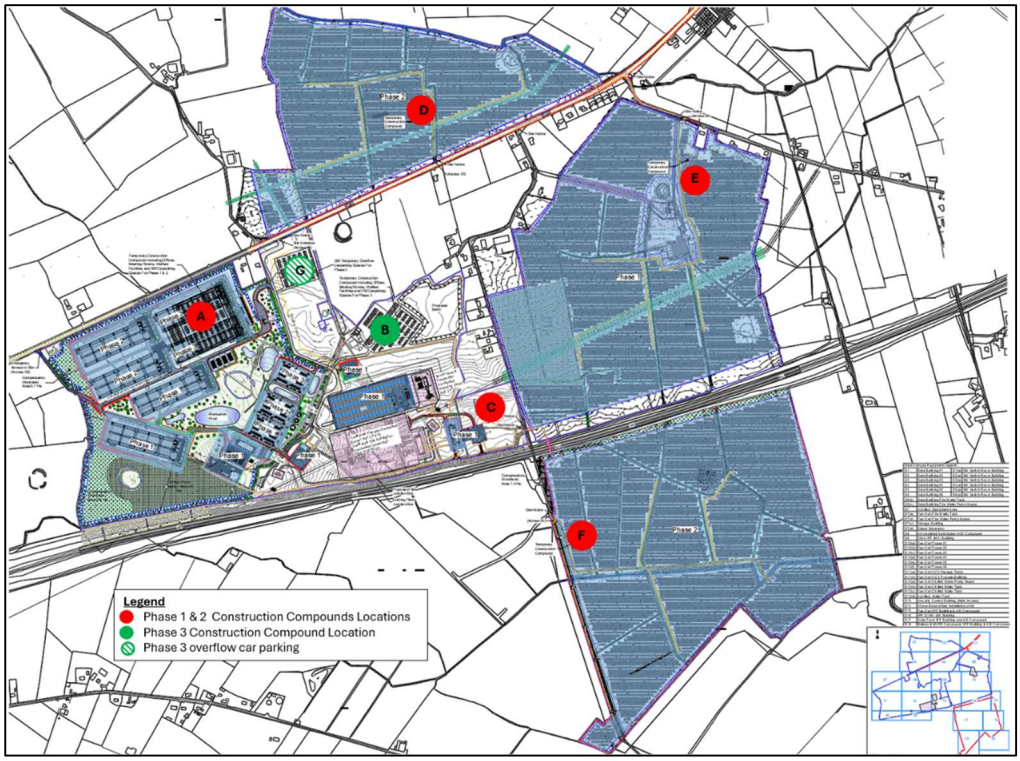
The applicant is committed to ensuring that all the mitigation measures are implemented in full. Haul roads, internal construction site roads, construction compound, main drainage runs, temporary car-parking and staff facilities will also be constructed during this phase. Such site preparation works are expected to be carried out within the first 6 months of the project commencing.

Site preparation and enabling works will also involve the site set up by the building contractor, which will include provision of a site construction compounds which will include the following:

- Site Office,
- Site Facilities (canteen, toilets etc.),
- Office for Resident Engineer,
- Secure compound for the storage of all on site machinery and materials,
- Carparking,
- Permanent/temporary fencing,
- Site Security.

Construction traffic will enter the site via the R446 Regional Road. Internal Roads will be constructed from the public roads to the project development compounds and contractor's compounds (see Figure 2.33). It should be noted that the construction compound for Phase 1 and 2 works on the DC facility will be located in the area where DC Buildings 5 & 6 will be constructed (Phase 3). The temporary construction compound will be relocated to east (to the position marked as "B" on Figure 2.33) and an overflow car park (marked as "G" on Figure 2.33) will be located within the development lands.

Figure 2.33 Layout showing locations of temporary construction compounds



2.10.1.1 Structural Works

Structural works will comprise the construction of the foundations and buildings (e.g., DC Buildings, IPP Buildings, etc), below ground pipework and conduits for services, bunds, internal roads, drainage works, and infrastructural works completion.

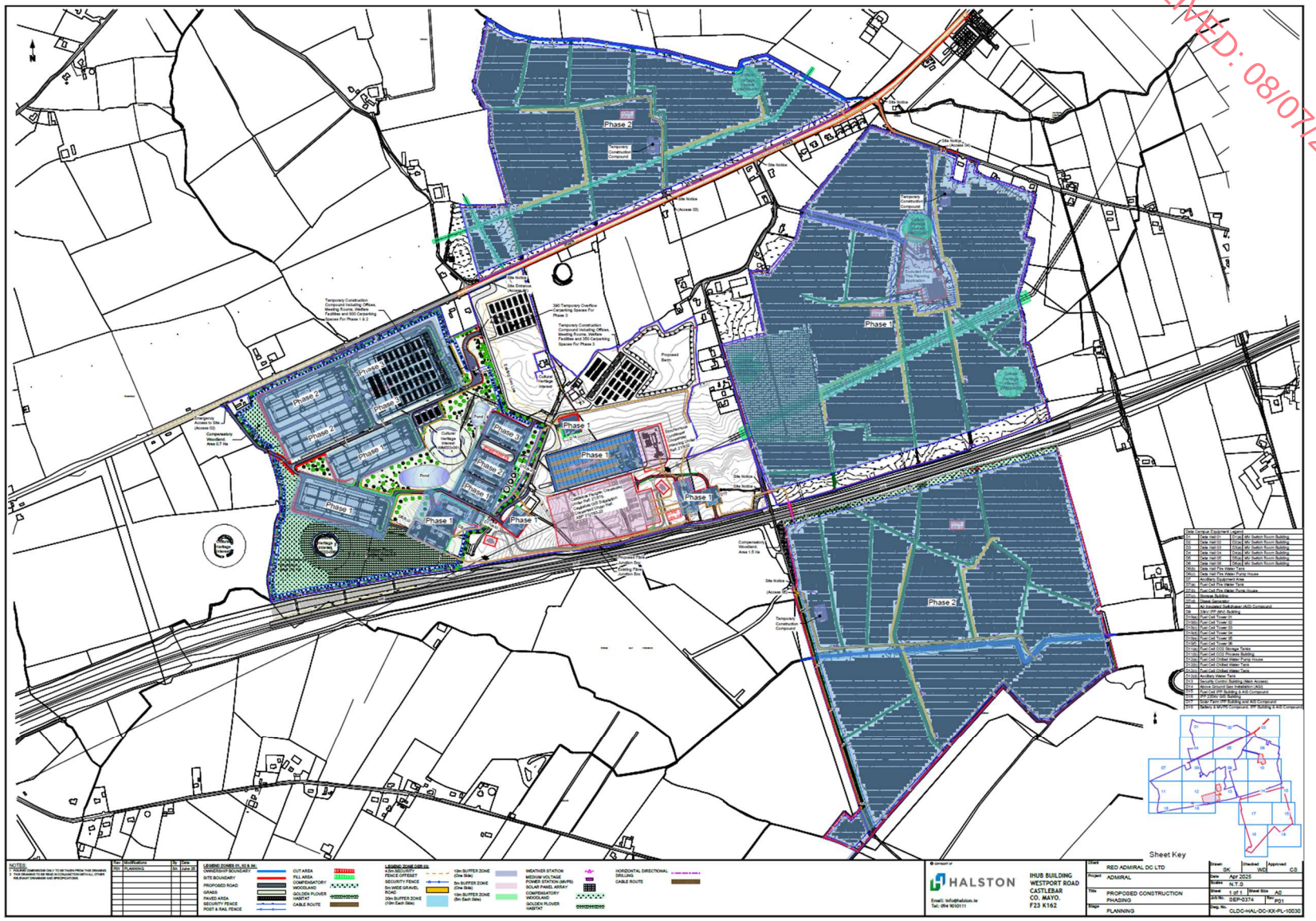
2.10.1.2 Mechanical and Electrical Works

Mechanical and electrical works include placement of plant and machinery, transformers, tanks, skid mounted structures and enclosures, above ground pipework, wring and cabling, etc. The individual project plant components will be delivered to the site by the preferred supplier and will be installed in accordance with manufacturer requirements.

2.10.1.3 Commissioning and Testing

Commissioning and testing of mechanical and electrical equipment will be carried out in anticipation of handover of the projects to the project owner /client. It should be noted that the above phasing is indicative only and may be subject to variation by the planning authority and also to final schedule agreement with the main contractor. In terms of the DC facility, each building will undergo a five-month integrated-systems test. This will be followed by 1-2 months of snag clearance and demobilisation of contractor's compounds.

Figure 2.34 Proposed Construction Phasing



2.10.2 EMPLOYMENT

Employment levels during the development will vary depending on the construction programme and the extent of activities occurring on the site. It is expected that during peak activities there will be up to 900 construction workers at the site. An assessment of the likely traffic volumes which may arise during the construction and operational phase is discussed in the Traffic and Transport Chapter of this EIAR (Chapter 13 and in the supporting Appendices, in particular Appendix 13.2).

2.10.3 ACCOMMODATION/FACILITIES

The relevant statutory requirements will be provided for all workers on the construction site including:

- Canteen facilities and drinking water supply
- Toilet, wash up and locker facilities and hot water
- Drying room
- Car parking for workers
- First Aid Office
- Site Engineers & Resident Engineers offices
- Site offices for Contractors
- Secure site compounds

2.10.4 CONSTRUCTION OPERATION HOURS

Subject to agreement with the planning authority, it is anticipated that the following times will constitute the standard working hours[14] on the construction site.

- Monday to Friday 07:00 to 19:00
- Saturdays 07:00 to 13:00
- Site closed on Sundays and Bank Holidays,

Working hours may vary slightly depending on weather conditions and daylight hours during winter months. Heavy construction activities will be avoided where possible outside the normal working hours outlined above. Lighting for night-time working will be downward facing and directed towards the centre of the site so as to minimise any

[14] Typical Construction hours will apply with the exception of commissioning and specific engineering works (e.g., concrete pours) which could take place outside these hours, as and when agreed with the planning authority. It is likely that some construction activities will be required to continue for 24 hours for limited durations. The facility may be operational at any point during a 24-hour period during commissioning (and operation).

nuisance outside of the site in relation to residential receptors or light disturbance to ecological receptors.

2.10.5 CONSTRUCTION TECHNIQUES

The construction techniques used will be standard and similar to those that would normally be associated with large industrial projects of this nature with both building and technology installation elements and a large civil engineering element.

2.10.6 MATERIALS

In so far as possible, construction materials will be from local sources to support the local economy and minimise environmental impact associated with vehicle emissions. All imported material that will be used on site will be retrieved from approved sources.

Under LEED v4.1 BD+C—Data Centres, the Materials & Resources (MR) credit framework incentivises both (i) the specification of products that can demonstrate quantifiable reductions in cradle-to-gate global-warming potential (e.g. via whole-building life-cycle assessment or EPD Optimisation pathways) and (ii) the procurement of products whose extraction, manufacture and point of purchase all occur within a 160 km radius, through the Location Valuation Factor that doubles their weighted contribution to the BPDO credits.

Crucially, these mechanisms are performance based rather than prescriptive: LEED awards points for verified embodied-carbon improvements and for documented regional sourcing, but it does not mandate either criterion in isolation. This design flexibility allows the project's procurement strategy (aiming for Gold/Platinum certification) to optimise the mix of low-carbon materials and local supply chain advantages in a manner that best meets cost, schedule and risk objectives while maximising credit uptake.

The construction of surface water systems are an important element of the project. Temporary localised settlement ponds and interceptors (where necessary) will be constructed during the initial stages of the contract mitigating against adverse impacts on receiving water receptors.

2.10.7 EMBODIED CARBON OPTIMISATION AND LCA

The baseline scenario presented for the DC facility in the LCA (Appendix 3.2) derived from the provisional estimated quantities and specifications contained in the design package. Concrete mixes in this reference case already incorporate a 20–25 % ground-granulated blast-furnace slag (GGBS) replacement to reflect prevailing Irish practice for large industrial floors and foundations, while structural steel has been assigned an emissions

factor of 1.51 kg CO_2/kg in line with the latest Environmental Product Declarations (EPDs) for standard hot-rolled sections.

Applying these inputs through the LCA platform yields a cradle-to-practical-completion intensity of 567kg CO_2e/m^2. This figure captures the primary materials of the superstructure, envelope and internal floor systems as well as a proportional allowance for temporary works, fittings and construction-stage energy. Although respectable by historic data-centre benchmarks, the result maps the major carbon hot spots that were further considered. A component-by-component breakdown of the baseline reveals that five material groups dominate the carbon profile, i.e. ground-floor concrete slab, upper floor, concrete slab, primary structural steel, composite façade panels and secondary steel. An iterative optioneering exercise tested alternative material specifications, supply chains and design efficiencies. The optimum blend of measures, all technically feasible within programme and budget parameters, achieves a 34% reduction, bringing embodied-carbon intensity down to 373kg CO_2e/m^2 without compromising durability, structural integrity or fire performance.

The cumulative effect of these material switches—for the same structural spans and loading criteria—drives the embodied-carbon saving of 194kg CO_2e/m^2 relative to the baseline, equating to an absolute reduction of roughly 18,000t CO_2e/m^2 over the building's gross internal floor area.

The embodied-carbon modelling demonstrates that intelligent material choices,particularly high-GGBS concrete, low-carbon steel, and optimised façade components—deliver a quantifiable 34% reduction without diluting functional performance. Coupled with a forward-looking DER configuration, the scheme outperforms current policy baselines and provides a replicable model for how large-scale digital infrastructure can contribute positively to Ireland's legally binding climate targets. In total, the combination of design optimisation, construction-phase controls and operational net-zero capability means the proposed project will exert no significant residual impact on climate, while simultaneously underpinning the nation's digital transformation.

2.10.8 EXTENSION OF INFRASTRUCTURE

Services such as ESB and Telecoms will be brought to the dedicated construction compound from the nearest available point. Where this is not practicable and deemed unnecessary, diesel generators will provide power (as required) at the more remote /low intensity construction compounds. Potable water for the development will be supplied from the on-site well which is currently serving the residential property which is to be demolished. Temporary sanitary accommodation will be provided on site until proposed

foul effluent management packages are installed. All domestic effluent generated on site will be discharged to temporary sewage containment facilities prior to transport and treatment off site.

2.10.9 WASTE MANAGEMENT

During the construction phase both solid and liquid waste will be produced at the facility. Waste oils, solvents and paints will be stored in a temporary bunded area prior to transport off site by a licensed contractor. All wastes arising from construction of the proposed development will be managed in accordance with the Waste Management Acts 1996, as amended.

It is proposed to demolish and remove some farm buildings /outbuildings and a derelect house within the development lands. These will be demolished and removed from site upon commencement of construction work in accordance with best practice. Anticipated wastes which will be generated include soils, bricks and blocks; concrete and reinforced concrete; timber; metal sheeting and steel. Materials arising from this process will be recycled /disposed of at authorised waste management facilities.

Designated skips and receptacles will be provided on site for all recyclable wastes. The appointed waste contractor will collect and transfer the recyclable wastes as skips are filled. Non-recyclable waste (e.g. canteen waste, general waste) will be transferred by an authorised waste collector to licensed facilities (e.g., canteen waste, general waste). Numerous licensed waste contractors are available in the area and will be obtained from the waste management authority listing.

It is not envisaged that there will be any excess spoil materials arising from construction, as all the excavated soil will be re-used as part of the construction process (formation of berms and landscaping). All other solid waste generated during the construction phase will be adequately segregated and stored prior to transfer to an authorised facility for recovery/recycling/disposal.

2.10.10 FENCING AND SECURITY

Secure fencing will be erected around individual development sites and temporary fencing will be erected around the construction compound. All on site machinery and materials will also be stored within the fenced compound.

2.10.11 NOISE, VIBRATION AND DUST

Dust emissions during the construction period have been detailed under temporary environmental protection measures. The CEMP will incorporate all mitigation measures detailed in the EIAR and any conditions specified in the interests of proper planning, sustainable development and environmental protection. This will include measures and trigger values to mitigate any potential impacts to nearby receptors.

2.10.12 TEMPORARY ENVIRONMENTAL PROTECTION MEASURES

During the construction stage site construction roads will be sprayed with water during dry periods to mitigate against the formation of dry dust particles. Excavated materials stored or moved on site could lead to the formation of airborne dust particles during dry weather periods. Water suppressants will be used during these dry weather conditions.

The landscaping areas proposed for the facility will be constructed and planted at the earliest opportunity thus limiting the potential for off-site migration of airborne dust. Where temporary stockpiles are required, the material will be stored in designated areas and will be covered with tarpaulins and/ or regularly dampened during dry weather periods.

All potentially polluting substances such as oils, chemicals and paints used during construction will be stored in designated storage areas. These will be bunded to a volume of 110% capacity of the largest tank/container within the bunded area with all filling and draw-off points fully located within the bunded area. Drainage for the bunded area will be diverted for dedicated collection and safe disposal.

As stated above all domestic effluent generated on site will be discharged to temporary sewage containment facilities prior to transport and treatment off site.

Temporary settlement ponds and interceptors will be constructed as necessary during the early stages of construction mitigating against silt laden run-off to the existing drainage network.

Prior to commencement of development a construction quality assurance plan (CQA) will be jointly prepared by the contractor and developer. Written approval of the CQA will be sought from the planning authority prior to commencement of construction activities on-site if required.

Good housekeeping and facility management during the construction period will ensure that there will be no negative environmental impacts from the construction of the proposed facility.

The majority of machinery associated with the construction phase is likely to be onsite for extended periods of time. The traffic associated with these will therefore be limited to their delivery and removal, with the intervening period involving internal movements within the site. The impact of these on the surrounding road network is therefore expected to be minimal and infrequent.

2.11 DESCRIPTION OF OPERATIONAL STAGE

The operational stage of the proposed DC facility and collocated DER is designed with robust sustainability commitments which represents a critical period in the facility's lifecycle. This stage is characterised by the continuous operation of advanced digital infrastructure, supported by integrated energy systems and environmental management practices that align with international best standards. The following outlines the anticipated operational characteristics, resource consumption, emissions, waste management, and mitigation measures relevant to the project.

2.11.1 DC FACILITY

The operational phase begins once final commissioning tests are complete, and the data halls are handed over for live IT load. From that point, the facility operates continuously, twenty-four hours a day, three hundred and sixty-five days a year, to provide services. Its design philosophy links its performance with best-in-class environmental stewardship, reflecting the commitments embodied in the European *Climate Neutral Data Centre Pact*. It is proposed that as part of detailed design work (preconstruction) the project will be prepared for certification to the LEED BD+C v4 rating system for data centres.

Unlike conventional data centres that often rely on water-intensive evaporative cooling, the proposed DC facility will employ a combination of free fresh air cooling, air handling units, and, during periods of unusually high ambient temperatures, electric and absorption chillers. The primary cooling strategy utilises filtered outside air to maintain optimal server temperatures, significantly reducing water consumption and associated environmental impacts.

Electric chillers and absorption chillers will only operate when climatic conditions exceed the design thresholds for free air cooling. This hybrid approach ensures year-round thermal stability while minimising both energy and water use. The absence of evaporative

cooling eliminates the need for large-scale water abstraction and discharge, further reducing the facility's environmental footprint. The operational phase will be characterised by substantial but carefully managed resource consumption. Electricity will remain the primary input, with demand moderated through energy-efficient hardware, virtualisation, and intelligent workload management (*"Digital Carbon Passport Solution").* The Digital Carbon Passport automatically ranks supply options in a carbon merit order. The facility's commitment to sourcing energy from the lowest carbon-intensive sources will result in a significantly reduced operational carbon footprint compared to conventional data centres.

Direct emissions will be minimal, primarily associated with periodic testing of backup systems. The use of fuel cells and renewable energy will further limit reliance on fossil-fuel-based backup generators. Air quality impacts will be negligible, with emissions well below regulatory thresholds (refer to Chapter 10). Noise emissions, primarily from cooling equipment and backup power systems, will be addressed through careful equipment selection, acoustic screening, and adherence to design criteria specified. Predictive modelling was used to ensure that operational noise levels remain within permissible limits at the site boundary and nearby sensitive receptors (refer to Chapter 11).

Operational water use is confined to domestic demand, cleaning and minor closed-loop top-ups. Groundwater abstraction, supplied though a modular water treatment unit, will serve the vast majority of the proposed demand on site and this will be supplemented by rainwater harvested from each building. Harvested rainwater stored in underground tanks and will used as "grey water", e.g. for WC flushing or replenishment of bulk water storage tanks (e.g. firewater). Clean stormwater is attenuated on site using open ponds in accordance with SuDS principles and released to an existing receiving watercourse at greenfield run-off rates flow controls to safeguard and mitigate any risk of downstream impact. Foul effluent from the DC facility will be discharged to the public sewer.

Operational waste streams will include electronic waste (e-waste) from hardware upgrades and decommissioning, packaging materials, and general municipal waste from staff activities. The DC facility will implement a comprehensive waste management plan, prioritising reduction, reuse, and recycling in line with LEED BD+C v4 requirements and circular economy principle. Waste will be processed by certified contractors, ensuring responsible handling and material recovery. Routine training and awareness programmes will be provided for staff to support waste segregation and minimisation efforts. The facility will report on waste generation and diversion rates as part of its ongoing sustainability commitments

2.11.2 DER

A distinguishing feature of project is the collocation and integration of a DER including a solar farm, fuel cell, and BESS, in addition to a grid connection. These systems are designed to prioritise the lowest carbon-intensive energy sources available at any given time, thereby minimising the facility's carbon footprint. The solar farm will provide renewable electricity during daylight hours, while the fuel cell offers a low-emission, dispatchable power source. The BESS will facilitate load balancing, back-up, and support to energy source integrations, enhancing overall energy resilience and flexibility.

The facility's energy management system will dynamically optimise the use of on-site and grid-sourced electricity, ensuring that the data centre's demand is met in the most sustainable manner possible. Although the fuel cell does not involve combustion, it is expected that it will require an industrial emissions licence from the EPA. EU guidance on both the IED and the ETS makes clear the oxidation of a fuel, not the presence of a flame, that brings an installation into the "combustion" category, i.e., it falls under a class of activity ("*Combustion of fuels in installations with a total rated thermal input of 50 MW or more*") as outlined in the first schedule of the EPA Act 1992, as amended.

The Solar Farm and BESS facility will operate largely unmanned and will be controlled remotely. The Solar PV farm and BESS will provide power to the DC facility via the 220kV IPP GIS. Neither project is a class of activity under the First Schedule of the EPA Act 1992, as amended. Noise emissions, primarily from DER assets has been addressed through careful equipment selection, acoustic screening, and adherence to design criteria specified. Predictive modelling was used to ensure that operational noise levels remain within permissible limits at the site boundary and nearby sensitive receptors (refer to Chapter 11).

Upon handover after the Commissioning and Testing Phase, the plant operators will provide suitably qualified and technically competent staff who will be responsible for maintenance of the facility. Employees will cover a broad range of services including safety, engineering, technical, security, maintenance and administrative support staff. Subcontracted maintenance staff will also be required at critical times throughout the life of the project. The plant will be operated in accordance with procedures which will be prescribed in management systems associated with the site operations, i.e., quality, health and safety.

2.12 DECOMMISSIONING

A decommission plan has been prepared for the project and is contained in Appendix 2.3.

3 NEED FOR THE DEVELOPMENT AND ALTERNATIVES

This chapter of the EIAR sets out the need for the development and the consideration of reasonable alternatives in terms of locations, designs and processes. The impact of not proceeding with the proposed development at all, often referred to as the *"do nothing"* option, is also considered.

3.1 NEED AND RATIONALE FOR THE PROJECT

Ireland's case for continued but carefully managed data-centre development is now framed explicitly by two companion policy texts: the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (July 2022)[15] and Harnessing Digital, The Digital Ireland Framework (February 2022)[16]. Together they set out how the twin transitions of digitalisation and decarbonisation are to be delivered, and what is expected of every new facility. The national policies are mutually reinforcing rather than competing ambitions.

The July 2022 Statement is unambiguous: Data centres are *"core digital infrastructure"* and *"indispensable"* to the economy and society, underpinning everything from banking to health-service delivery. At the same time, the document recognises acute short-term constraints which include limited spare grid capacity, tighter carbon budgets, and rising public concern over water use, which mean *"not all existing demand for data-centre development can be accommodated."* To address this, the Statement establishes six national principles:

- demonstrable economic impact;
- efficient use of the electricity grid;
- renewables additionality;
- co-location with future-proof power or storage;
- decarbonised by design; and
- tangible SME and community benefits.

The statement sets a clear preference for projects that (i) locate outside the electricity-constrained Dublin area, (ii) make efficient use of existing transmission assets, and (iii) add renewable generation and storage *"in regional locations where capacity is available"*.

[15] Department of Enterprise, Trade and Employment (DETE) (2022) *Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy*
[16] Department of the Taoiseach (DoT) (2025) *Harnessing Digital – The Digital Ireland Framework* (updated 2024 progress report)

Ireland's Digital Ireland Framework positions the State as a *"bridge between the United States and the European Union"* in global tech, while promising that digital solutions will also tackle climate challenges and boost inclusion and productivity. The strategy mirrors the EU's Digital Compass along four axes (a) digital transformation of business, (b) world-class infrastructure, (c) digital skills, and (d) digitised public services. The strategy insists on a *"modern, cohesive, well-resourced regulatory framework"* to keep the transition safe and trusted.

The Government Statement prioritises projects that reduce pressure on the grid through on-site renewable generation and other grid supporting technologies (such as BESS and Fuel Cell technologies). The proposed project aligns with the six principles of the 2022 Government Statement and the four pillars of the Digital Ireland Framework. The project does not result in conflicts with electricity grid capacity constraints, and the DER is a catalyst for innovation in the decarbonisation and digitalisation transition.

3.2 CONSIDERATION OF ALTERNATIVES

This Section of the EIAR sets out the reasonable alternatives considered and iterations of the design of the development which have evolved in terms of layout and processes.

Schedule 6(1)(d) to the Planning and Development Regulations, as replaced by by Article 97 of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, states that the EIAR should contain *"A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment".* It should be noted that the assessment does not include an assessment of potential alternatives, rather it evaluates and considers "reasonable alternatives" that have been "*studied by the person or persons who prepared the EIAR".*

In Section 4.2(d) of the *"Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018"* it states that the information provided must include

> *"A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;"*

Reasonable alternatives are defined under Section 4.13 in the 2018 guidelines as the following:

> *The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by Reasonable alternatives may relate to matters such as project design, technology, location, size and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative sites may not be relevant. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each. A 'mini- EIA' is not required for each alternative studied.*

The above statement is also reiterated in the 2022 EPA EIA Guidelines (Section 3.4.1).

> *The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required.*

3.2.1 DO NOTHING

The European Union's Digital Decade Policy Programme 2030[17], created by Decision (EU) 2022/2481, recasts the Union's long-standing digital ambitions as a legally framed contract between Brussels and every member state. The associated targets call for *"secure and sustainable digital infrastructures"*, including 10,000 climate-neutral edge nodes, to underpin cloud uptake, e-health, digital ID and AI[18]. Variables that influence global locations for this type of development include power availability, latency and resilience, natural hazard score (e.g. earthquakes, hurricanes,) security, climate, workforce and regulation and tax policy.

Ireland has succeeded in establishing itself as a leading cloud destination in Europe with a significant presence of data centres and cloud computing companies. However,

[17] European Parliament and Council (2022) *Decision (EU) 2022/2481 of 14 December 2022 establishing the Digital Decade Policy Programme 2030*. *Official Journal of the European Union*, L 323, 19 December, pp. 4–26.
[18] European Commission (2025) *Europe's Digital Decade: digital targets for 2030 - https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en*

maintaining this position depends on providing low-carbon power expanding resilient fibre routes, keeping a predictable pro-innovation regulatory and tax environment, and growing a skilled workforce able to design, run and secure the next generation of climate-neutral facilities.

In a do-nothing scenario, the project site would remain in its current use (agricultural pastures with arable parcels.). As demonstrated by the extensive biodiversity studies carried out, there are no rare or protected habitats recorded in the study area and the proposed development area is of low local ecological value with treelines of higher local value. The open field habitats are considered of low biodiversity value at a local level as are the internal hedgerows. There are no rare or protected habitats recorded in the study area and the is no potential for connectivity to any other European sites. The project site does provide habitat for certain specified identified; however, the project is designed to allow these habitats to endure. The *"reasonable alternative"* of *"doing nothing"* would displace environmental impacts rather than eliminating them and would fail to advance Ireland's digital and climate goals.

If the proposed project is not pursued, domestic workloads would revert to using legacy in-house less efficient servers (which are collectively less efficient than cloud-based servers) or relocate to other parts of the world thereby diminishing Ireland's reputation as a technology hub service economy and the loss of high-value activity from the domestic ICT cluster. This conflicts with the EU's (75% cloud-adoption goal) and Government policy, which treats energy-efficient digital infrastructure as the twin engine of the State's digitalisation and decarbonisation agendas. A *"do-nothing"* outcome would defer not only direct employment but also the spill-over benefits for indigenous ICT firms and energy-services companies that cluster around large digital infrastructure.

A *"do nothing"* approach will impede regional diversification and the spread of growth more evenly across the island of Ireland required by National Strategic Outcomes (NSOs) stated in the National Planning Framework (NPF)[19] and the National Development Plan (NDP)[20]. Balanced regional growth is both a social imperative and economic obligation.

For reasons presented above, the *"do-nothing"* alternative can be rejected as unreasonable within the meaning of Schedule 6. The project is inconsistent with national and EU policy objectives, and a "do-nothing" alternative offers no superior environmental outcome when the full life cycle and system context are considered.

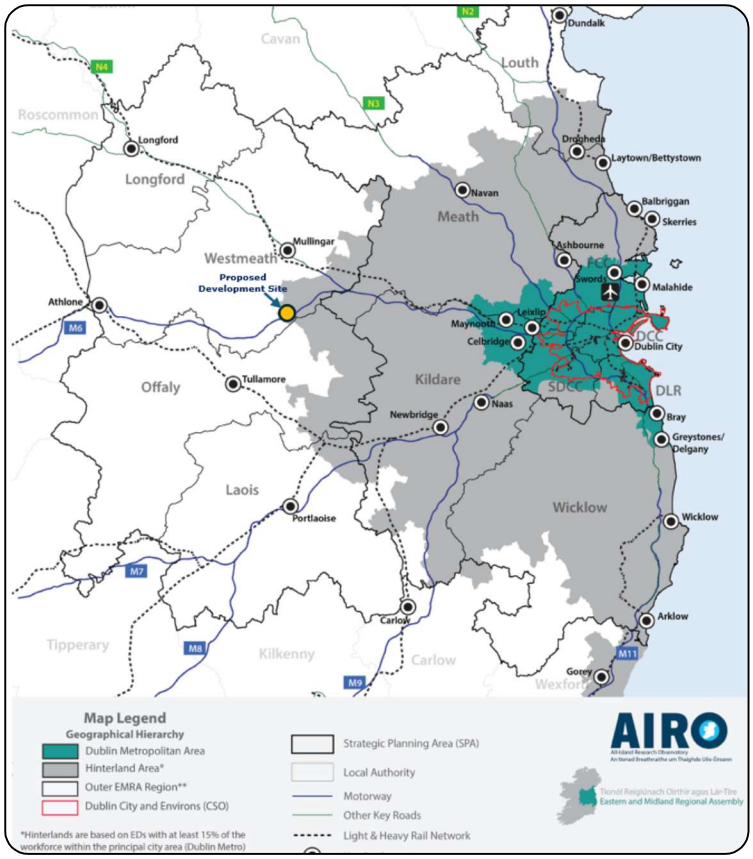
[19] Government of Ireland (2025) *National Planning Framework: First Revision (Project Ireland 2040)*. Dublin: Department of Housing, Local Government and Heritage
[20] Government of Ireland (2021) *National Development Plan 2021-2030 (Project Ireland 2040)*. Dublin: Department of Public Expenditure, National Development Plan Delivery and Reform

3.2.2 ALTERNATIVE LOCATIONS

The government guidance[21] regarding alternative sites is clear and supports the decision to locate the development at the proposed site, i.e. *"….some projects may be site specific so the consideration of alternative sites may not be relevant…."*

The location of the proposed project was guided by a number of factors not least being the existing 220kV transmission corridor and Castlelost GIS substation (node) within the site, which provides firm Maximum Import Capacity (MIC) without triggering major off-site reinforcement works. Locating the project at the proposed site, which is an unconstrained grid area, therefore aligns with the Statement's *"grid-capacity-and-efficiency"* principle and avoids intensifying grid stress in the Greater Dublin Area.

Figure 3.1 Proposed Site Location



The c.243ha landbank comfortably accommodates the DC facility and collocated DER energy assets the DER. The project lands allow for development of a campus style DC facility with appropriate separation of project assets and purposefully designed landscapes that promote biodiversity enhancement. Ground conditions at the site are suited to the

[21] Department of Housing, Planning and Local Government (2018) *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment*.

proposed project and while there are recorded archaeological monuments within the site the project has been designed to avoid any known archaeological and architectural heritage constraints.

The project site is comprehensively served from a fibre and telecoms perspective, providing the opportunity for a straightforward and secure fibre and telecoms connection, whilst also limiting the works and associated impacts of the same. Several dark fibre options are available near the site which meet the capacity and performance requirements for the DC facility (low latency, diverse fibre routes and multiple designated fibre pairs).

The existence of the adjacent high-pressure natural gas network on site allows for construction of the fuel cell asset on site without the need for off-site development for an associated gas pipeline. This eliminates the need for new wayleaves, reduces construction time and avoids potential cumulative effects. The fuel cell is designed to operate on natural gas but is also capable and future-proofed to operate on biomethane and green hydrogen in accordance with the policy as set out in the National Hydrogen Strategy (2023)[22] and National Biomethane Strategy (2024)[23].

Figure 3.2 Summary of Benefits of Proposed Project Location

[22] Department of the Environment, Climate and Communications (2023) *National Hydrogen Strategy*.
[23] Department of Agriculture, Food and the Marine and Department of the Environment, Climate and Communications (2024) *Ireland's National Biomethane Strategy*

The site fronts directly onto a regional road with direct access to the M6 and N52, giving HGVs, construction traffic and service buses multiple route options without passing through village cores and there are no material conflicts with zoning objectives. The nearest European site (SAC/SPA) is located over 5km from the site (Raheenmore Bog SAC) and the downstream River Boyne and River Blackwater SAC /SPA is greater than 30km from the site. The local settlement pattern is dispersed and consequently the project avoids encroaching on any sensitive receptors.

The regionally located project collocates a DC facility with a mix of low emissions and zero-carbon generation and storage DER assets. The design ensure that the development is consolidated and substantially improves cost benefit analysis of the proposed development. Developing the project at this location avoids and reduces adverse environmental effects (following the mitigation hierarchy of avoid, reduce and, if possible, remedy).

3.2.3 ALTERNATIVE TECHNOLOGIES AND PROCESSES

The proposed project incorporates a DER which shifts the DC facility design away from a *"plug and play"* approach. The proposed DER approach grew from the Government's 2022 policy statement, and this is also echoed in the Commission for Regulation of Utilities (CER) draft Large Energy User (LEU) connection policy[24]. An Energy Statement and Approach to Sustainable Data Centre Development was commissioned to inform the design and this is presented in Appendix 3.1 (Volume 3 of EIAR). This DER approach coupled with alternative DC facility cooling technologies is presented below.

3.2.3.1 DC facility with Collocated DER

A mix of energy technologies were chosen to support the DC facility and configured as a DER. The DER component of the project is a key attribute and provides a future-proof powertrain that supports the electricity demand of DC facility.

The DER includes demonstrated proven energy generation and storage assets. This include a 180MW solar PV farm, a 500MWh BESS, 160MW of high efficiency fuel cells and a grid connection to allow for import of low carbon and /or renewable energy from the network (see Figure 3.3). The DER also incorporates technologies to facilitate recovery of by-products (waste CO_2 and waste heat) which increases its overall efficiency.

The fuel cell is designed to provide variable power to the DC facility. When compared with conventional generation technology such as a combined cycle gas turbine (CCGT), fuel

[24] https://consult.cru.ie/en/consultation/review-large-energy-users-connection-policy

cells provide more power (kWh) per cubic meter (m^3) of natural gas, has lower CO_2 emissions and practically zero NO_X and SO_2 emissions. This mitigates the need for emissions abatement technology such as Selective Catalytic Reduction (SCR) catalyst. Fuel cells are modular in nature, can be deployed to match DC facility phasing and have a much smaller footprint. The technology has low noise emissions and has no requirement for water (no stream cycle).

The BESS provides resilience and demand flexibility. In terms of the BESS, a number of battery types were considered. This included lead acid, flow battery (iron, vanadium)[25] and NaS batteries. Criteria which informed selection of the preferred technology included, proven and demonstrated technology, long life cycling requirements and positive environmental and safety attributes.

The 500 MWh BESS will play a central role in enabling the DC facility to operate on a fully optimised, net-zero carbon energy mix. While all battery systems incur some round-trip efficiency (RTE) losses, typically around 10% for lithium-ion, these are significantly outweighed by their advantages. By enabling the datacentre to displace traditional diesel backup, the BESS delivers far greater environmental and operational value. Instead of relying on carbon-intensive generators during peak demand or emergencies, the battery discharges clean, stored energy, sourced from renewable generation, when it's needed most. In effect, the BESS transforms backup power from a passive liability into an active, climate-aligned energy asset.

Power from the solar PV farm will be either used directly or stored in the BESS to provide further resilience. This asset gives the operator a direct, traceable source of zero-carbon electricity without relying on the electricity grid. It is expected that the maximum output from the solar farm will occur and coincide with the DC facility's cooling peaks (i.e. during hot sunny days).

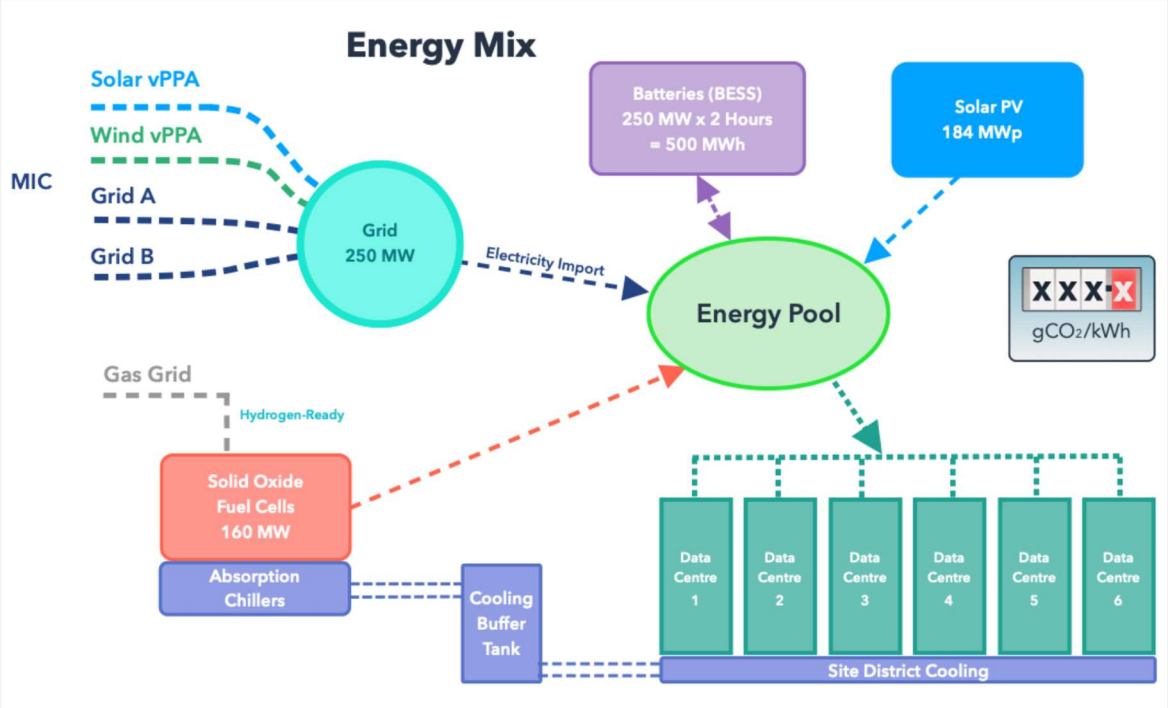
The project will be grid connected, which allows for import of electricity and facilitates power purchase agreements, but the DER is designed and configured to eliminate any demand pressure on the grid. The project optimises its electricity supply for highest efficiency and lowest carbon intensity by monitoring the data centre demand, DER availability, the national grid and selecting modes of energy supply based on hourly data. It is proposed that the data centre operator will report to the System Operator annually in relation to their use of renewable energy (directly or through Corporate Power Purchase

[25] Including the previously consented flow battery (Westmeath Co. Co. Case Ref. 21/532) proposed within the development lands.

Agreements (CPPAs)) and their site's emissions. Reporting will align with the requirements of the EU's EED article 12[26] on data centre reporting.

By pooling the energy assets on site, the optimum mix can be adjusted based on live carbon intensity data. The data centre will be able to monitor and report its hourly carbon footprint. Predictive analysis can help the data centre tenant to best avail of the available power supply and to balance workload and the prevailing carbon intensity of the energy supply.

Figure 3.3 Admiral DER Energy Mix



3.2.3.2 DC Cooling and Water Use

The building envelope, the climate and the cooling train have been engineered to keep water use essentially at background domestic-service levels. For roughly 95 per cent of the year the DC buildings (halls within) will be conditioned by drawing in naturally cool air, filtering it, and passing it across heat-exchange coils. By contrast, a conventional evaporative system would mist or cascade water through adiabatic pads or cooling towers every hour that the data centre load produces heat. The proposed dry-cooling alternative avoids ad removes any water usage vulnerabilities and stresses which evaporative cooling might place on local water supplies. The proposed project also incorporates recovery /harvesting of the high-grade waste heat from the fuel cells and routing it through

[26] European Parliament and Council (2023) *Directive (EU) 2023/1791 of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955 (recast)*. *Official Journal of the European Union*, L 231, 20 September, pp. 7-108 — see Article 12 'Data centres'.

absorption chillers. This replaces additional compressor work with waste thermal energy and further improves the overall fuel-utilisation efficiency of the fuel cell (toward 80%). This non-evaporative cooling system, which is a synergy of airside economisation, electric chillers and waste-heat recovery, underpins the sustainable design principles employed on the project.

3.2.4 ALTERNATIVE LAYOUT AND DESIGNS

Once the preferred site was selected, the design team focused on suitably positioning a proposal within the site that is sympathetic and one which integrates into the landscape and surrounding environment. The final design concept has been developed, as far as practicable, to minimise visual intrusion and accordingly the proposed finished ground levels were determined following careful consideration of cut and fill requirements and existing local topographical conditions.

During the EIA process, baseline surveys were carried out and design mitigation measures were incorporated into the overall scheme. Various design layout options were developed to minimise potential impact on sensitive receptors and accord with the natural features of the site (e.g., topography). Extensive consideration was also given in relation to devising suitable access all parts of the project development lands to mitigate potential impacts.

Key to developing the project concept was a detailed review of the policy hierarchy at EU, national and local levels. In particular, the 2022 Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy and the six principles laid down in the statement framed the thinking from the outset; (1) economic impact, (2) grid capacity and efficiency, (3) renewables additionality, (4) co-location or proximity to future-proof energy supply, (5) Decarbonised by design, and (6) SME access & community benefit.

The design also used the LEED process as a design manual to improve consider efficiency and sustainability measures within the planning stage. Given the rural setting and following consideration of baseline findings in conjunction the functional specifications of DC facility and DER technologies, it was proposed to develop the DC facility within a secure campus in the western part of the proposed project site and to collocate suitable DER technologies on adjoining available lands to the east (consolidating these assets with the Castlelost Flexgen and GIS substation). The adopted LEED preassessment (LEED BD+C v4 Rating System for Data Centres) is tailored for the projects involving multiple buildings within a single development site. Campus approach allows for efficiency in certification process as shared site features (e.g., stormwater management, landscaping, renewable energy, parking) can be documented once and applied across multiple buildings.

Examples of early iterations of development layouts are presented in Figure 3.4 to Figure 3.9 and these initially focused on the DC facility.

Figure 3.4 DC Facility Site Layout Iteration #1

As can be seen, the layout of the DC campus evolves through the various iterations presented, demonstrating consideration of site constraints, building positions, building types, separation distances, access points, etc. As development of the DER advanced, proximity of key components to one another resulted in changes to the layout within the project lands. The site layout presented in Figure 3.7 incorporates the fuel cells, BESS and grid connection point (220kV IPP GIS building) and the DC facility's 33kV IPP building and AIS compound. This followed input from technology suppliers, electrical engineers (including HV infrastructure) and the EIA team of specialists.

Figure 3.5 DC Facility Site Layout Iteration #2

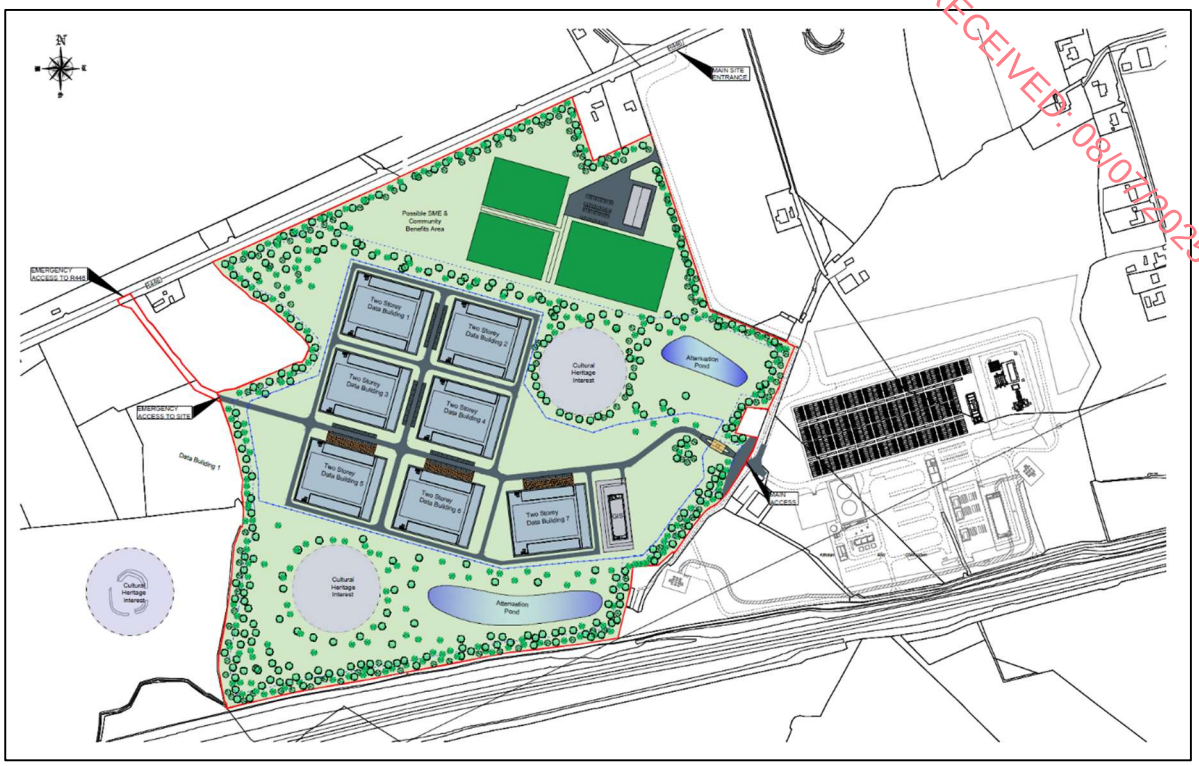


Figure 3.6 DC Facility Site Layout Iteration #3

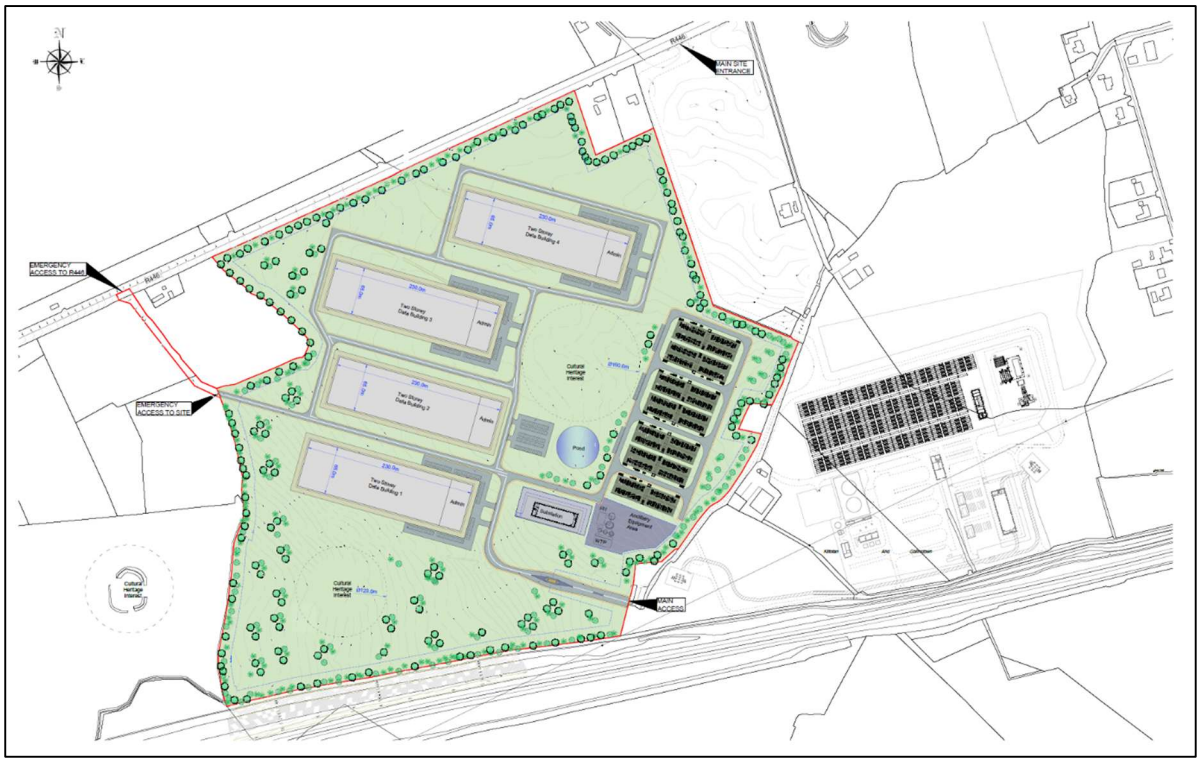


Figure 3.7 Site Layout Iteration #5 (DC Facility and DER Layout)

An overall project layout shown in Figure 3.8 highlights the importance of securing land rights for the solar farm component of the DER. The solar farm layout subsequently further evolved alongside the DC facility layout and this is presented in Figure 3.9.

Figure 3.8 DC Facility and DER Project Layout (April 2024)

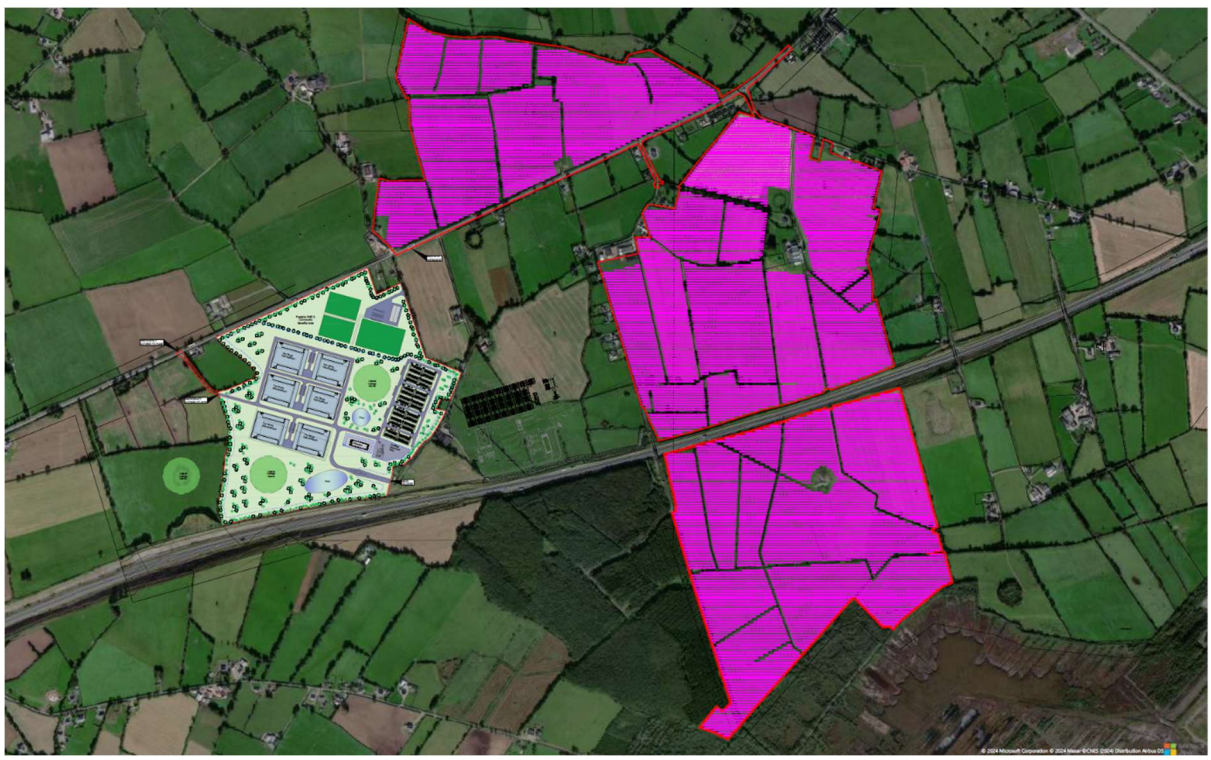
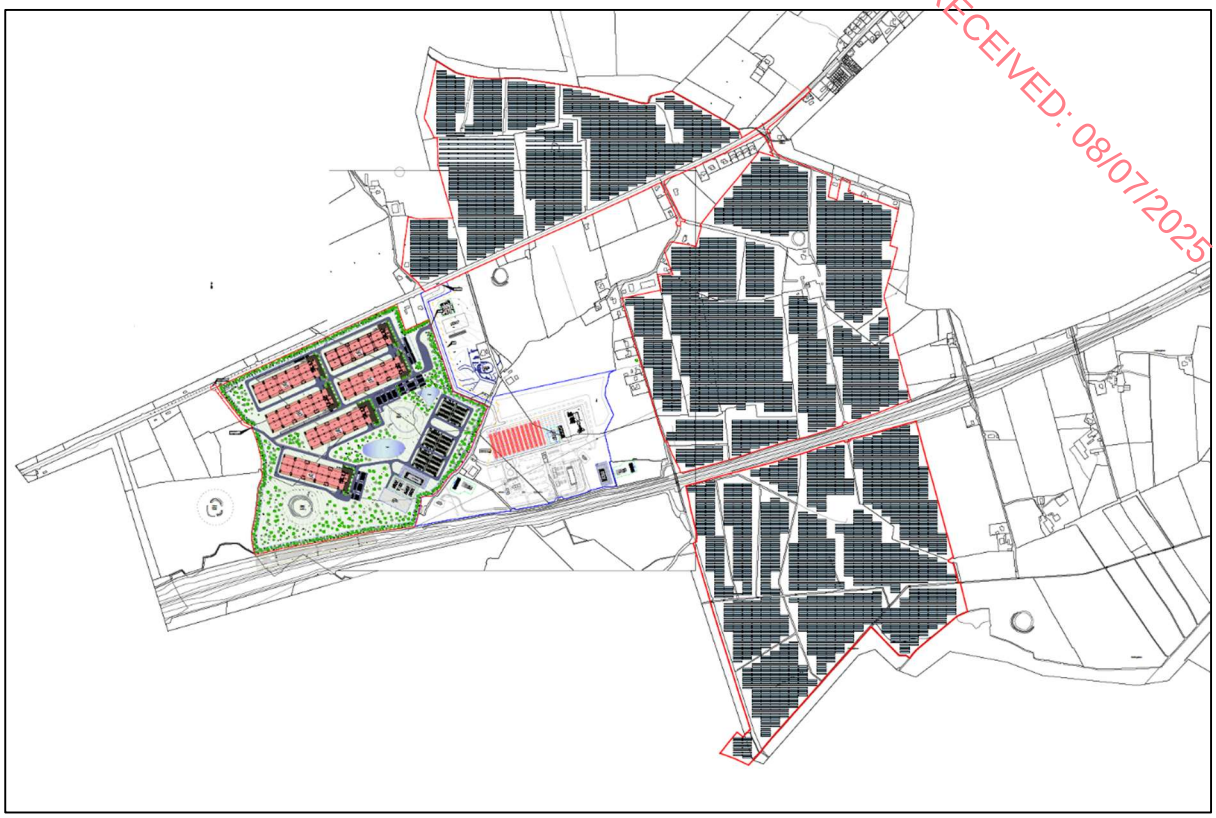


Figure 3.9 DC Facility and DER Project Layout



3.2.5 ALTERNATIVE PROCESSES AND TECHNOLOGIES

Ireland's 2022 *Government Statement on the Role of Data Centres in Enterprise Strategy* promotes six design principles including maximising renewables additionality, flexibility, and decarbonisation. The project was design to align with this and satisfy the twin transitions of digitalisation and decarbonisation set by Government. In terms of power demand required by the DC facility, the DER assets were chosen to (a) optimise the balance between security of supply, (b) compliment and efficiently use existing services within the site (transmission gas and HV electricity), (d) deliver carbon abatement, and (e) conform with policy and international best practice.

The proposed differs from traditional *"plug and play"* models by integrating a suite of collocated DER power generation and storage assets. A range of alternative DER energy technologies were considered to ensure both operational resilience and environmental sustainability. These included open cycle gas turbines (OCGT), combined cycle gas turbine (CCGT), vanadium redox flow battery (VRFB), iron flow battery (IFB) technology and standby diesel /HVO generators.

The chosen DER design leverages fuel cell technology (avoiding combustion related air quality impacts) for power generation and this is complemented by a commercial battery energy storage system (BESS) and renewable generation (solar PV farm). The modular

nature of fuel cell systems allows for incremental capacity additions and seamless its integration with the BESS and solar farm to match the proposed phased build approach of the DC facility.

In terms of configuration, a power tower configuration (rather than ground level) of fuel cell technology is proposed. Siting and placement of the fuel cell power towers east of the DC facility and close the Castlelost Flexgen is compliment and aligns with the height and scale of nearby structures (i.e. the DC buildings to the west and Castlelost Reserve Gas-Fired Generator (OCGTs and 30m high stacks) further east. Once suitably placed within the development lands, further efforts were made to minimise visual impact and integrate the structures. This included design of and external screen across the facades of the power towers (see iterations of this design in Figure 3.10 to Figure 3.12.

Figure 3.10 Fuel Cell – Tower without external screens (iteration #1)

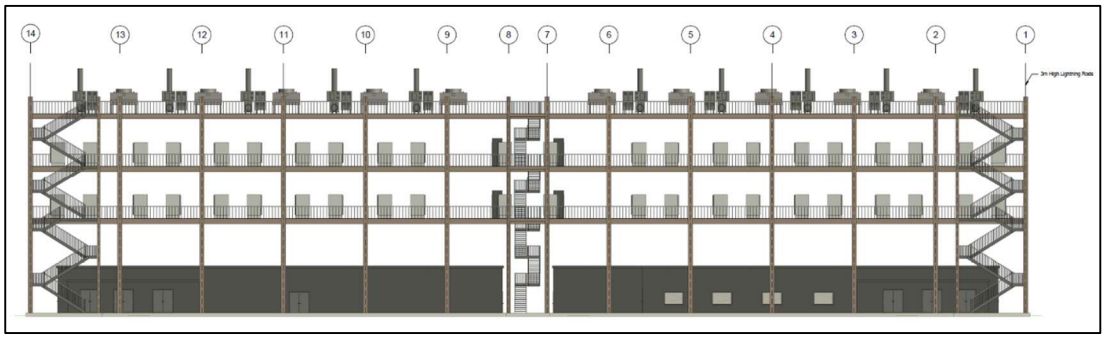


Figure 3.11 Fuel Cell – Tower with external screen (iteration #2)

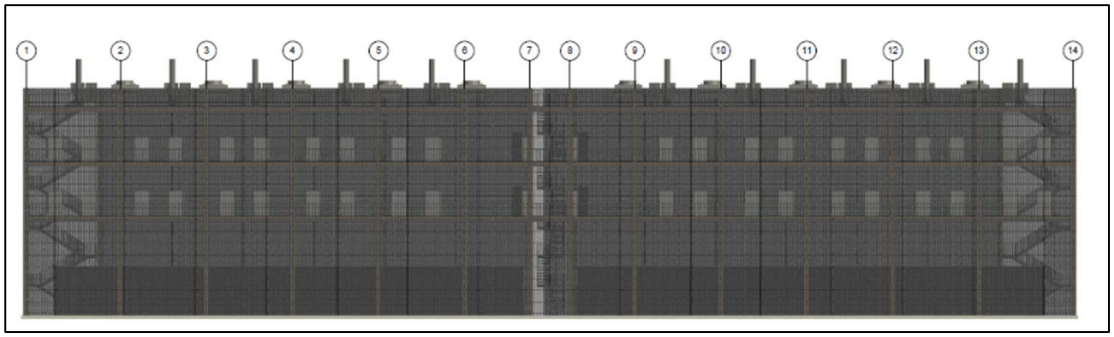
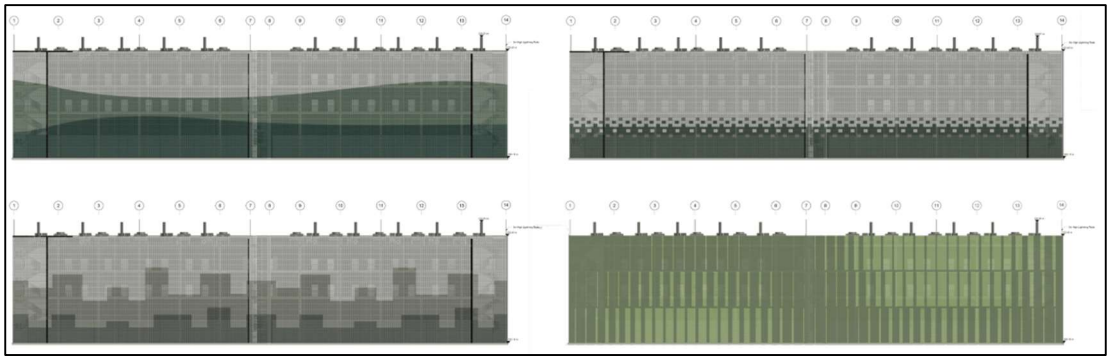


Figure 3.12 Visual consideration of Fuel Cell elevations (external screens)



The solar farm layout was optimised during project design work and most significantly this included consideration of DC/AC ratios to better utilise the available inverter capacity and adoption of a three-panel table (module) rather than a two-panel table. A two-panel table supports two portrait modules, while a three-panel table supports three. Both versions can be deployed on fixed-tilt racking and spacing was optimised to avoid inter-row shading and efficiently use the proposed development land and optimise output.

Figure 3.13 Typical section through two-panel table

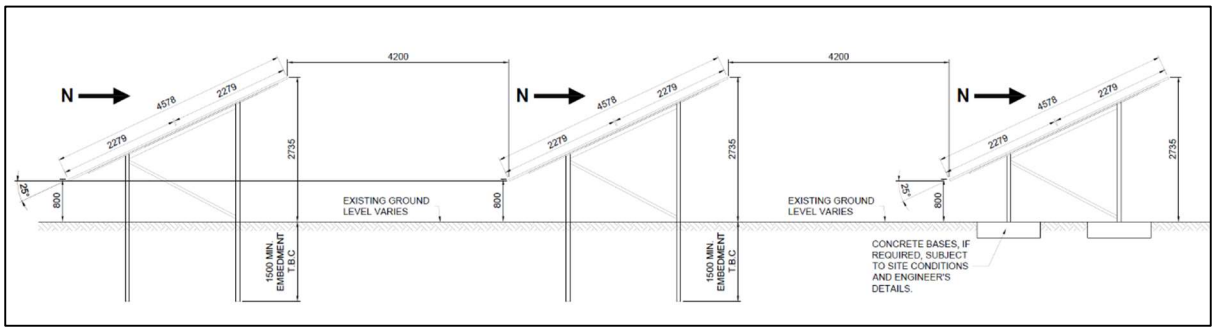
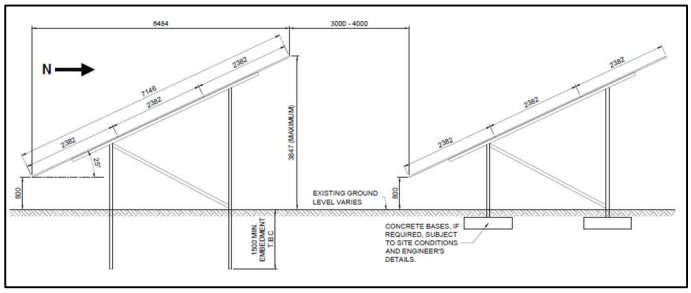


Figure 3.14 Typical section through two-panel table



The DC facility is also specifically designed without evaporative cooling or diesel standby generators. The proposed cooling technologies are complementary to the Irish climate profile and offers the simplest maintenance regime and aligns with sustainability (including LEED pre assessment) principles by minimising water and power usage. Further details related to the selected cooling technologies are presented in the project description chapter.

4 PLANNING & POLICY

4.1 INTRODUCTION

This Chapter provides an overview of national, regional, and local policy associated with the proposed project at Gneevebane, Oldtown, Farthingstown, Castlelost and Kiltotan and Collinstown, Rochfortbridge, Co. Westmeath. The proposed project is examined in the context of the policies and objectives set out within each of these plans.

The development is reviewed in the context of the following:

1) National Policy; including the National Development Plan 2018-2027 and Energy, and Climate Change Policy.
2) Regional Policy; Regional Spatial and Economic Strategy (RSES) Eastern & Midland Regional Assembly (EMRA) 2019
3) County and Local Policy; Westmeath County Development Plan 2021-2027
4) Planning History of the Site

This Chapter provides an overview of international, national, regional, and local policy associated with the proposed development. The proposed project is examined in the context of the policies and objectives set out within each of these plans.

4.2 INTERNATIONAL AND EUROPEAN

4.2.1 EUROPEAN GREEN DEAL

The European Green Deal[27] (launched in 2019) is the EU's flagship strategy to achieve climate neutrality by 2050, with an interim target of reducing greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels. The EGD aims to transform the EU into a modern, resource-efficient, and competitive economy, decoupling economic growth from resource use and ensuring no person or region is left behind. To turn that vision into law the EU has since adopted the European Climate Law, which makes the 2050 neutrality goal legally binding, and has rolled out the wide-ranging *Fit for 55* legislative package, a bundle of energy, transport, land-use and taxation files designed to deliver the interim 55% cut this decade. The EGD is fundamentally reshaping data centre development in Europe. Operators must now integrate sustainability into every aspect of their operations, from design to daily management, to meet ambitious climate and energy targets. This

[27] European Commission (2019) *The European Green Deal*. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, COM(2019) 640 final, Brussels, 11 December 2019

transformation is both a regulatory requirement and a driver of innovation and competitiveness in the digital economy.

4.2.2 EUROPEAN UNION TAXONOMY REGULATION

The European Union Taxonomy Regulation, officially known as Regulation (EU) 2020/852, establishes a standardised framework for defining what constitutes *"environmentally sustainable economic activity"* within the single market. This regulation identifies six environmental objectives: climate change mitigation and adaptation, water conservation, circular economy practices, pollution prevention, and biodiversity preservation. These objectives are integral to the broader Sustainable Finance agenda and the European Green Deal. It is designed to redirect investment flows towards financing decarbonisation, enhance investment security, and prevent greenwashing. Additionally, it establishes a unified classification system for sustainable economic activities.

Companies and financial intermediaries subject to the Corporate Sustainability Reporting Directive (CSRD) or the Sustainable Finance Disclosure Regulation (SFDR) are now required to disclose the proportion of their turnover, capital expenditures, and operational expenditures that align with the Taxonomy. Consequently, project teams that can demonstrate compliance with these standards will gain preferential access to the rapidly expanding pool of green capital.

The European Commission has included gas under the transitional activity category of the Taxonomy Regulation to *"allow us to accelerate the shift from more polluting activities, such as coal generation, towards a climate-neutral future, mostly based on renewable energy sources."* To qualify as taxonomy aligned, use of natural gas must satisfy technical screening criteria; emissions intensity, replacement logic, future proofing, transparency (disclosure of KPIs) and *"do-no-significant-harm"* safeguards. Rather than conventional combustion, fuel cells convert energy from natural gas by an electrochemical reaction that directly transforms the fuel's chemical energy into electricity, without burning the fuel. By leveraging electrochemical conversion instead of combustion, fuel cells achieve a combination of high efficiency, lower carbon intensity, and fuel flexibility that directly supports EU sustainable finance goal.

The proposed project accords with taxonomy legislation by using fuel cell technology to convert natural gas to generate power. This DER component is coupled with recovery technologies (CO_2 and waste heat) and is part of the overall on-site energy generation and storage mix serving demand from the proposed DC facility Another critical feature of fuel cell technology is its fuel flexibility and compatibility with low-carbon gases, which future-proofs it for long-term sustainability. The fuel cells can run on biomethane or green

hydrogen in future, without wholesale redesign of the balance-of-plant allowing for decarbonisation of the gas network and use of renewable gas (such as biomethane) and blends of hydrogen.

4.3 NATIONAL POLICY

4.3.1 NATIONAL PLANNING FRAMEWORK (NPF), 2018-2040 – PROJECT IRELAND 2040

The National Planning Framework 2018-2040 (NPF) is the comprehensive strategic plan designed to guide the development of Ireland over the next 20-year period. The framework aims to achieve balanced regional development, promote sustainable growth, and improve quality of life across the country.

The 2025 review[28] recasts the plan against a different backdrop: post-pandemic work patterns, a tighter climate-action regime, the Census 2022 demographic evidence-base and the new legislative architecture that will be introduced by the forthcoming Planning and Development Act 2024. The NPF provides a high-level, long-term destination that capital spending must enable. All NDP projects are tagged to (at least) one of the ten National Strategic Outcome (NSO), so that the capital budget can be audited against the spatial strategy.

Figure 4.1 National Strategic Outcomes of the NDP

[28] https://www.npf.ie/first-revision-to-the-national-planning-framework/national-planning-framework-first-revision-april-2025/

Most NPOs are retained under the revised NPF, some have been updated and amended and a number of new NPOs have been inserted.

NSO 6; A Strong Economy Supported by Enterprise, Innovation and Skills (see Figure 4.1), recognises that a competitive, innovative and resilient regional enterprise base is essential to provide the jobs and employment opportunities to enable people to live and prosper in the region. Key focus areas include *"digital and data innovation"* and *"promoting regionally balanced investment and jobs creation outside of Dublin".*

The NPF acknowledges that Ireland offers significant appeal regarding international digital connectivity, climate conditions, and both present and future renewable energy resources, making it an ideal location for the establishment of international digital infrastructures like data centres. This attractiveness, the plan argues, underpins Ireland's global ICT position and *"contributes to wider synergies in the economy as indigenous and multinational enterprises develop linkages and benefit from the potential of regional clustering."*

It is forecast in the economic assessment prepared in support of the planning application, that the proposed project will deliver the following economic contributions to the local and Midlands regional economy:

- Construction Investment in excess of €1bn over the five year development
- Construction related employment of 320 FTEs (full time equivalents) annualised for ten years;
- 440 direct operational jobs across a range of occupations;
- 1,094 indirect and induced jobs in the local /regional service economy and the supply chain;
- Generating almost €80m in additional annual wage circulation;
- Annual GVA (Gross Value Added) of €118m to the economy.

Under the section headed *"Digital and Data Innovation"* the NPF cross references other relevant digital policies.

- *Harnessing Digital – The Digital Ireland Framework* (2022)[29], which seeks to position Ireland as a digital leader, driving and enabling digital transformation across the economy and society

[29] Department of the Taoiseach. (2022) *Harnessing Digital – The Digital Ireland Framework*. Dublin: Government of Ireland. Available at: https://www.gov.ie/en/department-of-the-taoiseach/publications/harnessing-digital-the-digital-ireland-framework/

- *Ireland's Industry 4.0 Strategy 2020-2025*[30] which is Ireland's first Industry 4.0 strategy and sets out a five-year roadmap to keep the country's manufacturing base at the *"frontier of the fourth industrial revolution"*. Prepared by the then-Department of Business, Enterprise and Innovation, the document (a) diagnoses the competitive threat and opportunity posed by digital technologies such as artificial intelligence, advanced robotics, additive manufacturing and big-data analytics; (b) articulates a 2025 vision of Ireland as an *"innovation-driven manufacturing hub"*; and (c) organises its response under six themed action-programmes. The strategy deliberately ties these actions to higher-level agendas—Future Jobs Ireland and the national Climate Action Plan—emphasising that digitalisation should raise productivity and resource-efficiency in equal measure.
- *AI - Here for Good: National Artificial Intelligence Strategy for Ireland, (2021)*[31], is Ireland's first whole-of-government blueprint for the responsible adoption of artificial intelligence. Grounded in three guiding principles—human-centricity, openness to innovation and strong governance—it pursues two broad goals: (1) making Ireland an international test-bed for trustworthy AI, and (2) ensuring that citizens, enterprises and the public service can all capture an *"AI productivity dividend".*

NSO 8, *Transition to a Low Carbon and Climate Resilient Society* (see Figure 4.1). embeds the Climate Action and Low-Carbon Development (Amendment) Act 2021 commitments: a 51% cut in economy-wide greenhouse-gas emissions and an 80 % RES-E share by 2030, moving to net-zero by 2050. It states that *"new energy systems and transmission grids will be necessary for a more distributed, more renewables-focused generation system"*, highlighting the need for reinforcing the transmission network, smart-grid roll-out, and co-location of renewables with major demand centres to minimise extra grid build.

NSO 8 recognises the strain on the electricity sector, and that the outcome promotes *diversifying supply, strengthening interconnection and developing district-heating networks*, alongside technologies that can provide balancing and flexibility services. NSO 8 stresses place-based adaptation measures and the protection (and restoration) of natural capital so that growth, infrastructure delivery and biodiversity goals are mutually supportive.

[30] Department of Business, Enterprise and Innovation. (2019) *Ireland's Industry 4.0 Strategy 2020-2025: supporting the digital transformation of the manufacturing sector and its supply chain*. Dublin: Government of Ireland. Available at: https://enterprise.gov.ie/en/publications/publication-files/irelands-industry-4-strategy-2020-2025.pdf

[31] Department of Enterprise, Trade and Employment. (2021) *AI – Here for Good: National Artificial Intelligence Strategy for Ireland*. Dublin: Government of Ireland. Available at: https://enterprise.gov.ie/en/publications/national-ai-strategy.html

The NPF supports the proposed project under the following NPOs:

- *NPO 32 Enhance the competitiveness of rural areas by supporting innovation in rural economic development and enterprise through the diversification of the rural economy into new sectors and services, including ICT-based industries and those addressing climate change and sustainability.*
- *NPO 62 In co-operation with relevant Departments in Northern Ireland, develop a stable, innovative and secure digital communications and services infrastructure on an all-island basis.*
- *NPO 66 The planning system will be responsive to our national environmental challenges and ensure that development occurs within environmental limits, having regard to the medium and longer-term requirements of all relevant environmental and climate legislation and the sustainable management of our natural capital.*
- *NPO 69 Reduce our carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives, as well as targets for greenhouse gas emissions reductions as expressed in the most recently adopted carbon budgets*
- *NPO 70 Promote renewable energy use and generation at appropriate locations within the built and natural environment to meet national objectives towards achieving a climate neutral economy by 2050*
- *NPO 71 Support the development and upgrading of the national electricity grid infrastructure, including supporting the delivery of renewable electricity generating development*
- *NPO 73 Support the co-location of renewable technologies with other supporting technologies and complementary land uses, including agriculture, amenity, forestry and opportunities to enhance biodiversity and promote heritage assets, at appropriate locations which are determined based upon the best available scientific evidence in line with EU and national legislative frameworks.*

The proposed DC facility and DER which provides its own zero-carbon generation and storage, along with flexible low carbon, hydrogen-ready, power (fuel cell) through the DER illustrates exactly how new energy systems, grids and more *renewables-focused generation* 8 can be delivered on the ground in County Westmeath.

4.3.2 NATIONAL ENERGY AND CLIMATE PLAN 2021-2030

Under the new 2030 Climate and Energy Framework, which is also part of the Clean Energy for all Europeans Package, EU countries are required to draft 10-year National Climate and Energy Plans (NECPs) for 2021-2030, outlining how they will meet the new 2030 targets for renewable energy and for energy efficiency. In June 2019, the government agreed to support the adoption of a net zero target by 2050 at EU level, and to pursue a trajectory of emissions reduction nationally which is in line with reaching net zero in Ireland by 2050.

The national plan released in 2019 centres around the five dimensions of the Energy Union:

1. Decarbonisation – GHG Emissions and Removals & Renewable Energy
2. Energy Efficiency
3. Energy Security
4. Internal Energy Market
5. Research, Innovation & Competitiveness

These plans are designed to ensure that the EU remains on track to meet its long-term energy and climate goals, including the transition to a low-carbon economy and the fulfilment of commitments under the Paris Agreement. Each NECP also includes specific policies, measures, and trajectories for achieving these targets, reflecting national circumstances and priorities.

4.3.3 GOVERNMENT STATEMENT ON THE ROLE OF DATA CENTRES IN IRELAND'S ENTERPRISE STRATEGY (2022)

Ireland's *Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy* (July 2022) defines how the State will reconcile the *"twin transitions"* of deep digitalisation and rapid decarbonisation. The document recognises data centres as *core digital infrastructure* while acknowledging the finite headroom on the national electricity grid and the binding carbon-budget ceilings set under the Climate Action and Low-Carbon Development (Amendment) Act 2021. Within that strategic tension the Statement articulates six guiding principles, each of which were carefully examined and used to guide and development the proposed project.

The proposed DC facility and DER will generate high-value employment, skills and export earnings rather than speculative capacity. It is located at an existing unconstrained node on the electricity system with available network headroom. The project includes a DER which can alleviate constraints through behind-the-meter flexibility (e.g. battery storage). Use of renewable capacity was heavily considered. Because of its location and design, the

DC facility be able to enter into long-term corporate power-purchase agreements (CPPAs) (importing low carbon and renewable generation from the national grid) in addition to it being supported by DER assets (on-site generation and storage).

The DC facility adjoins the DER assets which includes to large-scale renewable and storage assets. It is also located adjacent to the existing Castlelost Flexgen project in anticipation of CRU large energy user (LEU) policy decision[32]. The project presents a *credible pathway to net-zero operations*, addresses embodied carbon, efficient cooling, low water usage, waste-heat recovery, CO_2 recovery and zero-carbon standby generation; This aligns with Article 12 of the Energy Efficiency Directive (EU) 2023/1791. Finally, the project will provide tangible benefits to the local and wider communities along with indigenous small- and medium-sized enterprises (SMEs); examples of tangible socio-economic benefits from a data-centre development include employment (direct and indirect), upskilling of workers, local procurement and SME enablement, wage circulation effect, development contributions, donations to charitable organisations, local authority rates, community benefit funds and social investment. Please refer to Economic Assessment Report provided in Appendix 5.1.

4.3.4 CLIMATE ACTION PLAN 2025

The Government's third plan under the Climate Act 2021 shifts the emphasis decisively from policy design to delivery at speed. While CAP24 and CAP23 set the strategic direction, CAP 25 updates this by building on the progress made under previous plans by delivering policies, measures and actions that will support the achievement of our carbon budgets, sectoral emissions ceilings, and 2030 and 2050 climate targets. To achieve Ireland's targets under the Plan, a detailed sectoral roadmap setting out a range of measures and actions for each sector of the economy is included.

For the electricity sector, CAP25 retains the 80% renewable-share target for 2030, adds an interim 50% milestone for 2025, and confirms a build-out of at least 6GW on-shore wind, up to 5GW solar and 2GW of new flexible, hydrogen-ready gas generation. It restates the need for *"rapid delivery of flexible gas generation"* and in a timeframe that replaces emissions from coal and oil generation as soon as possible to reduce impacts on the carbon budgets. The proposed high efficiency fuel cell technology is aligned with taxonomy regulations and CAP25 aligns with taxonomy transition rules.

Chapter 7 of CAP25 extends Just-Transition supports for the Midlands, presenting the region as Ireland's test-bed for clean-energy clusters. Taken together, these measures

[32] Commission for Regulation of Utilities (CRU) (2025) *Large Energy Users Connection Policy – Proposed Decision*, CRU/202504

create a clear enabling framework for the proposed DC facility and collocated DER in county Westmeath supporting regional economic renewal.

4.3.5 NATIONAL HYDROGEN STRATEGY 2023

Published in July 2023, the Strategy sets three drivers: decarbonisation, energy security and industrial opportunity. It singles out *renewable* ("green") hydrogen as Ireland's focus and envisages its use as a zero-emission store of renewable energy and as flexible power for hard-to-abate sectors. The strategy provides a sequenced policy, governance and market blueprint that stretches into the 2030s

4.3.6 NATIONAL BIOMETHANE STRATEGY 2024

The strategy was jointly prepared by the Department of Agriculture, Food and the Marine (DAFM) and the Department of the Environment, Climate and Communications (DECC). The Strategy is Ireland's first major policy statement on biomethane and is an important milestone in the development of an indigenous sector. The primary objective of the National Biomethane Strategy is the delivery of the ambitious Government target of producing 5.7 TWh[33] of indigenous biomethane by 2030 and that Ireland will have developed a sustainable biomethane industry (anaerobic digestion) of scale.

Biomethane is already firmly established and available on the European market, with circa. 37 TWh produced in 2022. The Strategy identifies the sectors in which biomethane could bring the most benefit in terms of decarbonisation, and it will be critical that biomethane resources are principally used in those sectors where no alternative decarbonisation options exist. It is acknowledged that it is likely that biomethane will be injected into the grid and a percentage of that renewable gas could contribute to the decarbonisation various sectors.

In 2024 Gas Networks Ireland (GNI) published *Pathway to a Net-Zero Carbon Network*[34], resetting its earlier "Vision 2050" and committing to run the network on 100 % renewable gases by 2045. Subsequent corporate plans and independent analyses (including KPMG's 2024 Turning Down the Gas paper[35]) provide milestones, economics and regulatory asks needed to deliver the vision.

[33] This figure has increased substantially from an original Climate Action Plan 2019 target of 1.6 TWh by 2030.
[34] Gas Networks Ireland. (2024) *Pathway to a Net-Zero Carbon Network*
[35] Smyth, R. (2024) *Turning down the gas: how Ireland can make biomethane work*. Dublin: KPMG Ireland.

4.4 REGIONAL

4.4.1 EASTERN & MIDLAND RSES (2019-2031)

The *Eastern & Midlands Regional Assembly Regional Spatial & Economic Strategy (RSES) 2019-2031* provides a high-level development framework for the region, which supports the implementation of the National Planning Framework (NPF) and economic policies and objectives of Government. It provides a 12-year strategy with a vision to 2040 and it provides a solid foundation to deliver transformational change that is necessary to achieve the objectives of the NPF. It provides a framework for investment to better manage regional planning and economic development throughout the Region.

The RSES recognises that one of the key challenges facing the region is the transition to a low carbon society. To expedite this transition, the RSES sets out 16 Regional Strategic Outcomes which are broken down into Economic Opportunity, Healthy Placemaking and Climate Action. There are six Strategic Outcomes specific to Climate action which can be summarised as follows:

1. Integrated Transport & Land Use - Promote best use of Transport Infrastructure, existing and planned, and promote sustainable and active modes of travel to ensure the proper integration of transportation and land use planning.
2. Sustainable Management of Water, Waste & other Environmental Resources - Conserve and enhance our water resources to ensure clean water supply, adequate wastewater treatment and greater resource efficiency to realise the benefits of the circular economy.
3. Build Climate Resilience - Ensure the long-term management of flood risk and build resilience to increased risks of extreme weather events, changes in sea level and patterns of coastal erosion to protect property, critical infrastructure and food security in the Region.
4. Support the Transition to Low Carbon and Clean Energy - Pursue climate mitigation in line with global and national targets and harness the potential for a more distributed renewables-focussed energy system to support the transition to a low carbon economy by 2050.
5. Enhanced Green Infrastructure - Identify, protect and enhance Green Infrastructure and ecosystem services in the Region and promote the sustainable management of strategic natural assets such as our coastlines, farmlands, peatlands, uplands woodlands and wetlands.

6. Biodiversity and Natural Heritage - Promote co-ordinated spatial planning to conserve and enhance the biodiversity of our protected habitats and species including landscape and heritage protection.

The RSES frames digital infrastructure as an engine of *balanced* growth and places climate action at the heart of its investment framework. Section 8 (Connectivity) of the RSES recognises fast, resilient digital connectivity as *"an essential utility for economic competitiveness and social cohesion".* Regional Policy Objective 8.25 states that local authorities shall:

- Support the National Broadband Plan.
- Facilitate enhanced international fibre links.
- Promote a high-quality ICT network throughout the Region in order to achieve balanced social and economic development, whilst protecting the amenities of urban and rural areas.
- Support the national objective to promote Ireland as a sustainable international destination for ICT infrastructures such as data centres and associated economic activities at appropriate locations.
- Support the national objective to promote Ireland as a sustainable international destination for ICT infrastructures such as data centres and associated economic activities at appropriate locations.

RPO 8.25 ties local decision-making directly to national enterprise policy. The policy is supportive of data-centre development, where it can be shown to enhance the Region's connectivity, protect local character and crucially occupy a site that is *"appropriate";* in terms of grid capacity, renewable-energy availability, connectivity and environmental fit.

Chapter 6 (Economy and Employment) deals with the type of jobs the Region wants to attract. One of its "Guiding Principles for Investment Prioritisation in Placemaking for Enterprise Development" states: *"Align to national strategy and approach for data centres – right location for use and energy demand.*

The proposed regionally based project data centre facility and DER has been integrated to be compatible with the receiving environment. The DER is proximate to the existing Castlelost Flexgen Flexgen Plant and GIS substation which is an unconstrained node on the grid. It is well served in terms of fibre and public transport corridors, and the location is sufficiently distanced from sensitive receptors.

The proposed regionally based DC facility and DER have been designed to seamlessly integrate with the receiving environment. The DC facility has been designed as a campus

and the DER is located proximate to the existing Castlelost Flexgen Plant and GIS substation (which is an unconstrained node on the grid. Additionally, the site is well-supported by dark fibre connectivity (along M6 corridor and along the gas pipeline within the site) and public transport corridors, while sufficiently safe distanced from sensitive receptors.

It is submitted that the subject site is an appropriate location for the development of a new ICT infrastructure development having regard to its strategic and accessible location in close proximity to the key attributes as described in Section 3 (Need for the Development Rationale).

4.4.2 WESTMEATH COUNTY DEVELOPMENT PLAN 2021-2027

The Westmeath County Development Plan (CDP) 2021-2027 sets out the Council's proposed policies (CPO's) and objectives for the development of the County over the Plan period. In this regard the CPO's listed in the Plan constitute the policies and objectives of the Plan. The Development Plan seeks to develop and improve, in a sustainable manner, the social, economic, environmental and cultural assets of the County.

Chapter 10 (Transport, Infrastructure and Energy) mirrors the position as stated in the RSES. It is a policy objective (CPO 10.178) of Westmeath County Council to *"Support the national objective to promote Ireland as a sustainable international destination for ICT infrastructures such as data centres and associated economic activities at appropriate locations."* The plan simultaneously requires:

- enhanced international fibre links;
- a county-wide high-quality ICT network; and
- facilitation of renewable-energy generation.

The plan states that new energy systems and transmission grids will be necessary for a more distributed, renewables-focused energy generation system, harnessing both the considerable onshore and offshore potential from energy sources and connecting the richest sources of that energy to the major sources of demand. In terms of energy and renewable energy policy, the CDP outlines the following:

- CPO 10.139 Support local, regional, national and international initiatives for limiting emissions of greenhouse gases through energy efficiency and the development of renewable energy sources which make use of the natural resources in an environmentally acceptable manner and having particular regard to the requirements of the Habitats Directive.

- CPO 10.140 Facilitate measures which seek to reduce emissions of greenhouse gases and support the implementation of actions identified in the Westmeath County Council Climate Change Adaptation Strategy 2019-2024 and any future amendments.
- CPO 10.141 Promote and support the use of renewable forms of energy as a contribution to the energy demand of all new buildings where it is consistent with the proper planning and sustainable development of an area.

The CDP acknowledges the importance of the existence of the 220kV grid and the natural gas pipelines which passes through the southern part of the County. The plan states that key investments are planned by Eirgrid for the upgrading of the transmission network and new circuit build /reinforcement, to cater for continued demand. The upgrading of the transmission network at Castlelost (adjoining the site) facilitates power flows from both renewable and conventional sources and maximises the use of the existing power corridor.

The CDP states that the Council will continue to encourage solar energy in commercial and residential developments, subject to design and other environmental considerations

- CPO 10.149 Support Ireland's renewable energy commitments outlined in national policy by facilitating solar power where such development does not have a negative impact on the surrounding environment, landscape, historic buildings or local amenities
- CPO 10.150 Encourage and support the development of solar energy infrastructure, including solar PV, solar thermal and seasonal storage facilities.
- CPO 10.151 Ensure that proposals for solar farms consider the following criteria:
  - The Landscape Character of the County.
  - Visual impact particularly on raised/elevated sites
  - Zone of visual influence and visual impact of the structures.
  - Glint and glare report and potential impact on adjoining road networks and dwellings.
  - Road access and impact on road network serving the site during the construction phase (A pre and post construction impact report may be required)
  - Archaeological Impact.
  - Incorporation of security measures – use of CCTV/surveillance cameras and security fencing.
  - The suitability/strength of the grid and accessibility to it.
  - The suitability of the site, having regard to other land use policies, including the need to protect areas of important built and natural heritage.

- Decommissioning of obsolete infrastructure and after-use.

The electricity and gas policy objectives prescribed in the CDP are presented below:

- CPO 10.169 Support and promote the sustainable improvement and expansion of the electricity transmission and distribution network that supply the County, subject to landscape, residential, amenity and environmental considerations.
- CPO 10.170 Support the provision of electricity and gas transmission networks to Athlone and Mullingar to provide for the medium to long-term future needs of these towns, subject to landscape, residential, amenity and environmental considerations.
- CPO 10.171 Support and promote the improvement and extension of gas infrastructure to serve the County,
- CPO 10.172 Co-operate and liaise with statutory and other energy providers in relation to power generation, in order to ensure adequate power capacity for the existing and future needs of the County.
- CPO 10.173 Support the implementation of EirGrid's Grid 25 Investment Programme, subject to landscape, residential, amenity and environmental considerations
- CPO 10.174 Support and facilitate the development of enhanced electricity and gas supplies, which do not negatively impact on environmental quality, landscape, wildlife, habitats or residential amenity and which are critical to the economic development of the County.
- CPO 10.175 Support roll-out of the Smart Grids and Smart Cities Action Plan enabling new connections, grid balancing, energy management and micro grid development.
- CPO 10.176 Support and facilitate the development of enhanced electricity and gas supplies, and associated networks, to serve the existing and future needs of the Region and facilitate new transmission infrastructure projects that might be brought forward in the lifetime of this Strategy including the delivery of the necessary integration of transmission network requirements to facilitate linkages of renewable energy proposals to the electricity and gas transmission grid in a sustainable and timely manner subject to appropriate environmental assessment and the planning process.

Chapter 11 of the CDP sets out details with regard to Climate Action. The aim is *"to transition to a low carbon and climate resilient County, with an emphasis on reduction in energy demand and greenhouse gas emissions, through a combination of effective mitigation and adaptation responses to climate change".* The recently published

Westmeath County Council Climate Action Plan (2024-2029) builds on the Council's *Climate Change Adaptation Strategy* 2019-2024. The Plan (2024-2029) incorporates all the adaptation work already done, updates the risk assessment using new data, and adds a full mitigation programme to meet the 51% emissions-reduction target and other statutory duties. The plan commits the council to *"support the National Renewable Energy Action Plan and Ireland's Transition to a Low-Carbon Energy Future 2015-2030"* through increased deployment of renewables and careful siting that respects environmental sensitivities.

4.4.3 PLANNING HISTORY AT THE SITE

A review of other projects /development in the general area of the site was undertaken using the Westmeath Planning Search Portal[36]. The recent valid planning permission consents in the immediate vicinity of the site (1 km radius) relate to the following

Project Name	Pl Ref	Details	Status
Castlelost Flexgen	21/515	Application to Westmeath County Council for development comprises 275MWe reserve gas-fired generator to boost and back up the power system and will include the following elements (a) 5no. open cycle gas turbine (OCGT) modules (each module being c 1042sqm) and complete with lube oil coolers, generators, air intake vents, continuous emissions monitoring (CEMS) technology, selective catalytic reduction (SCR) units and c.30m high stacks, (b) 1no two-storey administration building (32.615m long x 13m wide x 9.33m high) which contains a control room, offices, storage meeting room workshop and double height warehouse (c) 2no. 2,400m3 capacity bunded secondary fuel storage tanks (each with a diameter of 17.6m and height of 10m), (d) a fenced above ground installation (AGI) compound containing gas pipework , a regulator house enclosure, instrument kiosk, boiler house enclosure and analyzer kiosk, (e) 1no. fuel pump and filter unit, (f) 1no. containerised water treatment module (12.192m long x 2.438m wide x 2.896m high), (g) 1no. 10m3 purified water storage tank (2.75mm high and 2.27m diameter), (h) 2no. containerised black start diesel generators (2.438m x 12.192m long x 2.896m high) with integrated stacks(4.755m high), (i) 1 no 50m3 ammonia storage tank (9.360m high and 3.16m diameter, (j) fire pump skid building (9.23m long x 6.98m wide x 4.6m high), (k) 1 no. 500m3 capacity water tank (7.597m high x 10m diameter, (l) 1 no.	Granted with conditions Altered by 23/60042 & 24/60053

[36] https://westmeathcoco.maps.arcgis.com/apps/webappviewer/index.html?id=f114217b26f348ea95660cad27e42ef6

		single storey IPP building (20m long x 10m wide and 6.853m high, (m) 1 no. low voltage (LV) bunded house transformer (1.914m high), (n) 5 no. medium voltage (MV) bunded step-up transformers (6.287 m high) 1no. high voltage (HV) customer compound containing 2no. bunded transformers (9m high) connected to electrical equipment, (o) 1no air compressor building (8.33m long x 4.73m wide x 4.517m high) and (p) all ancillary development including new access road, internal roads, 2.65m high fencing and gates securing the main reserve generator site, and associated engineering works to provide for the connection of site services and for the treatment and disposal of foul wastewater and surface water. The development includes for construction of a new entrance to the site from the R446 with associated signage and an access road from the new entrance to the reserve gas-fired generator. The development also includes for the demolition and removal of a farm shed, farm workshop, feed silo and a silage clamp	
Castlelost GIS	312783	Application to An Bord Pleanála for a 220kV Gas Insulated Switchgear (GIS) Electrical substation and two 220kV underground transmission cables, interface compounds and pylons and associated works	Granted with conditions
Castlelost ESS	21/532	Application to Westmeath County Council for development of an Energy Storage System (ESS) development comprising (i) an open area battery energy storage system (BESS) compound(area of 26,317sqm) containing 264no battery modules and associated medium voltage power station (MVPS) enclosures (12.192m long x 2.438m wide x 3.896m high), (ii) IPP building (40n long x 10m wide x 6.853m high), (iii) synchronous condenser compound (area of 9,309sqm) containing a horizontal synchronous generator positioned within a building (30.0m long x 18.0m wide x 12.15m high), 5no control modules each (12.192m long x 2.438m wide x 3.332m high), associated bunded transformers and electrical plant, (iv) high voltage (HV) customer compound containing 1no. bunded transformers (9m high) and electrical plant to provide for connection to the electricity transmission system, and (v) all ancillary development, including lightening mast protection, perimeter fencing with access gates, landscaping, lighting, car parking, internal access roads and all civil engineering works for the disposal of foul and surface water. The development includes for construction of a new entrance and access road to the facility from the R446 with associated signage from the new entrance to the ESS facility.	Granted with conditions

Other historic nearby planning applications predominantly relate to once off residential development and agricultural sheds. The projects are mainly positioned along public roads (R446 and L51251) in the vicinity of the site and are deemed to be not significant in terms of cumulative impacts with the proposed projects. It was also noted that some projects which were consented were not subsequently constructed (e.g., PL001590 which relates to a house which was granted planning permission in 2001).

5 POPULATION & HUMAN HEALTH

5.1 INTRODUCTION

This Chapter presents an assessment of impacts on Population & Human Health. The recitals to the 1985 and 2011 Directives refer to *'Human Health'* and include 'Human Beings' as the corresponding environmental factor. The 2014 Directive changes the title of this factor to *"Population and Human Health".*

While there are a range of issues which may impact on human beings many of these have been considered within other disciplines within this EIAR, including Planning Policy (Chapter 4), Water Environment (Chapter 8), Air Quality (Chapter 10), Noise and Vibration (Chapter 11), Landscape and Visual (Chapter 12), Traffic and Transport (Chapter 13), and Cultural Heritage (Chapter 14). This approach is consistent with the EPA EIAR Guidelines (2022)[37].

This Chapter is therefore focused on potential impacts which have not been assessed elsewhere within the EIAR.

5.2 ASSESSMENT METHODOLOGY & SIGNIFICANCE CRITERIA

5.2.1 METHODOLOGY

A desk-based assessment was undertaken to examine relevant information pertaining to the population impact assessment. Information on population statistics, employment and social data for the relevant Electoral Division (EDs) was obtained from the Central Statistics Office (CSO) for census years 2022. Fáilte Ireland's EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects and specifically the potential impact of the proposed development on Tourism is considered. Given the rural setting, much of the potential for impacts is addressed in Chapters 6 (Biodiversity) and 12 (Landscape and Visual) of this EIAR.

5.2.1.1 Study Area

The Study Area for the assessment of *"Population and Human Health"* includes a review of relevant information on a county and national scale but is mainly concentrated on the Electoral Districts (EDs) and Small Areas (Small Area Population Statistics (SAPS)) within which the Proposed Development is located.

[37] EPA, Guidelines of the Information to be contained in Environmental Impact Assessment Report, 2022

The EIA Directive does not define the term *"human health"*, however the 2017 EC Guidance on the preparation of the EIAR states that:

> *"human health is a very broad factor that would be highly project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation and decommissioning of a Project in relation to workers on the Project and surrounding population".*

The assessment of human health is a qualitative rather than quantitative assessment, due to the diverse nature of health determinants and health outcomes which are assessed.

Local Authority

The proposed development lands lies midway between the villages of Rochfortbridge and Tyrrellspass and within the Eastern and Midland Regional Assembly's *"Dublin Hinterland"* growth belt within the jurisdiction of Westmeath County Council.

Electoral Divisions

Electoral Divisions (EDs) are the smallest legally defined administrative areas in the State for which consistent population and socio-economic data are published. The also uses Small Areas (SAs) in recent censuses, and townlands exist as historic land divisions, but neither is a modern legal administrative unit. Therefore, in order to discuss the receiving human environment and other statistics in the vicinity of the proposed development site, the Study Area for this assessment has regard to Electoral Divisions (EDs) within or located close to the proposed development site. The proposed development is predominantly within the Castlelost ED, though it also extends partially into Ballykilmore ED.

Small Area

Small Areas were first published for Census 2011 following work undertaken by the National Institute of Regional and Spatial Analysis (NIRSA) on behalf of Ordnance Survey Ireland (now Tailte Éireann) and in consultation with the CSO. They were designed as the lowest level of geography for the compilation of statistics in line with data protection guidelines and typically contain between 50 and 200 dwellings. A further constraint imposed when creating these new areas was that they nested within Electoral Division boundaries. Finally, they are generally comprised either of complete townlands or neighbourhoods. Small Areas within a 1km radius from the centre of the proposed

development lands are included in this assessment. This includes three small area named as A237024001, A237024002 and A237012003 by CSO.

5.2.1.2 Desktop Study

A desk study was undertaken to assess the baseline environment. The desk study involved the assessment and review of data from the Central Statistics Office (CSO) and a review of the Westmeath County Development Plan (CDP) 2021-2027. Information was also obtained from the following sources:

- Environmental Protection Agency (www.epa.ie);
- Westmeath County Council (https://www.westmeathcoco.ie/en/)
- Central Statistics Office (http://www.cso.ie);
- Geohive (https://airomaps.geohive.ie/ESM);
- Health and Safety Authority (http://www.hsa.ie/eng/);
- Pobal (https://maps.pobal.ie/WebApps/DeprivationIndices/index.html);
- All-Island Research Observatory (AIRO) (https://airo.maynoothuniversity.ie/).

As there is no loss of residential or community lands as a result of the proposed developments, the impacts from the loss of private property are not further considered. Similarly, the development of either or all of the proposed projects will not result in negative adverse impact to the local economy. Positive effects on the local economy, supply chains, and employment opportunities (particularly) during construction is anticipated.

5.2.1.3 Field Work

Various site walkover surveys of the proposed development lands and windscreen survey of the wider study area were undertaken and include three during the period February, April and June 2025 to inform this assessment.

5.2.2 DETERMINATION OF SENSITIVE RECEPTORS

The sensitivity of the existing baseline environment defines the ability of the receptor to respond to potential effects.

5.2.2.1 Employment

This assessment considers the impact on the workforce in County Westmeath and the Region, as this is where the majority of effects are likely to occur. The Proposed Development may provide direct and indirect job opportunities. Direct jobs include the

temporary workforce required to construct the Proposed Development in the short to medium term, as well as the workforce required to operate the facility in the longer term. Indirect jobs include those created in the supply chain to provide material, specialist labour and demolition and remediation services for the workforce. There is no consolidated methodology or practice for assessing the magnitude of the impact on employment in EPA Guidelines. It has therefore been assessed based on professional opinion in which the size of the workforce in the impact area is considered, relative to the number of jobs that the Proposed Development and will create.

5.2.2.2 Severance

Severance of land as a result of the proposed development and the loss of rights of ways or amenities is considered in this assessment along with the separation of residents from facilities and services, they use within their community caused by new or improved roads or by changes in traffic flows. The Proposed Development could cause severance effects by changing levels of traffic congestion on existing roads and / or introducing traffic management measures. This may lead to separation of residents from facilities and services which they use. All severance impacts are direct impacts. The assessment of magnitude is informed by the assessment results presented in Chapter 13 (Traffic and Transport).

5.2.2.3 Landuse Change

A description of the existing site is presented in Chapter 2 and assessed in the context of Planning & Policy and Material Assets in Chapter 4 and Chapter 9 respectively. Land use changes can affect populations in different ways. Planning policy plays an important role in guiding and facilitating approximate changes in land use which can influence settlement as well as transportation patterns. Planning policy ensures these changes are managed sensitively and are appropriate to the unique existing and emerging social, economic and environmental conditions. The primary consideration relating to land use change is to assess whether the proposed development conforms with land use policy and to identify if the proposed development is likely to change the intensity of patterns, types of activities and land uses. Therefore, a review of planning policy was carried out as part of this assessment as well as an assessment of the existing and emerging baseline and its capacity to absorb predicted changes. Landuse Change is further discussed in Chapter 9 (Material Assets).

5.2.2.4 Health and Safety

The primary legislation in Ireland is the Safety Health and Welfare at Work Act 2005. There are a number of amendments to the Act, as well as Regulations and Codes of Practice. Primary legislation can be referenced from the HSA website and the Act can be downloaded from the Irish Statue Book. Within the legislation responsibilities have been assigned to each party at the different stages of the development of a project. These apply to any construction project and are applicable to the project discussed within this EIAR. The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations") implement the Seveso III Directive (2012/18/EU) and aim to prevent and mitigate the effects of major accidents involving dangerous substances which can cause serious harm to people and/or the environment, with the overall objective of providing a high level of protection in a consistent and effective manner.

5.2.3 SIGNIFICANCE CRITERIA

The assessment of significance is a professional appraisal based on the sensitivity of the receptor and the magnitude of the effect. Within any area, the sensitivity of individuals in a population will vary.

The purpose of the population assessment is to identify the likely significant impacts as they might affect users of the proposed development and the local community. It usually follows that impacts of a population and human health nature are a function of:

- The location and character of the local environment,
- The sensitivity of the local population and its capacity to absorb change,
- The nature of the environmental effect,
- The scale or extent of the effect in terms of area or population affected,
- The duration and frequency of an effect, and,
- The probability of an impact's occurrence and possibility of effectively reducing the effects through mitigation.

Impacts result from direct, indirect, secondary and cumulative effects on existing environmental conditions. Effects can be positive, neutral or negative. The significance of an effect depends on, among other considerations, the nature of the environmental effect, the timing and duration of an effect and the probability of the occurrence of an effect. The significance of an effect is described as imperceptible, slight, moderate, significant, very significant or profound. The impacts may be short term, medium-term or long-term. The duration of an effect may be momentary, brief, temporary, short-term, medium-term,

long-term, permanent or reversible in accordance with the timescales. The frequency of that effect can also influence significance i.e., if the effect will occur once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually.

The population and human health assessment addresses impacts at a community level rather than for individuals or identifiable properties, although impacts for individual properties are discussed where these are significant or located within proximity to the proposed development, as appropriate.

This EIAR is focused on providing a clear documentary trail of analysis used to arrive at conclusions. The criteria used to describe the predicted effects is outlined in Table 5.1 in accordance with Table 3.4 of the 2022 EPA Guidelines[38].

Table 5.1 Description of Effects [Magnitude]

Effect Characteristic	Description
Quality	
Positive	A change which improves the quality of the environment
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
Negative	A change which reduces the quality of the environment
Duration of Effect	
Brief	Effects lasting <1 day
Temporary	Effects lasting <1 year
Short-term	Effects lasting 1-7 years
Medium-term	Effects lasting 7-15 years
Long-term	Effects lasting 15-60 years
Permanent	Effects lasting over 60 years
Reversible	Effects that can be undone, e.g., through remediation or restoration
Probability of Effects	
Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented
Significance of Effects	
Profound	An impact which obliterates all previous sensitive characteristics.
Significant	An impact, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Moderate	An impact that alters the character of the environment in a manner that is consistent with existing or emerging trends

[38] EPA, Guidelines of the Information to be contained in Environmental Impact Assessment Report, 2022

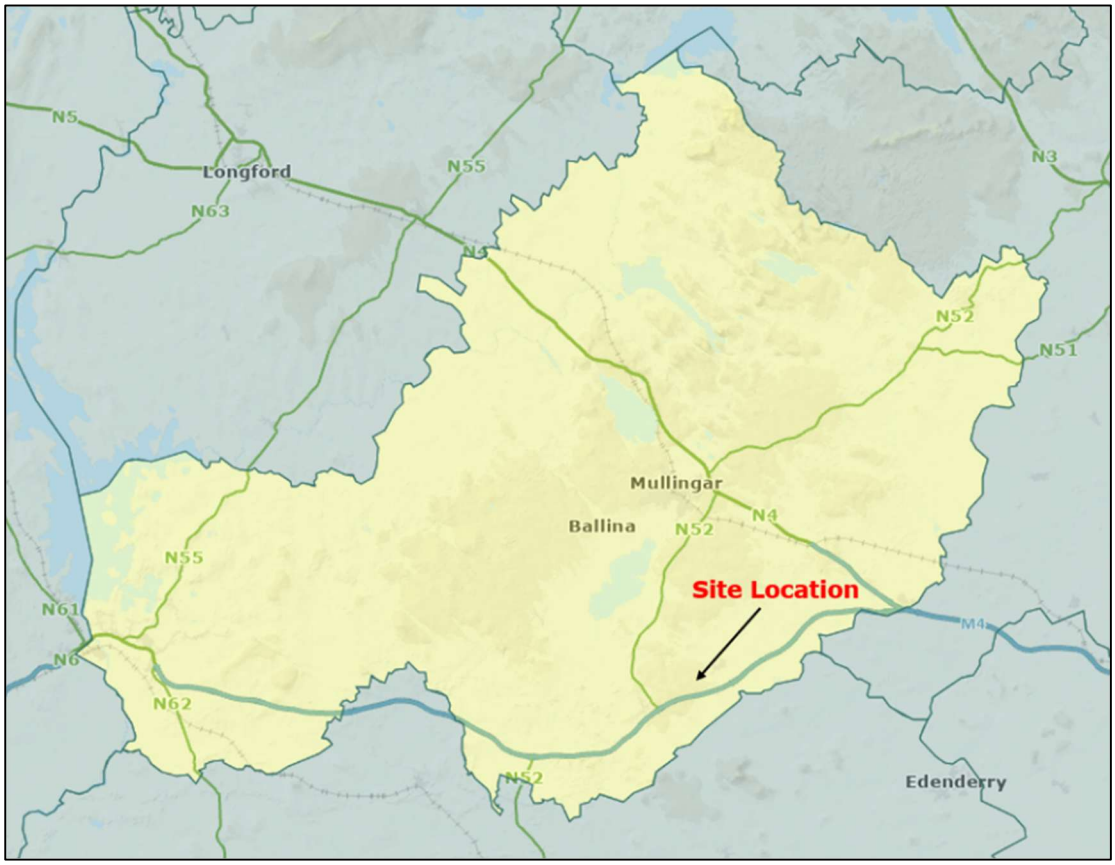
Effect Characteristic	Description
Slight	An impact that alters the character of the environment without affecting its sensitivities
Imperceptible	An impact capable of measurement but without noticeable consequences

5.3 DESCRIPTION OF RECEIVING ENVIRONMENT

5.3.1 POPULATION AND SETTLEMENT PATTERNS

The proposed development lands are located midway between the villages of Rochfortbridge and Tyrrellspass within the jurisdiction of Westmeath County Council (see Figure 5.1).

Figure 5.1 Westmeath County Council Area



Westmeath County Council is responsible for the administrative area of County Westmeath. The Council is responsible for the County's Housing, Planning, Roads, Environment, Fire, Libraries and Economic Development functions. Westmeath County Council is the custodian of the environment and through its planning and environment policies seeks to enhance the County's attractiveness while protecting its unique character

and atmosphere. The Council takes an active role in the promotion and development of the County's industrial, economic, business, social, arts, heritage and cultural affairs. Westmeath County Council covers an area of 1,756 square kilometres (km^2) and includes two municipal districts (MDs). The vast majority of the proposed development lands are located in the Mullingar MD. According to the CSO (2022) the population of Westmeath County Council is 96,221. A breakdown of population is presented in Figure 5.2.

Figure 5.2 Westmeath County Council - Population

The subject development lands are located in the electoral divisions (ED) of Castlelost and Ballykilmore, which have a population of 1,736 people (859 males and 877 females) and a population of 778 (390 males and 388 females) respectively (Figure 5.3). A breakdown of each ED population is presented in Figure 5.4 and Figure 5.5. The largest settlement in the Castlelost ED is the town of Rochfortbridge, which has a population of 1,498 people. The ED of Ballykilmore adjoins the western boundary of Castlelost ED. The Ballykilmore ED has a population of 778 people of which 480 live in the settlement of Tyrrellspass. Mullingar and Tullamore are the closest settlements with populations greater than 5,000 people. Both settlements are approximately 14km and 17km (approximately 15-minute vehicle journey time to/from site) respectively from the proposed development lands.

Figure 5.3 Setting – Electoral Division

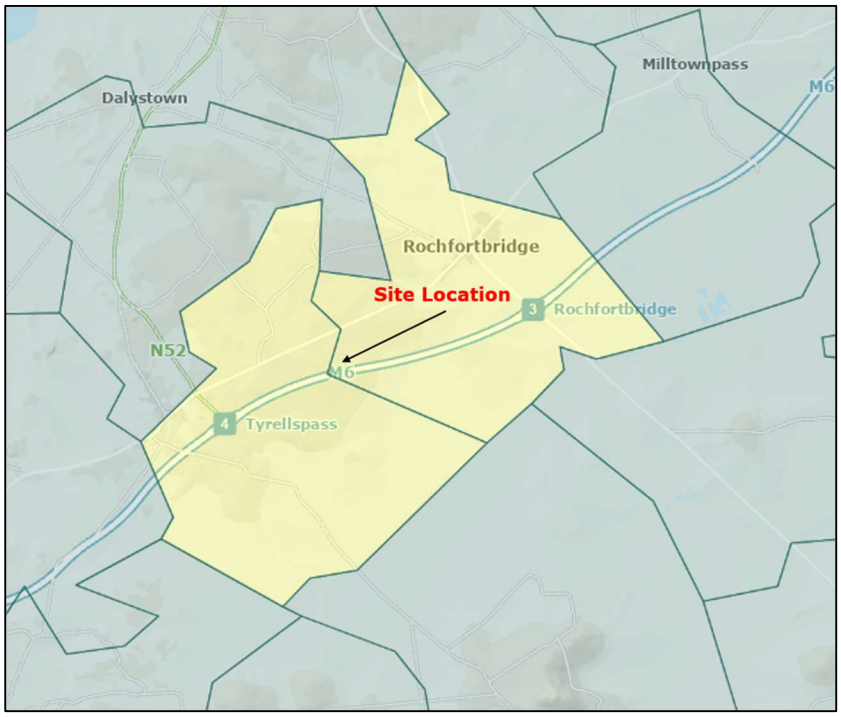


Figure 5.4 Castlelost ED - Population Breakdown

Figure 5.5 Ballykilmore ED - Population Breakdown

The Pobal[39] deprivation indices describe the Castlelost ED as being *"Marginally Above Average"* (index 6.41) compared with the County of Westmeath being *"Marginally Below Average"* (Index -1.43). The Pobal deprivation indices describe the Ballykilmore ED as *"Marginally Below Average"* (index -0.70). Further details are presented in Figure 5.6 and Table 5.3.

[39]https://data.pobal.ie/portal/apps/experiencebuilder/experience/?id=3b0acba7eb694ffa85340a60f81d516c#data_s=id%3AdataSource_1-18b85a45500-layer-28-18b85a418a0-layer-26%3A6

Figure 5.6 Castlelost ED Deprivation Indices Map

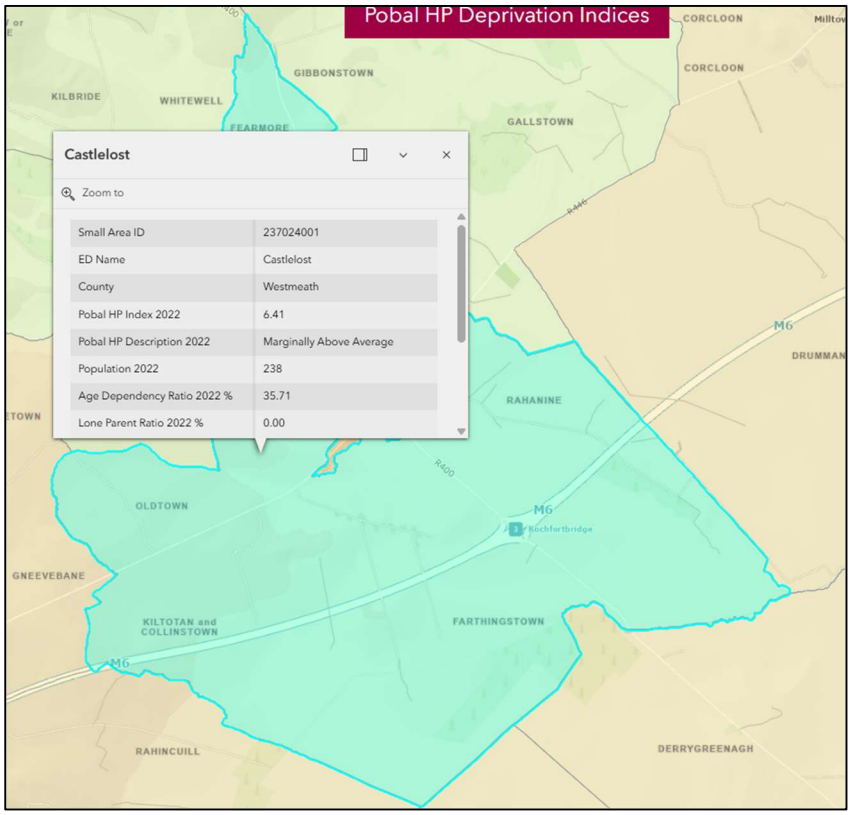


Figure 5.7 Ballykilmore ED Deprivation Indices Map

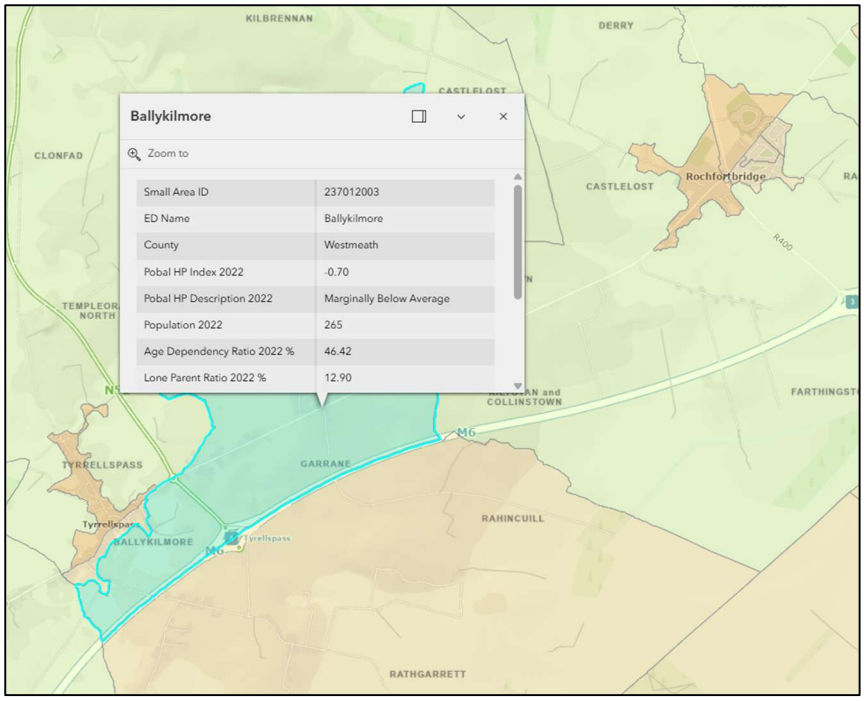


Table 5.2 Castlelost ED Statistics

Castlelost ED Statistics	
ED ID	237024001
ED Name	Castlelost
County	Westmeath
Pobal HP Index 2022	6.41
Pobal HP Description 2022	Marginally Above Average
Population 2022	238
Age Dependency Ratio 2022 %	35.71
Lone Parent Ratio 2022 %	0.00
Prop. Primary Education Only 2022 %	7.19
Proportion at Third Level Education 2022 %	42.48
Unemployment Rate - Male	4.48
Unemployment Rate - Female	4.17

Table 5.3 Ballykilmore ED Statistics

Ballykilmore ED Statistics	
ED ID	237012003
ED Name	Ballykilmore
County	Westmeath
Pobal HP Index 2022	-0.70
Pobal HP Description 2022	Marginally Below Average
Population 2022	265
Age Dependency Ratio 2022 %	46.42
Lone Parent Ratio 2022 %	12.9
Prop. Primary Education Only 2022 %	12.21
Proportion at Third Level Education 2022 %	43.60
Unemployment Rate - Male	6.25
Unemployment Rate - Female	10.64

A map showing an inclusion of small area population statistics (SAPS), whose boundaries intersect a 1km radius of the main project areas is provided in Figure 5.8. A breakdown of population for each areas is presented in Figure 5.9, Figure 5.10 and Figure 5.11. The combined populations of the area delineated in Figure 5.8 is 845 people (430 males and 415 females). Pobal HP Deprivation details for SAPS Area ID A237024001describe geographic units as *"Being Marginally Above Average"*. Pobal HP Deprivation details for SAPS Area ID A237012002 and A237012003 describe both geographic units as *"Being Marginally Below Average"*.

Figure 5.8 Small Areas Map – Radius of 1km

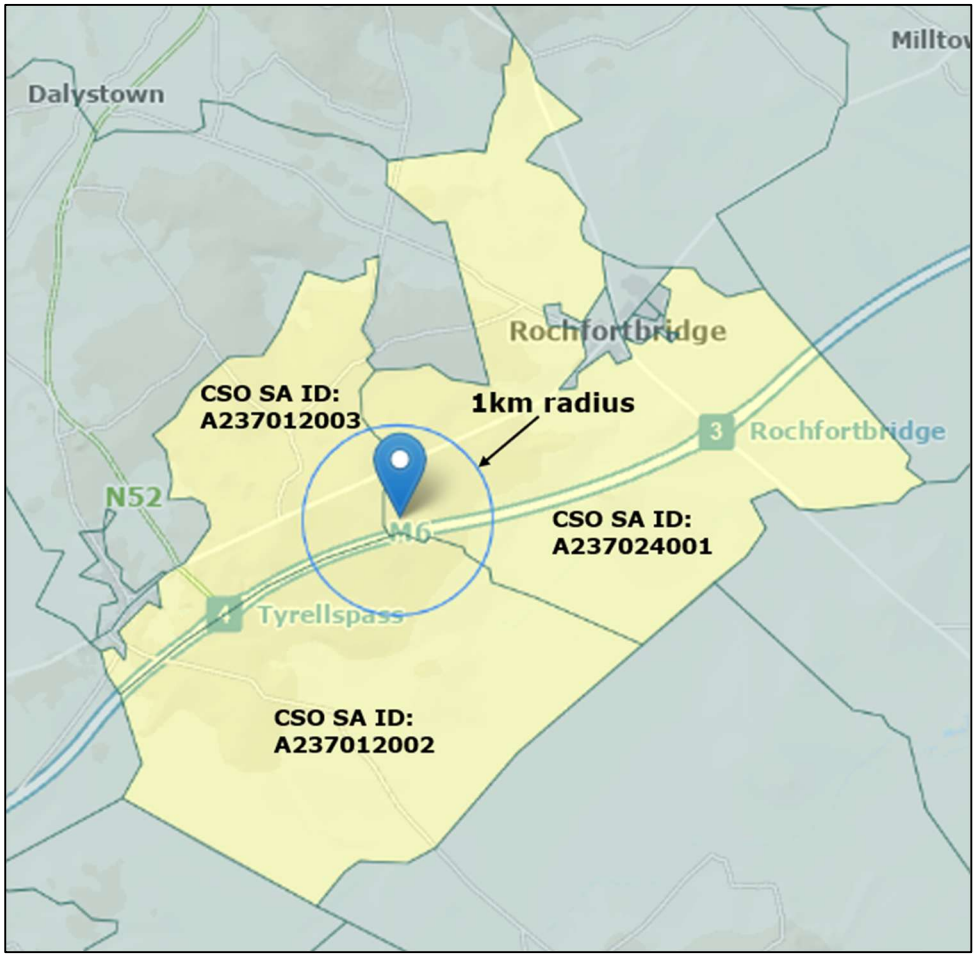


Figure 5.9 Small Areas: A237012002 (176 males, 166 females)

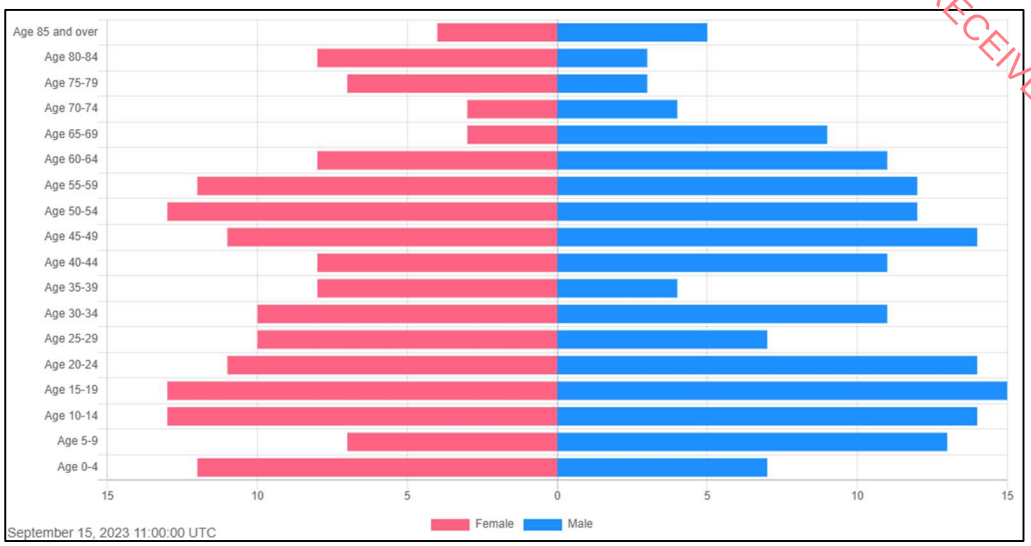


Figure 5.10 Small Areas: A237012003 (132 males, 133 females)

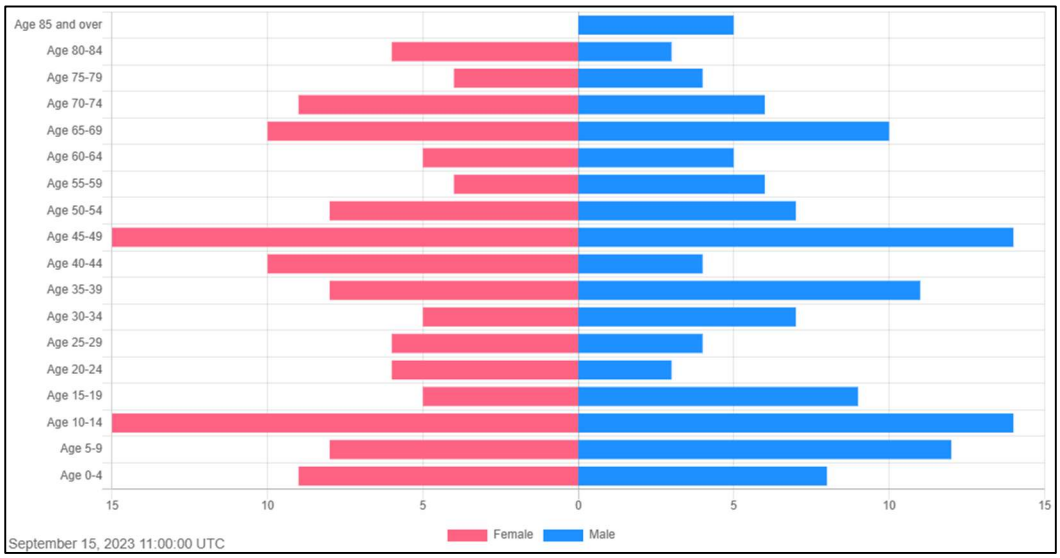
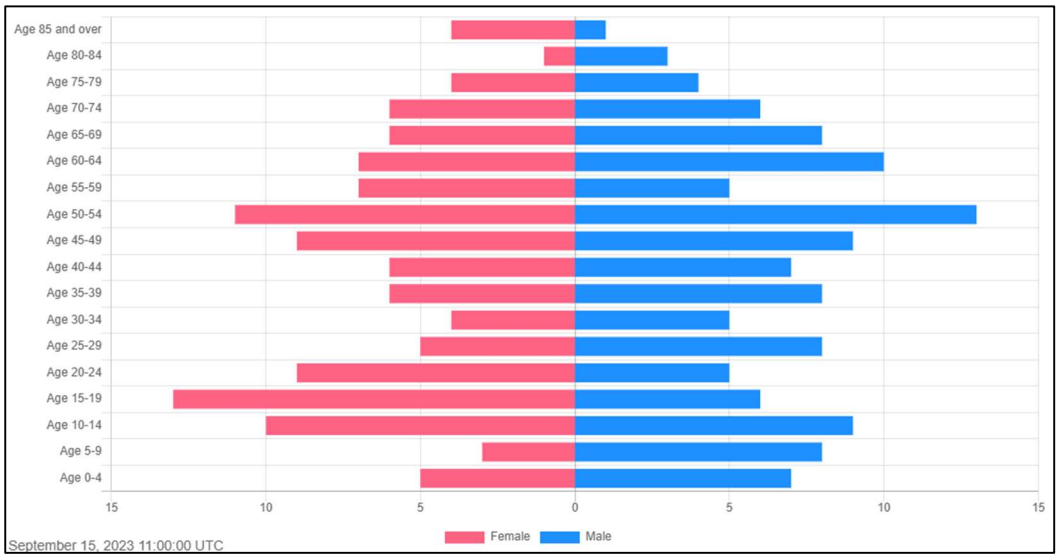
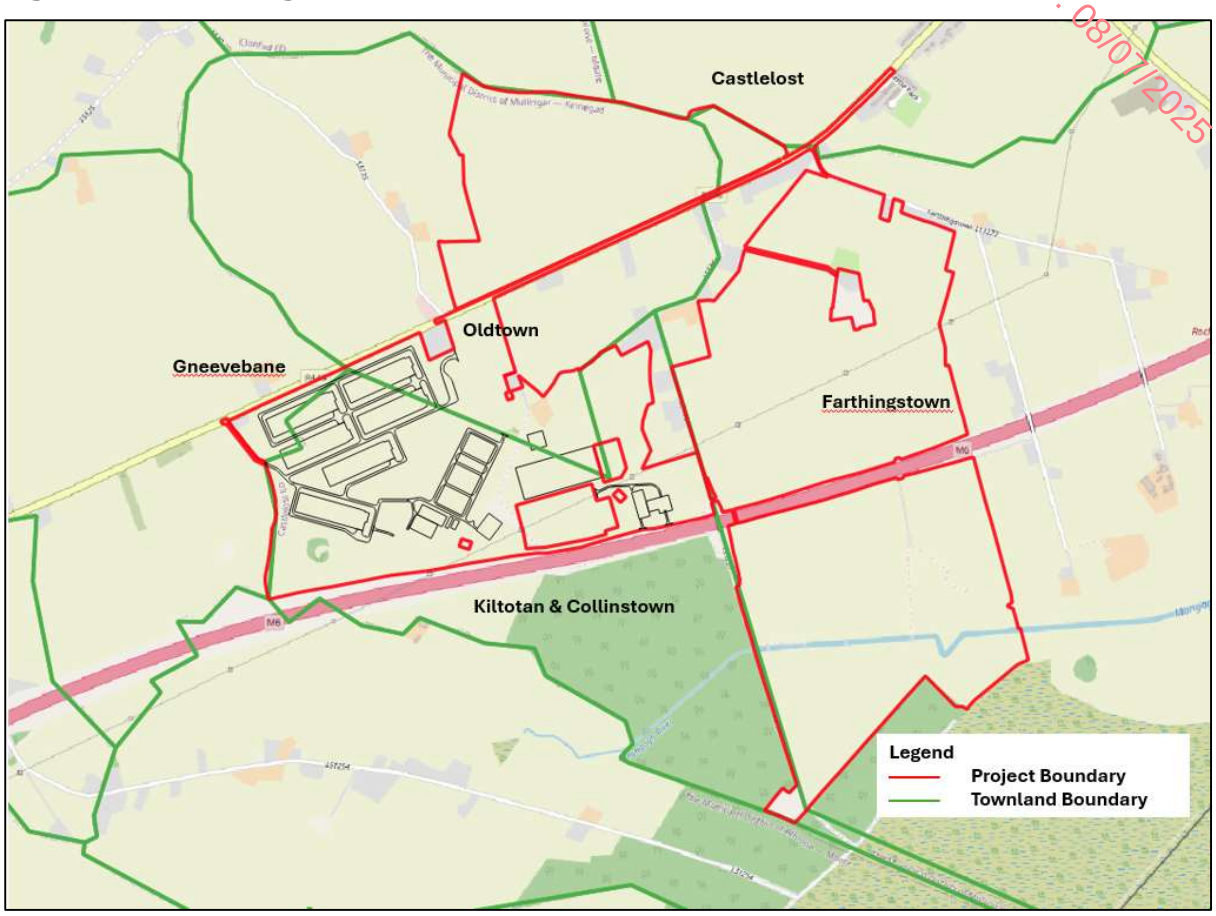


Figure 5.11 Small Areas: A237024001 (122 males, 116 females)



The number of persons enumerated in the townlands which the proposed development lands are located (see Figure 5.12) is not reported by CSO in the 2022 statistics.

Figure 5.12 Setting – Townlands



5.4 ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS

5.4.1 DO NOTHING SCENARIO

In the "do-nothing" scenario, the site would remain as agricultural land (pastures and arable fields). Biodiversity studies confirm the absence of rare or protected habitats, with the area offering generally low ecological value aside from some treelines of local significance. There are no links to European protected sites, and existing habitats for certain species would be preserved within the project design. Choosing not to proceed would merely shift environmental impacts elsewhere, without delivering climate or digital benefits for Ireland. Please refer to Chapter 3, Need for the Development and Alternatives.

5.4.2 POPULATION AND SETTLEMENT PATTERNS

This project does not contain a housing or services element and is not considered to have any direct positive or negative impacts on the local or regional population levels. However,

the plant will attract employees who are not based in locally to relocate to the town to reduce commuting distances. During the construction phase there is the potential for limited impacts on the residential amenity of the local population. The overall impact is considered to be imperceptible in terms of population. Temporary /short term slight adverse impacts associated with an increase in traffic (construction) levels will likely occur. With the recommended traffic and transport mitigation measures in place, no significant adverse roads and traffic related environmental impacts are anticipated during the construction, operational or decommissioning phases of the proposed development.

5.4.3 SEVERENCE

The effect of the impact associated with the project or in combination with other projects is considered as neutral and long-term.

5.4.4 HEALTH AND SAFETY

Given the nature of the project, dispersed residential population and distance to nearby settlements, the sensitivity of receiver is considered to be low. The predicted impact on air quality is short term and not significant hence the potential human health impact during construction is imperceptible. Air quality and noise are dealt with separately in Chapters 10 (Air Quality) and 11 (Noise and Vibration) and 15 (Climate). The air quality impacts associated with the proposed developments are will be well within the relevant Air Quality Standards. The impacts are deemed to be not significant and long-term. Due to the size and nature of the development and the nature and volume of the potential emissions, the construction phase activities will not have a significant impact on climate and will be short-term in duration while the operational phase activities will have an imperceptible impact on climate and a not significant impact on air quality and will be long-term in duration. A Stage 1 Road Safety Audit has been carried out in accordance with TII's publication *'GE-STY-01024 – Road Safety Audit'* and is included under the Traffic and Transport Appendix 13.5. All issues raised in the Road Safety Audit have been addressed so the proposed development will be satisfactory in terms of traffic operations and safety.

In terms of COMAH, it is noted that the adjoining Castlelost Flexgen Reserve Gas Fired Generator is a lower tier COMAH site due to the requirement to store gas oil as backup fuel onsite. Lower-Tier sites fall under the *European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015* (S.I. 209 of 2015). Development sensitivity levels were considered during the design and layout of the proposed project. Proposed infrastructure (level 1 sensitivity band[40]) is sufficient

[40] Industrial (Level 1) development is generally acceptable even in the inner zone, provided it does not exacerbate risk or hamper emergency response

distanced and sited in respect of the COMAH facility and emergency planning or evacuation routes are not impeded by the proposed development

5.5 MITIGATION MEASURES

In order to control potential negative impacts during construction, a Construction Environmental Management Plan (CEMP) is prepared for the development (Appendix 2.2). This will be further developed and implemented by the nominated Contractor in advance of construction works and agreed with the planning authority. Mitigation measures outlined within the various Chapters of the EIAR will be incorporated into the CEMP along with any conditions applied by the planning authority. Post mitigation impacts to population and human health during the construction (and decommissioning stages) are predicted as temporary /short-term, direct and indirect slightly adverse effects. Given the setting and sensitivity of identified receptors, the potential effects associated with operation of the proposed development is considered neutral. A project decommissioning plan has been prepared for the project and is available in Appendix 2.3 of the EIAR.

5.6 RESIDUAL IMPACTS OF THE DEVELOPMENT

Based on the assessment, the proposed development will not give rise to any significant negative population and human health effects.

5.7 CUMULATIVE EFFECTS

Based on the assessment findings presented in all Chapters of the EIAR which have interactions with Population and Human Health, the magnitude of potential effects associated with operation of the proposed development in combination is considered neutral.

6 BIODIVERSITY

6.1 INTRODUCTION

This chapter provides an assessment of the impacts of the proposed development on the ecological environment, i.e. biodiversity, flora and fauna. It has been compiled in compliance with European Communities Legal requirements and follows EPA Guidelines on Information to be contained in an EIAR (EPA, 2022) and on Transport Infrastructure Ireland TII policy and guidance outlined in Section 6.2.

6.2 METHODOLOGY

The chapter concentrates on ecological features within the development area of particular significance, primarily designated habitats and species. This includes habitats/species listed in Annex I, II and IV of the EU Habitats Directive, rare plants listed in the Flora Protection Order and other semi-natural habitats of conservation value.

A Report for the purposes of Appropriate Assessment Screening was also undertaken by Moore Group for the proposed development and this is presented under separate cover. In order to screen out a project, it must be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site. The report concludes that an appropriate assessment is not required.

6.2.1 POLICY AND GUIDANCE

6.2.1.1 EU Habitats Directive

The "Habitats Directive" (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union and lists certain habitats and species that must be protected within wildlife conservation areas, considered to be important at a European as well as at a national level. A "Special Conservation Area" or SAC is a designation under the Habitats Directive. The Habitats Directive sets out the protocol for the protection and management of SACs.

The Directive sets out key elements of the system of protection including the requirement for "Appropriate Assessment" of plans and projects.

Both the Habitats Directive and the Birds Directive have been transposed into Irish law by one set of regulations (i.e. The European Communities (Birds and Natural Habitats) Regulations 2011 to 2015 (S.I. No. 477/2011 as amended by S.I. No. 355 of 2015)).

6.2.1.2 EU Birds Directive

The "Birds Directive" (Council Directive 2009/147/EC on the Conservation of Wild Birds) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting and wintering areas. This directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection (Annex I species). Appendix 1 indicates Annex I bird species as listed on the Birds Directive. A "Special Protection Area" or SPA, is a designation under The Birds Directive.

Special Areas of Conservation and Special Protection Areas form a pan-European network of protected sites known as Natura 2000 sites and European sites.

6.2.1.3 Wildlife Acts (1976 - 2021[41])

The primary domestic legislation providing for the protection of wildlife in general, and wild birds in particular, and the control of some activities adversely impacting upon wildlife is the Wildlife Act of 1976, as amended. The aims of the Wildlife Act, according to the National Parks and Wildlife Service (NPWS) are "... to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims." All wild bird species are protected under the Act. The European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) made significant amendments to the Wildlife Acts to ensure consistency with the Habitats and Birds Directives.

6.2.2 HABITAT SURVEY

The Biodiversity survey was carried out in three stages, firstly through desktop research to determine existing records in relation to habitats and species present in the study area. This included research on the National Parks and Wildlife Service (NPWS) metadata website, the National Biodiversity Data Centre (NBDC) database and a literature review of published information on flora and fauna occurring in the proposed development area.

[41] Wildlife Act 1976, as amended. Administrative consolidation of the Wildlife Act 1976, Law Reform Commission (2021)

Sources of information that were used to collate data on biodiversity in the potential Zone of Influence are listed below:

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
  - National Parks & Wildlife (NPWS) protected site boundary data;
  - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
  - OSI/ Environmental Protection Agency (EPA) rivers and streams, and catchments;
  - Open Street Maps;
  - Digital Elevation Model over Europe (EU-DEM);
  - Google Earth and Bing aerial photography 1995-2025;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
  - Natura 2000 - Standard Data Form;
  - Conservation Objectives;
  - Site Synopses;
- National Biodiversity Data Centre records;
  - Online database of rare, threatened and protected species;
  - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019); and
- Relevant Development Plans in neighbouring areas:
  - Westmeath County Development Plan 2021-2027

Other environmental information for the area was reviewed, e.g. in relation to soils, geology, hydrogeology and hydrology. Interactions in terms of the chapters on these topics presented in this EIA Report were important in the determination of source vector pathways and links with potentially hydrologically connected areas outside the proposed development site.

The second phase of the survey involved site visits on the following dates to establish the existing environment in the footprint of the proposed development area.

- 20/08/24 Habitats, Badgers and Otters Surveys
- 31/10/24 Habitats and Badgers Surveys
- 01/04/25 Spring Habitats, Badgers and Otters Surveys
- 07/05/25 Habitats and Badger Surveys

Areas which were highlighted during desktop assessment were investigated in closer detail according to the Heritage Council Best Practice Guidance for Habitat Survey and Mapping (Smith *et al*., 2011). Habitats in the proposed development area were classified according to the Heritage Council publication "A Guide to Habitats in Ireland" (Fossitt, 2000). This publication sets out a standard scheme for identifying, describing and classifying wildlife habitats in Ireland. This form of classification uses codes to classify different habitats based on the plant species present. Species recorded in this report are given in both their Latin and English names. Latin names for plant species follow the nomenclature of "An Irish Flora" (Parnell & Curtis, 2012).

Signs of mammals such as badgers and otters were searched for while surveying the study area noting any sights, signs or any activity in the vicinity especially along adjacent boundaries.

Bat Surveys were undertaken by Éire Ecology and the methodology for those surveys is presented in the Bat Report which is included as Appendix 6.2.

Bird Surveys were undertaken by Éire Ecology and the methodology for those surveys is presented in the Bird Report which is included as Appendix 6.3.

The final part of the assessment involves an evaluation of the study area and determination of the potential impacts on the habitats of the study area. This part of the assessment forms the basis for Impact Assessment and is based on the following guidelines and publications:

- Guidelines for Ecological Impact Assessment in the UK And Ireland Terrestrial, Freshwater, Coastal and Marine September 2018 Version 1.1 - Updated September 2019 (CIEEM, 2019);
- EPA Guidelines on Information to be contained in an EIAR (EPA, 2022);
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011);
- Ecological Surveying Techniques for Protected Flora & Fauna (NRA, 2008);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, December 2009, Rev 2010);
- Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC (EC, 2007).

While prepared for linear projects the TII Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009) are still relevant and outlines the methodology for

evaluating ecological impacts of the project in the present report. According to the TII Guidelines, the Ecological Study should address:

- Designated conservation areas and sites proposed for designation within the zone(s) of influence of any of the Project options,
- All the main inland surface waters (e.g. rivers, streams, canals, lakes and tanks) that are intersected by any of the route corridor options, including their fisheries value and any relevant designations,
- Aquifers and dependent systems and turloughs and their subterranean water systems,
- Any known or potentially important sites for rare or protected flora or fauna that occur along or within the zone(s) of influence of any of the route options,
- Any other sites of ecological value, that are not designated, along or in close proximity to any of the route corridor options,
- Any other relevant conservation designations or programmes (e.g. catchment management schemes, habitat restoration or creation projects, community conservation projects, etc.),
- Any other features of particular ecological or conservation significance along any of the route options.

The TII Guidelines set out a method of evaluating the importance of sites identified and in turn the evaluation of the significance of impacts.

Impact Assessment is then based on CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland, 2019.

6.2.3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

Red Admiral DC Limited propose to develop a DC facility and DER on lands in the townlands of Gneevebane, Oldtown, Farthingstown, Castlelost and Kiltotan and Collinstown in the south of County Westmeath. The project includes two main elements, namely:

- The Data Centre (DC) facility, comprising six two-storey Data Centre buildings, car parking, landscaping, drainage and other associated works. The DC facility will be constructed and secured within a 39ha campus. Each DC building will have a footprint of 13,978 m^2 (sqm) and have a gross floor area of 28,561 sqm. Each DC building will contain:
  - Data halls fitted with server racks and distribution units,
  - Mechanical and electrical (M&E) plant rooms /spaces which will house advanced cooling equipment, pumps, piping and medium voltage (MV) and low voltage (LV) switchgear, and

    - Administration and support areas including, reception, offices, meeting rooms and welfare facilities.
- Decentralised Energy Resource (DER), which will be constructed across approximately 200ha of lands adjoining the DC facility. The DER incorporates several power assets which will generate, store and manage electricity close to the DC facility. The DER comprises the following assets:
    - Fuel Cell Power System – 160MW,
    - Battery Energy Storage System (BESS) – 250MW,
    - Solar PV farm (nominal 180MWp), and
    - 220kV IPP GIS Grid connection to the 220kV Castlelost GIS substation which adjoins the proposed development site.

A full description of the proposed development is provided in Chapter 2 of this EIAR.

6.3 DESCRIPTION OF EXISTING ENVIRONMENT

6.3.1 GENERAL

The site comprises a mosaic of open farmland fields (GA1) which are either mown for sileage or under Arable Crops (BC1).

The fields are bordered by low gappy sections of Hedgerows with semi-mature or outgrown mature trees.

The following is a description of the flora and fauna of the existing environment in the study area.

6.3.2 DESIGNATED CONSERVATION AREAS

The Zone of Influence may be determined by connectivity to the Proposed Development in terms of:

- Nature, scale, timing and duration of works and possible impacts, nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and
- Sensitivity and location of ecological features.

The potential for source pathway receptor connectivity is firstly identified through GIS interrogation and detailed information is then provided on sites with connectivity. European sites that are located within a potential Zone of Influence of the Proposed

Development are listed in Table 6.1and presented in Figure 6.1 below. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on 4 June 2025. This data was interrogated using GIS analysis to provide mapping, distances, locations and pathways to all sites of conservation concern including pNHAs, NHA and European sites.

Table 6.1 European Sites located within a potential Zone of Influence[42] of the Proposed Development

Site Code	Site name	Distance (km)[43]
000582	Raheenmore Bog SAC	5.12
000685	Lough Ennell SAC	5.62
001831	Split Hills And Long Hill Esker SAC	6.47
004044	Lough Ennell SPA	6.30
002299	River Boyne and River Blackwater SAC	31.5
004232	River Boyne and River Blackwater SPA	31.5

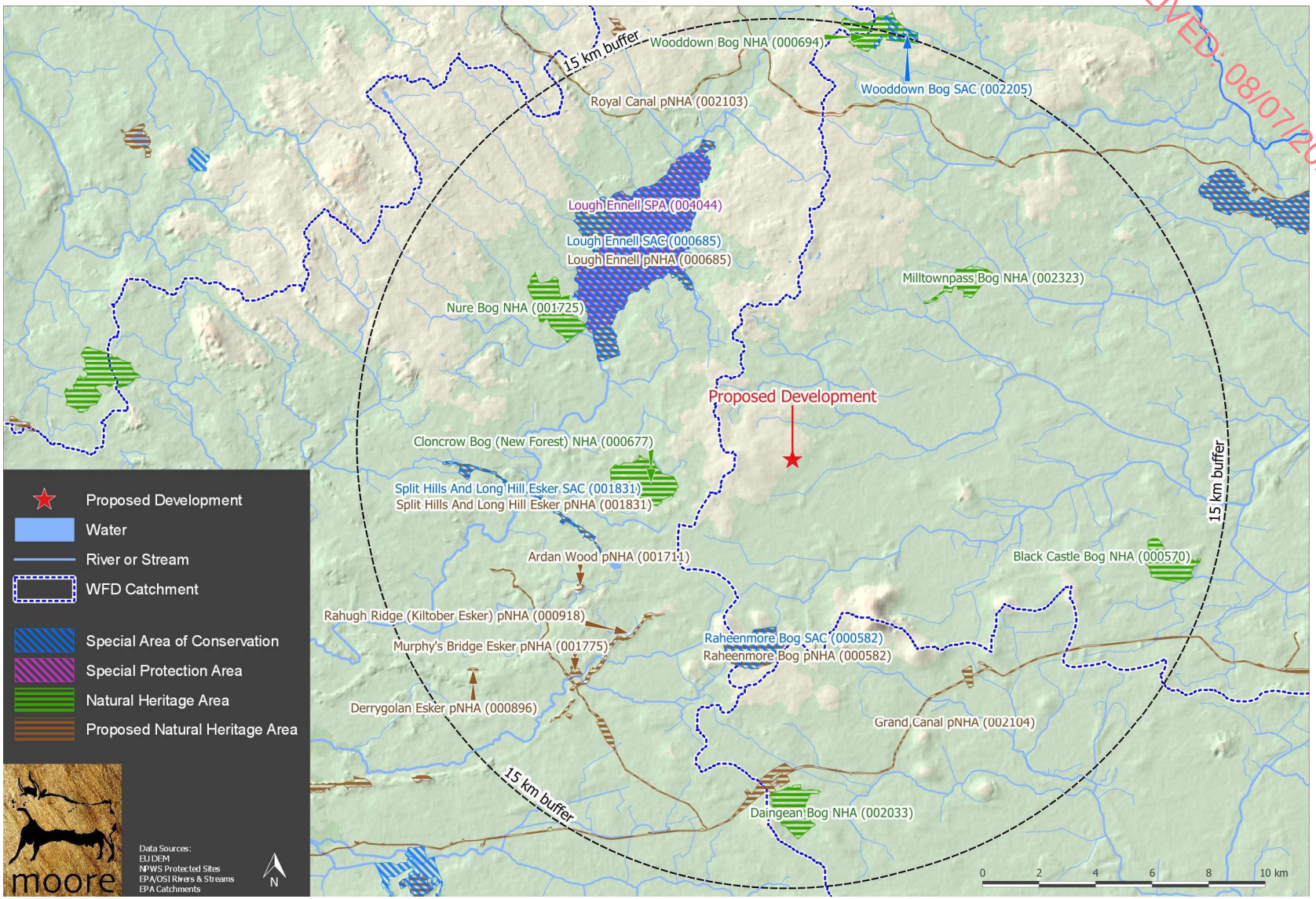
The nearest European sites to the Proposed Development are associated with Raheenmore Bog and include the Raheenmore Bog SAC (Site Code 000582), which is located just over 5.12km to the south. However, there are no pathways to these sites, and they are excluded from the assessment at this preliminary stage.

The Proposed Development is located in a separate catchment to Lough Ennell and two associated European sites are excluded from the assessment at this preliminary stage.

The Proposed Development is located within the hydrological catchment of the Castlejordan and Yellow River which flow northeast to the River Boyne with its associated European sites, the River Boyne and River Blackwater SAC (Site Code 002299) and the River Boyne and River Blackwater SPA (Site Code 004232), which are located over 30 river km to the northeast of the Proposed Development. As such, at this great distance downstream, the River Boyne European sites are outside the zone of influence and are both excluded from the assessment at this preliminary stage.

[42] All European sites potentially connected irrespective of the nature or scale of the Proposed Development.
[43] Distances indicated are the closest geographical distance between the Proposed Development and the European site boundary, as made available by the NPWS.

Figure 6.1 Showing European Sites & NHAs/pNHAs within the wider Potential Zone of Influence



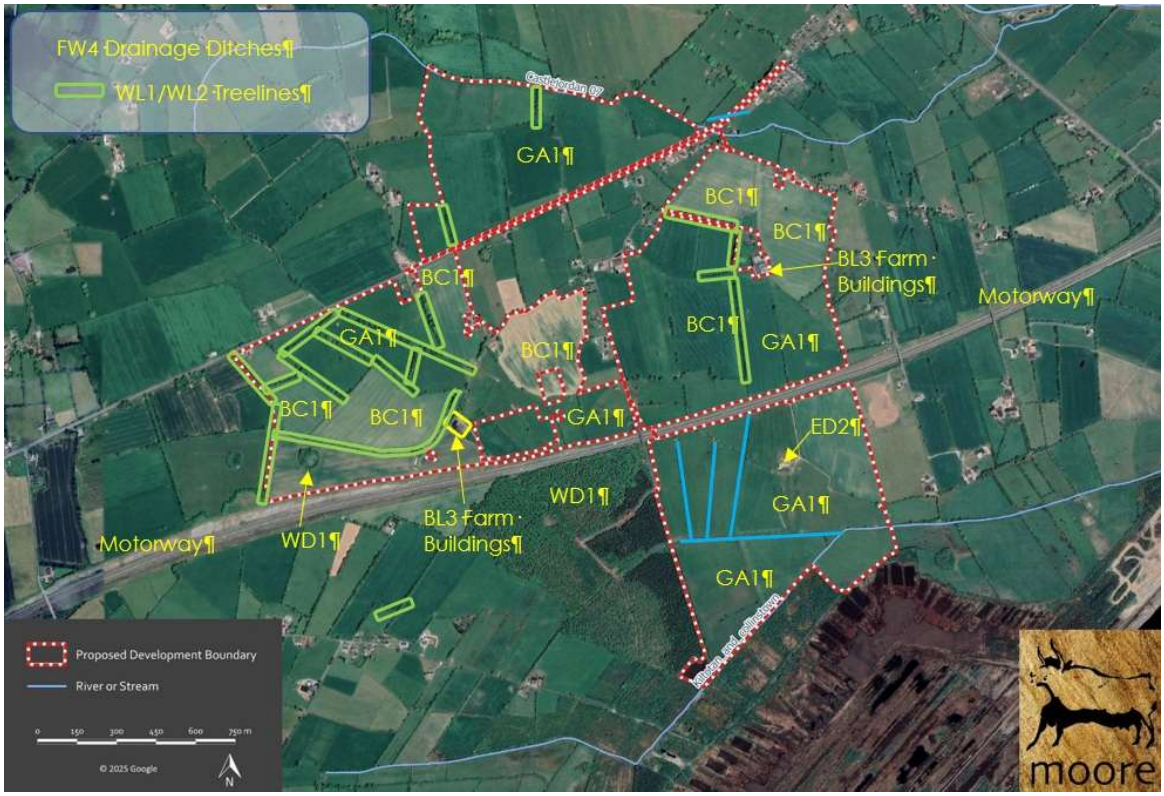
6.3.3 NON-DESIGNATED HABITATS

The proposed development area is improved farmland with open fields which are either heavily grazed or under Arable Crops. There are internal hedgerows and associated short shallow drainage ditches and surrounding outgrown hedgerows. The main habitats are presented on the recent aerial photography in Figure 6.2. A list of habitats recorded, and their corresponding Fossitt codes is presented in Table 6.2.

Table 6.2 Details of Habitats Recorded and their Corresponding Fossitt Codes

Habitat	Habitat Category	Habitat Type
(F) Freshwater	(FW) Watercourses	((FW4) Drainage ditches
(G) Grassland	(GA) Improved grassland	(GA1) Improved agricultural grassland
(W) Woodland and Scrub	(WD) Scrub and transitional woodland	(WD1) Mixed broadleaved woodland
	(WL) Linear woodland	(WL1) Hedgerows
		(WL2) Treelines
(B) Cultivated and Built land	(BC) Cultivated land	(BC1) Arable crops
(B) Cultivated and Built land	(BL) Built land	(BL3) Buildings and artificial surfaces
(ED) Exposed rock and disturbed ground	(ED) Disturbed ground	(ED2) Spoil and bare ground

Figure 6.2 Showing habitats recorded at the proposed development site.



6.3.3.1 (FW4) Stream/Drainage ditches

This habitat classification applies to drainage ditches within and bounding the site, as well as the Castlejordan stream running along the northern boundary, the Kiltotan and Collinstown stream along the southern boundary, and the unnamed channelised minor stream entering the southern site from the west.

These ditches are of depths from 1 to 3m, with steep sides, and generally with little flow. Species present include Fool's Water Cress (*Apium nodiflorum*), Water Cress (*Nasturtium officinale*), Angelica (*Angelica sylvestris*), Branched Bur-reed (*Sparganium erectum*), Iris (*Iris pseudacorus*) and Reed Canary Grass (*Phalaris arundinacea*). Occasional poached muddy margins where animals drink also support Brooklime (*Veronica beccabunga*) and Lesser Spearwort (*Ranunculus flammula*).

6.3.3.2 (GA1) Improved agricultural grassland

This habitat refers to those grassland areas which comprise the fields managed for silage or grazed by livestock on the site. Species present include abundant Perennial Rye Grass (Lolium perenne), Meadow grass (*Poa* spp.). Ribwort plantain (*Plantago lanceolata*), Meadow Buttercup (*Ranunculus acris*), Cocks foot (*Dactylis glomerata),* Yorkshire Fog *(Holcus lanatus),* Creeping Thistle (Cirsium arvense), and Nettle (*Urtica dioica*). Some of the southern fields have more impeded drainage, and Soft Rush (*Juncus effusus*) and Creeping Buttercup (*Ranunculus repens*) are more prominent.

6.3.3.3 (WL1) Hedgerows & WL2 Treelines

This habitat refers to the various field boundaries within and surrounding the site, a mix of tightly managed and outgrown hedgerows, as well as significant treelines bordering fields and avenues.

Many field boundary hedgerows have been so degraded that they are remnants along fencelines, with some better managed hedgerows particularly in the western section, and occasional fine outgrown hedgerows which include mature specimen trees. Species composition is typical of such farmland, with Hawthorn (*Crataegus monogyna*), Elder (*Sambucus nigra*), Ash (*Fraxinus excelsior*), Blackthorn (*Prunus spinosa*), Wild Privet (*Ligustrum vulgare*), Sycamore (*Acer pseudoplatanus*) and Grey Willow (*Salix cinerea*). Ivy (*Hedera hibernica*) is abundant throughout, as are Bramble (*Rubus fruticosus*) and Honeysuckle (*Lonicera periclymenum*). Ground flora is similar to that of the adjacent grassland, with occasional woodland edge plants such as Wood Avens (*Geum urbanum*) and Ground Ivy (*Glechoma hederacea*).

The avenue to Farthingstown House and farm comprises a double row of Copper Beech (*Fagus sylvatica var purpurea*) and Ash, while the western aspect of the farm is defined by a row of large specimen Beech trees. As is the case throughout Ireland, much of the Ash in hedgerows and treelines is exhibiting various symptoms of Ash Dieback.

6.3.3.4 (WD1) Mixed Broadleaved Woodland

This habitat was recorded in the ringfort, located in the western section of the site. The ringfort comprises a double earthen embankment, with Ash, Sycamore, Hawthorn and Grey Willow, as well as scrubby Elder. Hogweed (*Heracleum sphondylium*) and Ivy are frequent in the understorey, as is Bramble.

6.3.3.5 (BC1) Arable crops

Several large fields throughout the site are managed for crops, with barley being the most widespread, as well as some Rapeseed. Typical arable weeds observed on the margins of these fields included Giant Brome (*Anisantha diandra*), Common Field Speedwell (*Veronica persica*), Scarlet Pimpernel (*Anagallis arvensis*) and Shepherd's Purse (*Capsella bursa pastoris*).

6.3.3.6 (BL3) Buildings and artificial surfaces

This habitat refers to a variety of farm buildings within the site, with little to no vegetation.

6.3.3.7 (ED2) Spoil and bare ground

This habitat classification refers to the area within the southern section of the site used to store piles of unconsolidated spoil and stone and baled silage. A rough track leading to this area is included in the classification. Some ruderal colonisation has occurred, with species recorded including Oxeye Daisy (Leucanthemum vulgare), Broad-leaved Willowherb (*Epilobium montanum*), Docks (Rumex sp.) and scrubby Grey Willow.

6.3.4 INVASIVE SPECIES

Small patches of Japanese Knotweed were record during preliminary site visits in May 2019. The area is located on the access road to the east and was treated in the past 5 years having reduced an extensive patch along the road in that area to a few persistent plants.

6.3.5 FAUNA

6.3.5.1 Badgers

There were no badger setts along field boundaries which would be disturbed and no signs of badgers in the study area.

6.3.5.2 Otters

There were no signs of otters in the site or along the drainage ditches which have no fisheries value.

6.3.5.3 Bats

6.3.5.3.1 Tree Surveys

In total 420 trees were surveyed from ground level for their potential to host individual bats or a maternity roost. Two veteran ash trees in Section 1 and two Beech trees in Section 3 were flagged as having the potential to host a maternity roost (PRF-M). Both pairs of trees were subjected to nighttime emergence surveys as a second survey after an at-height inspection. Results are summarized below

At-height surveys were carried out by John Curtin and Rik Pannett where Rik climbed trees and used a Ridgid CA-350. This was connected to the ecologist's phone via wi-fi thus the ecologist inspected all cavities. Surveys were conducted on the 02 and 08 April 2025. A number of Veteran trees onsite were noted to be of key importance in maintaining the continuity of connectivity through the site during and post construction. It is advised as many of these trees be kept as Monolith features to assist in the establishing of the Compensatory woodland that will be planted on the west of the site.

No bats were found to be roosting in trees onsite, though bats were observed utilising treelines for feeding purposes during nighttime surveys.

6.3.5.3.2 Structure Surveys

A search was conducted of sheds and dwellings of highest potential that were within or close to the site. In situations where access was not possible the surveyor conducted nighttime surveys from the road examining bats and attempting to locate commuting routes and roosts.

During the daylight search no evidence of bats was noted from any of the structures listed in Table 3-4 of the Bat Report. Night-time surveys did reveal the presence of bat roost within five of these structures.

6.3.5.3.3 Night-time Surveys

Nighttime surveys were conducted on 23 April, 01 May and 09 May 2025. These surveys consisted of multiple surveyors recording activity levels at various points throughout the site at various structures identified during desktop surveys. The purpose of surveys was to examine for roosting bats that could be impacted by the development, observe bat interactions such as commuting routes, feeding areas, and examine if there are current impediments to bats within and surrounding the site.

Two emergence surveys were conducted on the 01 May 2025 of structures 1, 2 and 3 by multiple surveyors working with NVA's and Ultrasonic detectors. Six Pipistrelle bats were observed emerging from Structure 3 (most likely 5 Common Pipistrelle and 1 Soprano Pipistrelle), from various exit points in the walls and gable end of the building. Only a single bat was observed leaving Structure 2.

Multiple emergence surveys were conducted on 09 May on Structure 4, an occupied house with tile roof and Structure 5, a semi-detached derelict shed and dwelling. No bats were found to be emerging from either building. Structure 4 is an occupied dwelling and shed, with a modern slate roof. The shed is small but showed better potential for a small number of roosting bats than the dwelling. Additionally, a derelict dwelling with semi-detached sheds, both with slate roofs in disrepair, were also surveyed. Facia was in disrepair on these structures, but many areas had collapsed roofs, making the interior brighter and thus less suitable for bats.

6.3.5.3.4 Static Detector Surveys

Eight Song Meter Mini full spectrum bat recorders were deployed within areas suitable for bats for 12 nights from August to early September during the bat active season, and again in May 2025. Detector 3, located in Section 3 showed the highest levels of Soprano Pipistrelle, Natterer's Bat and Leisler's Bat on site and had the highest activity level overall.

Several Pipistrelle calls were recorded with a peak frequency of around 40kHz. These calls are lower than expected for Common Pipistrelle but higher than the typical for Nathusius. In these cases, the calls are classified to genus level (Unidentified Pipistrelle 40kHz).

A summary of data with full data tables provided in Appendix 6.1. Results show number of registrations and Bat passes per hour (Bp/Hr) and divides results per species and detector. An overall average of 46.9 Bp/Hr was recorded from the August-September period.

Activity across the site was very high in edge habitat and much lower in open habitat, with the highest areas of bat activity being at Detector 3 and Detector 2 which show Bp/Hr of

241.1 and 131.6 respectively. The most common species recorded was Common Pipistrelle with 27,060 registrations (48%) followed by Soprano Pipistrelle with 14,829 recordings (27%). Leisler's bat represents 2.3% of total calls with other species recorded at low levels comparatively.

Activity in Spring showed reduced activity when compared to the first survey period. Detector 3 showed the largest drop-in activity of any location, activity dropped from 241.5 Bp/Hr (15,803 recordings), to just 18.5 Bp/Hr, with all species dropping in the same proportions. The majority of the calls on this site are still recorded at Detector 2, where Common Pipistrelle is the most abundant call recorded (89% of D-2 Bat calls are Common Pipistrelle).

It should be noted that a single bat continuously circling a small stand of trees will produce numerous recordings, thus the number of registrations cannot quantify abundance, rather activity.

6.3.5.4 Summary

Seven of the nine resident Irish bat species were found within the site; Leisler's Bat, Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Brown Long-eared, Natterer's Bat and Daubenton's bat.

A total of 62,880 registrations were recorded over the course of 22 nights from 8 static bat detectors placed in key locations throughout the site. Detectors 2, 3, 5, 7 are set in Edge Habitat which shows much higher activity on this site and these detectors make up 97% of all bat calls. Locations with high density of bat commuting traffic are Detector 2 and Detector 3 (D3 particularly in late summer when Young are present).

Lowest Levels of activity are consistently seen in open habitats onsite, with Detector 1, 4, 6 and 8 showing drastically lower levels of activity. Detector 5 is the only detector placed adjacent to a watercourse, a small stream along the northern border of Section 3. It also showed the highest levels of Myotis Species on site though few Myotis bats were recorded.

A Breeding pair of Barn owls were observed nesting onsite near Detector 3. Literature suggests that Barn Owls can influence the suitability of an area for bats, potentially driving bats out of a roost. Roulin (2013) concludes that while Barn Owls can predate on insectivore bat species, bats typically make up a small portion of their diet (usually <0.2%) and predation is mostly opportunistic on the part of the Barn Owl.

No tree roosting bats were recorded during any survey. Bat roosts were noted from buildings to the west of the site (two roost structures) however these buildings will not be

altered by the proposed development. For further detail please refer to Appendix 6.1 for Bat Survey Report.

6.3.5.5 Other Mammals

There were signs of fox recorded along with rabbits. These species are of low ecological concern and are not protected.

6.3.5.6 Birds

The NBDC was accessed on the 14 August 2024 and again on the 21 May 2025 for previous records within the 3 x 2km squares the site resides in N43U, N43P and N44K. In total there were sixteen bird species recorded within the records examined. The following rare and / or threatened birds have been recorded in Table 6.3.

Table 6.3 Designated species recorded within the 2km squares; N43U, N43P and N44K.

Name	Latin Name
Mallard	*Anas platyrhynchos*
Eurasian Teal	*Anas crecca*
Eurasian Wigeon	*Anas penelope*
Tufted Duck	*Aythya fuligula*
Common Snipe	*Gallinago gallinago*
Eurasian Woodcock	*Scolopax rusticola*
Eurasian Curlew	*Numenius arquata*
Northern Lapwing	*Vanellus vanellus*
Barn Swallow	*Hirundo rustica*
Common Starling	*Sturnus vulgaris*
House Martin	*Delichon urbicum*
House Sparrow	*Passer domesticus*
Lesser Black-backed Gull	*Larus fuscus*
Mute Swan	*Cygnus olor*
Sky Lark	*Alauda arvensis*
Yellowhammer	*Emberiza citrinella*

The proposed site lies in close proximity to the Yellow River windfarm project where numerous bird surveys have previously been carried out. The Kilmurray's sand and gravel quarry (lying 1.4km from the subject site) is a component of this windfarm and contains a breeding population of Lapwing as well as numerous wintering birds including Golden Plover and Whooper Swans.

6.3.5.6.1 Field Survey

During Vantage point surveys, species of interest noted using the site included Golden Plover, Lapwing, Snipe and Woodcock. Buzzard, Golden Plover and Kestrel were seen most frequently making use of the site, with moderately sized flocks of Meadow Pipit, Mallard and Redwing also present. A large flock of Golden Plover observed far to the South of the Site numbering ~375 individuals were noted, and the largest recorded flock was 262 individuals strong.

Three vantage point surveys were conducted each month between September 2024 and March 2025. The presence of the Target species and their flightlines were recorded. Table 6.4 provides a summary of species of interest including number of times the species was observed and if the species interacted with the site (perched within, hunting or roosting compared to flying over).

Table 6.4 Summary of Vantage Points 'Species of Interest' Results

Species	No of Obs.	Max Obs.	Recorded within site	Interacting with Site	BoCCI4	Season for BOCCI4 designation
Black-headed Gull	2	2	In	No	Amber	Breeding/Wintering
Buzzard	63	7	In	Yes	Green	-
Golden Plover	42	375	In	Yes	Red	Breeding/Wintering
Great Cormorant	2	1	In	No	Green	-
Hen Harrier	1	1	In	Yes	Amber	Breeding
Herring Gull	1	1	In	No	Green	-
Kestrel	21	92	In	Yes	Red	Breeding
Lapwing	2	3	In	Yes	Green	-
Lesser Black-backed Gull	1	5	In	No	Amber	Breeding/Wintering
Meadow Pipit	3	22	Out	Yes	Red	Breeding
Peregrine Falcon	1	1	Out	Yes	Green	-
Raven	1	2	In	Yes	Green	-
Redwing	2	35	In	Yes	Red	Wintering
Sky Lark	1	1	In	Yes	Green	-
Snipe	4	2	In	Yes	Red	Breeding/Wintering
Sparrowhawk	3	1	In	Yes	Green	-
Whooper Swan	7	10	In	No	Amber	Breeding/Wintering
Wigeon	1	4	In	No	Amber	Breeding/Wintering
Woodcock	1	2	In	Yes	Red	Breeding
Yellowhammer	29	3	In	Yes	Red	Breeding

Table 6.5 Summary of Vantage Point Non-Target Results

Species	No of Obs.	Max Obs.	BoCCI4	Season for BOCCI4 designation
Blackbird	16	6	Green	-
Barn Swallow	3	10	Amber	Breeding
Blackbird	3	1	Green	-
Blue Tit	12	4	Green	-
Bullfinch	1	4	Green	-
Chaffinch	16	10	Green	-
Coal Tit	1	1	Green	-
Collared Dove	2	6	Green	-
Dunnock	14	2	Green	-
Fieldfare	9	150	Green	-
Goldcrest	2	2	Amber	Breeding
Goldfinch	6	25	Green	-
Great Tit	6	2	Green	-
Greenfinch	4	30	Amber	Breeding
Grey Heron	1	1	Green	-
Hooded Crow	20	40	Green	-
House Martin	1	6	Amber	Breeding
House Sparrow	2	7	Amber	Breeding
Jackdaw	13	80	Green	-
Jay	5	3	Green	-
Lesser Redpoll	2	5	Green	-
Linnet	4	4	Amber	Breeding
Long-tailed Tit	5	9	Green	-
Magpie	3	2	Green	-
Meadow Pipit	12	10	Red	Breeding
Mistle Thrush	4	7	Green	-
Pheasant	1	1	Green	-
Pied Wagtail	13	4	Green	-
Raven	4	3	Green	-
Redwing	6	50	Red	Wintering
Reed Bunting	2	18	Green	-
Robin	24	20	Green	-
Rook	18	100	Green	-
Sky Lark	3	2	Green	-
Song Thrush	9	3	Green	-
Starling	21	500	Amber	Breeding
Stonechat	5	2	Green	-
Tree Sparrow	1	4	Amber	Breeding
Winter Wren	16	8	Green	-
Wood Pigeon	26	150	Green	-
Yellow Wagtail	1	2	Green	-

6.3.5.6.2 Winter Season Surveys

To determine which species are breeding within the site, combined surveys were conducted, including preliminary barn owl assessment, a nighttime thermal survey and several breeding walkover surveys (O' Brien and Smith). Summaries are provided below with full results in Appendix 6.2.

Three wintering transect surveys were conducted in December and two in January; these surveys are of benefit to discover species not obvious during VP surveys. Table 6.6 below provides a summary of birds found during these transect surveys, including the number of times the species was observed and the largest flock observed at once. All Transect Points were recorded within the site outline.

Table 6.6 Summary of Vantage 'Species of interest' Results

Species	No. of observations	Max no. observed	BoCCI4	Season for BOCCI4 designation
Buzzard	16	2	Green	N/A
Golden Plover	5	262	Red	Breeding/Wintering
Little Grebe	1	1	Green	N/A
Meadow Pipit	29	16	Red	Breeding
Mute Swan	3	2	Amber	Breeding/Wintering
Northern Pintail	1	2	Green	N/A
Redwing	8	22	Red	Wintering
Snipe	14	42	Red	Breeding/Wintering
Yellowhammer	33	8	Red	Breeding

Table 6.7 Summary of Vantage Non-Target Transect Results

Species	No. of observations	Max no. observed	BoCCI4	Season for BOCCI4 designation
Blackbird	142	5	Green	N/A
Blue Tit	21	2	Green	N/A
Bullfinch	3	2	Green	N/A
Chaffinch	80	9	Green	N/A
Dunnock	30	5	Green	N/A
Fieldfare	17	100	Green	N/A
Goldfinch	3	3	Green	N/A
Great Tit	7	6	Green	N/A
Hooded Crow	3	1	Green	N/A
Jackdaw	10	4	Green	N/A
Jay	17	18	Green	N/A
Lesser Redpoll	3	2	Green	N/A
Long-tailed Tit	1	2	Green	N/A
Magpie	1	1	Green	N/A
Mistle Thrush	5	7	Green	N/A
Pheasant	5	3	Green	N/A
Pied Wagtail	25	7	Green	N/A
Robin	3	4	Green	N/A
Rook	18	3	Green	N/A
Sky Lark	2	3	Green	N/A
Starling	51	2	Amber	Breeding

Species	No. of observations	Max no. observed	BoCCI4	Season for BOCCI4 designation
Stonechat	14	71	Green	N/A
Tree Sparrow	3	1	Amber	Breeding
Winter Wren	1	4	Green	N/A
Wood Pigeon	1	1	Green	N/A

6.3.5.6.3 Breeding Season Surveys

To determine which species are breeding within the site, combined surveys were conducted, including preliminary barn owl assessment, a nighttime thermal survey and several breeding walkover surveys (O' Brien and Smith).

Table 6.8 Summary of Breeding Season Species of Interest Results

Species	No. of observations	Max no. observed	BoCCI4	Season for BOCCI4 designation	Confirmed Breeding?
Barn owl	1	2	Red	Breeding	Yes
Buzzard	8	1	Green	N/A	No
Goldcrest	11	1	Amber	Breeding	No
Golden Plover	1	1	Red	Breeding/Wintering	No
Great Black-backed Gull	1	1	Green	N/A	No
House Martin	5	6	Amber	Breeding	No
Little Grebe	2	3	Green	N/A	No
Mallard	1	2	Amber	Breeding/Wintering	No
Meadow Pipit	65	11	Red	Breeding	Yes
Mute Swan	2	2	Amber	Breeding/Wintering	No
Northern Lapwing	2	1	Green	N/A	No
Snipe	1	1	Red	Breeding/Wintering	No
Teal	2	2	Amber	Breeding/Wintering	No
Willow Warbler	16	1	Amber	Breeding	No
Yellowhammer	64	3	Red	Breeding	No

Table 6.9 Summary of Breeding Season Non-Target Results

Species	No. of observations	Max no. observed	BoCCI4	Season for BOCCI4 designation	Confirmed Breeding?
Blackbird	218	4	0	0	Yes
Blackcap	87	2	0	0	No
Blue Tit	30	2	0	0	No
Bullfinch	1	1	0	0	No
Chaffinch	248	3	0	0	Yes
Chiffchaff	15	1	0	0	No
Dunnock	43	2	0	0	Yes
Goldfinch	34	8	0	0	No
Great Tit	15	2	0	0	Yes
Greenfinch	10	2	Amber	Breeding	No

Species	No. of observations	Max no. observed	BoCCI4	Season for BOCCI4 designation	Confirmed Breeding?
Hooded Crow	3	2	0	0	No
Jackdaw	11	7	0	0	No
Linnet	33	7	Amber	Breeding	Yes
Long-tailed Tit	3	2	0	0	No
Magpie	3	2	0	0	Yes
Mistle Thrush	17	2	0	0	No
Moorhen	1	1	0	0	No
Pheasant	2	1	0	0	No
Pied Wagtail	8	2	0	0	No
Raven	11	4	0	0	No
Reed Bunting	2	1	0	0	No
Robin	128	2	0	0	Yes
Rook	5	6	0	0	No
Sky Lark	20	2	0	0	No
Song Thrush	56	2	0	0	
Starling	28	12	Amber	Breeding	Yes
Tree Sparrow	25	4	Amber	Breeding	Yes
Winter Wren	205	1	0	0	No
Wood Pigeon	42	7	0	0	No

6.3.5.6.4 Nighttime Thermal Surveys

Thermal Surveys were conducted in order to assess the use of the site by wintering wader species, particularly Golden Plover. Most commonly found species during these surveys was snipe, with 39 Observations of Snipe during nighttime surveys, mostly in Section 4 of the site to the North.

Table 6.10 Summary of Thermal Survey Results

Species	No. of observations	Max no. observed	BoCCI4	Season for BOCCI4 designation
Golden Plover	3	2	Red	Breeding/Wintering
Meadow Pipit	1	5	Red	Breeding
Snipe	39	16	Red	Breeding/Wintering
Song Thrush	1	3	Green	N/A
Woodcock	3	2	Red	Breeding

6.3.5.6.5 Hinterland Surveys

Hinterland surveys were conducted monthly, in order to examine the connectivity of the subject site to the surrounding lands. Areas of high ornithological value were established through a desktop study followed by ground truthing. February's hinterland survey consisted of the assessment of Golden Plover Habitat with a 5km area based on the results

of this desktop study. Surveys were conducted in lands thought to have high potential for species of interest, Golden Plover, Whooper Swan, Snipe and Woodcock. During the surveys, Golden Plover, Whooper Swan, Curlew, Northern Lapwing and Tufted Duck were found to be using lands to the south of the site.

The majority of Hinterland activity surrounding the site was located in the wetlands to the south of site, where multiple water bird species were observed interacting with these lands, including Tufted Duck, Mallard, Whooper Swan and Mute Swan.

Lapwing were discovered adjacent to these lands, with observations of birds using the quarry lake, located just to the Southwest of the site. Territorial Behaviour was indicative of a breeding pair of Lapwing. Larger flocks of Lapwing were observed further South of the quarry, reaching a maximum size of 235 individuals.

An Area to the East of Section 1, the westernmost section of the site, is labelled as "Construction Area" below in Figure 6.3, this is the location of the construction works being conducted ancillary to the construction of the main substation for this site and is no longer suitable habitat for species of interest in this site and was disregarded in the transect surveys conducted.

Please refer to Appendix 6.2 for Bird Survey Report.

6.3.6 HABITAT EVALUATION

The ecological value of the site was assessed following the guidelines set out in the Institute of Ecology and Environmental Management's Guidelines for Ecological Impact Assessment (2019) and according to the Natura Scheme for evaluating ecological sites (after Nairn & Fossitt, 2004). Additionally, the TII Guidelines (formerly NRA) for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009) outlines the methodology for evaluating ecological impacts Judgements on the evaluation were made using geographic frames of reference, e.g. European, National, Regional or Local, see Table 6.11 below.

Due cognisance of features of the landscape which are of major importance for wild flora and fauna, such as those with a *"stepping stone"* and ecological corridors function, as referenced in Article 10 of the Habitats Directive were considered in this assessment.