Environmental Impact Assessment Report

KILLALA DATA CENTRE DEVELOPMENT

MULLAFARRY AND TAWNAGHMORE UPPER, KILLALA, CO. MAYO

Volume 2 - EIA Report Main Chapters

Prepared by: AWN Consulting, November 2024

Prepared for: Mayo Data Hub Limited

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INTRODUCTION

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1.0 INTRODUCTION TO THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1.1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared in respect of the Proposed Development which comprises a Data Centre facility development, and ancillary services. The applicant for the Proposed Development is Mayo Data Hub Limited (hereinafter referred as 'the Applicant').

The Proposed Development is c. 10.58 hectares and is located c. 1.8 km south of the town of Killala, to the west of the Ballina/Killala Road (R314). Killala is located c. 9km to the north of Ballina, c. 46km west of Sligo town, and c. 39km north of Castlebar. The site is located in the townlands of Mullafarry and Tawnaghmore Upper, Killala, Co. Mayo. The site borders the Killala Industrial Estate, immediately south west of the Tawnaghmore Power station and west of the 110 kV substation. Figure 1.1 presents the site location.

In this chapter of the EIAR, the Proposed Development is introduced, the Environmental Impact Assessment (EIA) process is summarised, and it provides an overview of the methodology used for preparing the EIAR. Details of the competency of the EIAR authors, the consultation undertaken, as well as details of any additional environmental related reports and/or assessments that are required under Legalisation or EU Directives other than the EIA Directive (Directive 2011/92/EU as amended by 2014/52/EU) are herein outlined.

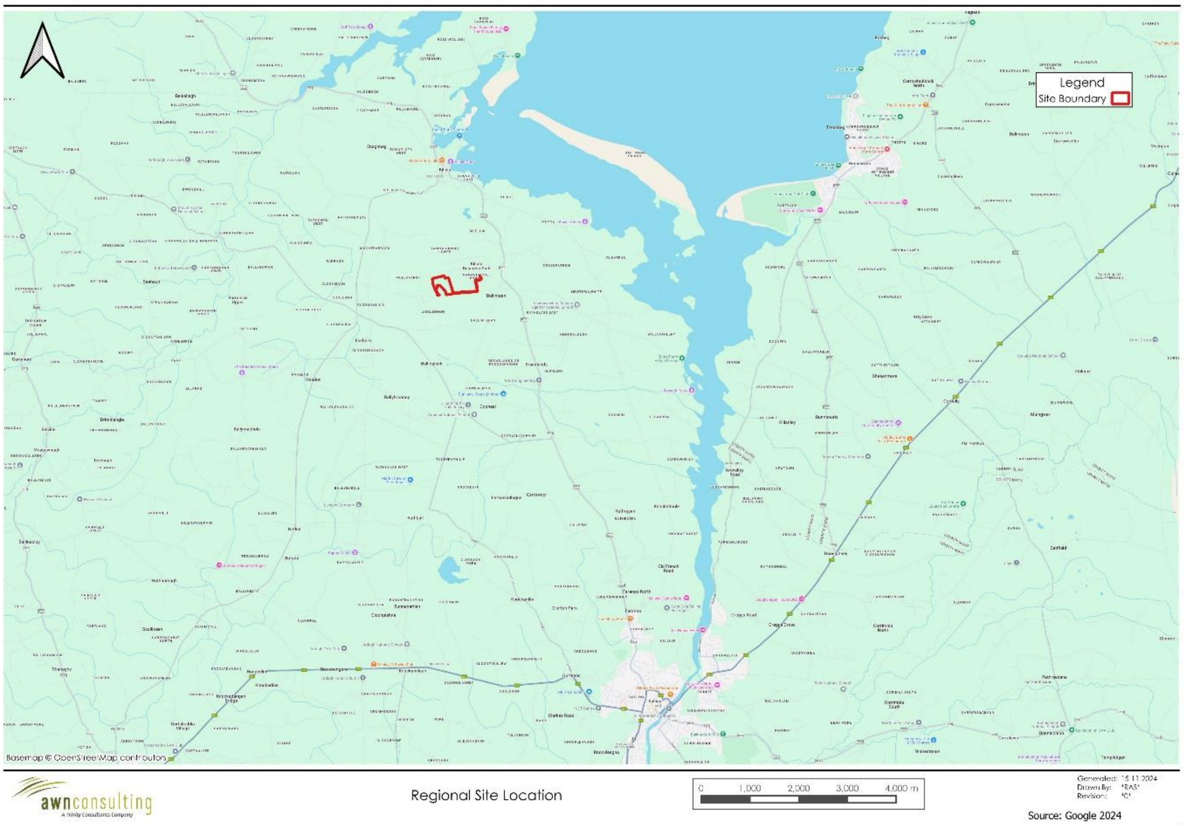

Figure 1.1 *Regional Site Location*

The Proposed Development is predominantly located within green field lands adjacent to the Killala Industrial Estate. The Planning Report prepared by John Spain Associates (JSA) sets out the planning history of the site and identifies how the Proposed Development accords with the policies and objectives of the Mayo County Development Plan 2022 - 2028. Where relevant, accordance with specific objectives is discussed within individual chapters of the EIAR.

A detailed description of the Proposed Development and the development site context is presented in Chapter 2 (Description of the Proposed Development).

1.2 RELEVANT LEGISLATIVE REQUIREMENT FOR ENVIRONMENTAL IMPACT ASSESSMENT

EIA is an essential tool in the implementation of EU environmental legislation. According to the Guidelines for Planning Authorities and An Bord Pleanála (ABP) on carrying out Environmental Impact Assessment (August 2018) the objective of the Directive 2011/92/EU as amended by 2014/52/EU (‘the EIA Directive'), is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for EIA, prior to development consent being given, of public and private developments that are likely to have significant effects on the environment. The requirement for EIAR is set out in the EIA Directive (Directive 2011/92/EU as amended by 2014/52/EU); the EIA Directives have been transposed into existing Irish planning consent procedures i.e., the *Planning and Development Act 2000 as amended* (the Act) and *Planning and Development Regulations, 2001 as amended* (the Regulations).

The process involves the preparation of an EIAR by the applicant. This report is then subjected to review by the competent authority, who will also consult with the public and the relevant prescribed bodies. The competent authority will consider the EIAR as well as any other pertinent information before arriving at a reasoned conclusion regarding the probable significant effects of the Proposed Development on the environment.

The EIA Directive lists projects for which an EIA is mandatory (Annex I) and those projects for which an EIA may be required (Annex II) of the EIA Directive (2011/92/EU and 2014/52/EU), these Annex are transposed into Schedule 5 of the *Planning and Development Regulations 2001 as amended*. The EU Member States can choose to apply thresholds for Annex II projects or use a case-by-case examination, or a combination of both, to assess where EIA is required. In Ireland, a combination of both has been applied.

Ireland’s type of projects for which an EIA is mandatory is set out in the Schedule 5 Part 1 and Part 2 of the Regulations. The EPA Guidance (2022) requires an assessment beyond the general description of the project and to consider the component parts of the project and/or any processes arising from it. In considering the wider context and the component parts of the Proposed Development AWN have identified the thresholds of relevance to the proposal from Part 2 of Schedule 5; outlined in Table 1.1.

Table 1.1 *Relevant Part 2 Schedule 5 Thresholds for EIA and determination of requirement of EIA*

Development for the Purposes of:	Related Development Details	Exceeds Threshold?
10. Infrastructure projects (a) Industrial estate development projects, where the area would exceed 15 hectares.	The Proposed Development site is c.10.58 hectares. The Proposed Development site is not equal to nor does it exceed the limit, quantity or threshold set out in Class 10(a); therefore, an EIA is not mandatory under this Project Class.	No – EIA is not mandatory under this class.
15. Any project listed in this Part which does not exceed a quantity, area or other limit specified in this Part in respect of the relevant class of development but which would be likely to have significant effects on the environment, having regard to the criteria set out in Schedule 7.	The Proposed Development has the potential for significant effects on the environment, having regard to the criteria set out in Schedule 7.	The nature, size and location of the Proposed Development has been reviewed informally buy AWN against the criteria as set out in Schedule 7 and Schedule 7A. It is AWNs view that it is appropriate to carry out EIA on the basis that, following a preliminary examination of the nature, size and location of the Proposed Development, there is doubt in regard to the likelihood of significant effects on the environment arising from the Proposed Development due to the proximity to ecologically sensitive sites (Killala Bay), and due to the location of the development and potential for significant cumulative effects

1.2.1 Relevant Legislation, Policy, And Guidelines

This EIA Report has been prepared in accordance with the most relevant guidance and legalisation, including the following:

- EIA Directive (2011/92/EU) as amended by EIA Directive (2014/52/EU)
- Planning and Development Act 2000 (as amended)
- Planning and Development Regulations 2001 (as amended)
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (Department of Housing, Planning and Local Government, 2018)
- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022)
- *European Commission,* Environmental Impact Assessment of Projects Guidance on Scoping (Directive 2011/92/EU as amended) (European Commission, 2017)
- *European Commission,* Environmental Impact Assessment of Projects Guidance on Screening (Directive 2011/92/EU as amended) (European Commission, 2017)
- *Guidance on the preparation of the Environmental Impact Assessment Report* (European Commission, 2017)

1.3 FORMAT OF THE EIA REPORT

This EIAR has been laid out using the grouped format structure, the report examines each environmental factor in a separate chapter (the chapters are listed in Table 1.2. These EIAR chapters have been prepared by suitably qualified expert(s) and have considered the construction and operational phases of the Proposed Development under the following headings:

- Assessment Methodology;
- Receiving Environment;
- Characteristics of the Proposed Development;
- Potential Impacts of the Proposed Development;
- Mitigation Measures;
- Monitoring or Reinstatement Measures;
- Residual Effects of the Proposed Development; and
- Cumulative Impacts of the Proposed Development

While the EIAR has the focus on the Proposed Development, each specialist chapters also considers the potential cumulative impact (as far as practically possible) of the Proposed Development with the any future development and the cumulative impacts with developments in the locality (including planned and permitted developments).

1.3.1 EIA Scoping and Consultation Processes

The scope of the EIAR has been defined at an early stage of the design process, the scoping process involves defining the scope of the EIAR early on in the design process to ensure that all relevant environmental issues are addressed in the subsequent studies.

To establish the scope, a comprehensive review of the development site's context, including its locality and any previously permitted developments, is undertaken. This review helps identify the specific matters that need to be covered within the environmental impact assessment. By identifying and addressing these issues upfront, the EIAR aims to provide a comprehensive understanding of the potential environmental impacts associated with the Proposed Development.

The structure and presentation of the EIAR is designed to facilitate the dissemination of information to the public and stakeholders. The EIAR is structured in a clear and accessible manner, allowing easy navigation through its content. Additionally, a non-technical summary is provided, which presents a concise overview of the report's main findings and conclusions. The presentation of the information is done in a way that is understandable to both technical experts and non-experts, enabling a wider audience to grasp the key findings and implications of the assessment.

Public participation in the Environmental Impact Assessment (EIA) process is facilitated through the statutory planning application process. As part of this process, the EIAR is made available to the public, allowing interested individuals and organizations to review and comment on the report. This provides an opportunity for public input, ensuring that a wide range of perspectives are considered before making decisions regarding the Proposed Development.

To further enable public access to the EIAR, information about the report is also made available through the Department of Housing, Planning, and Local Government's EIA Portal. This portal serves as a centralised platform that can be accessed by the public, stakeholders, and regulatory authorities. By utilising this portal alongside the Mayo County Council online planning systems, broader public participation and scrutiny, as well as transparency and accountability in the EIA process is enabled.

Ensuring public awareness and involvement is a core objective of the EIAR process in Ireland. By disseminating the information contained in the EIAR, the aim is to make the public and local community aware of the likely environmental impacts of the proposed project prior to the granting of consent. This empowers the public to participate meaningfully in the decision-making process and voice their concerns or provide feedback.

The scoping and consultation are essential components of the EIAR process. The early definition of the EIAR scope ensures that all pertinent environmental issues are addressed, while the structure and presentation of the report, along with the provision of a non-technical summary, facilitates the dissemination of information. Public participation is actively encouraged through the statutory planning application process and the Department's EIA Portal, aiming to ensure that the public and local community are informed and have a voice in the decision-making process regarding Proposed Developments.

1.3.2 Contributors to the EIA Report

The preparation and co-ordination of this EIAR has been completed by AWN Consulting in conjunction with experienced subject matter experts. Each environmental specialist of the applicants project team was commissioned having regard to their previous experience in EIA; their knowledge of relevant environmental legislation relevant to their topic; familiarity with the relevant standards and criteria for evaluation relevant to their topic; ability to interpret the specialised documentation of the construction sector and to understand and anticipate how their topic will be affected during construction and operation phases of development; ability to arrive at practicable and reliable measure to mitigate or avoid adverse environmental impacts; and to clearly and comprehensively present their findings.

Table 1.2 below outlines the specific responsibilities of each author(s) and their corresponding EIAR chapter(s). Further information regarding the qualifications and relevant experience of the EIAR team can be found below the table.

Table 1.2 Roles and Responsibilities in the EIA Report

EIA Chapter No.	Chapter Title	Company and Consultant
	Non-Technical Summary	AWN; Input from each specialist
Chapter 1	Introduction	AWN; Harry Reynolds and Teri Hayes
Chapter 2	Description of the Proposed Development	AWN; Harry Reynolds and Teri Hayes
Chapter 3	Alternatives	AWN; Sarah Robertson
Chapter 4	Population and Human Health	AWN; Tara Lee and Teri Hayes
Chapter 5	Land, Soils, Geology and Hydrogeology	AWN; Alan Wilson and Teri Hayes
Chapter 6	Hydrology	AWN; Alan Wilson and Teri Hayes
Chapter 7	Biodiversity (including AA Screening Report)	Moore Group; Ger O'Donohoe
Chapter 8	Air Quality	AWN; Jovanna Arndt
Chapter 9	Climate	AWN; Edward Porter
Chapter 10	Noise & Vibration	AWN; Mike Simms
Chapter 11	Landscape and Visual	Modelworks; David Bolt and Richard Butler
Chapter 12	Archaeological, Architectural and Cultural Heritage	CRDS; Stephen Mandal
Chapter 13	Material Asset - Traffic and Transportation	CSEA; Carol Diaz
Chapter 14	Material Asset - Utilities	AWN; Tara Lee and Teri Hayes
Chapter 15	Material Asset - Waste Management	AWN; Laura Barry and Chonaill Bradley
Chapter 16	Interactions- Interrelationship between the Aspects	AWN; Input from each specialist

EIA Project Team Qualifications and Relevant Experience

Project Director/EIA Co-ordinator/Selected Chapters

Teri Hayes, BSc MSc PGeo Ad Dip Env & Planning. Teri is a member and former president of the International Association of Hydrogeologists (Irish Group) and a professional Member of the Institute of Geologists. Teri is a director with AWN Consulting with 30 years of experience in water resource management and environmental assessment and remediation. Teri has contributed to numerous environmental impact assessments and design of appropriate mitigation measures, acted as an expert witness at public hearings, lectured in EIA and providing expert advice on EIA sections for planning authorities. She has qualified for the register of "competent person" for contaminated land assessment as required by the EPA under the Institute of Geologists of Ireland an d has completed a Diploma in Environmental and planning law.

Introduction and Description of the Proposed Development

Teri Hayes & Harry Reynolds. Harry is an Environmental Consultant in AWN Consulting with ongoing roles within the water department. Harry has a BSc (Hons) in Environmental Science from Atlantic Technological University, Sligo. In 2022, he won the Academic Excellence award for the highest overall marks in his department, and the ESAI Undergraduate of the year award for his thesis. Harry has worked on a range of large scale projects involving EIA screening, EIA reports, SEA reports, baseline studies, GIS mapping and groundwater and surface water monitoring on various operational developments and greenfield sites. Harry now works on projects involving EIA Reports and EIA screening for a range of developments.

Alternatives

Sarah Robertson. Sarah is a Senior Environmental Consultant in AWN Consulting with responsibility for IED licence applications, GMM and DAFM ABP certificates. She also provides EIAR management and specialist input to EIAR chapters. Sarah has over ten years experience working in the environmental field in impact assessment, EIAR management, environmental masterplans, urban planning, waste management, specialist ecological surveys, AA screening and Natura Impact Statements. Sarah holds a BA. Hons (mod Science), MSc. and a Diploma in Environmental Engineering, and has worked in Ireland, the UK, and the USA.

Population and Human Health and Material Assets - Utilities

Tara Lee. Tara is a Senior Environmental Consultant with AWN, with over 7 years' experience working in the regulatory reporting and compliance field. Tara holds a MSc in Environmental Sciences from Trinity College Dublin and a BSc in Environmental Sciences and Alternative Energies from Keystone College of Pennsylvania. Tara has a wide range of experience including dealing with environmental compliance issues, WEEE and packaging regulations, and regulatory reporting. Tara now works on projects involving EIA Reports, EIA screening and EPA licence applications for a range of developments.

Land, Soils, Geology, Hydrogeology, and Hydrology

Teri Hayes & Alan Wilson. Alan Wilson is an Environmental Consultant at AWN. Alan holds a BSc Honours in Environmental Management in Agriculture/ Environmental and Geographical Sciences. Alan has worked on a range of large scale projects involving EIA reports, site specific flood risk assessments, baseline studies, hydrological and hydrogeological risk assessments, environmental due diligences, site investigations and groundwater and surface water monitoring on various operational developments and greenfield and brownfield sites. Alan has over 3 years' experience as an Environmental Consultant including roles in Ecology and Forestry related work. Alan is a member of the International Association of Hydrogeologists (IAH).

Biodiversity

Ger O'Donohoe. Ger is a Consultant Ecologist with Moore Group. Ger graduated from GMIT in 1993 with a B.Sc. in Applied Freshwater and Marine Biology and completed an M.Sc. in Environmental Sciences, graduating from TCD in 1999. Ger has over 20 years of experience as an environmental consultant with experience in the planning and management of numerous complex Environmental Impact Assessments for large scale developments nationwide. He has wide ranging experience as an expert witness at public hearings.

Air Quality

Dr. Jovanna Arndt is a Senior Environmental Consultant in the Air Quality section of AWN Consulting. She holds a BSc (Hons) in Environmental Science from University College Cork and completed a PhD in Atmospheric Chemistry at University College Cork in 2016. She is a Member of the Institute of Air Quality Management and specialises in assessing transportation impacts on air quality using dispersion modelling and source apportionment of particulate matter. Jovanna has been involved in assessing air quality impacts from major Highways England road schemes, Clean Air Zones and major rail infrastructure in the form of HS2. She has also provided Air Quality Action Plan (AQAP) and Air Quality Management Area (AQMA) support to several UK councils.

Climate

Dr Edward Porter Dr Edward Porter is a Director with responsibility for Air Quality with AWN Consulting. He holds a BSc from the University of Sussex (Chemistry), has completed a PhD in Environmental Chemistry (Air Quality) in UCD where he graduated in 1997 and is a Full Member of the Royal Society of Chemistry (MRSC CChem), the Institute of Environmental Sciences (MIEnvSc) and the Institute of Air Quality Management (MIAQM). He specialises in the fields of air quality, EIA and air dispersion modelling.

Noise and Vibration

Mike Simms. Mike (Principal Acoustic Consultant) holds a BE and MEngSc in Mechanical Engineering and is a member of the Institute of Acoustics and of the Institution of Engineering and Technology. Mike has worked in the field of acoustics for more than 20 years. He has extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, energy, industrial, commercial and residential.

Landscape and Visual Impact Assessment

Richard Butler (BL Arch, MSc, MILI MIPI). Richard is the LVIA director of Model Works Ltd and has degrees in Landscape Architecture and Town Planning and is a member of the Irish Landscape Institute and Irish Planning Institute. He has over 20 years' experience in development and environmental planning, specialising in Landscape and Visual Impact Assessment (LVIA).

Archaeological, Architectural and Cultural Heritage

Dr Stephen Mandal holds an honours degree in Science (Geology) from Trinity College Dublin (1991) and a PhD in Geoarchaeology, also from Trinity College Dublin (1995). Following two years as a post-doctoral researcher in University College Dublin, he founded CRDS Ltd (established in 1997; incorporated in 1999), archaeological, cultural and architectural heritage consultants. As one of Ireland's leading heritage consultancies for almost 25 years, CRDS has employed over 600 archaeologists, undertaken some of the largest and most significant archaeological excavations throughout Ireland, and has won numerous national and international awards. He has overseen the writing of the Archaeology, Architectural and Cultural Heritage Chapters of in excess of 100 EIARs dating from 1997 to present. This experience covers the island a wide range of development types including small scale developments close to culturally sensitive sites, large scale developments and liner developments including roads, ESBI power lines, railways and cycle paths.

Traffic and Transportation

Carol Diaz. Carol is a Transportation Engineer with CSEA with over 5 years of experience in the Traffic and Transport field. Carol holds MSc. Transport Planning & Modelling, BEng. She has been involved in a variety of transportation projects in the private and public sector involving Transport planning, Transport modelling, Data

Analysis, Traffic and Transport assessments and Traffic Impact Assessment, Sustainable mobility planning, Route Options, Report writing, Junction design, Visibility splay assessment and Tendering and procurement of traffic counts. In addition to that, Carol has undertaken junction analysis using modelling software such as LinSing3, ARCADY, PICACY, Vissim, and Visum.

Material Assets - Waste Management

Chonaill Bradley. Chonaill Bradley (BSc ENV AssocCIWM) of AWN Consulting. Chonaill Bradley is a Principal Environmental Consultant in the Environment Team at AWN. He holds a BSc in Environmental Science from Griffith University, Australia. He is an Associate Member of the Institute of Waste Management (AssocCIWM). Chonaill has over seven years' experience in the environmental consultancy sector and specialises in waste management.

Laura Berry is an Environmental Consultant with AWN Consulting with ongoing roles within the waste department. Laura has a BSc (Hons.) in Environmental Management from Technological University Dublin. She has completed Resource and Waste Management plans, Operational Waste Management Plans and Waste License Compliance and Waste Permit Applications.

1.4 DESCRIPTION OF EFFECTS

The quality, magnitude and duration of potential effects are defined within each specialist chapter of this EIA in accordance with the criteria provided in the EPA *'Guidelines on the* information to be contained in Environmental Impact Assessment Reports' (2022) as outlined in Table 1.3.

Table 1.3 Description of Effects as per EPA Guidelines (2022)

Effect Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	A change which does not affect the quality of the environment
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An impact capable of measurement but without noticeable consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging trends
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
	Profound	An impact which obliterates sensitive characteristics
Duration of Effects	Momentary Effects	Effects lasting from seconds to minutes
	Brief Effects	Effects lasting less than a day

Effect Characteristic	Term	Description
	Temporary Effects	Effects lasting less than a year
	Short-term Effects	Effects lasting one to seven years.
	Medium-term Effects	Effects lasting seven to fifteen years
	Long-term Effects	Effects lasting fifteen to sixty years
	Permanent Effects	Effects lasting over sixty years
	Reversible Effects	Effects that can be undone, for example through remediation or restoration
Probability of Effects	Likely Effects	The effects that can reasonably be expected to occur as a result of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Type of Effects[1]	Indirect Effects	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do Nothing'	The environment as it would be in the future should no development of any kind be carried out
	`Worst case' Effects	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant impact is of greater significance than the sum of its constituents

1.5 ADDITIONAL ASSESSMENTS REQUIRED

The additional reports and/or assessments required under Legalisation or EU Directives other than the EIA Directive in respect of the Proposed Development are described in this section.

[1] For the purposes of facilitating the Competent Authority in conducting Environmental Impact Assessment as defined by Annex 1 of the EU Directive, the terms "imperceptible effects", "not significant effects", "Slight effects", and "moderate effects" used within this report, while exhibiting varying degrees of impact, are all considered to be without significant consequence.

1.5.1 Habitats Directive (Directive 92/43/EEC) and Birds Directive (Directive 2009/147/EC)

The main EU legislation for conserving biodiversity is the Directive 2009/147//EC of the European Parliament and of the Council of November 2009 on the conservation of wild birds (Birds Directive); and the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).

The Habitats Directive is the cornerstone of habitats and species protection in Ireland. The Habitats Directive (92/43/EEC) and the associated Birds Directive (2009/147/EC) are transposed into Irish legislation by Part XAB of the 2000 Act and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) as amended.

The environmental sensitivity of the Proposed Development site in respect of Natura 2000 sites designated pursuant to the Habitats Directive and the Birds Directive been considered with reference to the application Appropriate Assessment Screening, which comprises an initial impact assessment of a project; examining the direct and indirect impacts that it might have on its own or in combination with other plans and projects, on one or more Natura 2000 sites in view of the sites' conservation objectives.

The AA Screening and NIS has been prepared for the Proposed Development by Ger O'Donohoe of Moore Group and is included with the planning application (Chapter 7 – Appendix 7.1).

1.5.2 Water Framework Directive

The Water Framework Directive (WFD) 2000/60/EC aims to protect and enhance the quality of the water environment (both surface water and groundwater) across all European Union member states. The WFD requires all EU member states to classify the current condition or 'status or potential' of surface and groundwater bodies and to set a series of objectives for maintaining or improving conditions so that water bodies maintain or reach 'good status or potential' during the next river basin management planning cycle. Environmental Protection Agency (EPA) and other stakeholders such as planning authorities are the competent authority for implementing the WFD in Ireland. As part of their role, these authorities must consider whether proposals for new developments (other than where exemptions apply) have the potential to:

- Cause a deterioration of a water body from its current status or potential; and/ or
- Prevent future attainment of good status or potential where not already achieved.

As a result, new developments that have the potential to impact on current or predicted WFD status are required to determine whether the project will cause a deterioration of the status of the body of surface water or if it would jeopardise the attainment of good surface water status, having regard to the existing status of the water body as designated in accordance with the Directive.

A WFD Assessment has been undertaken for the Proposed Development, the results of which are presented in Appendix 6.3 of Chapter 6 (Hydrology).

1.5.3 Industrial Emissions Directive

The Industrial Emissions Directive 2010/75/EU was transposed into Irish law by under the European Union (Industrial Emissions) Regulations 2013, S.I. 138 of 2013.

The Regulations primarily amend the Environmental Protection Agency (EPA) Act 1992 (as amended) to introduce a system of licensable activities. The First Schedule of EPA Act 1992 lists the activities that are licensable.

An Industrials Emissions Directive ("IED") licence application is required for the Proposed Development under Class 2.1 “Combustion of fuels in installations with a total rated thermal input of 50 MW or more.”

1.5.4 Greenhouse Gas Emissions Regulations

The Proposed Development will require an EPA Greenhouse Gas (GHG) Emissions permit in accordance with the EPA Act 1992, as amended. The application will be submitted by the Operator prior to commencement of the scheduled activity and meets the requirements of the Climate Action and Low Carbon Development (Amendment) Act 2021 and the obligation imposed on An Bord Pleanála and local authorities (in Section 17) to "*in so far as practicable, perform its functions in a manner consistent with —*

(a) the most recent approved climate action plan,

(b) the most recent approved national long term climate action strategy,

(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,

(d) the furtherance of the national climate objective, and

(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State.”

1.5.5 Seveso Directive / COMAH Regulations

The Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU) was developed by the EU after a series of catastrophic accidents involving major industrial sites and dangerous substances. Such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the “COMAH Regulations”), implement the latest Seveso III Directive (2012/18/EU).

The purpose of the COMAH Regulations is to transpose the Seveso Directive into Irish law and lay down rules for the prevention of major accidents involving dangerous substances, and to seek to limit as far as possible the consequences for human health and the environment of such accidents, with the overall objective of providing a high level of protection in a consistent and effective manner.

The Proposed Development will not be a Seveso/COMAH facility. The only substance stored on site controlled under Seveso/COMAH will be diesel for back-up generators and the quantities proposed do not exceed the relevant thresholds of the Seveso Directive.

The Health and Safety Authority (HSA) register shows that the Proposed Development is not located within close proximity or within statutory consultation distances of any Notified Seveso Establishment. However, an adjacent development which has a current application for planning (Planning ref: 2360266) is noted by the Applicant as a Lower Tier Seveso site. The site is within the consultation distance outlined in the EIAR for this proposed development. This proposed development (not yet built) will likely be classed as a lower tier establishment. The data centre is expected to lie within the inner land use planning zone around the Seveso site but as the data centre is a workplace (level 1 development) under the HSA LUP guidance, and such a development is compatible with the inner LUP zone then the data centre is an appropriate development to be located in the vicinity of the nearby Seveso site. Refer to Chapter 4 (Population and Human Health) for more detail.

1.5.6 Energy and Sustainability Statement

The Energy Statement (Ethos 2024) provides an overview of the mechanical and electrical systems for the proposed Data Centre facilities and how, where appropriate, the development addresses the requirements set out in the building regulations, the government Statement on the Role of Data Centres in Ireland's Enterprise Strategy and the Mayo County Development Plan 2022 – 2028.

CHAPTER 02:

DESCRIPTION OF THE PROPOSED DEVELOPMENT

02

CHAPTER CONTENTS

2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 INTRODUCTION

The Proposed Development is located in the townlands of Mullafarry and Tawnaghmore Upper, Killala, Co. Mayo. The site borders the Killala Industrial Estate, immediately south west of the Tawnaghmore Power station and west of the 110 kV substation.

The Proposed Development comprises the construction of a single data centre building along with all associated and ancillary development. The development boundary also incorporates a new 110 kV substation which will form part of a separate SID application. The redline boundary extends along the Mullafarry road to the Uiscé Éireann (UÉ) wastewater treatment plant (WWTP).

This chapter presents the description of the Proposed Development comprising information on the site, design, size and other relevant features of the Proposed Development. The scope of this chapter aligns with the relevant legislation and guidance which comprises the following:

- EIA Directive (2011/92/EU), as amended by the 2014 EIA Directive (2014/52/EU) (herein referred to as the EIA Directive);
- European Commission 'Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report' (2017); and
- EPA 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (2022) (herein referred to the as the EPA EIA Report Guidelines 2022).

This guidance advises that description of the existence of the project should define all aspects of the proposed lifecycle of the facility, including:

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

This description is not exhaustive, and as such the EIA Report should be read in conjunction with full application package. The description of the Proposed Development is described in this chapter in terms of those environmental topics that will form the basis of the impact assessment process and the characteristics of the Proposed Development and potential effects. The specialist assessments reported in this EIA Report have been conducted using this description, and the full application package as a guide to the details of the development under consideration.

2.2 DESCRIPTION OF THE EXISTING DEVELOPMENT SITE

The Proposed Development main site is c. 10.58 hectares and is located c. 1.8 km south of the town of Killala, to the west of the R314, within the townlands of Mullafarry and Tawnaghmore Upper, Killala, Co. Mayo. Killala is located c. 9 km to the north of Ballina, c. 46 km west of Sligo town, and c. 39 km north of Castlebar. The below Figure 2.1 presents the lands subject to this application indicated by the red line boundary and surrounding land uses. The subject site comprises undeveloped greenfield lands with access from the south. The topography rises from south to north.

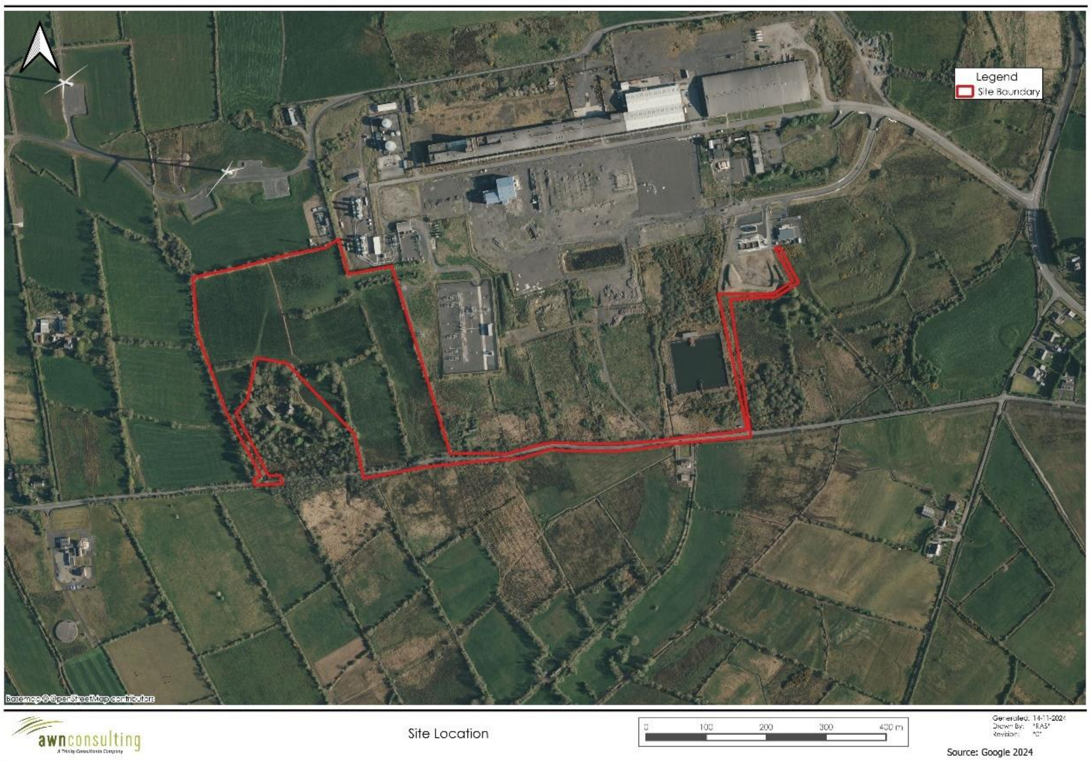

Figure 2.1 *Proposed Development Lands (indicative site boundary) (Source: Google Earth)*

2.2.1 Existing Land Use

The subject land is undeveloped greenfield land. The site has frontage with the Mullafarry road to the south. The perimeters of the site are generally formed by hedgerows which also form internal field boundaries. The surrounding area is primarily defined by agricultural uses to the west and south and industrial uses (including historical) to the north and east. There are residential dwellings to the west and east of the site along the local road.

To the south, the redline boundary excludes Ballysakeery Glebe House, a 19th century house and surrounding gardens (NIAH No 31302208).

Killala Business Park encompasses the former site of Asahi Chemical Works (manufactured synthetic fibres, ceased operating in 1997), Mayo Renewable Power Ltd (Biomass CHP) (IE Reg No. P1077-01) SSE Airtricity Electricity Peaking Plant (IE Reg No P0566-02), a 110kv Electricity Supply Board Networks (ESBN) owned substation, an Uisce Éireann (UÉ) wastewater treatment plant site (Killala, Licence No. D0067-01) and Killala Community Windfarm is located immediately north of the site. The site has ready access to the national grid.

Records from GNI indicate the presence of existing Aurora and Eir telecommunications cables in close proximity to the site. The site is also adjacent to the land fall of the AEConnect 1 Transatlantic Data Cable. AEConnect 1 is a transatlantic subsea fibre optic cable extending from Long Island, New York, to Killala, Mayo, positioning the West of Ireland as a potential key telecommunications and data gateway. The cable has the capacity to handle the entirety of existing European and American information and data traffic, with the potential to double this capacity in the coming years if needed. AEConnect 1 provides high-speed, low-latency connectivity to New York, Dublin, and London and is planned as the landing site for an additional cable connecting to Northern Norway. The landing point is adjacent to the nearby UÉ wastewater treatment plant to the east of the proposed development. The development of advanced technological infrastructure in the area presents a significant opportunity for the growth of ICT facilities, including data centres, and encourages other businesses to establish their operations locally.

To the west of the site there is a mix of residential dwellings, agricultural land, Mullafarry Presbyterian Church and graveyard along with two quarries (Killala Rock and Mullafarry Quarry). The south of the site is predominately agricultural land with a few lone residential dwellings located along the local road.

The Moyne stream c. 500m to the south east of the subject site and flows in a northeasterly direction into Killala Bay. The land is drained by an agricultural ditch which runs along the south perimeter of the site beside the Mullafarry road (local road). The drainage ditch flows in an easterly direction and connects to the Moyne Stream (c. 500m to the east of the site) which ultimately discharges into the Killala Bay/Moy Estuary SAC which is c. 3.8km downstream of the site.

The existing ground is characterised by a steep gradient, descending from the highest point at approximately 61.0 m along the northern boundary to the lowest point at around 42.0 m, resulting in a level change of nearly 20 m.

2.2.1.1 Current Planning Permission

A list of relevant planning permissions from the surrounding areas of the Proposed Development within the previous five years is shown in Appendix 2.1. Relevant local planning permissions are presented below. Where relevant each chapter has considered cumulative effects from current and permitted planning applications.

Table 2.1 *Selection of local planning permissions. Full listing in Appendix 2.1*

MCC Planning Ref.	Project ID	Decision Date
2360266 Constant Energy	Hydrogen Plant	Further Information requested on 21/08/2023 and Further Information received on 04/09/2024 (Pending Decision)
2360134 Mayo Renewables Ltd.	Tawnaghmore Power Station	Permitted 29/10/2024
2193 Lisglennon Ad Ltd.	Anaerobic Digestion Biogas Facility	Permitted 07/06/2022
21708 BP Mitchell Haulage & Plant Hire Ltd	Continued use and operation of existing quarry	Permitted 11/01/2022
21342 Mullafarry Quarry Ltd.	Filling of lands with Inert waste – Quarry Restoration	Permitted 22/11/2021

MCC Planning Ref.	Project ID	Decision Date
17619 Killala Community Windfarm	Wind Farm – Amendment to existing Windfarm	Permitted 11/01/2018
2193 Lisgennon anaerobic digestion biogas facility	anaerobic digestion biogas facility	Permitted 2014 – No commencement

Figure 2.2 *Local Planning Permissions. Source Google Mapping. Indicative site in red. Full listing in Appendix 2.1*

2.2.2 Proximity to Seveso and COMAH Sites

The potential for major accidents to occur at the facility has also been considered with reference to establishments registered with the Health and Safety Authority in accordance with the Control of Major Accident Hazards (COMAH) Regulations that implements the implements the Seveso III Directive.

There are no significant risks in relation to the proposed development and Major Accident Hazards. The site is not a Seveso facility. The nearest Seveso facility, European Refreshments, is located approximately 8.5 km southeast of the Proposed development on Killala Road in Balliana, Co. Mayo. This is classed as an upper tier establishment. No significant effects associated with major industrial accidents involving dangerous substances are anticipated based on distance.

The proposed Killala Hydrogen project is located to the immediate northeast of the Proposed Development (within the industrial estate) – it should be noted this facility is not built and as such is not notified to the HSA as a Seveso site. This proposed development (not yet built) will be likely to be classed as a “lower tier” establishment. The data centre is expected to lie within the inner land use planning zone around the Seveso site but as the data centre is a workplace (level 1 development) under the HSA Land Use Planning (LUP) guidance, such a development is compatible with the inner

LUP zone then the data centre is an appropriate development to be located in the vicinity of the nearby Seveso site.

2.2.3 Proximity to Industrial Emissions Licenced Facilities

Table 2.2 below shows the closest Integrated Pollution Control (IPC) and Industrial Emissions (IE) licensed facilities to the Proposed Development site according to the EPA (2024). Licensed facility, are required to comply with specific licence conditions, including monitoring and reporting on their emissions (such as emissions to air, water and soil), to ensure that they do not pose a risk to human health or the environment.

It is important to note that the proximity of a licensed facility does not necessarily mean that the Proposed Development will be impacted by their emissions. However, it is essential to consider these sites as part of the existing environment and to consider and understand the potential for cumulative impacts or other interactions with the Proposed Development at this location.

The closest permitted licensed facility is the Tawnaghmore Electricity Generating Plant 'SSE Generation Ireland Limited (Killala)' located adjacent to the site on the east.

Table 2.2 *EPA Licenced facilities nearby to the Proposed Development site*

Registration number	Name	Category	Licence type	Distance (km)
P0566-02	SSE Generation Ireland Limited (Killala) 4 gas Turbines	Industry	IE	<0.2km
P0958	Mayo Renewable Power Limited	Industry	IE	<0.2km
P1077-01	Mayo Renewable Power Limited – Biomass CHP	Industry	IE	0.20
W0067	Rathroeen Landfill	Industry	IE	4.40

2.2.4 Existing Site Utilities, Infrastructure and Access

Existing and planned utilities, infrastructure and access are fully described in Chapter 14 Material Assets (Utilities).

2.2.4.1 Existing Water and Wastewater Utilities

Records received from UÉ indicate that there is an existing 250mm uPVC watermain running through the subject site from north to south.

There is currently no foul sewer at the site. The closest UÉ WWTP, Killala WWTP (Licence Number: D0067-01) is located in the east section of Killala Business Park Killala WWTP serves as the municipal wastewater treatment plant for Killala village and environs.

The Proposed Development is located on undeveloped, agricultural land. Several man-made land drains and streams are present on the site and likely discharge to an unnamed stream which runs west to east along the southern boundary of the site before joining the Moyne stream.

2.2.4.2 Existing Power Supply

An existing MV (10KV/20KV) power line runs through the site from the site of the Old Rectory to the North of the site towards Glebe House. Two existing HV (110KV) overhead lines also run over the site from south of the site from Mullafarry Road.

An existing gas distribution network is located in Srahyconigaun exists approximately c. 25.5 km from the site of the Proposed Development.

2.2.4.3 Existing Telecommunications Infrastructure

There are existing Aurora and Eir telecoms cable in close proximity to the site. It is also noted that the site is adjacent to the landfall of the AEConnect Transatlantic Data Cable, providing high-speed connectivity and low latency rates to New York, Dublin and London, and is the planned landing site for an additional cable connecting to Northern Norway.

2.2.4.4 Existing Roads, Access, and Parking

The site is currently accessible via the Mullafarry road which connects to the R314 (Regional road). The R314 provides access to Killala town or south to access Ballina town. From Ballina town the N59 (National road) provides access to the N4 which leads north to Sligo town or south to Dublin.

2.3 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The Proposed Development site layout is shown in Figure 2.3 below and further described below. Details of the layout are presented in the planning drawings prepared by Henry J Lyons (HJL) and Clifton Scannell Emerson (CSEA). The landscape plan is provided by Kennedy Fitzpatrick Landscape Architecture (KFLA).

The Proposed Development as set out in the public notices consists of:

- The construction of a single data centre building located to the north of the site, with an overall gross floor area of c. 29,076 sq.m across two levels and an overall maximum height of c. 22.764m at parapet level.
- The data centre building includes data halls and associated electrical and mechanical plant rooms (c. 23,908 sq.m), an administrative and staff services block (c. 5,052 sq.m) and circulation and stairs (c. 116 sq.m).
- 2 no. external terraces are proposed to the east of the building (c. 309 sq.m) and an external generator yard to the south of the building (c. 5,205 sq.m) accommodating 25. no. backup / dispatchable generators and associated flues (to a height of c. 21.164m) within an enclosed compound.
- The construction of a sprinkler tank and pump house to the northeast of the site, the sprinkler tank is an overall height of c. 7.2 m and the pump house is a single storey building with an overall height of c. 4.15m and area GFA of c. 40.23 sq.m.
- The construction of an entrance hut at the main access to the south of the site, the hut is an overall height of c. 3.225m and area GFA of c. 11.6 sq.m.
- Construction of 2 no. site access points from the south and internal road network and circulation areas, footpaths, cyclist infrastructure, the provision of 56 no. car parking spaces (including 12 EV charging spaces and 7 disabled spaces, 3 of them EV), 20 no. cycle parking spaces, hard and soft landscaping and planting, site lighting, PV panels and plant at roof level, foul water

connection connecting to existing WWTP in Killala Business Park, boundary treatments, green walls and all associated and ancillary works including underground foul and storm water drainage network and utility cables and all ancillary works and services.

Figure 2.2 *Proposed Site Masterplan (Source:HJL KLL1-HJL-S0-ZZ-DR-A-D-0005)*

2.3.1 Proposed Data Centre

The proposed development comprises a single datacentre building towards the north of the site. The building will accommodate data halls, associated electrical and mechanical plant rooms, maintenance and storage space, ancillary office administration areas, with plant at roof level. The data centre will have a gross floor area (GFA) of c. c. 29,076 sq.m across two levels and an overall maximum height of c. 22.764 m at parapet level.

To the south of and adjacent to the main data centre building it is proposed to provide for 25 no. backup generators and associated flues (to a height of c. 21.164 m) within a fenced compound (generator yard).

The data centre equipment, including associated mechanical and electrical plant, which require power to maintain availability and the necessary environmental conditions. The data centre facility, once fully operational will have an IT load in the order of 40 MW which will require c. 50 MW average electrical power to operate. This power supply will be provided from the national grid with emergency and peaking ability available from HVO fuelled generators.

In the event of a loss of power supply i.e. temporary grid blackout, back-up generators will be provided to maintain power supply and provide emergency power if required.

The generators are designed to automatically activate and provide power pending restoration of mains power. There will be 75 MWe of generation which is approximately 210 MW thermal input. The development will require application for an IE licence as outlined in Chapter 1 (section 1.5.3).

The 25 no generators are located to the immediate south of the data centre building. Air modelling (Chapter 8 of the EIAR) has confirmed that the minimum stack of 21.164 m (less than the building height) is adequate for dispersion. The generators will be powered by HVO rather than diesel to minimise environmental impact.

The required HVO to operate the generators will be supplied by individual double lined tanks or ‘belly tanks’ (c. 36,000 litres) within the container at each generator. The generator yard for each building will be appropriately bunded, and storm drainage from the generator yard is drained through an oil interceptor to treat any accidental leaks. The loading bay is drained to foul sewer to minimise potential for any accidental leaks reaching surface water receptors. In addition, interceptors are located above and below the attenuation pond i.e. prior to stormwater discharging from the site.

The data centre equipment rooms and electrical rooms require a consistent temperature and humidity to operate. The cooling system within the data halls will be a closed loop water circulatory system with roof chillers forming the primary cooling solution. Closed loop water cooling systems reuses the cooling water, which minimises water usage (Overall water requirement is 0.047 l/s (peak) of which 0.04 (peak) is industrial).

Further detail on the suitability of design and operation is provided in the Energy and Sustainability Statement prepared by Ethos Engineering.

Figure 2.3 *Computer Generated Imagery of Proposed Data Centre*

2.3.1.1 Proposed Data Centre System Facility Processes

Data centre facilities are centralised locations for data centre equipment/systems on a large scale. At a typical facility, they offer significant advantages (and economies of scale) over traditional on premises or de-centralised systems.

The primary advantages are:

- Higher reliability and redundancy of systems;
- 24/7 monitoring and maintenance by staff;
- Higher security and protection; and
- Flexibility – ability to increase or decrease requirements at short notice in line with specific business needs.

It has been well publicised in recent years, that Ireland's climate is highly suited to data centre facility operations. The relatively cool, steady Irish climate means that facilities here can be cooled primarily using outside air. This reduces the need for additional more expensive forms of cooling, often required elsewhere around the world.

The demand for off-premises and on-demand data centre systems continues to be high and the Proposed Development is intended to help meet this need.

2.3.2 Ancillary Development

To the east of the datacentre is an area which is reserved for a 110 kV substation (subject to a separate application for SID). A sprinkler tank and pumphouse compound is located to the north east of the site. The attenuation pond, wastewater holding tank and wastewater pumping station is located in the south east of the development.

The main entrance to the site is proposed from the south with a gatehouse located on the easternmost of the two entrances along with a turning area to allow vehicles to return to the road safely. Access will be provided around the site for delivery and emergency vehicle access. Car parking is proposed to the east of the building. 56 spaces are proposed which is in line with the future users' requirements. Safe and secure cycle parking is also proposed to the east, close to the building entrance. All main vehicular routes and hard standing will be paved with permeable surfacing.

An attenuation pond is proposed to the south of the site to facilitate sustainable drainage within which a range of native marginal and macro-aquatic planting will be incorporated.

Figure 2.5 provides some detail regarding the design response taken by the design team. Using the nomenclature in the key in Figure 2.5, it can be seen that the façade will comprise a number of different materials all designed to break the building up, screen any of the more "industrial" elements and to help the building relate to the surrounding landscape. The façade will utilise large cladding panels (4) juxtaposed with smaller muted tones hook-on-cassette panels (2) and decorative perforated aluminium screening panels and acoustic louvres on roof plant (3 and 7) to produce a clean outlook. The built elements of the façade will be softened with the strategic use of green living walls along the front perimeter (6) and climbing walls around the glass frontage of the admin building (5), and a green roof (1) on top of the admin building. The green roof (1) will also reduce, attenuate and clean rain water runoff originating from the roof, while reducing heating and cooling requirements for the admin building. The climbing walls (5) also reduce cooling needs for the admin building via the screening and light filtering effect of the vegetation. The choice of the Kingspan external cladding (2 and 4) will result in a 21% reduction in embodied carbon.

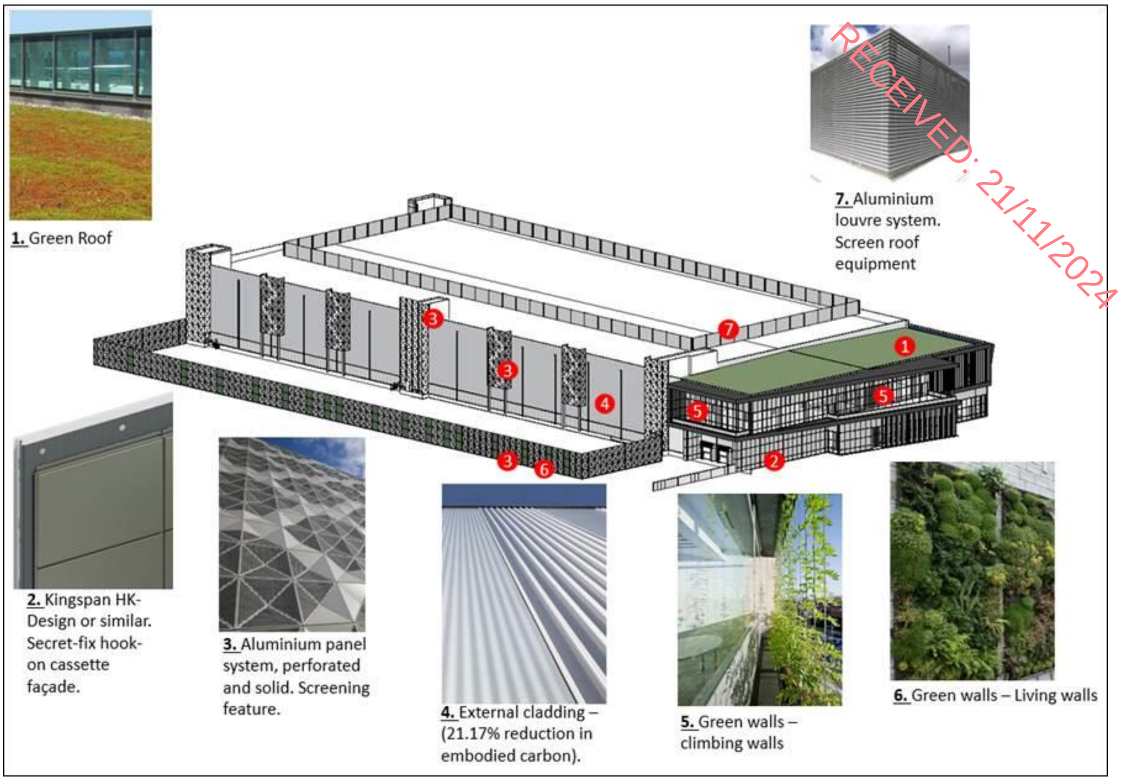

Figure 2.4 External Design Features (source HJL)

2.3.3 Proposed Site Utilities and Infrastructure

2.3.3.1 Proposed Potable Water Infrastructure

It is proposed to divert the existing 250mm diameter watermain around the eastern extent of the Red Line Boundary. The proposed watermain diversion will divert the existing watermain connection around the edge of the site as shown in CSEA Drawing 1300 and 1301.

As noted above the cooling system within the data halls will be a closed loop water circulatory system which minimises water usage. A Pre-Connection Enquiry (PCE) was submitted to UÉ in September 2024. Refer to the CSEA Infrastructure Report which includes for a copy of the Confirmation of Feasibility and demand requirement calculations.

2.3.3.2 Proposed Foul Wastewater Infrastructure

It is proposed that domestic effluent arising from occupation of the buildings will be collected in a newly constructed foul drainage network and directed to the Killala wastewater treatment plant (WWTP) (Killala, Active Licence No. D0067-01) via a proposed foul rising main which will run along the Mullafarry road before heading north across lands to the WWTP. Foul drainage design is presented in CSEA drawing 1200 and 1201. A foul pumping station with provision for storage is located in the south east corner of the site.

A Pre-Connection Enquiry (PCE) was submitted to UÉ in September 2024 Refer to the CSEA Infrastructure Report for a copy of the CoF and demand requirement calculations. A review of the Annual Environmental Report (AER) for the WWTP licence and UÉ own website indicates that capacity is available.

2.3.3.3 Proposed Surface Water Drainage Infrastructure

The proposed surface water drainage system is presented in CSEA drawing 1100 and 1101. The design intends to mimic the existing stormwater drainage of the greenfield site. The proposed surface water drainage system is designed to comply with the 'Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Technical Document – Volume 2, New Developments, 2005' and the 'Greater Dublin Regional Code of Practice for Drainage Works, V6.0 2005'. CIRIA Design Manuals C753, C697 and C609 have also been used to design the surface water drainage system within the site.

The Sustainable Urban Drainage Systems (SuDS) incorporated into the proposed surface water drainage infrastructure include:

- Swales and filter along verges;
- Permeable paving in each parking space;
- Petrol and debris interceptor (within generator yard and before and prior to discharge from the attenuation tank and prior to discharge from the site; and
- Attenuation basin.

The attenuation volume has been designed for the 1 in 100 year storm event which an allowance of 20% for climate change. Full details of design calculations are included in the CSEA Infrastructure Report provided with planning.

Chapter 6 (Hydrology) and Chapter 15 (Material Assets - Utilities) address the potential impacts of the Proposed Development on the receiving water and wastewater environment.

2.3.3.4 Utility Supply

The proposed connection point for Killala Data Centre is via the 110 kV lines from Moy 110 kV to Tawnaghmore Power Station which is immediately adjacent to the site. The site drawing also shows the potential location of a new on-site 110 kV GIS substation located within the north-eastern portion of the site. A separate SID application (under section 182 of the Act) will be prepared for this substation.

The facility will primarily operate for emergency power generation in the event of a grid outage however, should it be required the generators are capable of providing up to 400 hours of power generation without any significant effect on air quality (ref air modelling including cumulative impact, Chapter 8 Air Quality). This available power generation facility will fulfil the requirement to support the facility in line with the CRU requirements:

- Bring onsite dispatchable generation (and/or storage) equivalent to or greater than the proposed datacentre facilities demand, in order to support security of supply.
- Provide flexibility in demand from the proposed datacentre facility by reducing consumption when requested to do so by the system Operator in times of system constraint through the use of dispatchable on-site generation (and/or storage) in order to support security of supply.
- Provide flexibility in their demand by reducing consumption when requested to do so by the relevant system operator, in times of system constraint, in order to support security of supply.

A gas Above Ground Installation (part of a future panning approval) would be located in the southwest of the facility to allow for gas connection when this becomes available. The future gas pipeline would be subject to an application to the Commission for Regulation of Utilities (CRU) under Section 39A of the Gas Act 1976 (as amended).

2.3.3.5 Proposed Telecommunications Infrastructure

There are telecommunication lines in existence for telephone and broadband services in the area and fibre provisions for the Proposed Development. The site will be provided with a telecommunications network consisting of separate incoming fibre infrastructure and provided to each building via fibre ducts.

2.3.3.6 Proposed Roads, Access, and Parking

Access to the site (primary and secondary access) will be from the Mullafarry road (ref CSEA 0011). The site layout with road plan is presented in CSEA 0015 and full details of the traffic assessment included in Chapter 13 (Material Assets - Traffic and Transportation). The secondary access is for emergency use only i.e. should the main entrance be blocked.

The design incorporates 56 no. car parking spaces (including 12 EV charging spaces and 7 disabled spaces, 3 of them EV), 20 no. bicycle spaces. This is to allow for parking for full time staff as well as visiting staff, maintenance contractors and visitors attending the site.

2.3.4 Proposed Construction Plan

2.3.4.1 Construction Staffing, Working Hours, and Duration

Table 2.3 presents the construction phasing, timing and staffing during construction. It is estimated that there will initially be 40 staff on site on a typical day, however during peak construction periods this is expected to fluctuate up to 300 staff and contractors on site per day. Site staff will include; management, engineers, construction crews, supervisors, environment health and safety personal, and maintenance contractors.

Site development and building works will only be carried out between the hours of 07:00 to 19:00 Mondays to Fridays inclusive and between 08:00 and 14:00 hours on Saturdays. However, it is possible that the contractor may wish to carry out certain operations outside these hours i.e. Sunday or evening hours during long summer days etc. Such occurrences will be kept to a minimum and take place over a short timeframe and as such are unlikely to cause excessive disturbance. Deviation from these times will only take place when written approval is granted by MCC in exceptional circumstances.

Once the grant of planning is received, the construction activities on site will commence. Phase 1 Enabling works will be approximately 4 months followed by a combined c. 20 months for construction and 3 months for testing as shown below.

Table 2.3 *Construction Phasing, Timelines and number of Construction Workers*

Phase	Description	Estimated Start	Estimated End	Construction Duration (months)	No of Construction Workers
1	Enabling works of the entire site inc. cut & fill, access roads, berms etc.	Q1 2026	Q2 2026	4	40 peak
2	Construction Substation, Construction Data Centre	Q1 2027, Q2 2026	Q4 2027, Q4 2027	10, 20	20 peak, 300 peak
3	Testing Phase	Q4 2027	Q4 2027	3	10 peak parallel to last quarter of construction

The following Table 2.4 is a general overview of the construction sequence and main construction works that will be involved in the construction phase of the Proposed Development.

Table 2.4 *Summary of key construction works and construction sequence*

Activity	Description of Main Activity
Site Preparation Works and Establishment of Construction Services	This will include clearing the land, grading the site, installing access roads, and setting up temporary facilities such as construction offices and storage areas, and establishment of construction fencing and hoarding. All required enabling works and site investigations, surveying and setting out for structures, etc are carried out. The site compound will provide office, portable sanitary facilities, equipment storage, parking etc for contractors for the duration of the works. All areas under construction will be fenced for security and safety purposes and temporary lighting supplied, as necessary.
Site Utilities and Infrastructure	During the site preparation phase, excavation works are carried out to install the necessary utility lines and connections. The installation of site utilities, such as water supply, sewer lines, and storm drainage systems may also continue throughout the construction phase.
Foundations	Once the site is prepared, foundation works can begin. This involves excavating and pouring the concrete foundations for the building or structure. The foundations will generally be reinforced concrete pad footings incorporated into the concrete slabs. Maximum excavation works will be c. 6.5m below ground level and the foundations will be established at formation level.
Structural and Building envelope works	After the foundations are in place, the structural steel and building construction can begin. This involves erecting the steel framework for the building or structure and installing the exterior walls, roofing, and insulation. Once the structural works are complete, building envelope works can begin. This involves installing the roof, walls, and other components that make up the exterior envelope of the building or structure.
Installation of equipment	Once the building structure is complete, the generation equipment can be installed. This includes the ICT equipment and other auxiliary equipment. After the equipment is installed, the electrical and control systems can be installed. This includes the switchgear, transformers, and other components needed to distribute electricity to the grid.

Activity	Description of Main Activity
	Mechanical, electrical, and plumbing (MEP) works are also undertaken that involve installing the building's mechanical systems such as heating, ventilation, and air conditioning (HVAC), electrical systems such as lighting and power, and plumbing systems such as water supply and drainage.
Commissioning	Once all the equipment and systems are installed, the generation plant must be commissioned. This involves testing all the equipment and systems to ensure they are functioning properly and meeting the plant's design specifications. The commissioning of the units will be completed within the construction duration set out below.
Site Wide Landscaping	The hard and soft landscaping and reinstatement works for that phase will be carried out in accordance with the proposed landscaping design. This involves planting trees, shrubs, and other vegetation to enhance the appearance of the site.

2.3.4.2 Site Access, Car Parking, and Traffic Management During Construction

Temporary car parking facilities for the construction workforce will be provided within the site and the surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads.

Construction traffic would consist of the following:

- Private vehicles belonging to site construction staff;
- Private vehicles belonging to site security staff;
- Occasional Private vehicles belonging to professional staff (i.e. design team, utility companies);
- Excavation plant and dumper trucks used for site development works.

The construction of the proposed development is predicted to result in an additional 240 cars, 100 – 120 Heavy Goods Vehicles and 30 Light Goods Vehicles per day during the construction phase peak. 10% of which are estimated to occur during the local road network peak hours. For the operational phase, the proposed development will generate/attract 22 car trips and 4 service trips (trucks) on the peak hours during the shift changeover periods.

The access arrangements and potential traffic safety impacts are considered in Chapter 13 (Material Assets - Traffic and Transportation).

2.3.4.3 Site Preparation Works and Establishment of Construction Services

This work will include; establishing entranceways and haul roads for vehicles, site clearance, vegetation removal, levelling, cutting and filling of various parts of the site; surveying and setting out for structures; setting up of the construction site with fencing, site compounds etc. No demolition work is required.

The compound will provide office, portable sanitary facilities, equipment storage, parking etc for contractors for the duration of the works. The construction compound will be fenced off for health and safety reasons so that access is restricted to authorised personnel only. All areas under construction will be fenced for security and safety purposes and temporary lighting supplied, as necessary.

A combination of bulldozer, excavators, trucks and other soil shifting plant will commence the main site clearance and levelling aspects. Based on the shallow depth to bedrock rock breaking will be required.

The overall development site is to be recontoured into a staggered or stepped site to improve the existing slope of the site into a stable building platform. This will require cut and fill and use of retaining walls. Levelling of the site will require the excavation of an estimated c. 27,962 m^3 of topsoil, c. 36,150 m^3 of subsoil and c. 22,648 m^3 of rock will be removed and transported off site. c. 36,150 m^3 of material will be re-used as fill material in landscaping areas. The construction will require excavations down to a maximum depth of 4.5m BGL from existing ground levels.

Following the completion of site clearance and levelling, all structures will require foundations to structural engineer specifications. Building structures will comprise standard structural steel frames.

2.3.4.4 Construction Equipment, Techniques and Materials

The typical construction plant equipment expected to be used during the construction phase is:

- Tracked excavator;
- Tracked dumper or tractor and trailer;
- Articulated and rigid trucks;
- Bulldozers, excavators, backhoes and ancillary equipment;
- Concrete delivery trucks and pumps;
- Scissor, boom and fork lifts,
- Crane, teleporter; and
- Chains / small tools, concrete pump, concrete vibrator.

There will be a requirement for deliveries of imported engineering fill (sands and gravels), and other construction materials include, steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site by road.

A 'Just in Time' delivery system will operate to minimise storage of materials. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances.

Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site. Liquid materials, such as fuels for construction vehicles, will be stored within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications) to prevent spillage.

Construction techniques will include mechanical excavation, construction of reinforced concrete foundations, structural steel frame building, mass concrete rising walls, steel roof beams, and composite cladding for external walls. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances. Specialised data centre equipment will be imported.

2.3.2.4 Landscaping and Reinstatement

Once the majority of the construction works are completed the landscaping will be completed in accordance with the specification of the project landscape architect (KFLA) and to the agreement with the local authority. KFLA have provided a landscape plan and strategy for the site (Ref Fig 2.1).

The layout of the Proposed Development is set back from locations where sensitive landscape and visual receptors may otherwise experience an adverse effect (e.g., Mullafarry Road, the R134 Wild Atlantic Way, the Presbyterian Church, Ballysakeery Manse). The main works are located in the far north of the site area to minimise visual impact on the Ballysakeery Glebe House (NIAH 1302208), a former rectory now in disrepair. The subject site is relatively contained in both a visual and physical sense.

The proposal will have a similar mass to that of nearby existing development in Killala Business Park and will be dominated by the height of nearby existing wind turbine generators.

The Proposed Development includes embedded landscape and visual impact mitigation strategies, including retention and enhancement of existing site vegetation, earthwork bunding, additional woodland areas, belts and wildflower meadows, to enhance visual screening and biodiversity. These measures ensure that the development integrates with the surrounding environment .

A range of native rapid growth ‘nurse’ species and slow-growth high-canopy broadleaf trees will be planted to quickly reinforce hedgerows and mature tree belts that currently provide screening and to increase biodiversity across the site. Strategic placement of woodland belts, aims to:

- Enhance screening for sensitive visual receptors, including heritage properties to the south and southwest, residential properties to the southwest and west, and the R314 to the west.
- Increase biodiversity by connecting with the surrounding network of hedgerows.

The irregular shape of the site and orthogonal arrangement of buildings create unused areas around the infrastructure. These spaces offer opportunities for future development and landscaping, serving dual purposes of visual screening and biodiversity enhancement. The remaining unused areas will be maintained as meadows, providing additional habitat with minimal maintenance requirements.

2.3.4.5 Commissioning Works

Once all the equipment and systems are installed, the Data Centre equipment and electrical equipment must be commissioned. The commissioning process for the site involves a series of steps to ensure that the plant is functioning properly and is ready to begin operations. The commissioning process typically takes several months to complete and is included in the proposed construction timeline.

The commissioning process includes the testing and inspection of the installed equipment to ensure that it is operating at its design specifications and is meeting performance guarantees. This will include the final preparations for operations, including training of plant personnel and development of operating procedures.

2.3.4.6 Construction and Environmental Management

CSEA have prepared an *Outline Construction Management Plan (CMP)* (2024). This outlines and explains the construction techniques and methodologies which will be implemented during construction of the Proposed Development. The CMP incorporates mitigation measures outlined in the EIA report as they relate to the construction phase. The CMP includes emergency response procedures in the event of a spill, leak, fire or other environmental incident related to construction. This is an active document which is continuously updated to manage risk during the construction programme.

The CMP will be implemented and adhered to by the Construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

All mitigation measures outlined within this EIAR, and within the CMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

2.3.3.7 Resource Waste Management Plan (RWMP)

Chapter 15 contains a detailed description of waste management relating to construction of the Proposed Development. A site-specific Resource Waste Management Plan (RWMP) is included as Appendix 15.1 of this EIA Report. This RWMP will be implemented to ensure best practice is followed in the management of waste from the Proposed Development.

2.3.5 Potential Impacts and Mitigation Measures During Construction and Commissioning

The potential for impacts during the construction phase of a project will depend on a range of factors, including the type of construction activity, prevailing environmental conditions, and proximity to sensitive receptors. There are potential short-term nuisances associated with construction activities, such as dust, noise, vibrations, pollution of groundwater or existing drainage. These nuisances can cause disruptions to nearby areas and may be a source of concern for sensitive receptors.

Some construction activity, such as excavation may have a greater potential for causing impacts than others. The potential for impacts will depend on prevailing environmental conditions, such as the amount of rainfall, wind speeds, and wind direction. For example, high winds can increase the amount of dust and debris that is generated during construction, potentially impacting nearby areas. Another important factor considered is the proximity of sensitive receptors to the construction site. Sensitive receptors can include nearby residences, schools, hospitals, or other areas where people may be affected by construction activities. The closer these receptors are to the construction site, the greater the potential for impacts.

The main potential impacts during the construction and commissioning phase which require mitigation are:

- Management of run-off water in terms of silt runoff and temporary dewatering (see Chapter 5 (Land, Soils, Geology and Hydrogeology) and Chapter 6 (Hydrology) for further information on potential impacts and mitigation measures);

- Impacts on human beings in terms of nuisances relating to the air quality of the environs due to dust and other particulate matter generated (see Chapter 8 (Air Quality) for further information);
- Impacts on human beings in terms of nuisances due to plant noise and vibration from equipment (see Chapter 10 (Noise and Vibration) for further information on potential impacts and mitigation measures;
- Effects on the road network (due to construction workers and other staff attending site (see Chapter 13 (Traffic and Transportation) for further information on potential impacts and mitigation measures; and
- The generation of construction waste materials from excavation works and other construction waste (see Chapter 15 (Waste Management) for further information on potential impacts and mitigation measures).

Each specialist chapter of this EIA Report has assessed the construction activity, prevailing environmental conditions, and proximity to sensitive receptors to determine the likely significant effects on the environment and have proposed mitigation measures (where required) to minimize potential impacts and ensure that the project is completed in a safe and environmentally responsible manner.

In order to manage the construction activities, implement and monitor the effectiveness of the mitigation measure set out in this EIAR, the site-specific CMP will be implemented and adhered to by the construction Contractor. The CMP will be reviewed to include any planning conditions that are imposed and updated by the Project Manager, Environmental Manager and Environmental Clerk of Works where relevant and as required if site conditions change. The specific mitigation measures to address potential environmental impacts are presented in each individual EIAR chapter.

2.4 OPERATION OF THE PROPOSED DEVELOPMENT

The Proposed Development once construction is completed will operate 24 hours a day, 7 days a week. The Data Centre equipment and supporting infrastructure will be monitored by site staff and faults identified and remedied as required. Staff are primarily required onsite for security, ongoing monitoring and maintenance of plant and equipment.

2.4.1 Employment and Hours of Operation

It is estimated that when the site is fully developed that there will be up to 32 staff onsite per shift. The rotational shift system consists of 3 shifts over a 24 hour period.

There will be a small increase in traffic owing to staff movements to and from the Proposed Development once operational (Chapter 13 Traffic & Transportation, Traffic Model). The modelling results indicate that the proposed main site access junction would operate well within capacity during both peak hours.

2.4.2 Sustainability and Energy Efficiency

The Applicant is committed to running its business in the most environmentally friendly way possible. The Proposed Development has been designed to take into account these policies with energy efficiency central to the decision-making process, minimising power and water consumption.

An Energy Statement has been prepared by Ethos Engineers to accompany the planning application to address the relevant energy related policies of the WCC Development Plan 2022-2028.

Sustainable design features of these units include enhanced building fabric performance, high efficiency HVAC systems and high efficacy lighting with occupancy and daylight control where applicable. Renewable technologies including both heat pumps and photovoltaic panels are proposed. Subject to a detailed design assessment with final construction details a final BER assessment will be completed.

The proposed development target BER rating of "A3" has been assessed using the SBEM interface VE Compliance 7.0.20 in the IES software version 2022 which demonstrates Part L compliance in accordance with NEAP. (BERs could change in the future with updates to software due to improvements in methodology and revised Electricity Primary Energy Factor)

In addition, the project is proximal to substantial renewable generation projects (i.e.: Glenora, Sheskin, Bellacorick, etc) and the tenants of the Project would seek to enter into CPPAs with renewable (wind) generators/producers, including direct/private wire as and when it becomes available. This will offset residual GHG emissions associated with the Proposed Development, given that the energy consumed by the development on site would be matched by renewable energy generation.

2.4.3 Potential Impacts During Operation and Mitigation Measures

The potential for impacts during the operation phase of a project will depend on a range of factors, including the type of construction activity, prevailing environmental conditions, and proximity to sensitive receptors. There are potential nuisances associated with the on-site operational activities, such noise, emission to air, and traffic. These nuisances can cause disruptions to nearby areas and may be a source of concern for sensitive receptors.

The main potential impacts during the operational phase which require design and mitigation are:

- Management of stormwater run-off water by attenuation and Suds measures to protect water quality and negate off site flooding, see Chapter 6 (Hydrology) for further information on potential impacts and mitigation measures);
- Stack heights have been determined by modelling to manage air emissions, see Chapter 8 (Air Quality) for further information potential impacts and mitigation measures;
- Acoustic attenuation solutions will be deployed where required to mitigate potential impacts on human beings in terms of nuisances due to plant noise and vibration from equipment see Chapter 10 (Noise and Vibration) for further information on potential impacts and mitigation measures;
- The embedded design features and landscaping ensure that, for its type, the development would be of appreciably high quality and some visual interest. See Chapter 11 (Landscape and Visual) for further information on potential impacts and mitigation measures incorporated in the landscape design;
- Effects on the road network due to staff attending site, see Chapter 13 (Traffic and Transportation) for further information on potential impacts and mitigation measures; and
- The generation of operational waste materials see Chapter 14 (Waste Management) for further information on potential impacts and mitigation measures.

Each specialist chapter of this EIA Report has assessed the operational activity, prevailing environmental conditions, and proximity to sensitive receptors to determine the likely significant effects on the environment and have proposed mitigation measures (where required) to minimize potential impacts and ensure that the project is completed in a safe and environmentally responsible manner.

2.5 DECOMMISSIONING

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

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

2.6 DESCRIPTION OF POTENTIAL CUMULATIVE DEVELOPMENTS

As part of the assessment of the impact of the Proposed Development, account has been taken of relevant related developments that are currently permitted, or under construction within the area surrounding the Proposed Development site. The potential for Cumulative Impacts arising from these related projects has been addressed within each specialist chapter of this EIA Report (Chapter 4 – 15).

Each specialist has considered the list of relevant planning permissions from the surrounding areas of the Proposed Development presented in Appendix 2.1. and in particular local planning permissions which are presented in Table 2.1 above. The cumulative assessment also considered the planned 110kV substation located within the site boundary.

CHAPTER 03:

ALTERNATIVES

03

CHAPTER CONTENTS

3.0 ALTERNATIVES

3.1 INTRODUCTION

The requirement to consider alternatives within an EIAR is set out in Annex IV (2) of the EIA Directive (Directive 2011/92/EU, as amended by Directive 2014/52/EU), and in Schedule 6 of the Planning and Development Regulations, 2001, as amended ("the Regulations"), which states:

> *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.*

Schedule 6(2)(b) of the Regulations elaborates on this requirement by requiring the following information:

> *(b) a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) 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 selecting the chosen option, including a comparison of the environmental effects;*

Reasonable alternatives may include project design proposals, location, size and scale, which are relevant to the proposed development and its specific characteristics. The regulations require that an indication of the main reasons for selecting the preferred option, including a comparison of the environmental effects to be presented in the EIAR.

The EPA's *Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022)* – states:

> *The presentation and consideration of the various reasonable alternatives investigated by the developer is an important requirement of the EIA process.*
>
> *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.*

As such, the consideration and presentation of the reasonable alternatives studied by the project design team is an important requirement of the EIA process.

This chapter provides an outline of the reasonable alternatives examined during the design phase. It sets out the main reasons for choosing the development as proposed, taking into account and providing a comparison on the environmental effects.

This chapter assesses the evolution of development and the alternatives examined by the Applicant relating to the location, size and scale and project design, processes of the Proposed Development. This chapter provides a full justification for the Proposed Development and provides a comparison of the environmental effects of each alternative option.

The reasonable alternatives examined throughout the design process are set out as follows:

- Do nothing alternative;
- Alternative project locations;
- Alternative layout, size and scale;
- Alternative processes; and
- Alternative mitigation measures.

This chapter describes the alternatives that were considered for the Proposed Development, where applicable, under each of these headings and the reasons for the selection of the chosen options, including a comparison of environmental effects.

3.2 DO NOTHING ALTERNATIVE

There is an established statement of need for data centres in Ireland within a National, regional and local strategic planning context. In the event that the Proposed Development does not proceed, the specific need for a data centre facility would still exist.

In the National Planning Framework – 2040 (2018) National Strategic Outcome 5 details as an objective the *"Promotion of Ireland as a sustainable international destination for ICT infrastructures such as data centres and associated economic activities."*

The Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (2022) states that *"Data centres are core digital infrastructure and play an indispensable role in our economy and society. Data centres provide the foundation for all almost all online aspects of our social and work lives, including video calling, messaging and apps, retail, banking, travel, media, and public service delivery such as healthcare and welfare."* Data centres are also described as *"critical to Ireland's economic future, and the success of our businesses"*.

It is stated in Chapter 12.13.3 of the Mayo County Council Development Plan 2022-2028 (MCDP) that "*opportunities exist for Killala for a data centre and/or renewable energy hub at the Killala Business Park*". The designated site for the Proposed Development, which is located adjacent to the Killala Business Park, is currently unzoned under the MCDP, however the development is located in close proximity to other permitted and proposed renewable energy developments, in addition other industrial developments within Killala Business Park to the east. There is currently no opportunity for the Proposed Development to be located within Killala Business Park; however the site represents a logical expansion to the business park and will integrate well with existing industries and businesses in the park.

Killala is identified as a self-sustaining Tier III town. The MCDP elaborates that "*Self-Sustaining Towns have moderate levels of population growth and a limited localised employment base, are reliant on other areas for employment and/or services and therefore require targeted 'catch up' investment to become more self-sustaining*" (p37).

Further objectives within the MCDP emphasise the need for the Proposed Development in Killala:

- *SSP 1 Support the appropriate growth of the Rural Countryside by offering a sustainable choice for people to live in order to maintain vibrant Rural Communities.*
- *EDO 40 To explore the feasibility of seeking the designation of the former Asahi Plant and adjoining lands outside of Killala as a Strategic Development Zone.*
- *EDO 52 To support the development of sites where data centres, ICT related development and high potential start-ups can thrive*
- *INP 20 To promote Mayo as a sustainable international destination for ICT infrastructures such as data centres and associated economic activities, at appropriate locations.*

Section 7.4.4.5 of the MCDP describes how:

> *"AEConnect 1 is a trans-Atlantic sub-sea fibre-optic cable extending from Long Island, New York to Killala, Mayo, which offers the potential for the West of Ireland to become a key telecommunications and data gateway. The AEConnect cable has the capacity to cover the entire European and American information and data traffic currently in existence and the potential to double its capacity within a few years as required. The delivery of advanced technological infrastructure in the area also provides a potential platform for the development of ICT facilities, such as data centres in the county and other businesses to set up their operations in the locality".*

If the Proposed Development does not proceed, the existing site would remain as a greenfield site and would result in a neutral impact on the environment.

Therefore, opting for the 'do-nothing' scenario would be underutilising this strategically positioned site, would not result in the opportunity for conservation works to the Rectory, and would contravene existing plans and policies.

3.3 ALTERNATIVE PROJECT LOCATIONS

The location of facilities is selected in order to provide secure, reliable and best performing cloud and potentially AI computing infrastructure. The developer has considered Ireland for this datacentre development due to the geographical advantages resulting in a moderate climate which minimises cooling requirement, and Ireland's capacity for generation of renewable energy, coupled with an educated and technically sophisticated population. This results in less requirement for air conditioning compared to elsewhere in the world resulting in more sustainable development and reduction in noise and air emissions compared to warmer countries.

Due to power constraints in the greater Dublin area and the proximity to renewable energy sources such as wind farms, the client looked towards Mayo for available land banks. Site selection criteria included; proximity to power supply, connectivity, and a suitable sized land bank.

In June 2021 Ireland's Commission for Regulation of Utilities (CRU), the country's energy and water economic utility regulator that oversees EirGrid, released its "Proposed Direction to the System Operators Related to Data Centre Grid Connection" document. The CRU's proposal considers three options in managing the growth of data centre power demand – (i) Do nothing, which would ultimately result in rolling blackouts, unacceptable to the CRU; (ii) impose a moratorium on all new data centre connections, which the CRU views as inappropriate; or (iii) put in place specific connection measures that prioritize new data centre power applications based on location, the potential to add power generation and demand flexibility.

The CRU's preferred option is (iii), emphasizing the need to site data centres in areas that aren't seeing the power bottlenecks that are increasingly affecting Greater Dublin, and ideally areas that have a growing supply of (particularly renewable) power generation. The Mayo region very clearly meets both of these criteria, given the lack of major power end users and the growing renewable capacity – Mayo is currently home to c. 380MW wind capacity[1].

The current location of the Proposed Development within Killala was decided by a number of preceding plans, policies and circumstances all of which pre-determined that a location in the vicinity of Killala offers an ideal project location in terms of planning, sustainability and the environment (section 3.2) and is in accordance with the relevant policies and objectives of the MCDP.

The Killala Business Park contains the landfall of a major US-to-Europe subsea data cable, the AEConnect Transatlantic Data Cable, making it a key node in the transatlantic data network. There are two additional subsea cables planned proximal to Killala Business Park that, when complete, will directly tie together five countries (Ireland, the US, the UK, Denmark, and Norway). Three independent terrestrial fibre networks are also proximal to Killala, with available capacity to Dublin Points of Presence (PoPs).

The Killala site meets the requirement of the CRUS as it is not in a constrained area, as defined by EirGrid. Furthermore, the proximity of Killala to wind generation facilities (existing and planned) makes the site suitable as consumption is located close to generation, alleviating potential transmission constraints.

The sites chosen are located adjacent to the Killala Business Park where the overall form of employment is compatible with the form of employment offered by the Proposed Development. Killala Business Park is well equipped with respect to services and infrastructure that can be extended to facilitate the Proposed Development and already supports many complimentary developments.

Killala Business Park has significant in-place infrastructure in terms of supporting a proposed Data Centre including HV (high voltage) lines, an upgraded substation, large capacity water lines, a newly built wastewater treatment facility, a planned battery array, and an adjacent peaker-plant complex with expansion potential.

Within Killala Business Park itself there are no available land banks which have adequate area for this development.

Following early consultation in 2019 with Mayo County Council, two suitable land banks were initially identified adjacent to Killala Business Park. One located southeast of Killala Business Park (the eastern parcel) and the other southwest of Killala Business Park (the western parcel). A technical due diligence assessment of these two parcels of land was conducted by Aecom in 2019 (*Aecom (2019) Technical Due Diligence Assessment: Site at Killala Business Park*) A high level environmental comparison of these alternative site locations is provided below. It should be noted that the

[1] https://www.thewindpower.net/zones_en_18_853.php

boundaries and plot sizes of the eastern and western parcels discussed within this sub-section do not represent the subsequent final site boundaries and plot sizes which formed the basis for agreement for sale with MCC. As seen in Chapter 2 of this EIAR the ultimate boundary of the Proposed Development altered in response to the findings within both the Aecom (2019) report and subsequent findings through the environment assessment process.

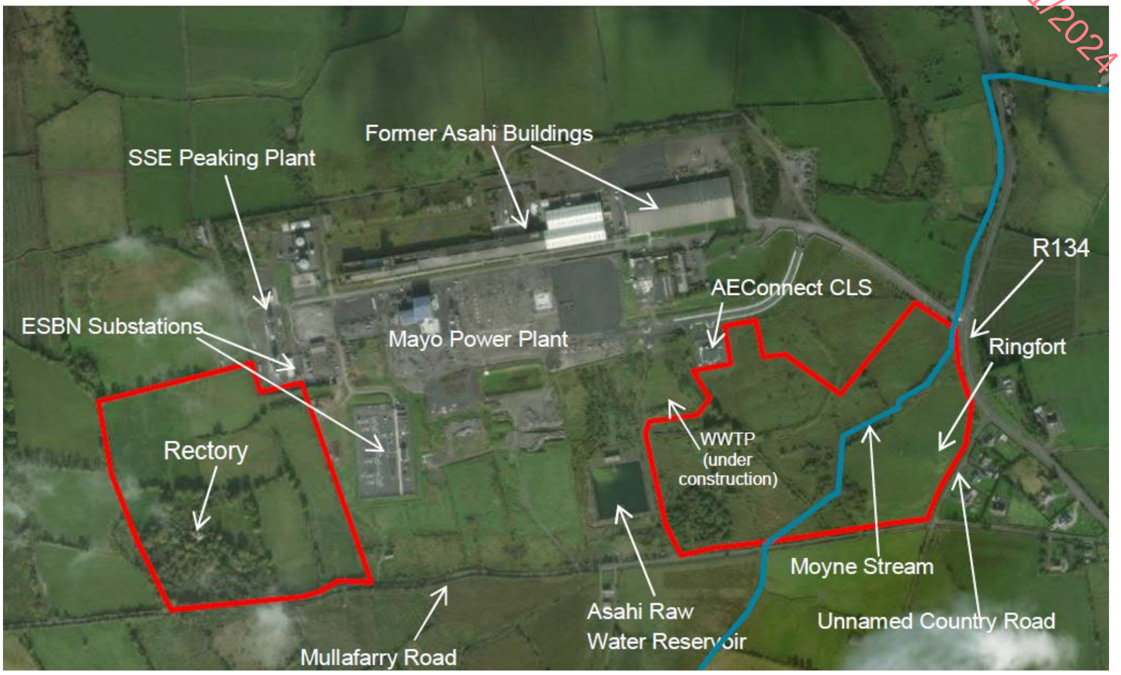

Figure 3.1 *Western and Eastern Parcels (source. Aecom (2019) Technical Due Diligence Assessment: Site at Killala Business Park)*

The western parcel of land (c. 12.12 ha.) is undeveloped and in agricultural use with the exception of the south west corner where it is wooded and houses a currently derelict rectory building (NIAH Reg. no. 31302208) with associated structures (sheds). There is a small unnamed stream flowing west to east along the southern boundary, which eventually flows into the Moyne Stream. The site is bounded by hedgerows, with some internal hedgerows delineating smaller internal fields all of which are vegetated with improved agricultural grassland. There are records of a historic lime kiln situated approx.110m east of the Rectory.

The eastern land parcel of land (c. 14.72 ha.) is also undeveloped and in agricultural use. There is also a ringfort present in the southeast corner of this parcel. The Moyne Stream bisects this land parcel in a southwest to northeast direction. The ruins of an old farmhouse (foundation of a small bungalow and sheds) are evident in the northwestern part of this land parcel.

An unnamed country road, the R314, and the Mullafarry Road border the eastern site. There is a cluster of residential houses (c. no. 9) at the junction of the unnamed country road and R134. Beyond this and extending for 2.5km is mainly agricultural land with a scattering of houses along small local roads. The newly constructed Killala wastewater treatment plant is located immediately to the north of the eastern parcel.

To the west of the western site is agricultural land and a small number of individual houses. The Killala Community Wind farm comprised of 6 no. turbines is located in the agricultural lands immediately north of the western site. Mullafarry Presbyterian Church is located approximately 350m from the western site and Killala Rock quarry is located c. 850m west of the western parcel.

Figure 3.2 *Location of Residential Properties (source. Aecom (2019) Technical Due Diligence Assessment: Site at Killala Business Park)*

There are overhead power lines running across parts of both the western and eastern parcels of land. Both parcels of land exhibit approximately the same topography with steep, inconsistent rises from the Mullafarry Road towards the northern boundaries of both sites. Preliminary phase 1 assessments of the two parcels of land revealed no discernible difference with respect to soils, hydrogeology, ecology. The wooded area in the southern section of the western site is noted to be boggy, while the eastern site also has boggy areas in the southern portions of the site.

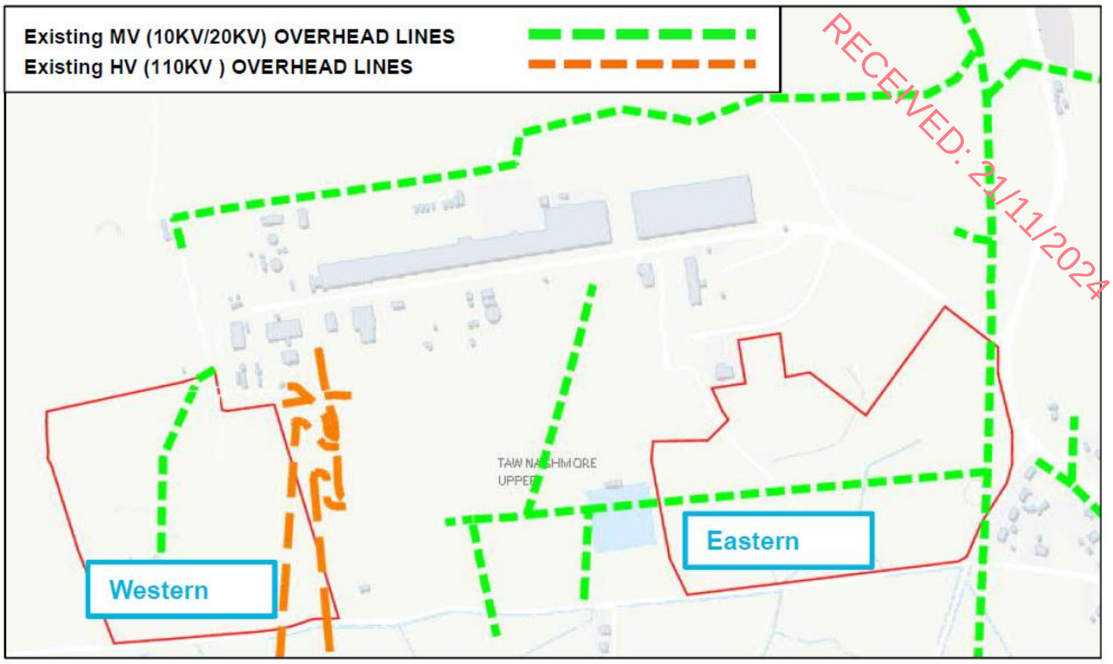

Figure 3.3 *Location of Overhead Powerlines (source. Aecom (2019) Technical Due Diligence Assessment: Site at Killala Business Park)*

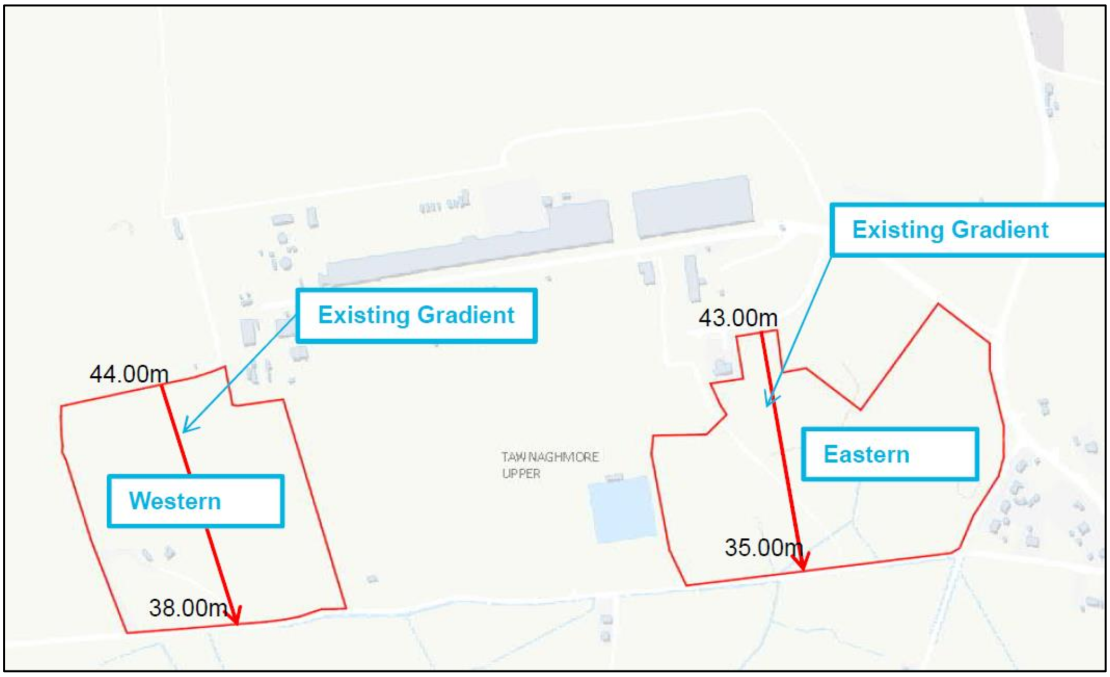

Figure 3.4 *General Indication of Gradient for Western and Easter Sites (source. Aecom (2019) Technical Due Diligence Assessment: Site at Killala Business Park)*

It is an objective of MCDP that SuDS is incorporated into the design of the Proposed Development;

- *INO 17 To require the use of SuDS to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks*

Development of either of these parcels of land would need to incorporate a surface water system with attenuation storage to reduce the impact of the surface water run-off generated by the Proposed Development on the existing Mayo County Council infrastructure. Discharges from this attenuation storage would need to be restricted to Greenfield runoff rates subject to approval by Mayo County Council. Therefore it would be necessary to ensure that adequate space is provided on both sites to accommodate surface water attenuation.

There are no environmental constraints which would prohibit development of either site.

The existing known archaeology on the sites makes the western site seem slightly more preferential given that it is more possible to locate the Proposed Development without disturbing known archaeological and architectural heritage. Furthermore development of the western parcel creates the opportunity for the Developer to facilitate the refurbishment of the Rectory Glebe house.

The existing known hydrology on site also makes the western parcel more preferable. The presence of the Moyne Stream on the eastern land parcel represents a constraint to the full build out of this parcel of land. Any diversion of this stream would have to be undertaken in consultation with the Office of Public Works and Inland Fisheries Ireland, and creates more potential for hydrological impacts.

The alignment of the power lines across both sites also present a constraint upon the proposed layout of a development, as the ESB will not permit buildings under these services or within arcing distance. Further investigation has revealed that it is more feasible to relocate the 10kv/20kv MV line across the western parcel in terms of the Proposed Development layout requirements. However in terms of infrastructure the eastern parcel is more preferable as it affords direct access for connection to the Killala wastewater treatment plant (there is currently no sewerage infrastructure from the western parcel) and a pumped sewer will require construction to facilitate development of this site.

Table 3.1 below outlines the relative environmental impact of the two land parcels and highlights where an option is preferred over another and where the preference in neutral.

Table 3.1 *Summary of site preference for each environmental factor*

Environmental Factor	Phase	Western Parcel	Eastern Parcel
Human Health and Populations	Construction		
	Operational		
Land, Soils, Geology and Hydrogeology	Construction		
	Operational		
Hydrology	Construction		
	Operational		
Biodiversity	Construction		
	Operational		
Air Quality	Construction		
	Operational		
Climate	Construction		
	Operational		
Noise and Vibration	Construction		
	Operational		
Archaeology and Cultural Heritage	Construction		
	Operational		
Traffic and Transportation	Construction		
	Operational		
Material Assets - Waste	Construction		
	Operational		
Material Assets - Utilities	Construction		
	Operational		
Landscape	Construction		
	Operational		

Less Preferred (relatively greater potential environmental impact)	**Neutral** (relatively neutral potential environmental impact)	**More Preferred** (relatively less potential environmental impact)

Ultimately, after careful analysis and comparison between the two parcels, it was determined that both have similar environmental constraints and are suitable for development with appropriate design and mitigation, with a slight preference shown for the western parcel. As can be seen in the ultimate Proposed Development design as presented in Chapter 2, a way leave through the western most portions of the eastern parcel (avoiding the known archaeological features, and the Moyne River) is being sought for the installation of sewerage to access the Killala waste water treatment plant.

3.4 ALTERNATIVE LAYOUT/DESIGN

The project design team undertook a comprehensive design process to determine an effective and efficient layout for the Proposed Development, which has regard for the operation requirements, environmental sensitivities of the site and the surrounding context.

The potential for environmental effects which informed this consideration primarily related to visual impact, ecology, architectural heritage, land and hydrology.

From the very outset, in response to both the ecological and the architectural value of the area of land defined by the curtilage of the rectory a decision was taken to sterilise that area from the Proposed Development.

The existing high voltage lines across the south-eastern portion of the site also effectively sterilise this corner from development.

Resulting from these initial responses to ecology, architectural heritage and material assets Figure 3.5 indicates the remaining land available for the Proposed Development.

Alternative layouts for the Proposed Development were curtailed principally by the need for rectangular buildings, traffic flows, topography constraints, adjacent land uses and visual impact, all of which informed the sitting and layout of the Proposed Development.

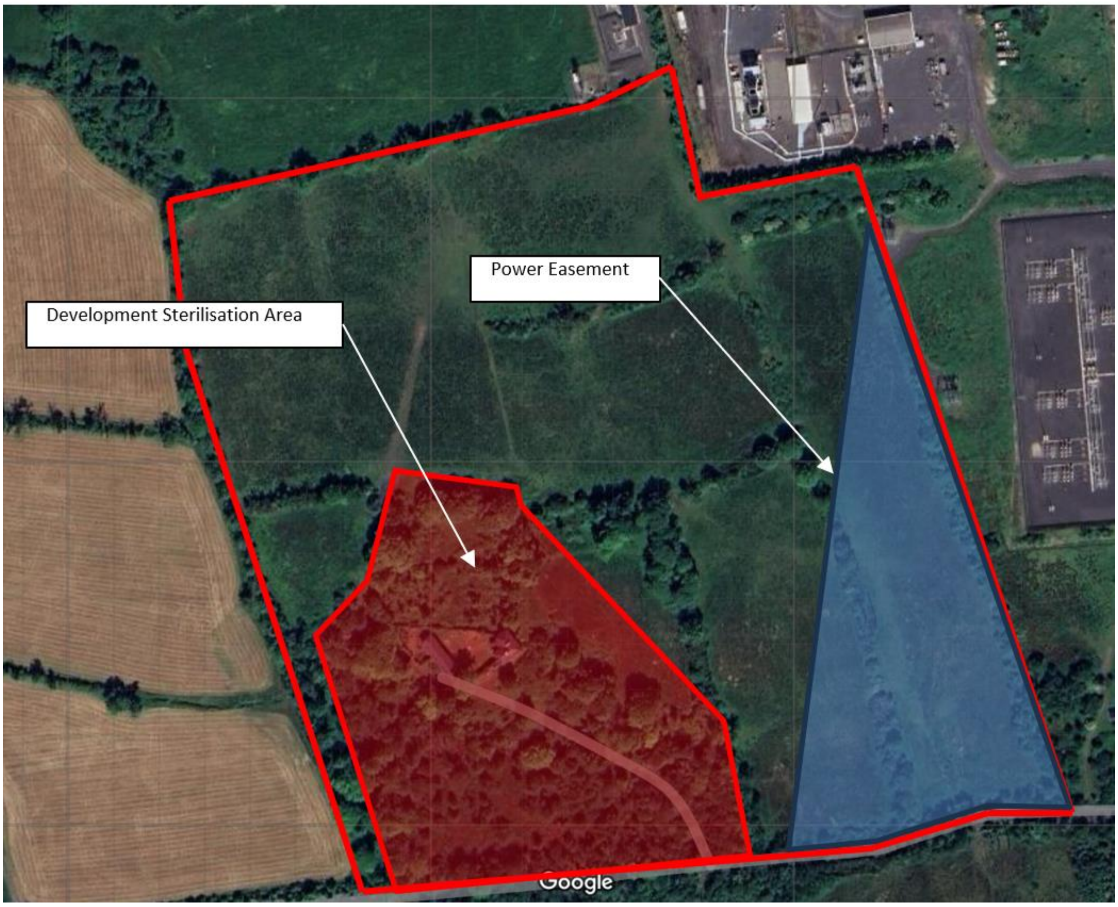

Figure 3.5 *Initial Areas of Layout Constraint (source Google Maps)*

The design process was an iterative one, which while ultimately driven by the need to provide for a Data Centre that met the MCC objectives outlined in Section 3.2, was also influenced by the following environmental criteria:

- To confine the most "industrial" aspect of the Proposed Development closest to similar adjacent land uses within the Killala Business Park – strengthening existing land use character, and capitalise upon adjacent availability of electric power sources.
- To reduce visual impact by confining the bulkiest portions of the Proposed Development to the northern extents of the site, stepping down the site by berming and tree planting, thereby affording greater opportunity for screening.
- To reduce the impact upon the architectural heritage of the Glebe house by confining installation to the most northern extent of the subject lands.
- Preserve as far as possible the existing hedgerows both internally and along the boundaries of the site.
- To seek the opportunities to maintain wooded areas and to provide further Green Infrastructure (GI) where feasible.
- Reduce the amount of excavation and geotechnical works on site.

In light of the above, the next step in the layout of the Proposed Development was to locate the main building at the most northern extent of the site. This action helped to strengthen and unify the land use patterns in the immediate area – curtailing the built element to the area of land adjacent to those parts of Killala Business Park that also are defined by business/industrial/energy land uses. The location of the main building in the most northern extent of the site has the added environmental benefit of direct connectivity to power sources (less installation impacts, materials usage), and provides greater opportunities for reduction of visual impact via existing and proposed new vegetation. It is also permits the rectory house to maintain its "presence" and relationship with the Mullafarry Road, without significant development. Finally, the location at the northern extent of the site also results in the removal of the least amount of internal hedgerows.

Once it has been determined that the most preferable environmental option is to locate the building to the most northern extent to the site then there were substantially diminished further options regarding the layout of the various elements within the Proposed Development. Figure 3.6 and 3.7 below two layout options that were explored, which ostensibly differentiated in the location of the emergency generators either to the south or the north of the proposed main building.

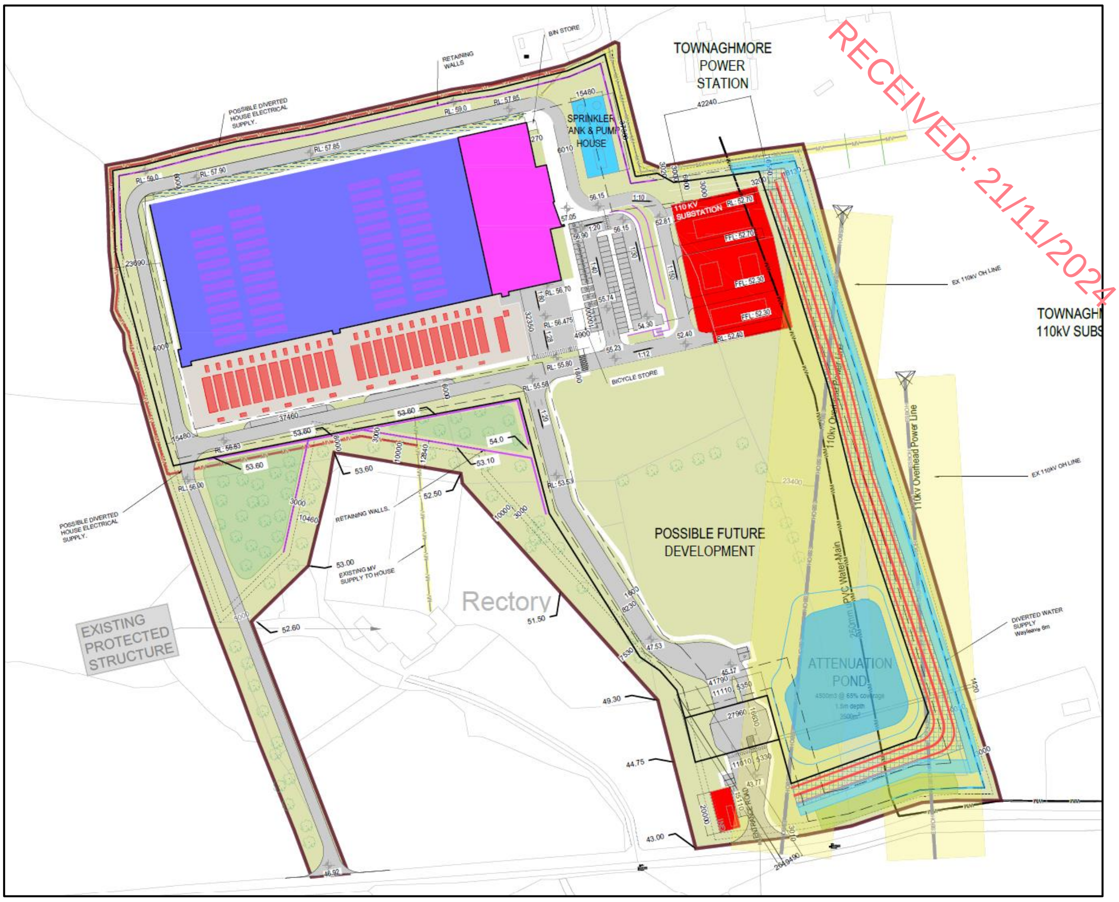

Figure 3.6 *Alternative Site Layout 1*

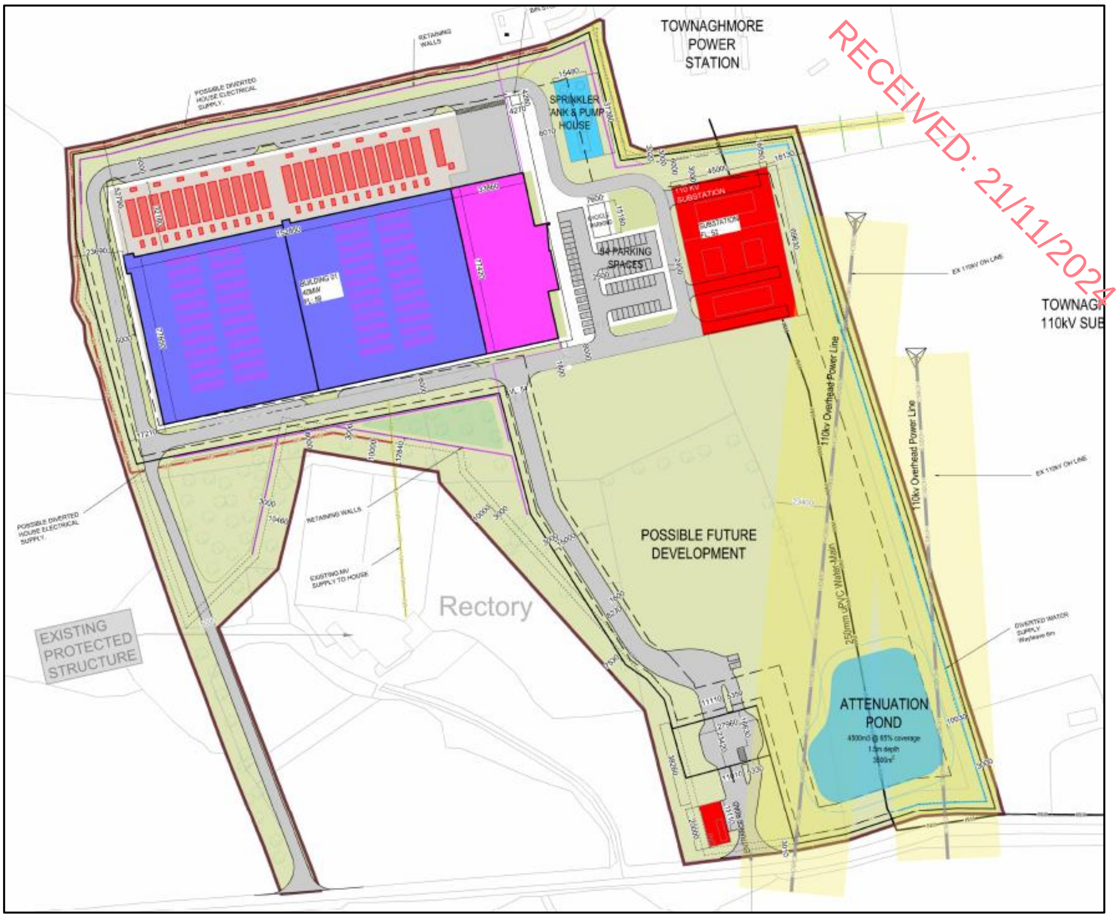

Figure 3.7 *Alternative Site Layout 2*

Upon analysis of the two site layout options, it was determined that the positioning of the generators to the south of the main building allowed for the main bulk of the building to be positioned further back from the Mullafarry Road and also the rectory house; thus minimising further visual impacts from the road and upon the architectural curtilage of the rectory house. Changing the position of the generators also allowed the building to be set into the cut section of the site as opposed to a noticeably elevated position above ground level with alternative layout 2. Finally Alternative layout 1 allowed for a step between the finished floor level and the generator yard which had the benefit of following the natural ground level, reduced cut and fill requirements, and allows lower retaining walls to the north and the south.

As can be seen in Figure 3.8 the landscape strategy for the Proposed Development has been designed to respond to the constraints and opportunities that the site presents with respect to potential environmental impact. Using the nomenclature in the key in Figure 3.8, the need to reduce the visual impact of the Proposed Development has been addressed by planting a high (3.4m) berm at location 2 with a mixed woodland, and the retention of existing mature trees wherever possible (locations 3). Impacts to the architectural heritage of the rectory house complex (in terms of visual intrusion) are also lessened via the provision of additional woodland planting at locations 6. In order to prevent impacts to soils via land slippage, and also to the built heritage associated with the rectory house, a number of retaining walls have been incorporated into the design (locations 7). The location of the western-most entrance road was intentionally kept to the most eastern-side of this thin strip of land to avoid impacting the existing hedgerows (locations 9), resulting minimal removal of existing trees (location 8). The existing site boundary with the land occupied by the rectory afforded the opportunity for the landscape design team to provide a Green

Infrastructure corridor (locations 4) which will links the existing hedgerows, and also the existing and planned woodland areas.

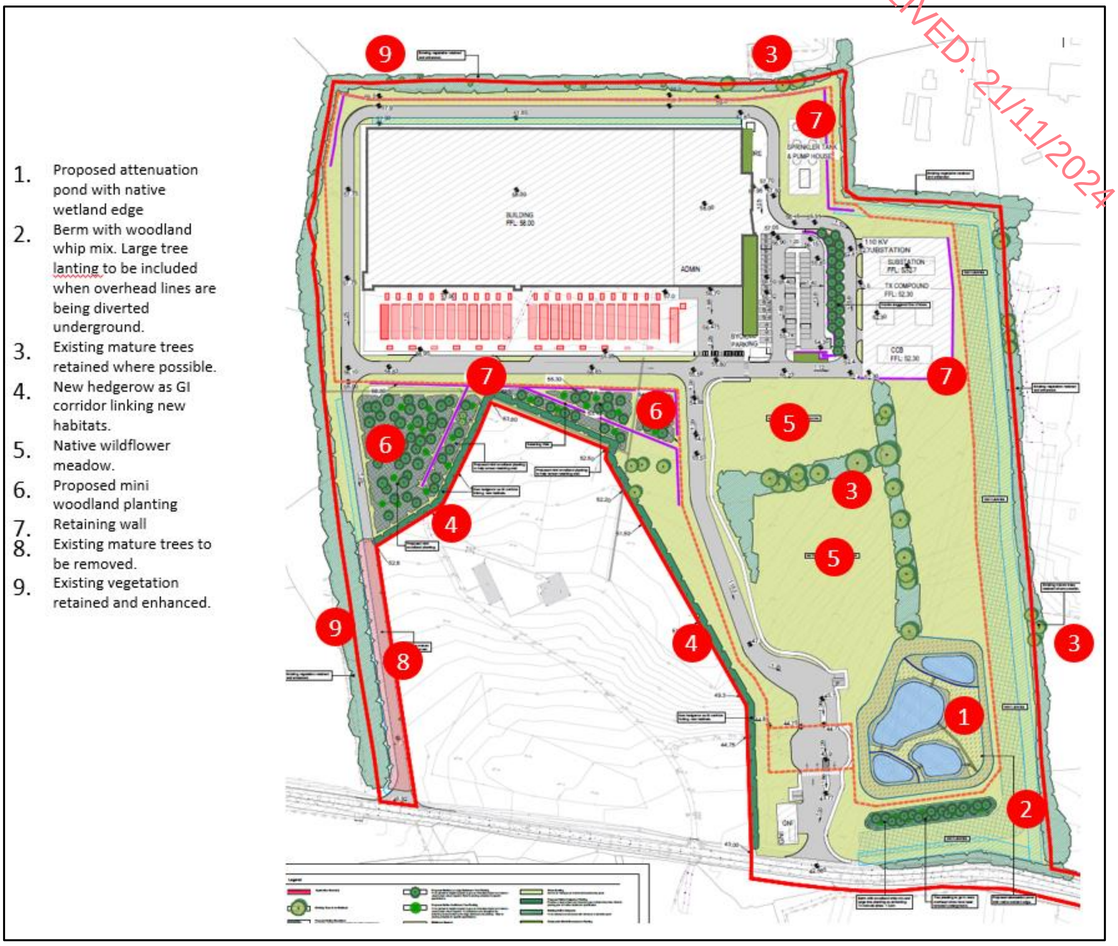

Figure 3.8 *Landscape Design Features (source Kevin Fitzpatrick)*

The proposed design facilitates additional future development within the land parcel which is more sustainable because the impacts associated with any future development in terms of internal roads, sewerage, potable water, electricity and gas connections will be negligible as they are already provided by the Proposed Development.

In response to the elevated position of the northern most extent of the lands, a number of design features regarding the external materials and finishes of the building have been proposed in order to minimise once more the visual impact of the building.

Figure 3.9 provides some detail regarding the design response taken by the design team. Using the nomenclature in the key in Figure 3.9 it can be seen that the façade will comprise a number of different materials all designed to break the building up, screen any of the more “industrial” elements and to help the building relate to the surrounding landscape. The façade will utilise large cladding panels (4) juxtaposed with smaller muted tones hook-on-cassette panels (2) and decorative perforated and solid aluminium screening panels (3 and 7) to produce a clean outlook. The built elements of the façade will be softened with the strategic use of green walls along the front perimeter (6) climbing walls around the glass frontage of the admin building, and a green roof (1) on top of the admin building. The green roof (1) will also reduce, attenuate and clean rain water runoff originating from the roof, while reducing heating and cooling requirements for the admin building. The climbing walls (5) also reduce cooling needs for the admin building via the screening and light filtering effect of the vegetation. The choice of the Kingspan external cladding (4) will result in a 21% reduction in embodied carbon.

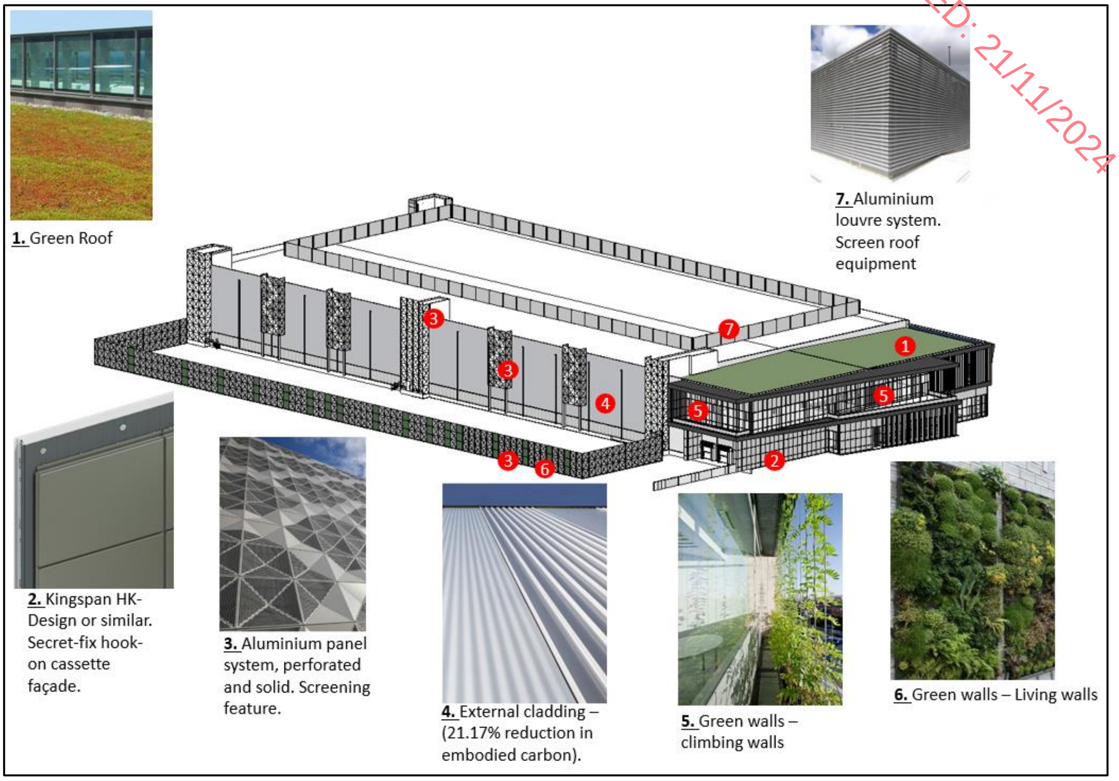

Figure 3.9 *External Design Features (source Henry J. Lyons)*

3.5 ALTERNATIVE PROCESSES (TECHNOLOGIES)

The EPA's Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022) state that within each design solution there can be a number of different options as to how the processes or activities of the development can be carried out. This section typically examines the project processes in relation to likely emissions to air, noise and water, likely generation of waste and likely effect on traffic to determine the process that is least likely to impact on these parameters.

In terms of the Proposed Development processes, the various layout options considered (Section 3.4) will generally necessitate the same power requirements, and result in the same waste and environmental emissions. The Proposed Development is guided by the applicant's standard specifications, and the flexibility to select alternative processes is limited for this type of development as opposed to an activity that has more complex equipment and processes.

Notwithstanding this, as detailed in the Energy Statement/Sustainability Report by Ethos Engineering, the design intent of the Proposed Development is to offer buildings which not only achieve NZEB (Nearly Zero Energy Building), but will exceed the current TGD Part L of the Building Regulations whilst working within the constraints and opportunities offered by this site. The Proposed Development will further reduce, as far as is feasible and reasonable, the primary energy consumption and CO_2 emissions of the Proposed Development through best practice design measures, and will also makes use of renewable energy technologies with PV panels on the roof.

A Building Energy Management System (BEMS) complete with front-end software is proposed to control and monitor the Mechanical and Electrical Engineering Services plant and equipment across the facility. The roof will have translucent roof lights, automatic opening vents and solar photovoltaic panels to meet current standards and be NZEB compliant.

In addition to this the Proposed Development has embraced the opportunity to utilise other sustainable measures such as SuDS measures (permeable pavers, grasscrete paving, filter drains, swales, attenuation ponds, integrated wetlands and a hydrobrake) along with planting and retention and augmentation of existing ecological features.

These measures, along with the partial green roof mentioned will attenuate the rate of surface water runoff from the development, intercept first flush flows and improve the quality of water that is intercepted by the surface water drainage network through biodegradation, pollutant adsorption and settlement and retention of solids.

A foul water holding tank has been included within the design along the southern boundary of the site. This tank will provide 24-hour storage and buffering capacity to ensure that there is no peak pressure on the Killala Wastewater treatment system.

The cooling for the data centre will be implemented utilising a closed loop chilled water system. This will achieve annual power consumption figures comparable with a direct air design but given that evaporative cooling would be required to meet the peak demand on a direct air system the chosen approach will require no ongoing water consumption and thus will not place any additional demand on the local water infrastructure.

3.6 ALTERNATIVE MITIGATION

The EIA process for the Proposed Development involved a team of specialists, each with expertise in a specific aspect of the environment. For each aspect of the environment, each specialist has considered the existing environment, likely impacts of the Proposed Development and reviewed feasible mitigation measures to identify the most suitable measures appropriate to the environmental setting of the Proposed Development. In making a decision on the most suitable mitigation measure the specialist has considered relevant guidance and legislation. Where relevant, a comparison of environmental effects was made, and the specialist has reviewed the possible mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction and offsetting (not required in this development). Mitigation measures have also been considered based on the effect on quality, duration of impact, probability and significance of effects.

The selected mitigation measures for the Proposed Development are outlined in each of the EIAR Chapters 4-15. These measures have been specifically chosen to address the potential environmental impacts of the Proposed Development and to minimise any adverse effects on the environment. By considering a range of mitigation measures and strategies, the specialist team has sought to ensure that the Proposed Development is as environmentally sustainable and responsible as possible.

3.7 CONCLUSIONS

Based on the assessment of reasonable alternatives (in relation to location, scale, design, technology, mitigation) relevant to the Proposed Development and its specific characteristics as set out in this chapter, the selected site is considered to be a suitable location for the Proposed Development from an environmental, strategic and planning perspective.

The site is currently unzoned, however the Proposed Development is in keeping with the surrounding land use and also the policies and objectives of the Mayo County Development Plan 2022-2028.

The siting of the proposed Data Centre has been carefully selected based on a suitably comprehensive assessment of reasonable alternative site locations, layouts and technologies. The Proposed Development presents minimised environmental impacts, while maximising the strategic potential of the site with respect to proximity to power and fibre connections.

In conclusion it is considered that the proposed site has capacity for development and is highly suitable for the Proposed Development.

CHAPTER 04:

POPULATION AND HUMAN HEALTH

04

CHAPTER CONTENTS

4.0 POPULATION AND HUMAN HEALTH

4.1 INTRODUCTION

This chapter has been prepared to assess the likely significant impacts on Population and Human Health in respect of the Proposed Development.

The EU (2017) *Guidance on the preparation of the Environmental Impact Assessment Report* outlines that human health is a very broad factor that is be highly project dependent. This guidance states:

> *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.*

Human health should be considered in the context of environmental pathways which may affect health such as air quality, noise, water and soil quality. All can contribute to negative effects on human health by facilitating the transport of contaminants or pollutants. An evaluation of the effects of these pathways on health, by considering the accepted standards of safety in dose, exposure or risk of air quality and noise levels for example, is considered appropriate, as these standards have been arrived at via scientific and medical research.

The EPA (2015) Advice Notes explains that the scope of population and human health is project dependant but should consider significant impacts likely to affect aspects such as: convenience (expanded range of transport options); displaced settlement patterns (residential); employment opportunities; land use patterns; access for tourism, amenity, health impacts and/or nuisance due to noise, dust or water pollution; and health and safety. The EPA Guidelines (2022), notes that the transposing legislation does not require assessment of land-use planning, demographic issues or detailed socioeconomic analysis (EPA, 2022). Furthermore, the EPA Advice Notes (2015) states that issues such as employment, commercial competition, zoning, property prices, agri-business and other social and economic issues are dealt with by more specific instruments (such as the Planning Acts).

Furthermore, in accordance with the EPA (EPA, 2022), the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR. The likely significant impacts on with Human Health and Population in regard to issues such as soils, geology and hydrogeology, water, air quality, noise and vibration, traffic and landscape are addressed in detail within the following EIA chapters:

- Chapter 5 - Hydrology
- Chapter 6 – Land, Soils, and Geology
- Chapter 7 – Biodiversity;
- Chapter 8 – Air Quality;

- Chapter 9 - Climate;
- Chapter 10 - Noise and Vibration;
- Chapter 11 - Landscape and Visual Impact; and
- Chapter 13 - Traffic and Transportation.

Where these topics are dealt with in further detail elsewhere in this EIA Report, the relevant chapters have been cross referenced in this Chapter to provide the Planning Authority with a context for their determination.

The assessment of other health and safety issues that are carried out under other EU Directives are also relevant. These may include reports prepared under the Industrial Emissions, Waste Framework, Landfill, Strategic Environmental Assessment, Seveso III, Water Framework Directive, Floods or Nuclear Safety Directives. In keeping with the requirement of the amended Directive, an EIAR considers the results of such assessments without duplicating them.

4.2 METHODOLOGY

4.2.1 Relevant Legislation and Guidance

This chapter has been prepared in accordance with:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Environment Protection Agency (EPA, 2022)
- Health Impact Assessment Guidance. Institute of Public Health (IPH), (IPH, 2021).
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report European Commission (EU, 2017)

This chapter follows these guidelines and will examine the health effects relevant to the proposed development as they relate to the relevant study area.

The description of the sensitivity, magnitude and significance, outlined within this assessment are based on the Health Impact Assessment Guidance (IPH, 2021) criteria, while the probability and duration of effects are based on the definitions set out within Section 3.7 of the 'Guidelines on information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

4.2.2 Data Sources of information

The following sources of information have been used in this assessment:

- 2016 Census carried out by the Central Statistics Office (CSO) 24 April 2016. Made available from https://www.cso.ie/en/
- 2022 Census carried out by the Central Statistics Office (CSO) 29 June 2023. Made available from https://www.cso.ie/en/
- Pobal HP Deprivation Index based on 2016 Census Data (CSO) Made available from https://www.pobal.ie/
- Pobal HP Deprivation Index based on 2022 Census Data (CSO) Made available from https://www.pobal.ie/
- Google maps available from https://www.google.com/maps
- OpenStreetMap and contributors available from https://www.openstreetmap.org

- Spatial Resource made available from the Geological Survey of Ireland from https://www.gsi.ie/
- GeoHive contributors and available from https://www.geohive.ie/

4.2.3 Study Area

There is no specific guidance available on an appropriate study area to focus the assessment of existing land use and/or permitted projects. The research area has been established using expert judgement and based on the accessibility of data and taking into consideration the potential for impact from the proposed development.

It is acknowledged that projects like the one proposed can have an impact on activity in a larger area that only the site itself. Generally, the closer to the works, the greater the potential for impacts. The most significant environmental impacts are likely to be confined within 50-150 m of the proposed development. Some effects from the Proposed Development, including air quality and traffic, might have a larger area of effect, and these are addressed in further detail in the corresponding expert assessments that set out the chapters within this EIAR.

The project being considered, is not expected to have Regional, National or International, or Transboundary impacts on Human Health. Therefore, the Study area has been restricted to the neighbouring community (site-specific population), and wider community (local population). A general study area with a radius of 1 km from the site location is included for population statistics, while the wider area within a radius of 3 km from the site location has been used to inform the baseline description of the area.

In the desk-based assessment of Population Health Sensitivity the use of Electoral Divisions (ED) statistics from CSO have been utilised. Electoral Divisions are the smallest legally defined administrative areas in the state; developed with the intention of producing areas roughly equivalent in both population and "rateable value" (CSO).

The selection ED within the study area has included ED that are either entirely contained within or partially within 3 km of the Proposed Development site. In the case of the Proposed Development, the site is located within the Ballysakeery (Small Area ID 157030001), and within 1.8 km of the site are the ED's of Killala (Small Area ID 157097004), and Rathoma (Small Area ID 15713301). These locations are all located within the Republic of Ireland, County Mayo.

4.2.4 Population Impact Assessment Categories

4.2.4.1 Assessment Sensitivity of Population

The assessment of significance of an impact is a professional appraisal based on the sensitivity of the receptor and the magnitude of effect. Within any area, the sensitivity of individuals in a population will vary. The Health Impact Assessment Guidance (IPH, 2021) sets out conceptual model of the different components of sensitivity (Figure 5.1). It uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding of sensitivity. The conclusion may be summarised as a high, medium, low or negligible sensitivity to change.

The existing sensitivity of the receiving environment (in terms of population and human health) has been appraised for the study area with a desk-based assessment of routine demographic and health indicators, rather than the use of surveys or collection of primary data. This includes analysis of existing data (based on the availably of information) from the Central Statistics Office (CSO) and Pobal to build up a profile of the baseline population information within the study area. Topographical maps and Google maps have also been used to inform the baseline description of the area to inform the proximity of the Site to areas of economic activity, employment, community infrastructure, emergency services, tourism and recreation amenities.

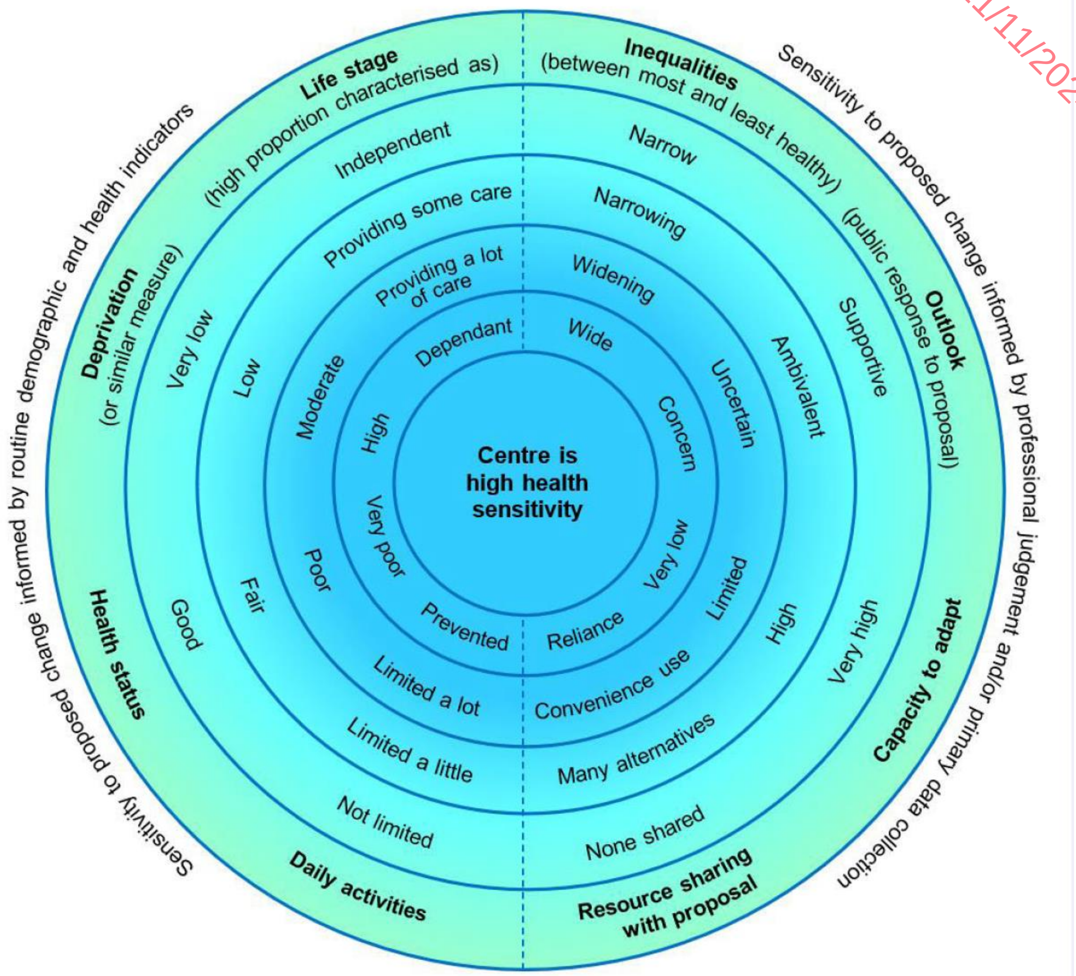

Figure 4.1 *Health sensitivity: conceptual model (Source: Health Impact Assessment Guidance (IPH, 2021))*

4.2.4.2 Magnitude of Impact

The magnitude of impact considers the characteristics of change which would affect the receptor as a result of the proposal. The Health Impact Assessment Guidance (IPH, 2021) sets out a conceptual model of the different components of sensitivity (Figure 4.2). Again, this model provides different components of *magnitude*. It uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding of *magnitude*. The conclusion may be summarised as a high, medium, low or negligible magnitude of change.

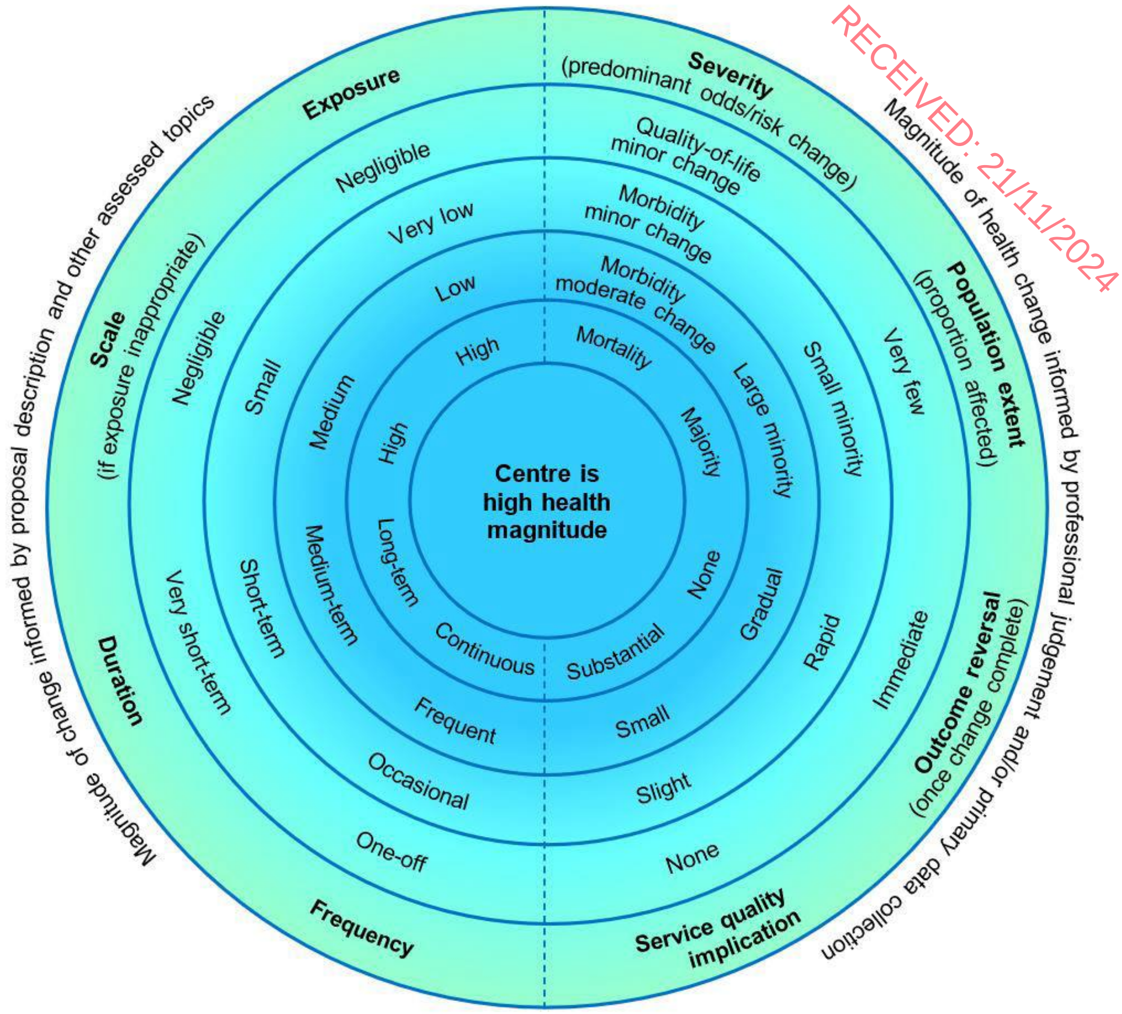

Figure 4.2 *Health magnitude: conceptual model (Source: Health Impact Assessment Guidance (IPH, 2021))*

4.2.4.3 Significance of Effects

Significance relies on informed, expert judgement about what is important, desirable or acceptable with regards to changes triggered by the proposal in question. The assessment of the significance of effects in this assessment is a professional appraisal and has been based on the relationship between the magnitude of the effects and the sensitivity of the receptor.

The Health Impact Assessment Guidance (IPH, 2021) sets out a conceptual model of the different components of significance. It uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding that a health effect is significant or not significant.

The Health Impact Assessment Guidance (IPH, 2021) model brings together different types of evidence, e.g. scientific literature, public health priorities, regulatory standards and health policy. The model thus not only take into account a range of evidence sources, but also a diversity of professional perspectives, e.g. academics, public health practitioners, regulators and policy makers.

The model below, includes the factors of magnitude of impact and the sensitivity of receptors as determined in Section 4.2.1 and Section 4.2.2 above. This EIA assessment typically relies on regulatory thresholds, where there would be formal monitoring by regulators, to set out the acceptability or desirability of change to population health.

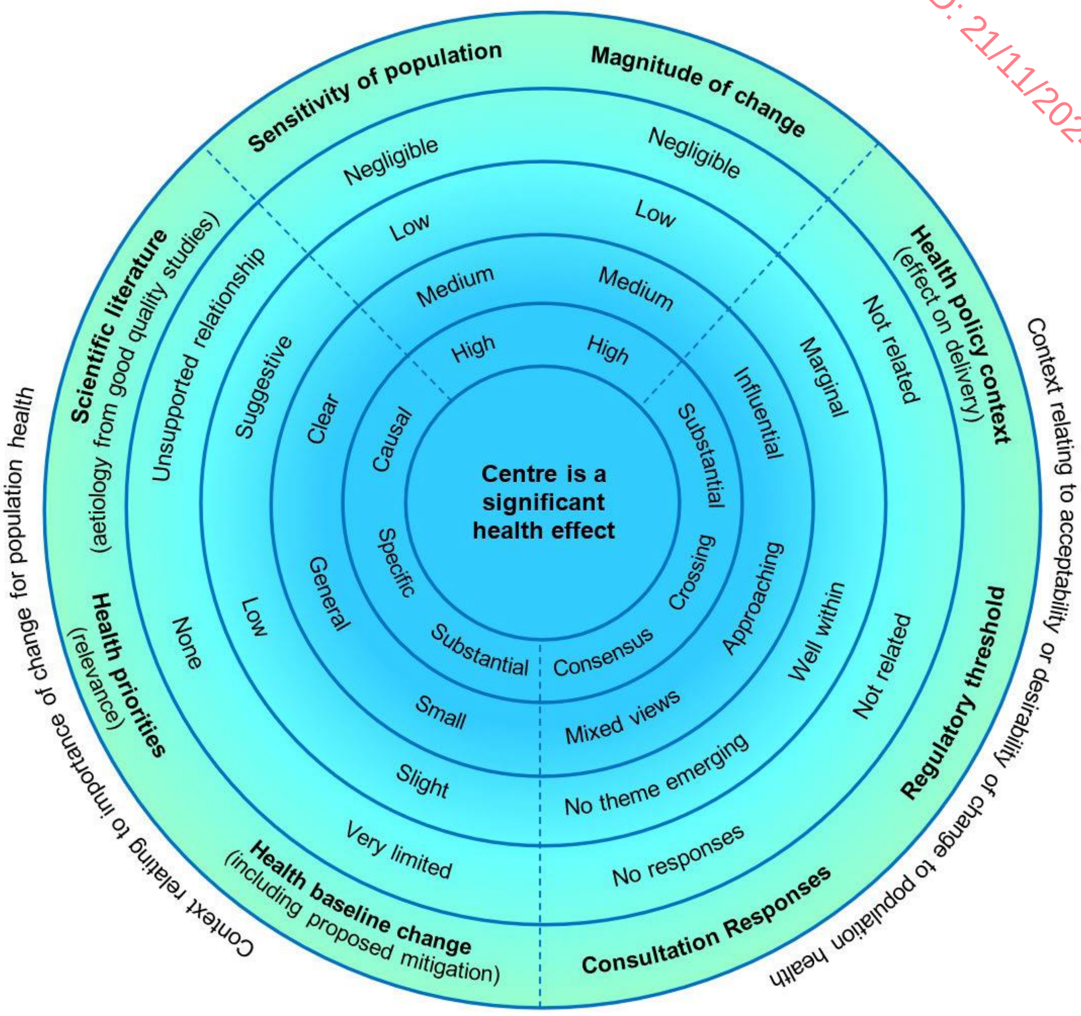

Figure 4.3 *Health significance: conceptual model*

4.2.5 Difficulties Encountered / Forecasting Methods

No particular difficulties were encountered in preparing the population assessment.

There are uncertainties in relation to assessing impacts on individuals or communities due to the lack of individual health data and the difficulty in predicting effects, which can only be based on general guidance and assumptions.

Forecasting methods and methodology, if any, are set out within the specialist chapters that this assessment relies upon.

4.3 RECEIVING ENVIRONMENT

4.3.1 Population Health Sensitivity within the Study Area

The purpose of the population health sensitivity assessment is to identify the likely sensitivity of the local population and its capacity to absorb change. It is considered that for the purpose of this assessment that available data on: Population; Deprivation; Life Stage; and Health Status within the Study Area provides sufficient information to establish the population sensitivity and to provide the Planning Authority with a context for this assessment.

4.3.1.1 Population

The latest census data (2022) shows that the population in within the study area at all Electoral Divisions saw an increase in population within the period between national census records. (Table 4.1).

Table 4.1 *Population change at National, County and Electoral Division level from 2016 – 2022 (Source: www.cso.ie)*

Area	Population for Census Year		% Change 2016-2022
	2016	2022	
State - Republic of Ireland	4,761,865	5,149,139	+8.1
Ballysakeery ED	613	620	+1.14
Killala ED	1,256	1325	+5.49
Rathoma ED	217	248	+14.3

4.3.1.2 Deprivation

The Health Impact Assessment Guidance (IPH, 2021) outlines that impact assessments should consider if the population is already stressed by limited resources or high burdens as well as if groups are affected that have reduced access to financial, social and political resources. Deprivation differences between areas are indicative of social gradients, which are central to the consideration of health inequalities.

Deprivation statistics for Ireland are available from the Pobal HP Deprivation Index (Figure 4.4), which shows the overall affluence and deprivation in an area. This Index draws on data from the national Census and combines three dimensions of relative affluence and deprivation: Demographic Profile, Social Class Composition and Labour Market Situation that are measured by ten key socio-economic indicators from the Census of Population.

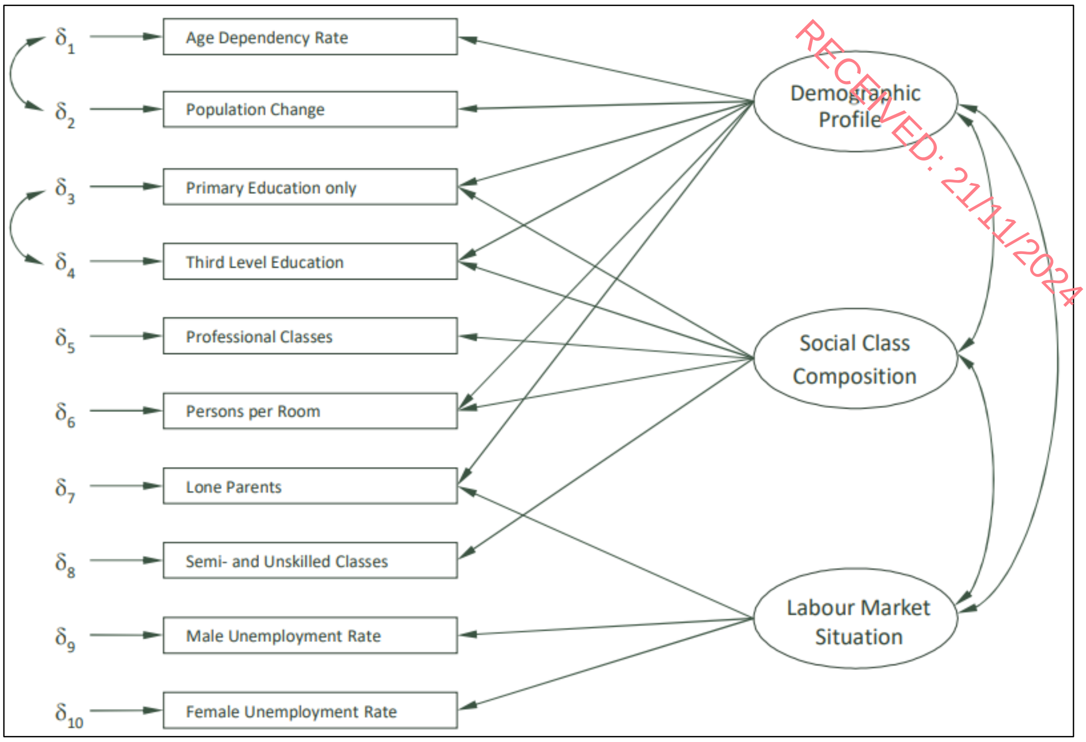

Figure 4.4 *Basic Model of the Pobal HP Deprivation Index*

The Pobal HP Deprivation Index Relative Index Score allows for the provision of descriptive labels with the scores, which are grouped by standard deviation as seen in Table 4.2 below.

In order to make a uniform assessment using the conceptual model as set out in Figure 4.1 above, a relative Population Sensitivity the Deprivation Score of 'Very disadvantaged', or 'Extremely disadvantaged' would represent a high sensitivity. Conversely, a 'Extremely affluent' or 'Very affluent' would represent a very low sensitivity.

Table 4.2 *Pobal HP Index Relevant Index Score labels (Source: Pobal HP Deprivation Index)*

Deprivation Score	Pobal HP Description	Sensitivity of Population
> 30	Extremely affluent	Very Low
20 to 30	Very affluent	Very Low
10 to 20	Affluent	Low
0 to 10	Marginally above average	Low
0 to -10	Marginally below average	Moderate
-10 to -20	Disadvantaged	Moderate
-20 to -30	Very disadvantaged	High
< -30	Extremely disadvantaged	High

The data in Table 4.3 show the Pobal HP Deprivation Index Relevant Index Scores for the Study Area based on the 2022 Census. These figures show for the year 2022 that the study area is largely 'Marginally Below Average' with areas of "Extremely Disadvantaged" and " Disadvantaged" in small pockets around Killala ED. These statistics align with the deprivation scores for the ROI, as the state as a whole has been found to have a deprivation score ''Marginally Below Average'. This indicates a Moderate Population Sensitivity (Deprivation) within the study area, with some highly sensitive pockets in the wider area.

__Table 4.3__ Deprivation Score within the Study Area (Pobal HP Deprivation Index, 2022 Census)

Area	Deprivation Score	Pobal HP Description
State - Republic of Ireland	-7.5	Marginally Below Average
Ballysakeery ED	-3.18	Marginally Below Average
Killala ED	-5.85	Marginally Below Average
Rathoma ED	-3.38	Marginally Below Average

4.3.1.3 Life Stage (Age Dependency)

The Health Impact Assessment Guidance (IPH, 2021) outlines that life-course analysis is often used in public health and reflects differing health sensitivities and needs at different ages. Typically, children and older people are particularly sensitive to change, including due to being dependants. Dependents are defined for statistical purposes as people outside the normal working age of 15-64. Dependency ratios are used to give a useful indication of the age structure of a population with young (0-14) and old (65+) shown as a percentage of the population of working age (15-64).

A low dependency ratio indicates that there is a larger proportion of working population age (15–64) years as compared to young (0-14) and old (65+). Conversely, a high dependency ratio indicates that there is a larger proportion of young (0-14) and old (65+) as compared to working population age. High dependency ratio can also indicate if some groups are more likely to be at home during the day (for example, due to childcare, or retired persons) and would therefore be more likely to be impacted by a development within the area.

Age dependency ratio is available through the Pobal Online Geo-Profiling tools (https://maps.pobal.ie/) which are based on the national Census.

The age dependency ratio for the study area is shown in Table 4.4 below. From these dependency ratios we can tell that the study area is less dependent when compared with ROI as a whole, with the exception of Killala ED. Killala ED was found to have a marginally higher age dependency ratio that the ROI and two other districts within the stud area. This indicates a generally ‘independent’ population within the Study Area as compared ROI which can be defined as per the conceptual model as ‘providing some care’ to ‘providing a lot of care’.

__Table 4.4__ Age Dependency Ratio within the Study Area (Pobal Geo-Profiling, 2022 Census)

Area	Age Dependency Ratio for Census Year	
	2016	2022
State - Republic of Ireland	34.40	37.04
Ballysakeery ED	35.84	35.06
Killala ED	39.20	42.06
Rathoma ED	40.55	36.29

4.3.1.4 Health Status (General Health)

The CSO as part of the census records an overall self-reported measure of population health within Ireland. Areas with a poor health status are typically considered to be of a higher sensitivity and more susceptible to change in environmental conditions.

Table 4.5 below shows the Self-reported measure of population health within the Study Area compared to ROI. This shows the area predominately self reports their health as 'Very Good' in-line with national trends.

Table 4.5 *Self-reported measure of population health (CSO, 2016 Census)*

Area	% population describing their general health					
	Not Stated	**Very Bad**	**Bad**	**Fair**	**Good**	**Very Good**
State - Republic of Ireland	3.33%	0.29%	1.32%	8.04%	30.00	53.00%
Ballysakeery ED	4.27%	0.30%	2.13%	8.23%	34.45%	50.61%
Killala ED	3.77%	0.23%	2.04%	10.6%	33.58%	49.81%
Rathoma ED	4.44%	0.40%	0.81%	10.89%	20.97%	62.50%

4.3.1.5 Ability to Perform Daily Activities

People's ability to perform day-to-day activities is relevant to population sensitivity, particularly where there are changes in access to services or community amenities. Persons with disabilities can also be more susceptible to the changes in environmental conditions. The CSO as part of the census records an overall self-reported measure of persons with disabilities within Ireland.

Table 4.6 details the number of persons with a disability compared to the population as a whole. The data shows that the study area has an equivalent or lower percentage of persons with a disability as the national average; indicating that for persons within the area there is a relatively limited restrictions on daily activity.

Table 4.6 *Persons with a disability (CSO, 2022 Census)*

Area	Persons with a disability	Population	% Persons with a disability
State - Republic of Ireland	1,109,557	5,149,139	22%
Ballysakeery ED	135	620	22%
Killala ED	290	1325	22%
Rathoma ED	49	248	20%

4.3.1.6 Summary of Population Health Sensitivity

The sensitivity of the surrounding area has been considered based on the details of the published data available from CSO and Pobal. The study area has seen a population growth between the 2016 and 2022 census. The Pobal HP Deprivation Index shows the area be Marginally Below Average, with small pockets of higher disadvantage. Overall, this indicates a largely Moderate Population Sensitivity (Deprivation) within the study area.

There is a low age dependency ratio, therefore a large proportion of the population is within working age, thus considered as largely independent and judged to be not sensitive to change. The information presented above for the study area shows, a high proportion [62 – 50%] describes their health status as 'Very Good' and low proportion as 'bad' or 'very bad'. The data shows that the study area has a lower or equivalent percentage of persons with a disability than the national average; indicating that for persons within the area there is a relatively limited restrictions on daily activity.

The population within the study area is therefore not particularly sensitive to change, with a ranking of low to medium sensitivity.

4.3.2 Location and Character of the Local Environment

The purpose of describing the location and character of the local environment provides useful information on the current local community and usage within the study area, providing the Planning Authority with a context for this assessment. This includes community and social infrastructure that covers a range of services and facilities that meet local and strategic needs and contribute towards a good quality of life. In this context it includes local business, residential areas, education, health facilities, emergency services, and places of worship, and green infrastructure.

Furthermore, the baseline identifies tourism and landscape amenity within the study area which provides an indication on current intrinsic values placed on the area for local, national and international users that may be impacted by the Proposed Development.

The local environment also includes areas of natural resources that relate to populations and human health that may be impacted by the proposed development, this includes economic resources, recreational and bathing waters, and drinking water resources.

While a general study area of ED's within 1 km from the site location is included for population statistics, the wider area of 3 km from the site location has been used to inform the baseline description of the area.

<u>4.3.2.1 Community and Social Infrastructure within the Study Area</u>

<u>Residential and Employment areas</u>

The site is located adjacent to the Killala Business Park and is not subject to any specific zoning objective but is directly contiguous to an existing area of employment and industrial and energy-related development. Notable facilities within the vicinity of the site include; Tawnaghmore Power Station (Energy), Killala Community Windfarm (Energy), SCHÜTZ Ireland (Industrial), Mullafarry Quarry LTD. (extraction quarry), Iron Excellence (Iron Works), Killala Precision Components Ltd. (Manufacturing), and G & G Engineering Ltd. (Manufacturing).

The closest shopping centre of note is the McAndrew Centre in Ballina, c. 10.4 km south-east of the site.

There are some notable concentrations of residential settlements that occur to the north of the site in the village of Killala. There are also rural residential developments surrounding the site, predominantly in a one-off development pattern that is typical of their rural setting.

The nearest noise sensitive location is Glebe house (the ‘Old Rectory’), which is currently not in use (not considered a residential dwelling) but located just 145m from the site boundary. The existing Glebe House Protected Structure is part of the redevelopment proposals to return the building to community use. Two dwelling houses situated to the east of the site are at a distance of 650 m & 400m from the Proposed Development. To the west of the site boundary there are three further noise sensitive residential houses, at distance between 235m – 370m from the Proposed development. Slightly further but still within the area of noise sensitivity are three additional residential houses, located between 950m – 1,210m to the northeast of the Proposed Development. Noise sensitive locations are further detailed in Chapter 10 (Noise and Vibration).

Education, Childcare, Schools

There are a number of primary and secondary schools in the vicinity of the proposed development including:

- St. Joseph's National School– 2.73 km north
- Newtownwhite Educate Together National School– 2.8 km south east
- Cooneal National School 2.79 km south

The closest third level institution in the area is Atlantic Technological University Sligo, located c. 49.42 km northeast of the site, well outside of the study area.

Healthcare Services

There are no healthcare services within the study area. The nearest is Atlantic Medical Centre which is located c. 9.7 km south-east in Ballina, and Moyview Family Practice which is also c. 9.7 km south-east in Ballina.

There are no hospitals within the study area, the nearest is Mayo University Hospital located c. 38.6 km to the south of the site in Castlebar, and Sligo University Hospital which is c. 49.3 km to the east of the site.

Emergency Services

The Killala Garda Station is located c. 2.3 km north of the site in Killala.

Ballina Fire Station is located c. 9.2 km southeast of the site, while Enniscrone Fire Station is located c. 9.3 km northeast of the site.

Places of Worship

There are three places of worship in the vicinity of the development:

- Mullafarry Presbyterian Church c. 0.33 km west
- Saint Patrick's Church c. 2.4 km north
- Church of the Holy Rosary 2.4 km south

Green Infrastructure, Landscape and Amenity, within the Study Area

The nearest noteworthy feature is for recreational use is Ross Beach, 4.27km from the proposed development. Tom Ruane Park is located 9.71 km from the site offering playground and sport recreational areas. Within 1.68 km north-west of the site is the Killala GAA pitch. Other nearby GAA pitches include Ardagh CAA club, 7.96 km to the southwest, Ballina Stephenites GAA Club 9.89 km to the southeast, and St Brendans GAA Park 9.76 km to the southeast.

In terms of landscape, undeveloped agricultural lands and the business park development to the east of the site are the dominant elements of the landscape. Visual amenity is limited within this area. This area can be considered of low sensitivity to the proposed development, which is of similar character. There are no listed or scenic views, no landscape or amenity designations or protected trees pertaining to the site. There are several monuments in proximity to the project sit, as visible in Figure 4.5 below. Most significantly and in closest proximity to the site is Gleb House, an early 1800's disused rectory house and grounds which exists just on the site's boundary. The house, a significant example of early nineteenth-century architectural heritage in the rural surroundings of Killala, has fallen into disrepair. Restoration efforts are currently underway to return the building to community use.

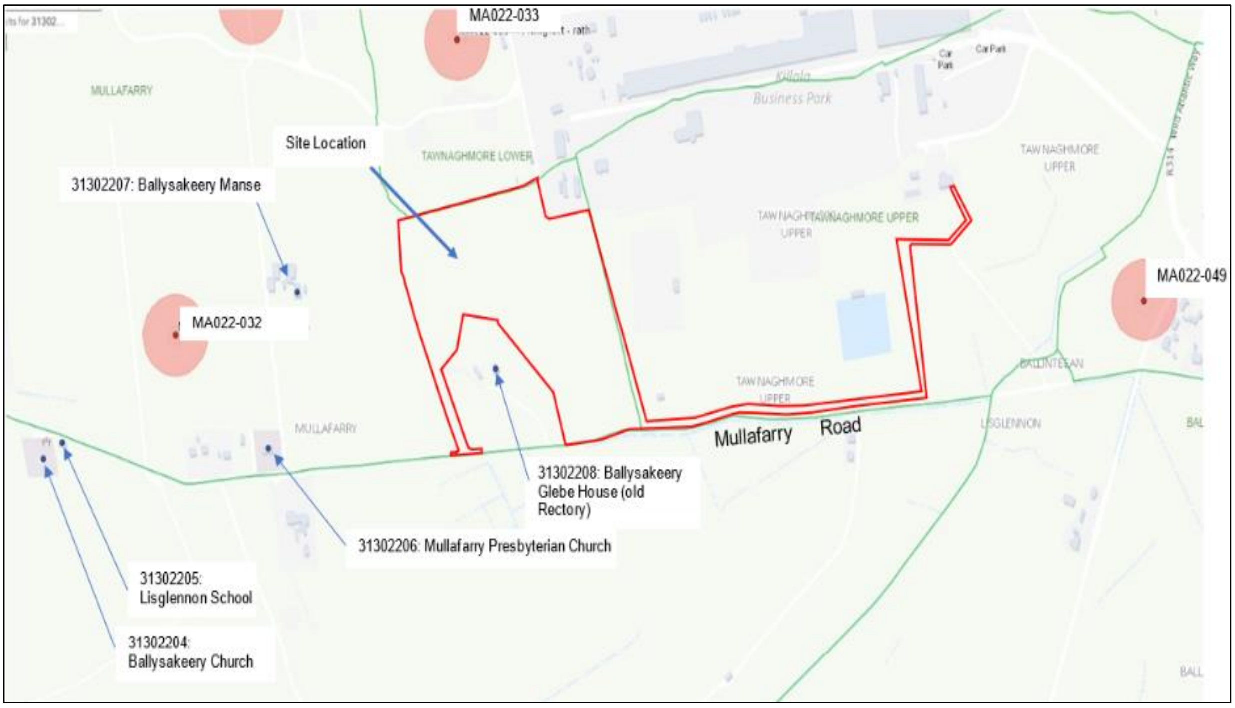

Figure 4.5 *Recorded sites and monuments (Source: National Monuments Service historic environment viewer) (Annotated).*

4.3.2.2 Tourism within the Study Area

Tourism is returning to strong growth and continues to play a hugely influential role in Irelands economic success.

The development site is located within County Mayo which has 1,150 km of scenic and varied coastline, a number of attractive towns, and several centres of residential, retail and service industries. Destination Mayo 2016-2021 outlines tourism strategy in the county as below:

The tourism strategy highlights that Mayo has significant potential for a new high quality, innovative product development, ranging from the Wild Atlantic Way, Monasteries of the Moy Greenway, expansion of the highly successful Great Western Greenway, Blueway Water Trails, VeloRail, Wild Nephin Wilderness Park and the Mary Robinson Centre in Ballina. Initiatives such as interpretation of the Sacred Landscape, Pilgrim Trails across the county, the famine history of Mayo and facilities for adventure activities both land and water-based, offer unique ways for a wide range of visitors to engage with Mayo's landscape, heritage and people.

The development site is located directly surrounding an existing business park and is not located near any areas of significance or local tourism. Tourism is not a major industry in the immediate environs of the site. Costal Killala, however, does benefit from being a tourist destination due to its water sports, beaches, fishing and wildlife.

4.3.2.3 Natural Resources within the Study Area

Geological Heritage, and Economic Resources

A review of Geological Survey Ireland (GSI) online maps has shown that there are one active quarries within the Study Area. The Mullafarry Quarry is located approximately 1.4 km west of the Proposed Development site.

Several mineral localities are present within the Study Area. These include non-metallic mineral deposits including clay, limestone, iron, tufa, calcite, sandstone, sand and gravel, and flagstone. Additional non-specified minerals within the study area include pyrrhotite and chalcopyrite.

An area of geological heritage is also present within the Study Area, as highlighted in a red cast in Figure 4.6. This area is defined by the GSI as an extensive area of ridges, located on the western side of the Moy Estuary in Killala, which is significant due its remarkable examples of glaciotectonic ridges. These features are substantial in size, and therefore face no significant threats are considered to drastically alter them.

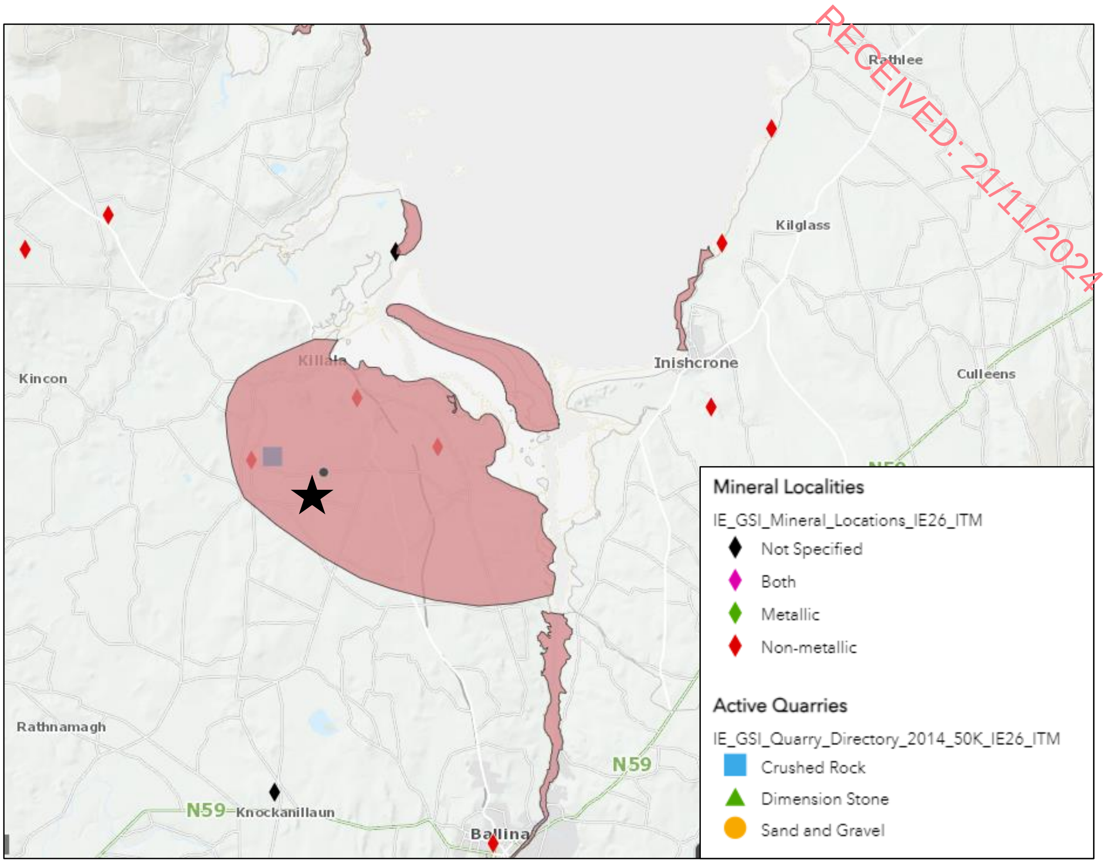

Figure 4.6 *Recorded Mineral Localities, Geologic Heritage Site and Quarry Locations (Source National Monuments Service historic environment viewer)*

Recreational Waters and Bathing Waterbodies

A review of Environmental Sensitivity Mapping online maps that includes the Register of Protected Areas (RPA) under the Water Framework Directive (WFD) has shown that there are no protected Recreational Waters or Bathing Waterbodies within the Study Area. The site is adjacent to an unnamed stream, that ultimately flows to the River Moyne. There are no RPA at this location.

Drinking Water Resources

A review of Environmental Sensitivity Mapping and Geological Survey of Ireland online maps that includes the Water Abstraction locations, and Groundwater Source Protection Areas has been undertaken. This shows no Groundwater Source Protection Areas within the Study Area.

4.3.3 Risk of Major Accident Hazards or Disasters

The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with sensitive facilities. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required.

Landslides, Seismic Activity and Volcanic Activity

There are no recorded landslide events within the study area. There is a negligible risk of landslides occurring in the immediate vicinity due to the topography and soil profile of the site and surrounding areas. The surrounding site area is classified as "Low" – "Moderate Low" in the GSI Landslide Susceptibility Classification, as seen in figure 4.7 below. The Site does however host a significant slope with the existing gradient falling from north to south by approximately 20m.

There is no history of seismic activity in the vicinity of the site. There are no active volcanoes in Ireland so there is no risk of volcanic activity. Further detail is provided in Chapter 5 (Land, Soils, Geology and Hydrogeology).

Figure 4.7 Recorded Mineral Localities, Geologic Heritage Site and Quarry Locations (Source National Monuments Service historic environment viewer)

The proposed development site is not vulnerable to landslides, seismic activity or volcanic activity. Therefore, there is no significant potential for the proposed development to cause risks to human health due to its vulnerability to landslides, seismic activity or volcanic activity.

Proximity to Seveso or Industrial Emissions Sites

The potential for major accidents to occur at the facility has also been considered with reference to establishments registered with the Health and Safety Authority in accordance with the Control of Major Accident Hazards (COMAH) Regulations that implements the implements the Seveso III Directive.

There are no significant risks in relation to the proposed development and Major Accident Hazards. The site is not a Seveso facility. The nearest recorded Seveso facility, European Refreshments, is located approximately 8.5 km southeast of the Proposed development on Killala Road in Balliana, Co. Mayo. This is classed as an upper tier establishment. No significant effects associated with major industrial accidents involving dangerous substances are anticipated.

Planning permission has been sought, however to a proposed Hydrogen Plant and an Energy Centre (Mayo County Council planning application number 2360266), with a decision anticipated by the end of October 2024. This development is within the adjoining business park. There are no significant risks in relation to the proposed development and Major Accident Hazards. It should be noted this facility is not built and as such is not notified to the HSA as a Seveso site. This proposed development (not yet built) but will be likely to be classed as a lower tier establishment and the likely consultation distance is as shown below (Source: Further Information report on the planning file). The data centre is expected to lie within the inner land use planning zone around the Seveso site but as the data centre is a workplace (level 1 development) under the HSA Land Use Planning (LUP) guidance, and such a development is compatible with the inner LUP zone then the data centre is an appropriate development to be located in the vicinity of the nearby Seveso site.

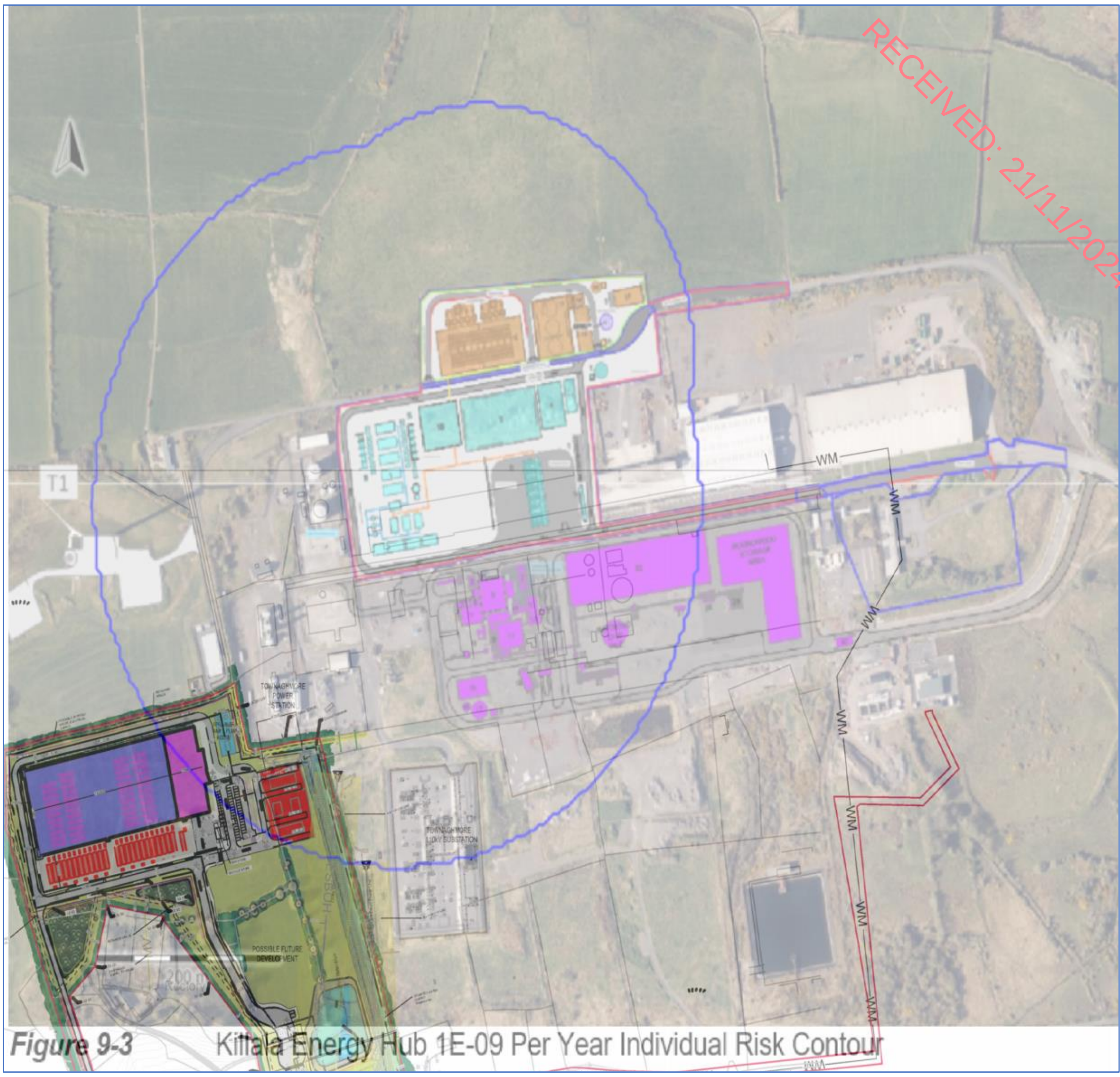

Figure 4.8 Risk associated with Proposed Hydrogen Plant and an Energy Centre development related to Site location. (Source MCC Planning File Further Information response PA 2360266, amended)

According to the EPA (2024), there are several Industrial Emissions (IE) licensed facilities near the proposed development site. These facilities adhere to specific licensing conditions. While the proximity of these facilities does not inherently impact the proposed development, these are assessed as part of the existing environmental context and potential cumulative impacts or interactions.

There are two EPA licensed instillations within 1km of the Proposed Development. The nearest licensed facility is the Tawnaghmore Electricity Generating Plant, operated by SSE Generation Ireland Limited (P0566-02), directly adjacent to the site to the east. Other nearby licensed facilities include the former Asahi Synthetic Fibres (Ireland) Limited (now inactive) and Mayo Renewable Power Limited (P1077-01).

Figure 4.9 Industrial Emissions License Locations Near Proposed Development (Source EPA Maps viewer)

Risk of Flooding

The potential risk of flooding on the site was also assessed in Chapter 6 (Hydrology) Section 6.3.5 and the infrastructure report and the site was shown not to be within a flood zone. An analysis with the most recent OPW flooding maps (available on www.floodinfo.ie) was also performed. No flood risk was identified for the Proposed Development. A review of the available flood data indicates that there is no historical flood hazards identified in the vicinity of the site. No recorded flood events have occurred near the site, with the closest documented flooding approximately 2.69 km north of the site, which is a recurring flood event, associated with coastal and estuarine waters from Killala Bay.

4.4 PROPOSOED DEVELOPMENT

The Proposed Development is described in Chapter 2 (Description of the Proposed Development).

4.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

The main potential impacts on population and human health from the proposed development are potential for spills/leaks, air emissions, noise, visual, and traffic impacts. The baseline environment, pollution pathways, relevant mitigation measures and residual impacts have been assessed in greater detail within the corresponding specialist chapters; Chapter 5 (Land, Soils, Geology and Hydrogeology); Chapter 6 (Hydrology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual) and Chapter 13 (Traffic and Transportation);

A summary of the main potential impacts as they are relevant to human health criteria during construction, commissioning, operation and decommissioning of the proposed development is presented herein.

4.5.1 Construction Phase

4.5.1.1 Potential Impacts on Businesses and Residences

The main potential impacts on local businesses and residences associated with the Proposed Development will be in relation to nuisances; air quality, noise, visual impact and traffic. The potential impacts and mitigation measures to address them are dealt with within the corresponding chapters of this EIA Report as follows:

- Chapter 8 – Air Quality
- Chapter 10 – Noise and Vibration
- Chapter 11 – Landscape and Visual Impact
- Chapter 13 – Traffic and Transportation

Construction will have an indirect positive effect on support industries such as builder suppliers, construction material manufacture, maintenance contracts, equipment supply, landscaping and other local services. There will also be a need to bring in specialist workers on a regular basis that may increase the above estimated working population at times. Specialists are only likely to stay for shorter periods depending on the nature of the work. The construction phase, therefore, is considered to have the potential to have an ***imperceptible, temporary*** *and* ***neutral*** impact on the economy and employment of the local and wider area.

4.5.1.2 Potential Impacts on Landscape Amenity and Tourism

There will be no impact on the local parks or the larger amenity areas. It is not anticipated the proposed development will have significant impact on local tourism or shopping amenities. The proposed development will not create any significant wastewater discharge which could have a potential impact on local amenities or the local population.

It is considered following landscape guidelines that the overall impact of the proposed development on the local landscape will be ***negative, slight adverse*** and ***short term*** during the construction phase. Visual impacts will vary depending on where the view is observed. A review of 10 views is assessed in Chapter 11 (Landscape and Visual Impact) Table 11.6, During construction, these vary from ***slight adverse*** (viewpoint from Wild Atlantic Way (R314) to **significant adverse** (Mullafarry road to southwest ref road users and church.)

4.5.1.3 Potential Impact from Land and Water Emissions on Human Health

With reference to Chapter 5 (Soils, Geology and Hydrogeology) and Chapter 6 (Hydrology) during construction of the proposed development, there is a risk of accidental pollution incidences from the following sources:

- Suspended solids (muddy water with increase turbidity) – arising from excavation and ground disturbance;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms.

Accidental spillages which are not mitigated may result in localised contamination of soils and groundwater/run-off water. However, as the underlying aquifer is a poor aquifer the potential for off site migration within the aquifer is not likely. In addition there are no downgradient public water supplies. As such no potential for impact on potable water supply.

There is an existing 'indirect' hydrological pathway/connection between the site and Killala Bay SAC/SPA via the unnamed drainage ditch that flows along the sites southern boundary before discharging to the Moyne Stream which eventually discharges to Killala Bay coastal waterbody. However, based on the distance and likely hazard loading during construction and operation there is no potential for impact on water quality at the natura sites.

In the absence of mitigation measures the potential impacts during the construction phase on Population and Human Health in respect of the environmental factor of Hydrology and Hydrogeology is ***neutral, imperceptible*** and ***short-term***.

4.5.1.4 Potential Impact from Air Quality on Human Health

The key elements of construction of the proposed development with potential impacts on populations and human health from air quality and climate impacts are:

- Potential for Dust Soiling Effects on People and Property from general site preparation, vehicles and construction activities;
- Potential Human Health Impacts from dust (PM_{10} and $PM_{2.5}$.) emissions from general site preparation, vehicles and construction activities;
- Engine emissions from construction vehicles, traffic and machinery.
- A change in traffic flows on road links nearby the proposed development.

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) as referenced in Chapter 8 (Section 8.3.3.2) the overall sensitivity of the area to dust soiling impacts is considered ***low*** based on the IAQM criteria outlined in Table 9.6. Based on the IAQM criteria outlined in Table 8.12, the worst-case sensitivity of the area to human health is considered to be ***low***.

The greatest potential impact on air quality during the construction phase of the Proposed Development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 250 m of a construction site, the majority of the deposition occurs within the first 50 m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. Sensitive receptors include residential properties within 250m of the site boundary, as seen in Figure 8.2.

An analysis of Belmullet meteorological data indicates that the prevailing wind direction is westerly to south-westerly, with typically moderate wind speeds (refer to Section 8.4.1). Dust generation is also significantly reduced on days with rainfall exceeding 0.2 mm. Historical data from the Belmullet meteorological station shows that, on average, there are 256 days per year with rainfall above 0.2 mm (Met Éireann, 2023), suggesting that approximately 70% of the time, natural weather conditions will help mitigate dust generation.

Table 8.21 of Chapter 8 shows a Summary of Dust Impact Risk used to Define Site-Specific Mitigation. This defines the Potential Impact from Dust Soiling and on Human Health to have a Low Risk. Therefore, in the absence of mitigation there is the potential for ***direct, short-term, negative*** and ***slig*****ht** impacts to human health as a result of the Proposed Development.

4.5.1.5 Potential Impact from Noise and Vibration on Human Health

Noise criteria are provided by relevant bodies with consideration of the likely impact of noise on human health. The construction phase is short-term and therefore any elevated levels of noise will be of limited duration and, as a result, are not expected to pose any risk to human health. In terms of the noise exposure of construction workers and potential hearing damage that may be caused due to exposure to high levels of noise, the Safety, Health and Welfare at Work (General Application) Regulations 2007 (Statutory Instrument No. 299 of 2007) provides guidance in terms of allowable workplace noise exposure levels for employees. The Regulations specify two noise Action Levels at which the employer is legally obliged to reduce the risk of exposure to noise. The appointed contractor will be required to comply with the Regulations and provide appropriate noise exposure mitigation measures where necessary. Therefore, in the absence of mitigation there is the potential for ***direct, short-term, negative*** and ***slig*****ht** impacts to human health as a result of the Proposed Development.

4.5.1.6 Potential Impact from Traffic and Transportation on Human Health

The World Health Organisation Report 'Health Effects and Risks of Transport Systems: The Hearts Project' (World Health Organisation, 2006) states that road traffic is a major cause of adverse health effects - ranking with smoking and diet as one of the most important determinants of health in Europe. The report states:

> *"Traffic-related air pollution, noise, crashes and social effects combine to generate a wide range of negative health consequences, including increased mortality, cardiovascular, respiratory and stress-related diseases, cancer and physical injury. These affect not only transport users but also the population at large, with particular impact on vulnerable groups such as children and elderly people, cyclists and pedestrians"*

In the Department of Communications, Climate Action & Environment document *Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy* vehicle emissions are included as a key source of health impacts in Ireland (DOCCA&E, 2017).

An assessment of the additional traffic movements associated with the proposed development during the construction phase is presented in Chapter 13 (Traffic and Transport).

The construction of the proposed development is predicted to result in an additional 240 cars, 100 – 120 Heavy Goods Vehicles and 20 Light Goods Vehicles per day during the construction phase peak spread out during the operational hours of the site - 10% of which are estimated to occur during the network peak hours.

Chapter 13 (Traffic and Transport) concluded that the effect of the construction traffic on the road network during the construction phase will be ***negative***, ***not significant*** and ***short-term***, and given the not significant traffic increase on the assessed junctions, there will be very minor changes to the junction's operational capacities.

Care will be taken to ensure that the pedestrian and cycling routes will be maintained or appropriately diverted as necessary during the construction period. Given the not significant traffic increase on the assessed junctions, the construction impact on human beings will also be ***negative***, ***not significant*** and ***short-term***.

4.5.1.7 Potential Impacts from Major Accident Hazards and/or Natural Disasters on Population and Human Health

The proposed development has the potential for an impact on the health and safety of workers employed during the construction phase. The activities of the applicant's contractors during the construction phase will be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) to minimise the likelihood of any impacts on workers' health and safety.

As outlined in Section 4.3, there is a negligible risk of external natural disasters; including landslides, seismic activity, volcanic activity and sea level rise.

The risk of major accidents at the facility is negligible due to the absence of nearby permitted Seveso/Control of Major Accident Hazards (COMAH) Regulation sites. As discussed above there is a planning permission for a Lower Tier COMAH site close to the facility (Mayo County Council planning application number 2360266), The proposed data centre is expected to lie within the inner land use planning zone around the Seveso site (if permitted). As the data centre is a workplace (level 1 development) under the HSA Land Use Planning (LUP) guidance and such a development is compatible with the inner LUP zone then the data centre is an appropriate development to be located in the vicinity of the nearby Seveso site.

The potential effect is therefore ***imperceptible***, and unlikely, respect of Major Accident Hazards or Natural Disasters on Population and Human Health during the Construction Phase of the Proposed Development.

4.5.2 Operational Phase

4.5.2.1 Potential Impacts on Businesses and Residences

The main potential impacts on local businesses and residences associated with the Proposed Development will be in relation to nuisances; air quality, noise, visual impact and traffic. The potential impacts and mitigation measures to address them are dealt with within the corresponding chapters of this EIA Report as follows:

- Chapter 8 – Air Quality
- Chapter 10 – Noise and Vibration
- Chapter 11 – Landscape and Visual Impact
- Chapter 13 – Traffic and Transportation

It is not expected there will be any likely significant effects on local residential figures in association with the operation of the proposed development.

4.5.2.2 Potential Impacts on Amenity and Tourism

The proposed development once operational will have no impact on local tourism or shopping amenities. There will be no impact on the local parks or the larger amenity areas.

Visual impacts and amenity impacts perceived by individual persons are highly subjective and difficult to characterise however, it is considered following landscape guidelines that the overall impact of the proposed development on the local landscape will be ***moderate and neutral*** during operation. Visual impacts will vary depending on where the view is observed. A review of 10 views are assessed in Chapter 11 (Landscape and Visual Impact) Table 11.6, During operation, these vary from ***not significant*** (viewpoint from Wild Atlantic Way (R314) to **moderate adverse** (Ballysakeery Glebe House) and **moderate adverse** (Mullafarry Road to southwest (ref house/church)

4.5.2.3 Potential Impact from Land and Water Emissions on Human Health

With reference to Chapter 5 (Soils, Geology and Hydrogeology) there are no abstractions from the aquifer included in the proposed development. There will be a minimal increase in hardstanding area associated with the proposed development. This will have an imperceptible effect on local recharge to ground and on the overall hydrological regime. There is limited potential for leaks and spillages from vehicles along the proposed permeable access roads and car park as the development will require only occasional vehicle access. In addition, there is no direct pathway to surface water from this site and therefore, is no likely potential impact to off-site watercourses i.e. Moyne 34 Stream and Killala Bay.

In the absence of mitigation measures the potential impacts during the construction phase on Population and Human Health in respect of the environmental factor of Soils, Geology and Hydrogeology is ***neutral, imperceptible*** and ***long-term***.

With reference to Chapter 6 (Hydrology) there will be no direct discharges to any waterbodies. SUDs measures, i.e. Attenuation Pond (4,500m^3), Pollutant Traps, Hydrocarbon Interceptors, Forebay, Paving and Swales have been incorporated into the design in order to minimise any increase in surface water discharge into the existing system. Discharge flow on the site will be restricted to the greenfield equivalent runoff for the catchment areas.

The potential impact during operation on Population and Human Health in respect of the environmental factor of Hydrology is ***neutral, imperceptible*** and ***long-term***.

4.5.2.4 Potential Impact from Air Emissions on Human Health

As outlined in Chapter 8 (Air Quality), National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are the protection of human health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Chapter 8, Table 8.1).

The key elements of operation of the proposed development with potential impacts on populations and human health from air quality impacts are:

- Engine emissions from vehicles accessing the site.
- Emissions associated with operation of 25 no. standby backup generators have the potential to affect air quality.

There is negligible additional operational phase traffic associated with the Proposed Development. Therefore, a detailed air quality modelling assessment of operational phase traffic emissions was not conducted.

The potential impact on human health from air quality during the operational phase of the Proposed Development is a breach of the ambient air quality standards as a result of air emissions from the site boundary. As outlined in Chapter 8, Section 8.5.2.2, emissions to atmosphere of NO_2 from the site will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health.

Due to the design of the proposed development there is no potential for significant impacts to air quality during operation as a result of emissions.

4.5.2.5 Potential Impact from Noise and Vibration Emissions on Human Health

Exposure to excessive noise is becoming recognised as a large environmental health concern. According to the 2015 European Commission report 'Noise Impacts on Health', (European Commission, 2015), the most common effects of noise on the vulnerable include;

- Annoyance
- Sleep Disturbance
- Heart and circulation problems
- Quality of Life
- Cognitive Process
- Hearing

Noise and vibration impacts associated with the development have been fully considered within Chapter 10 of the EIA Report.

The main potential noise impacts associated with the operation of the Proposed Development are noises related to building services, emergency site operations, and additional vehicular traffic on the public roads. Review of the predicted noise levels associated with the main potential noise impacts have been analysed further in Chapter 10 (Noise and Vibration). These reviews have found that that the site-specific levels comply with noise criterion relevant to these proposed activities.

The potential health effects of exposure to excessive noise include sleep disturbance. The *Community Noise* guidelines published by Stockholm University in 1995 for the World Health Organisation recommend an internal night-time level of no more than 30 dB $L_{Aeq,8hr}$.

As presented in Chapter 10, Table 10.18, the cumulative noise levels with the proposed development added to the prevailing noise environment are 37.5 dB $L_{Aeq,T}$ external to the worst-affected noise-sensitive location. Allowing for a 15 dB reduction across an open window, the expected noise level internal noise level is well within the indoor WHO criterion. The expected health effect due to noise from the proposed development is classified as ***neutral***, ***not significant*** and ***long-term***.

There is no vibration source from the routine operations of the development that would cause impacts at nearby noise-sensitive locations. Therefore, the operational vibration effects of the proposed development are classified as ***neutral, imperceptible***, and ***long-term***.

4.5.2.6 Potential Impact from Traffic and Transportation on Human Health

An assessment of the additional traffic movements associated with the proposed development during the operational phase is presented in Chapter 13 (Traffic and Transport).

Given the land use type of the proposed development (Data Centre), the number of employment density foreseen to be considerably low. Data centres also generally have very few operational demands involving traffic movements for delivery and/or collection.

The operational phase of the proposed development is predicted to result, as a worst-case scenario, in an additional 64 car trips during the day (32 inbound and 32 outbound) and 4 service trips (2 truck arrivals and 2 truck departures). The shift changeover periods will generate/attract 22 of the car trips and all of the service trips.

The analysis results indicated that the traffic effects of the proposed development during the operational phase will be ***neutral, imperceptible*** and ***brief***. Given the little significant traffic increase on the assessed junctions and the limited number of trucks arriving and departing the development during the operational phase, there will be very minor changes to the junction's operational capacities and also very little impact to human beings.

4.5.2.7 Potential Impacts from Major Accident Hazards and/or Natural Disasters on Population and Human Health

The proposed development has been designed with consideration given to the health and safety risks of people living and working in the vicinity. The facility has been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice and experience.

As outlined in Section 4.3 there is a negligible risk of external natural disasters; including landslides, seismic activity, volcanic activity and sea level rise. There is a negligible risk of major accidents to occur at the facility due to the lack of proximity to Seveso/Control of Major Accident Hazards (COMAH) Regulations sites.

The risk of major accidents at the facility is negligible due to the absence of nearby permitted Seveso/Control of Major Accident Hazards (COMAH) Regulation sites. As discussed above there is a planning permission for a Lower Tier COMAH site close to the facility (Mayo County Council planning application number 2360266), The proposed data centre is expected to lie within the inner land use planning zone around the Seveso site (if permitted). As the data centre is a workplace (level 1 development) under the HSA Land Use Planning (LUP) guidance and such a development is compatible with the inner LUP zone then the data centre is an appropriate development to be located in the vicinity of the nearby Seveso site.

As stated in Chapter 6 (Hydrology), the site is not at risk from flooding. SuDs measures including attenuation will ensure that there is no potential for off site flooding as a result of the proposed development

The potential effect is therefore ***imperceptible***, and unlikely, respect of Major Accident Hazards or Natural Disasters on Population and Human Health Operational Phase of the Proposed Development.

4.6 REMEDIAL AND MITIGATION MEASURES

4.6.1 Construction Phase

The mitigation measures to address the potential impacts on population and human health from the proposed development have been assessed within the corresponding specialist chapters; Chapter 5 (Land, Soils, Geology and Hydrogeology); Chapter 6 (Hydrology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual); Chapter 13 (Traffic and Transportation).

4.6.1.1 Businesses and Residences

Any impact will be mitigated by the use of binding hours of construction as well as the measures set out in the CMP and detailed in Chapter 5 (Land, Soils, Geology and Hydrogeology); Chapter 6 (Hydrology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual); Chapter 13 (Traffic and Transportation).

4.6.1.2 Landscape Amenity and Tourism

As noted in Chapter 11, Section 11.4.2, mitigation measures have been embedded into the layout and landscape design of the Proposed Development. The proposal will have a similar mass to that of nearby existing development in Killala Business Park and will be dominated by the height of nearby existing wind turbine generators.

Proposed embedded mitigation measures include:

- Setting back the layout of the development from locations where sensitive receptors may experience adverse effects (e.g., Mullafarry Road, the R134 Wild Atlantic Way, the Presbyterian Church, Ballysakeery Glebe House).
- Designing the buildings to have a similar horizontal mass to those in nearby Killala Business Park
- Planting hedgerows in existing gaps to fully screen views of the development from these viewpoints with rapid growth species (e.g., *Populus* and *Salix* spp).
- Managing existing hedgerows and vegetation to attain a height that will screen the development from public views beyond the boundary.
- Additional tree planting within the site to screen views from the old Rectory adjacent to and partially encompassed by the site.

Landscaping will require a period of growth to be fully effective.

4.6.1.3 Land and Water Emissions

All mitigation measures outlined within the Chapter 5 (Land, Soils, Geology & Hydrogeology) and Chapter 6 (Hydrology) will be implemented in accordance with *Construction Management Plan (CMP)*, as well as any additional measures required pursuant to planning conditions which may be imposed. The construction phase mitigation measures set out in the CMP, will be implemented by the construction contractor to ensure that pollution and nuisances arising from site clearance and construction activities is prevented where possible and managed in accordance with best practice environmental protection.

4.6.1.4 Air Emissions

Mitigation measures proposed to minimise the potential effects on human health in terms of air quality during the construction phase are set out in Chapter 8, Section 8.6.1. These include measures for dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to ensure that no dust nuisance occurs a series of measures drawing best practice guidance from Ireland, the UK and the USA will be implemented.

4.6.1.5 Noise and Vibration Emissions

Mitigation measures proposed to minimise the potential effects on human health in terms of noise and vibration during the construction phase are set out in the CMP and Chapter 10.

Mitigation measures for the construction phase include appointing a noise liaison officer to manage notifications to nearby noise-sensitive locations about upcoming disruptive activities and handle any noise-related complaints. The contractor will implement several general measures: avoiding unnecessary engine revving, switching off equipment when not in use, maintaining haul roads to high standards, avoiding steep gradients, minimizing the drop height of materials, and starting plant equipment sequentially rather than simultaneously.

Best Practicable Means (BPM) will be applied to ensure the use of the quietest equipment available, with enhanced sound reduction methods such as enclosures where necessary. Equipment will be positioned as far as possible from noise-sensitive areas, and regular maintenance by trained personnel will help minimize noise and vibration. Additionally, high-noise and vibration activities will be restricted to certain hours to reduce disruption. A site representative will be appointed to oversee noise and vibration management before construction begins.

4.6.1.6 Traffic and Transportation

As outlined in Section 13.6.1 within Chapter 13 (Traffic and Transport), a Construction Management Plan (CMP) has been prepared in order to provide guidance on how to minimise the potential impacts of the construction stage on the safety and amenity of other users of public road and considers aspects such as dust and dirt control measures, noise assessment and control measures, working hours of the site, facilities for parking. Specific measures include, ongoing assessment of construction traffic routes, not allowing construction traffic to wait on public roads, schedule delivery of material, provision of vehicle and wheel washing facilities, amongst others.

Prior to the construction, a detailed Construction Traffic Management Plan (CTMP) will be prepared by the main contractor which will outline the site logistics and indicate the site aspects such as site location, diversion of active travel users, location of loading and unloading areas and material storage.

Through the implementation of these Plans, it is anticipated that the construction traffic effects on both the local road network and on human beings will continue to be ***negative***, ***not significant*** and ***short-term***.

4.6.1.7 Major Accident Hazards and/or Natural Disasters

All mitigation measures outlined in the *Construction Management Plan (CMP)* (2024) will be implemented throughout the construction phase of the development. This will include mitigation measures outlined within this EIAR. The CMP includes emergency response procedures for environmental incidents. It will be continuously updated to manage risks during construction.

4.6.2 Operational Phase

The mitigation measures to address the potential impacts on population and human health from the proposed development have been assessed within the corresponding specialist chapters; Chapter 5 (Land, Soils, Geology and Hydrogeology); Chapter 6 (Hydrology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual); Chapter 13 (Traffic and Transportation).

4.6.2.1 Businesses and Residences

No additional mitigation measures are required.

4.6.2.2 Landscape Amenity and Tourism

As noted in Chapter 11, Section 11.4.2, mitigation measures have been embedded into the layout and landscape design of the Proposed Development. The proposal will have a similar mass to that of nearby existing development in Killala Business Park and will be dominated by the height of nearby existing wind turbine generators.

Proposed embedded mitigation measures include:

- Setting back the layout of the development from locations where sensitive receptors may experience adverse effects (e.g., Mullafarry Road, the R134 Wild Atlantic Way, the Presbyterian Church, Ballysakeery Glebe House).
- Designing the buildings to have a similar horizontal mass to those in nearby Killala Business Park
- Planting hedgerows in existing gaps to fully screen views of the development from these viewpoints with rapid growth species (e.g., *Populus* and *Salix* spp).
- Managing existing hedgerows and vegetation to attain a height that will screen the development from public views beyond the boundary.
- Additional tree planting within the site to screen views from the old Rectory adjacent to and partially encompassed by the site.

The magnitude of change will remain Medium, permanent and neutral.

The Operational Phase significance of landscape effects after mitigation will also remain a combination of Medium sensitivity and Medium magnitude of effects, resulting in a Moderate significance. This is below the level of significance considered to be unacceptable for a development of this type.

The proposed development is compliant with the relevant County Mayo guidance for development of this type. Additional mitigation measures beyond those incorporated into the proposal are not required to reduce effects to an acceptable level.

4.6.2.3 Land and Water Emissions

The proposed development will convey collected run-off via the proposed gravity surface water sewer system towards the proposed attenuation pond (4500 m^3) in the southeast of the site, including a forebay berm and a permanent pond feature located in the south-eastern section of the development lands. The network will discharge to the existing drainage ditch located along the sites southern boundary before eventually discharging to the Moyne 34 Stream. The attenuation pond will help to reduce the risk of flooding, improve water quality by acting as natural filters and removing pollutants and excess nutrients. Additionally, it will create a habitat for diverse aquatic species, promoting biodiversity and ecological balance.

In the event of an accidental leakage of oil on the site, this will be intercepted and treated by the interceptors within the drainage infrastructure. All storage tanks will be bunded in accordance with EPA best practice. Strict separation of surface water and wastewater will be implemented within the development.

4.6.2.4 Air Emissions

No additional mitigation measures are proposed for the operational phase of the Proposed Development. Air dispersion modelling has determined that concentrations of all pollutants are in compliance with the relevant ambient air quality standards.

4.6.2.5 Noise and Vibration Emissions

To minimize noise from external plant, low-noise equipment will be used, and in-line acoustic attenuators or ‘silencers’ will be incorporated for stacks and exhausts as needed. This approach, integrated into the detailed design process, will ensure that the site operates within the noise limits established by best practice guidance.

Noise mitigation measures for traffic generated during the operational phase of the development are not considered necessary.

4.6.2.6 Traffic and Transportation

To encourage future staff to reduce dependence on private car alone and avail of more sustainable forms of transport, a Mobility Management Plan (MMP) has been prepared and sets out a number of specific actions to be implemented during the operational phase of the site such as providing information on the available local public transport, tax incentives for public transport users, cycle to work scheme, benefits of carpooling and provision of cycle parking, shower and locker facilities.

Through the implementation of the MMP from early stages of the operational phase, it is anticipated that the effects of the proposed development both on the local road network and on human beings will continue to be ***neutral***, ***imperceptible*** and ***brief***.

4.6.2.7 Major Accident Hazards and/or Natural Disasters

No specific mitigation measures are required.

4.7 RESIDUAL IMPACTS OF THE PROPOSED DEVELOPMENT

4.7.1 Construction Phase

4.7.1.1 Businesses and Residences

It is predicted that there will be a slight positive impact on local business activity during the construction phase with the increased presence of construction workers using local facilities. This job creation will result in a ***positive***, local to regional, ***imperceptible***, ***short-term*** socioeconomic impact.

The presence of these site personnel in the area during the construction phase will create a slight additional demand in the area for services, particularly for food from local shops, restaurants and cafés. There will also be economic benefits for providers of construction materials and other supporting services, e.g., quarries. This is predicted to result in a positive, local to regional, indirect, not-significant, short-term socioeconomic impact.

The residual impacts on local businesses and residences in relation to air quality, noise, visual impact, and traffic has been summarised in the below sections.

4.7.1.2 Landscape Amenity and Tourism

The proposed development will result in temporary alterations to the site's landscape character due to various construction activities. These impacts will arise from earthworks, site reprofiling, cut and fill operations, spoil stockpiles, trenching, construction of environmental bunds and retaining walls, as well as increased dust, fumes, lighting, noise, and traffic disturbances. There will also be temporary security barriers installed, and nearby sites may experience some disruption.

In terms of human health, the primary concerns relate to reduced air quality from dust and vehicle emissions, noise pollution from machinery and traffic, and additional light pollution from construction lighting during night work in winter. Increased construction traffic could further disrupt the local community, while the risk of soil and groundwater contamination may also pose health risks if not properly controlled.

Given the low overall sensitivity of the receiving environment, however, the potential landscape effects can be classified as ***slight*** and ***adverse***, but ***temporary***, as would be expected during the construction phases of a major development of this scale.

4.7.1.3 Land and Water Emissions

The implementation of mitigation measures outlined above will ensure that the residual impacts during the construction phase in respect of the environmental factor of Soils, Geology, Hydrology and Hydrogeology is ***short term-imperceptible-neutral***.

4.7.1.4 Air Emissions

The mitigation measures that will be put in place during construction of the Proposed Development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the Proposed Development is likely to be ***direct, short-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

4.7.1.5 Noise and Vibration Emissions

As detailed in Chapter 10 (Noise and Vibration), there will be some impact on nearby noise sensitive receptors during construction, due to noise emissions from site activity, traffic, and other activities. The application of noise limits and limits on the hours of operation (as per Table 10.5, 10.6 and Section 10.2.4), along with implementation of appropriate noise and vibration control measures (as summarised in Section 10.6.1), will ensure that noise and vibration impact is kept to a minimum. Due to the distance between the site and the nearest sensitive locations, noise and vibration impacts generated during construction will be ***negative, not significant*** and ***short term***.

4.7.1.6 Traffic and Transportation

Provided the mitigation measures and management procedures outlined in the Construction Management Plan (CMP) and the Construction Traffic Management Plan (CTMP), as set out in Section 13.6.1 within Chapter 13 (Traffic and Transport), are incorporated prior and during the construction phase, the residual impact upon the local receiving environment, including human health, will continue to be ***short-term*** in terms of duration and ***neutral imperceptible*** in terms of magnitude.

4.7.1.7 Major Accident Hazards and/or Natural Disasters

Adherence to the mitigation measures outlined in the CMP will ensure there will not be significant residual impacts from the Proposed Development.

4.7.2 Operational Phase

4.7.2.1 Businesses and Residences

The Proposed Development will result in an ***imperceptible, positive*** impact due to increased employment opportunities and improved accessibility to jobs in the area during the operation phases.

The predicted impacts on local businesses and residences in relation to air quality, noise, visual impact, and traffic has been summarised below.

4.7.2.2 Landscape Amenity and Tourism

The Proposed Development will permanently alter the landscape character of the site. The transformation will involve the removal of grassland fields and mature hedgerows, replaced by industrial-scale buildings and infrastructure. Although this change is expected to significantly impact the site itself, it aligns with the broader trend toward urbanization focused on employment.

From a human health perspective, concerns may arise regarding potential increases in noise, air quality degradation, and visual impacts due to the new industrial development. The development's proximity to existing heritage properties may affect their setting, however, the existing vegetation and physical separation from the heritage properties will help mitigate some of these effects. The Proposed Development will reinforce the ongoing shift in landscape from the current peri-urban condition to one that is guided by employment. By aligning with the area's development strategy, this change can be regarded as neutral.

Landscape impacts during operation phase would vary over time as the landscape scheme matures. The overall landscape and visual effects are assessed in Chapter 11 (Landscape and Visual). Overall, the regional magnitude of effects will be ***negligible, long term,*** and ***neutral***, at the operational phase. Locally, the landscape and visual impacts will be considered ***medium, permanent*** and ***neutral***.

The Proposed Development will have no discernible effect on local tourism.

4.7.2.3 Land and Water Emissions

There are no source pathway linkages to potable water supplies or water amenities. As such the implementation of the design measures will continue to ensure that the residual impacts during the operational phase in respect of the environmental factor of Soils, Geology, Hydrogeology and Hydrology is ***imperceptible-neutral***.

4.7.2.4 Air Emissions

As detailed in Chapter 8 (Air Quality), Air dispersion modelling was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the dispersion modelling results, pollutant concentrations with the Proposed Development operational are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health. The impacts to human health are predicted to be ***direct, long-term*** and ***not significant***, which is overall not significant in EIA terms.

4.7.2.5 Noise and Vibration Emissions

The potential health effects of exposure to excessive noise include sleep disturbance. The *Community Noise* guidelines published by Stockholm University in 1995 for the World Health Organisation recommend an internal night-time level of no more than 30 dB $L_{Aeq,8hr}$.

As presented in Chapter 10, Table 10.18, the cumulative noise levels with the proposed development added to the prevailing noise environment are 37.5 dB $L_{Aeq,T}$ external to the worst-affected noise-sensitive location. Allowing for a 15 dB reduction across an open window, the expected noise level internal noise level is well within the indoor WHO criterion. The expected residual health effect due to noise from the proposed development is classified as ***neutral***, ***not significant*** and ***long-term***.

No mitigation is required regarding the additional vehicular traffic on public roads, as the impact is considered ***negative, not significant, and long-term.***

4.7.2.6 Traffic and Transportation

Provided the mitigation measures and monitoring outlined in the Mobility Management Plan (MMP), as set out in Section 13.6.2 within Chapter 13 (Traffic and Transport) are incorporated in the early stages of the operational phase of the development, the residual impact upon the local receiving environment, including human health, will continue to be ***neutral***, ***imperceptible*** and ***permanent***.

4.7.2.7 Major Accident Hazards and/or Natural Disasters

There are no significant potential impacts on Human Health from Major Accident Hazards and/or Natural Disasters; therefore, there are no significant residual impacts.

4.8 CUMULATIVE IMPACT ASSESSMENT

The potential for cumulative impact of the proposed development with any/all relevant other planned or permitted developments as outlined in Chapter 3 (Planning and Development Context) are discussed in Sections 4.7.1 and 4.7.2 below for construction and operational phases.

The likely cumulative impact of the proposed development in conjunction with these cumulative developments upon health in relation to noise, dust generation, construction traffic, visual impacts, etc., associated with the works; have been assessed in the respective EIA Report Chapters.

4.8.1 Construction Phase

The implementation of mitigation measures within each chapter and detailed in Section 4.5; as well as the compliance of adjacent developments with their respective planning permissions, will ensure there will be minimal cumulative potential for change during the construction phase of the Proposed Development.

In a worst-case scenario, multiple developments in the area could begin construction concurrently or overlap in the construction phase and contribute to additional impacts in terms of traffic, dust, and noise.

Contractors for the Proposed Development will be contractually required to operate in compliance with a project-specific CMP, application of noise limits and hours of operation and implementation of a Construction Traffic Management Plan which will include the mitigation measures outlined in this EIA Report. There are no predicted cumulative impacts arising from the construction phase of the proposed development.

The residual impact of the proposed development in combination with other planned or permitted developments is direct, short-term, negative and not significant.

4.8.2 Operational Phase

The potential cumulative impacts of the Proposed Development during the operational phase in terms of Air Emissions, Noise generation and Traffic assessment in the context of the Permitted Development and permitted and planned developments have been considered in Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration) and Chapter 13 (Traffic). The assessments include modelling of cumulative effects and indicate that there is no likely significant adverse impacts on Human Health either alone or in combination with any likely future projects.

4.9 REFERENCES

Environment Protection Agency, *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022)

Environment Protection Agency, *Advice Notes for Preparing Environmental Impact Statements* Draft (EPA, 2015)

Central Statistics Office. Statbank Databases (Accessed October 2024 https://www.cso.ie/en/databases/)

Central Statistics Office. Census of Population, 2011 and 2016. (Accessed October 2024, https://www.cso.ie/en/census/)

Central Statistics Office. Labour Force Survey, 2020 (Accessed October 2024, www.cso.ie/en/statistics/labourmarket/labourforcesurveylfs)

Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU)

CHAPTER 05:

LAND, SOILS, GEOLOGY, AND HYDROGEOLOGY

05

CONTENTS

5.0 LAND, SOILS, GEOLOGY AND HYDROGEOLOGY

5.1 INTRODUCTION

This Chapter assesses and evaluates the likely significant effects of the development on the land, soil, geological and hydrogeological aspects of the site and surrounding area. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

A detailed description of the proposed development is provided in Chapter 2.

5.2 METHODOLOGY

5.2.1 Criteria for Rating of Effects

This chapter evaluates the effects, if any, which the proposed development will have on Land, Soils, Geology and Hydrogeology as defined in the Environmental Protection Agency (EPA) '*Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (EPA, 2022) as well as in line with Article 94 and Schedule 6 of the Planning and Development Regulations 2001 (as amended) and Article 5 and Annex IV of the EIA Directive (2011/92/EU, as amended).

The EPA document entitled '*Advice Notes for Preparing Environmental Impact* Statements' (EPA, 2022) is also followed in this geological and hydrogeological assessment and classification of environmental effects. Due consideration is also given to the guidelines provided by the Institute of Geologists of Ireland (IGI) in the document entitled '*Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'* (IGI, 2013).

The document entitled '*Guidelines on Procedures for Assessment and Treatment of* Geology*, Hydrology and Hydrogeology for National Road Schemes*' by the Transport Infrastructure Ireland (TII) formerly National Roads Authority (NRA) (TII, 2009) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the land, soil, geological and hydrogeological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration, and type of effect characteristic identified.

The duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The TII (2009) criteria for rating the magnitude and significance of impacts on the geological related attributes and the importance of hydrogeological attributes at the site during the EIA stage.

The principal attributes (and effects) to be assessed include the following:

- Geological heritage sites within the vicinity of/ within the perimeter of the proposed development site;
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;
- The quality, drainage characteristics and range of agricultural use(s) of subsoil around the site;
- Quarries or mines in the vicinity and the potential implications (if any) for existing activities and extractable reserves;
- The extent of topsoil and subsoil cover and the potential use of this material on site as well as any requirement to remove it off-site as waste for disposal (D) or recovery (R) options;
- High-yielding water supply wells/ springs in the vicinity of/ within the site boundary to within a 2km radius and the potential for increased risk presented by the proposed development;
- Classification (regionally important, locally important etc.) and extent of aquifers underlying the site boundary area;
- Increased risks presented to the groundwater bodies by the proposed development associated with aspects such as, for example, the removal of subsoil cover, removal of aquifer (in whole or part thereof), spatial drawdown in water levels, alteration in established flow regimes, and changes in local/ regional groundwater quality;
- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site; and
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporally.

5.2.2 Sources of Information

Desk-based geological information on the substrata (both Quaternary deposits and bedrock geology) underlying the extent of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1: 100,000 mapping;
- Teagasc soil and subsoil database;
- Ordnance Survey Ireland - aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) – website mapping and database information;
- National Parks and Wildlife Services (NPWS) – Protected Site Register; and
- Mayo County Council - illegal landfill information.

Site specific data was derived from the following sources:

- Appendix 5.2 - Killala Project, Killala, Co. Mayo – Site Investigation Report (Site Investigation Ltd, October 2024).
- Engineering Planning Report – Proposed Killala Data Centre Development (CSEA, 2024).
- Various design site plans and drawings; and
- Consultation with design engineers.

5.2.3 Difficulties Encountered / Forecasting Methods

There were no significant difficulties encountered in compiling the specified information for this EIAR chapter.

5.3 RECEIVING ENVIRONMENT

The proposed development comprises a single data centre building and ancillary services located towards the north of the site (refer to Chapter 2 for full description). Relevant aspects for the land soils geology and Hydrogeology chapter are described below.

The site is currently a greenfield site comprising c. 10.58 hectares of undeveloped, agricultural lands adjacent to the southwest portion of Killala Business Park, traversing the townlands of Mullafarry and Tawnaghmore Upper, Killala, Co. Mayo, just west of the main Ballina/Killala Road (R314), c. 1.8km south of Killala town, c. 10.5 km north of Ballina, c. 46 km west of Sligo town and c. 39 km north of Castlebar.

The entire area is undeveloped and in agricultural use. There is an old rectory house (Ballysakeery Glebe House) and associated structures (sheds) located to the south of the site. The rectory and associated structures occupy approximately 800 m^2 of land, none of which will be impacted by the proposed development. The area of land between the Glebe House and the Mullafarry Road is boggy and contains a stand of trees and shrubs. There is a compacted gravel access road leading from Mullafarry Road to the old rectory house. To the east of the site is an area which is reserved for a 110kV substation which will connect the proposal to the electricity network. This substation will be subject to a separate pre-application request to An Bord Pleanála, to determine whether it constitutes Electricity Transmission Strategic Infrastructure Development under section 182A of the Planning and Development Act 2000, as amended. A sprinkler tank and pumphouse compound is located to the north east of the site.

Access to the site is proposed from the south with a gatehouse located on the easternmost of the two entrances along with a turning area to allow vehicles to return to the road safely.

Stormwater will be drained through oil interceptors to an attenuation pond located in the south-east of the site which drains to the public storm sewer along the road. A fueling area is proposed in the lay-by area to the south of the generator yard. Stormwater from this area will discharge through the foul sewer instead of the main sewer. Foul (primarily sewage) water will be collected in a holding tank (24 hour storage capacity) at the lowest point of the site in the south east corner. As this is below the level of the Uisce Éireann (UÉ) wastewater treatment plant (WWTP), it will be pumped to the WWTP along the public road and then northward to the WWTP. Consultation has been undertaken with UÉ and a pre connection (PCE) form has been submitted for water and wastewater.

A small drainage ditch is located along the southern boundary, adjacent to the Mullafarry Road, which eventually discharges into the Moyne Stream. The only other feature observed across this area of land was improved grassland (for grazing), hedgerows and a historic Lime Kiln, located c. 110 m east of the old rectory house.

The existing ground is characterised by a steep gradient, descending from the highest point at approximately 61.0 m along the northern boundary to the lowest point at around 42.0 m, resulting in a level change of nearly 20 m.

Refer to Figure 5.1 below for the proposed site location and surrounding land use/environment.

Figure 5.1 *Site Location and Surrounding Land Use Map (Source: Google Earth Pro, 2024)*

5.3.1 Existing Land Use and Site History

The site is greenfield and predominantly undeveloped and unoccupied by any substantial building structures, with the exception of an old Rectory House (unoccupied but formerly the residence of a Church of Ireland Rector) and associated structures (sheds) located in the south west of this land parcel.

Historical Ordnance Survey maps were examined during the preparation of this EIA Chapter. O.S. maps were available from 1829 (the historic 6” Cassini maps) and 1900 from the historic 25” maps. The historic maps indicate that the majority of the site was greenfield characterized by a predominant agricultural function. The historic 6-inch Cassini / Black and White 1829-1841 (First Editions) maps show the majority of the site appears to have historically been used for agricultural purposes. Apart from agricultural land the only features evident on the site include two small structures in the same location of the present day unoccupied old rectory house mentioned above and a small quarry c. 100m east of the two small structures, identified during a site visit in 2019 where an exposed bedrock face likely to have been used to source material for a small lime kiln, the ruins of which was observed. Given the previous site uses being agricultural, the potential presence of contamination or waste material is considered *low*.

Review of the hydrogeology and geology in the surrounding region indicates that there are no sensitive receptors such as groundwater-fed wetlands, Council Water Supplies or Group Water Schemes located in the vicinity of the site which could be impacted by the proposed development. The site is located within the “*Killala Area*” geological heritage site described as "*An extensive area of ridges on the west side of the Moy Estuary at Killala*". The feature at "*Killala Area*" geological heritage site are remarkable examples of glaciotectonic ridges. Some of the coastal exposures of these features are within the Killala Bay/Moy Estuary SAC (Site Code: 000458). However, the proposed development will have no direct impact on the footprint of these deposits and therefore there is no threats that should dramatically alter their overall geometry or configuration. Refer to Section 5.3.10 below for further information on the geological heritage of the surrounding area.

5.3.2 Surrounding Land Use

The surrounding area is primarily defined by agricultural uses to the west and south, industrial uses to the north and east (Killala Business Park) and residential development to the southwest.

The application site is not subject to any specific zoning objective but is directly contiguous to an existing area of employment / industrial and energy-related development. There are recorded monuments and sites in proximity to the subject lands.

The Ballysakeery Glebe House is located to the south of the site. This building, built in the early nineteenth century, was formerly a rectory but has fallen into disrepair. Works have been ongoing to repair the house and the Council's objective is understood to be to bring this building into community use.

Asahi Synthetic Fibres (Ireland) Limited is an active IPC facility (Licence No: P0232) is located to the immediate north-east of the proposed development site. SSE Generation Ireland Limited (Licence No: P0566) is an active IEL facility also located to the immediate north-east of the proposed development site. Both of the aforementioned licenced facilities are located within the Tawnaghmore Power Station. Mayo Renewable Power Limited (Licence No: P1077) is an active IEL facility located c. 50 m to the east of the proposed development site.

There are no other licenced Waste, IEL or IPC facilities in the vicinity of the proposed development site. However the EPA database indicated some licenced facilities in the wider area as follows:

- Rathroeen Landfill (Licence No: W0067), is located at Rathroeen, Ballina, Co. Mayo c. 4.4 km south-east of the proposed development site.
- Henniges Elastomers Ireland GmbH (License No. P0243-01) which is a rubber and plastics manufacturing company c. 8.67 km to the south-east of the proposed development site along the Crossmolina Road. Ballina Sewage Treatment Plant (Reg No. D0016-01) is located c. 8.54 km to the south-east of the proposed development site along the banks of the Moy Estuary. The Population Equivalent (PE) of the treatment plant is >10,000;
- Killala Waste Water Treatment Plant (Licence No. D0067-01), located in the eastern section of Killala Business Park.

All licenced sites are operated and governed under the EPA and are subject to environmental audits throughout the calendar year to ensure compliance. Therefore, the potential of any contamination migrating from one of these licenced sites to the subject site is very low.

Consultation with Mayo County Council has confirmed that there are no known illegal/historic landfills within 500 metres of the site.

5.3.3 Soils and Subsoils

The GSI/Teagasc (2024) mapping currently denotes 2 no. principal soil types occurring across the site, which are identified as follows:

- The majority of the proposed development site is underlain by shallow poorly drained mineral (BminSP) - mainly basic.
- The southern, eastern and a small portion in the west of the proposed development site and the majority of lands to the south, west and east are underlain by mineral poorly drained (BminPD) – mainly basic (Refer to Figure 5.2 below).

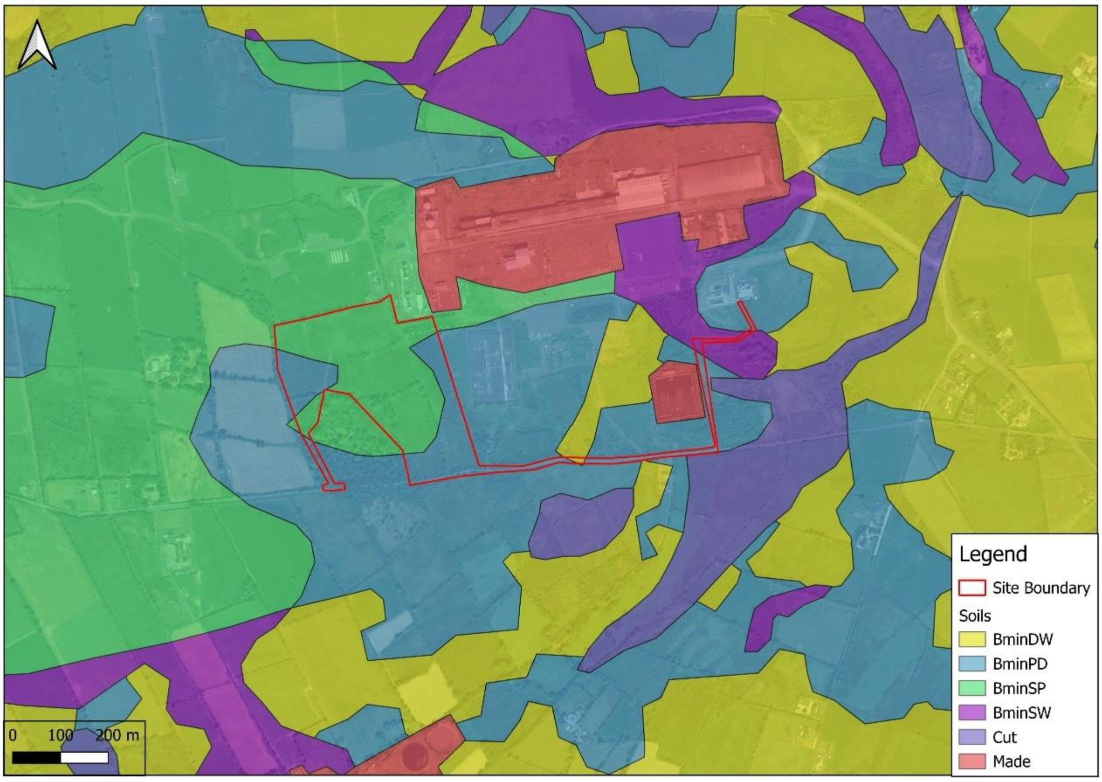

Figure 5.2 *Teagasc Soils Map (GSI, 2024)*

The regional overburden deposits are reflective of the Quaternary geological period that extends from around 1.5 million years ago to the present day. This can be further sub-divided into the Pleistocene Epoch, which covers the Ice Age period, and which extended up to 10,000 years ago and the Holocene Epoch, which extends from that time to the present day.

The GSI/ Teagasc (2024) mapping database of the subsoils in the vicinity of the site indicates (2) no. principal subsoil types, as shown in Figure 5.3 below and include:

- Bedrock outcrop or subcrop (Rck) underlying the majority of the site; and
- Till derived from limestones (Tls) underlying the southern and eastern portion of the site and immediate vicinity (south, west and east).

Further areas of bedrock outcrops or near surface subcrop occur in the west and east of the proposed development site and at several locations within the wider surrounding lands, primarily to the north and further west of the site, according to the latest GSI mapping.

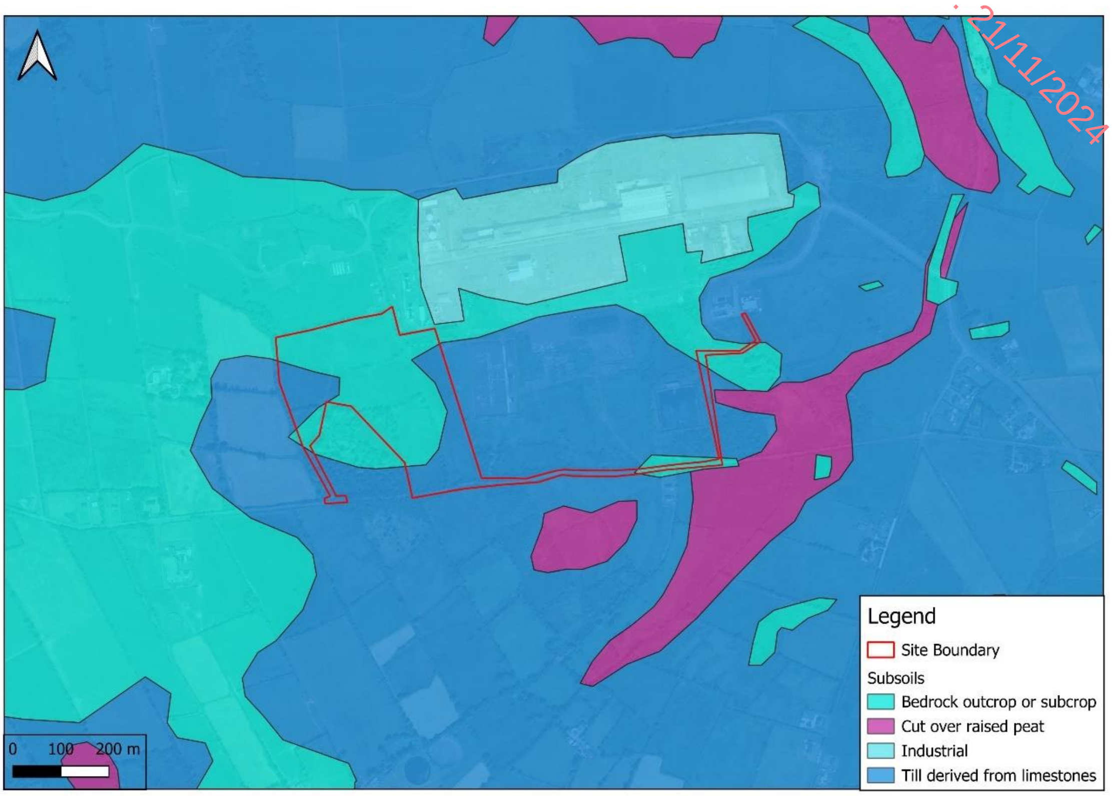

Figure 5.3 *Subsoils Map (GSI, 2024)*

5.3.3.1 Site Investigations

Site investigations were carried out by Site Investigations Limited between August and September 2024. The following works were undertaken:

- Surveying of Exploratory Hole Locations (using GeoMax GPS Rover);
- Slit Trenches (4 No.);
- Trial Pits (5 No.);
- Soakaway Tests (to BRE 365) (2 No.);
- Cable Percussion Boreholes (using a Dando 2000 Rig) (4 No.);
- Rotary Coreholes (using a Sondeq SS71 Top Drive Rig) (2 No.);
- Geotechnical Soil Laboratory Testing;
- Geotechnical Rock Laboratory Testing;
- Environmental Laboratory Testing; and
- Waste Classification Report.

The sequence of subsoils deposits recorded during the site investigations are shown in Table 5.1.

Table 5.1 *Strata Noted from Site Investigations (Site Investigations Ltd, Site Investigation Report, 2024)*

Name	Depths/ Notes
Overburden/Cohesive Deposits	The natural ground conditions are dominated by brown sandy slightly gravelly silty CLAY with cobbles ranging in depth between 0.4m BGL at BH04 to 1.8m BGL at TP01. The locations to the south east of the site achieved depths greater than 1.00mbgl, with TP01 achieving 1.80m depth before terminating. BH01 was the only borehole to record a SPT N-value and that was 14 at 1.00mbgl indicating firm soils. The laboratory tests of the cohesive soils show CLAY soils with low to intermediate plasticity indexes of 9 to 16%. The particle size distribution curves were poorly sorted straight-line curves with low fines content of 17% to 54%.
Bedrock	Bedrock was encountered at 0.80mbgl and 0.50mbgl at BH02 (and BH03 respectively and although highly fractured core was initially encountered, the bedrock was logged as a strong grey muddy LIMESTONE, with calcite veins and fossils recorded and is part of the Ballina Limestone Formation. The core quality improved at 1.35mbgl and 1.90mbgl in the coreholes and they were terminated after 3m of core was recovered.

The location of the site investigation points carried out by Site Investigations Limited between August and September 2024 on the proposed development site are illustrated in Figure 5.4 below.

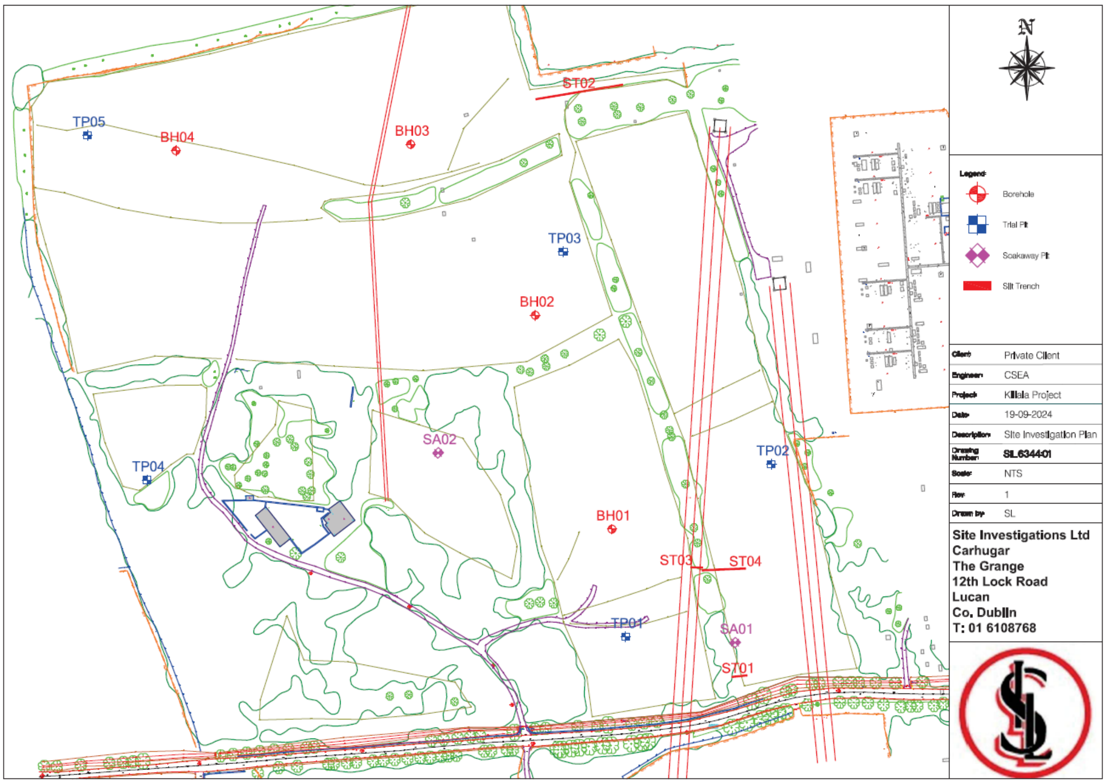

Figure 5.4 *Site Investigation Points (Source: Site Investigations Ltd, Report, 2024).*

5.3.4 Bedrock Geology

Inspection of the available GSI mapping data (GSI, 2024) shows that the bedrock geology underlying the site and surrounding area is dominated by rocks of the Palaeozoic, Carboniferous and Mississippian Age Bracket. The site and surrounding area are entirely underlain by Visean limestone and calcareous shale comprising dark fine-grained limestone and shale (Rock Unit Code: CDBALBL).

In terms of the structural features of the area, the GSI database displays 2 no. Dolerites (Category: Dyke), located c. 200m to the north of the site in a west-west direction. The GSI database presently lists no karst features or faults in the immediate vicinity of the site and significant karstification would not be expected in this type of limestone and shale.

Refer to Figure 5.5 below for the bedrock geology characteristics and features in the region of the proposed development site.

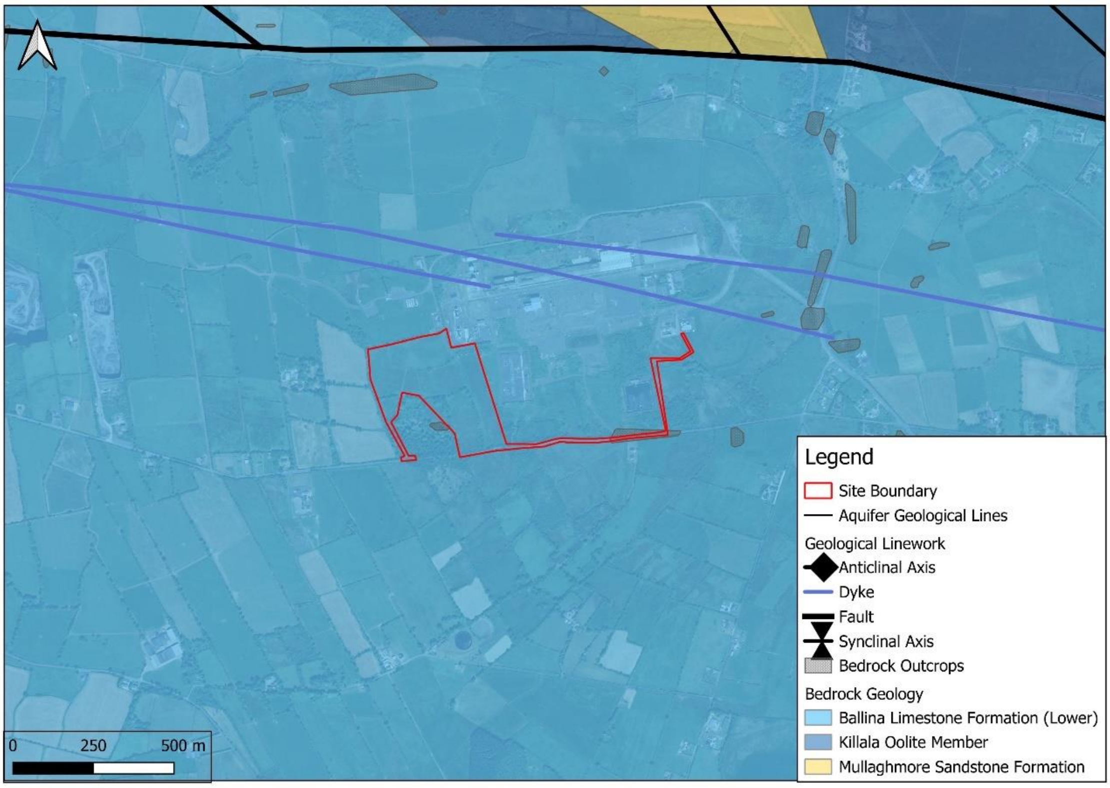

Figure 5.5 *Bedrock Geology Map (GSI, 2024)*

5.3.5 Regional Hydrogeology

<u>5.3.5.1 Aquifer Classification</u>

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km^2), well yield (m^3/d), specific capacity ($m^3/d/m$) and groundwater transmissivity (mm^3/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are subdivided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

The GSI (2022) classifies the principal aquifer types in Ireland as:

Bedrock Aquifer

- Rkc – Regionally Important Aquifer – Karstified (conduit)
- Rkd – Regionally Important Aquifer – Karstified (diffuse)
- RK – Regionally Important Aquifer – Karstified
- Rf – Regionally Important Aquifer – Fissured bedrock
- Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive
- Lk – Locally Important Aquifer – Karstified
- Ll – Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones
- Pl – Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones
- PU – Poor Aquifer – Bedrock which is Generally Unproductive

Gravel Aquifer

- Lg - Locally Important Aquifer - Sand & Gravel
- Rg - Regionally Important Aquifer - Sand & Gravel

The bedrock aquifer underlying the site, according to the GSI (www.gsi.ie/mapping) National Draft Bedrock Aquifer Map, are classified as a "*Locally Important Aquifer*" (Ll), which is described by the GSI as bedrock as "*Bedrock which is Moderately Productive only in Local Zones*". Figure 5.6 below presents the current bedrock aquifer map for the region.

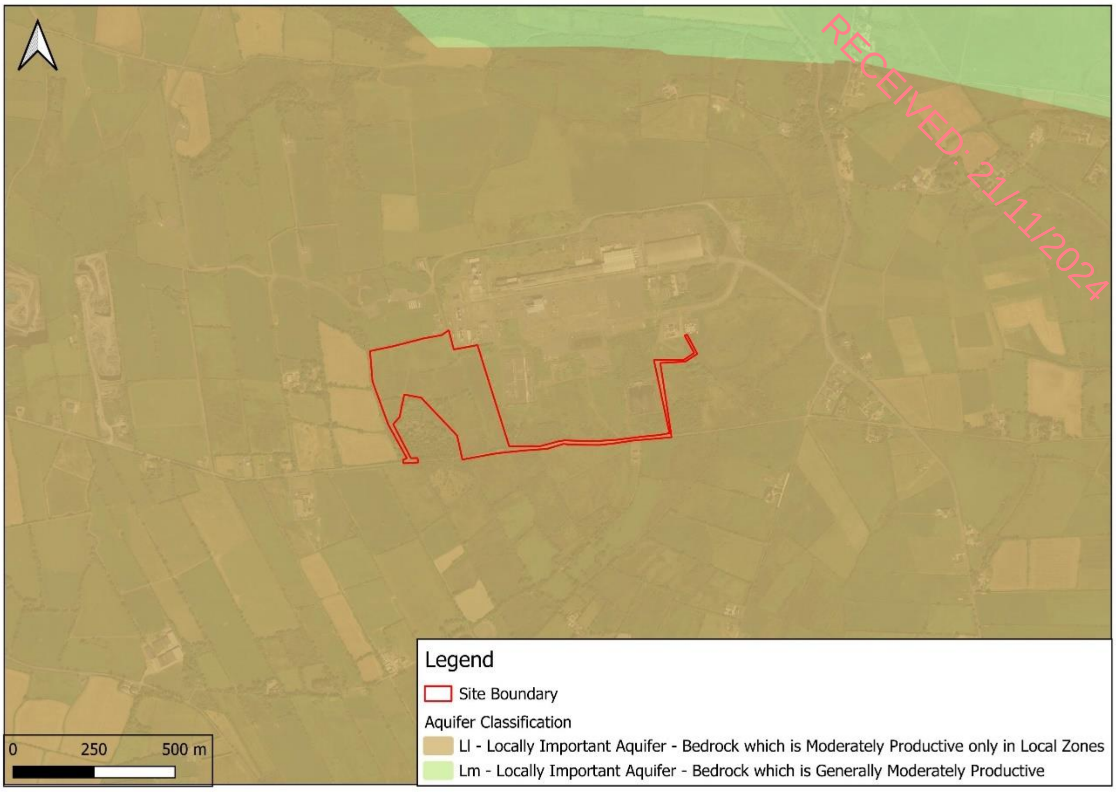

Figure 5.6 *Aquifer Classification Map (GSI, 2024)*

The site is underlain by the Bellacorick-Killala Groundwater Body (European Code: IE_WE_G_0041), which has been investigated by the GSI and is described as having a groundwater flow regime of '*PP*' which is a poorly productive bedrock aquifer. Based on the most recent data (www.epa.ie), the Bellacorick-Killala GWB for which the site is located entirely within, has a WFD status of "*Good*" (2016-2021) and a WFD risk score of "*Not at Risk*" of not achieving good status.

In addition, there are no groundwater source protection zones, which are zones defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution, located within the proposed development site or in the immediate vicinity. A group scheme borehole was identified c. >1.5 km north of the site (well no. 1131NWW004). However according to the latest GSI and EPA online mapping there is no groundwater source protection zone associated with this supply. Due to the discrete nature of fracturing withing the bedrock aquifer there is no potential for temporary dewatering or contamination to impact on any group or public water scheme. Therefore, there are no risks to water supplies from the proposed development.

5.3.6 Aquifer Vulnerability

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/ fractures, the main feature that protects groundwater from potential contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of or of mixtures of peat, sand, gravel, glacial till, clays or silts).

The GSI presently classifies the aquifer with a vulnerability classification of "*Rock at or near Surface or Karst*" (X) for the majority of the site and lands to the immediate north and west. The south and eastern portion of the site is classified as "*Extreme*" (E). To the immediate south of the site the GSI classifies the aquifer vulnerability as being "*High*" (H). Refer to Table 5.2 below.

Table 5.2 *Vulnerability Mapping Guidelines*

Vulnerability Rating	**Hydrogeological Condition**				
	Subsoil Permeability (type) and Thickness			**Unsaturated Zone**	**Karst Features**
	High Permeability (sand/gravel)	Moderate Permeability (e.g. sandy subsoil)	Low Permeability (e.g. clayey subsoil, clay, peat)	(Sand/ gravel aquifers only)	(<30 m radius)
Extreme (E)	0 - 3 m	0 - 3 m	0 - 3 m	0 - 3 m	-
High (H)	> 3 m	3 - 10 m	3 - 5 m	> 3 m	n/a
Moderate (M)	n/a	> 10 m	5 - 10 m	n/a	n/a
Low (L)	n/a	n/a	> 10 m	n/a	n/a

Notes: (1) n/a: Not applicable

(2) Precise permeability values cannot be given at present

(2) Release point of contaminants is assumed to be 1-2 below ground surface

The GSI vulnerability classification is relatively consistent with data obtained from the site investigations carried out by Site Investigations Limited between August and September 2024 at the proposed development site. As summarised in **Error! Reference source not found.** above, the natural ground conditions are dominated by brown sandy slightly gravelly silty CLAY with cobbles ranging in depth between 0.4m BGL at BH04 to 1.8m BGL at TP01. Refer to Figure 5.7 below for the aquifer vulnerability beneath the site.

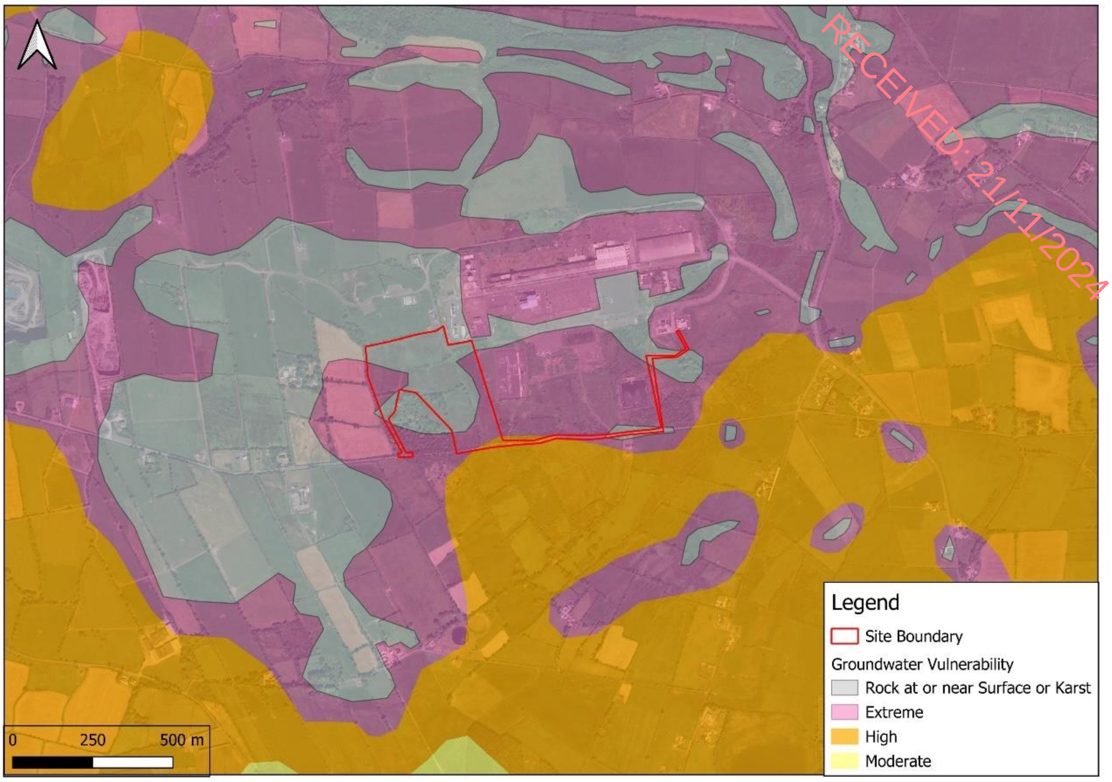

Figure 5.7 *Aquifer Vulnerability Map (GSI, 2024)*

5.3.7 Groundwater Wells and Flow Direction

There is no licencing system for wells in Ireland at present and as such no complete data set. The GSI Well Card Index is a record of wells drilled in Ireland, kept by the Geological Survey of Ireland. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the ROI.

While much useful information can be obtained from this Index, it is important to note that it is by no means exhaustive, as it requires individual drillers to submit details of wells in each area.

The well card data presented in Table 5.3 below shows the occurrence of recorded wells within a 2km radius of the site area, information regarding the depth to bedrock, and hence the depth of overburden is noted for each well where available. From the GSI well card data presented in Table 5.4, it can be seen that the yield class range from predominately '*Poor*' to '*Moderate*' indicating a poorly connected underlying bedrock aquifer overlain by low permeability glacial clays. The site and surrounding area is serviced by public supply.

Table 5.3 *GSI Well Card Data for the Site location and Surrounding Area (GSI, 2024)*

GSI Name	Type	Depth (m)	Depth to Bedrock	Bedrock Met	Townland
1131NWW004	Borehole				Killala
1131NWW013	Borehole	16.8	13.1	Yes	Meelick
1131NWW001	Borehole	11.1	3.1	Yes	Meelick
1131NWW012	Dug Well	1.5	0	Yes	Moyne
1131NWW011	Unknown	20.7	2.4	Yes	Moyne

11311NWW006	Borehole	33.2	0.6	Yes	Ballinteean
11311NWW016	Borehole	45.7	2.4	Yes	Rathglass East
11311NWW010	Dug Well	2.7			Newtown White

Table 5.4 *GSI Well Card Data – Yields in the Study Area (GSI, 2024)*

GSI Name	Type	Townland	Usage	Yield Class	Yield m^3/d
1131NWW004	Borehole	Killala	Group Scheme		27.3
1131NWW013	Borehole	Meelick		Poor	21.8
1131NWW001	Borehole	Meelick	Agri and Domestic	Moderate	27.3
1131NWW012	Dug Well	Moyne		Moderate	55
1131NWW011	Unknown	Moyne		Poor	21.8
11311NWW006	Borehole	Balllinteean		Poor	32.7
11311NWW016	Borehole	Rathglass East		Poor	33
11311NWW010	Dug Well	Newtown White		Poor	28

The well card data shows that the wells recorded close to the site location indications the depth of overburden to range from 16.8m (well no. 1131NWW013) to 45.7m BGL (well no. 11311NWW016), with an average depth of 31.25m BGL. The shallowest depth was record at dug well no. 11311NWW001 (1.5 m BGL) & 11311NWW010 (2.7m BGL), which are located approx. 1.5km north-east and 1.67km to the east, respectively. The average depth to bedrock ranges from 0m BGL at dug well no. 1131NWW012 to 13.1m BGL at Borehole no. 1131NWW001, located approx. 1.34km north-east and 0.48km to the north of the site, respectively.

The flow direction in the overburden generally follows no fixed pattern or trend. Flows of this nature are typical of low permeability clay strata with discontinuous gravel lenses, where often the water level measures represent pore water seepages into the overburden monitoring well (opposed to bedrock wells) or perched groundwater conditions (not bedrock aquifer water).

The existing ground is characterised by a steep gradient, descending from the highest point at approximately 61.0 m along the northern boundary to the lowest point at around 42.0 m, resulting in a level change of nearly 20 m. Regional groundwater flow would most likely be north-easterly towards Killala Bay coastal waterbody.

Groundwater ingresses were recorded in the south-east of the site at 1.60m BGL at TP01 (south-east of site) and 1.20m BGL at TP02 and SA01 (south-east of site) during the site investigation carried out between August and September 2024 by Site Investigations Ltd (refer to Appendix 5.2). Local minor dewatering may be required during excavation and groundworks depending on the time of year development works are carried out, in order to achieve the necessary foundation base level of c. 2.5m BGL. It is estimated that c. 22,648 m^3 of rock will be excavated and transported off site. This will increase the aquifer vulnerability during construction prior to paving and installation of stormwater drainage and services.

However, it should be noted that the groundwater ingresses were located within the bedrock interface and due to the discrete nature of fracturing and lengthy pathway of flow allowing time for attenuation and dispersion, there is no potential for change in water quality or levels as a result of local changes in the groundwater regime at the site. Therefore, there are no risks to these water supplies from the proposed development.

As stated in Section 5.3.5 above, there are no groundwater source protection zones, which are zones defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution, located within the proposed development site or in the immediate vicinity. A group scheme borehole was identified c. >1.5 km north of the site (well no. 1131NWW004). However according to the latest GSI and EPA online mapping there is no groundwater source protection zone associated with this supply. Due to the discrete nature of fracturing withing the bedrock aquifer there is no potential for temporary dewatering or contamination to impact on any group or public water scheme. Therefore, there are no risks to water supplies from the proposed development.

The area is serviced by Local Authority / Public Mains therefore it is unlikely that any wells are used for potable supply.

Figure 5.8 below presents the GSI well search for the area surrounding the site (Note: This source does not include all wells)

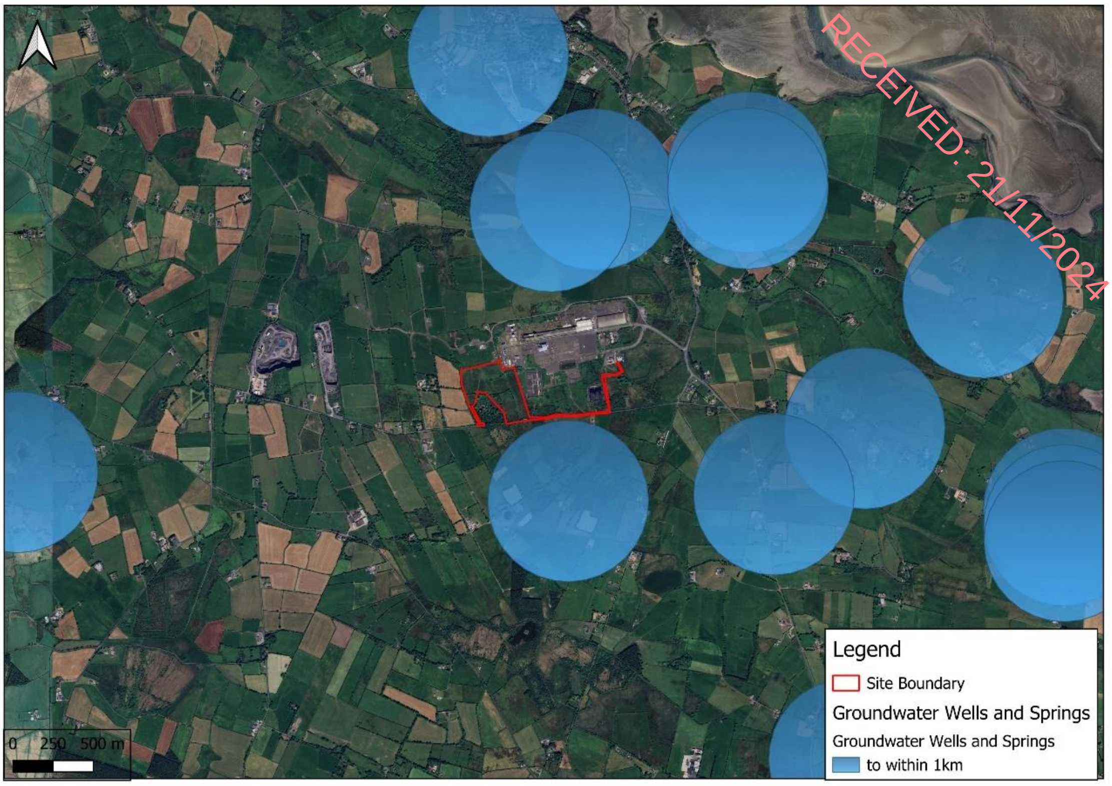

Figure 5.8 *GSI Well Search Map (GSI, 2024)*

5.3.8 Soil and Groundwater Quality

5.3.8.1 Regional Scale

The Water Framework Directive (WFD) Directive 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of '*Good Status*' in water bodies that are of lesser status at present and retaining '*Good Status*' or better where such status exists at present. '*Good Status*' was to be achieved in all waters by 2015, as well as maintaining 'high status' where the status already exists. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

The WFD required '*Good Water Status*' for all European water by 2015 or, at the least, by 2027, to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both '*Good Ecological Status*' and '*Good Chemical Status*'. The proposed development site is located entirely within the Bellacorick-Killala Ground Water Body (GWB) (European Code: IE_WE_0041). Currently, the EPA (2024) classifies the Bellacorick-Killala GWB as having a WFD status (2016-2021) of "*Good".* Presently the Bellacorick-Killala GWB has been classified by the EPA (2024) under the WFD Risk Score system as being "*Not at Risk"* of not achieving good status.

As detailed in Section 5.3.1 above the subject lands have been under agricultural use for a long time. Based on both the historic and recent agricultural use of the lands and environmental laboratory testing carried out as part of the site investigations carried out between August and September 2024 (Site Investigations Ltd), there is no evidence for prior / residual contamination.

5.3.8.2 Local Scale

As part of the site investigations carried out by Site Investigations Limited between August and September 2024, environmental laboratory testing was carried out on 1 no. soil sample taken from TP03 (north-east of site). A waste classification report was created using HazWasteOnline and it was determined that the material tested at TP03 was classified as non-hazardous and can be treated as inert waste at an Irish landfill. It cannot be discounted that any localised contamination was missed due to only 1 no. sample being taken and further environmental testing would be required to identify any possible contamination on the site.

No groundwater quality testing was conducted as part of this site investigation.

Refer to Appendix 5.2 - Killala Project, Killala, Co. Mayo – Site Investigation Report (Site Investigation Ltd, October 2024) for further information.

5.3.9 Economic Geology

The GSI (2024) mineral database was consulted to determine whether there were any mineral sites in close proximity of the study area. There were 3 mineral sites identified in the surrounding area/vicinity associated with Limestone (LS) and Sandstone (SS). The location and description of these mineral localities in relation to the site are presented in Table 5.5 below.

Table 5.5 *GSI Mineral Localities* (GSI, 2024)

Mineral Location Ref	Mineral Type	Key Mineral	Description	Comments	Location	County
1227	LS	Limestone	Non-metallic	Active quarry-30000 tpa-road aggregate. Dim 100X80X9-10m Limestone in flat beds with shaly partings-fine grained pyrite, bioclastic fragments. In Ballina Limestone Fm.	1 km west	Mayo
1359	LS	Limestone	Non-metallic	Lightish grey sst weathering gellowish brown. Prismatic jointing like basalt; easily worked-large blocks can be procured. Iron pyrites nearby. In Mullamore Sandstone Fm.	1.5 km north-east	Mayo
1356	SS	Sandstone	Non-metallic	Limestone is dull grey, irregular fracture but can be worked in any direction in very large blocks. Occupies a big area. Very durable. Bedrock in Killala Oolitic Member.	2.53 km east	Mayo

5.3.10 Geological Heritage

The Geological Survey of Ireland (GSI) Public Viewer was consulted and reviewed (2024) to identify sites of geological heritage for the site and surrounding area. The proposed development site is located entirely within the Killala Area Audited Site (Site Code: MO068), which is described as an extensive area of ridges on the west side of the Moy Estuary at Killala. From a geological aspect it comprised proglacial glaciotectonic landforms.

The Bartragh Island Audited Site (Site Code: MO007) is located c. 3.5 k m north-east of the site. The site is described as a long and narrow sandy island that separates the shallow, south-western area of Killala Bay from the open water to the northeast. From a geological aspect the site presents coastal geomorphology.

Approximately 4.8 km north-east of the site the Ross Strand and Spinc Audited Site (Site Code: MO091) is located. The site comprises a rocky coastline and beaches on the west side of Killala Bay and is recommended for geological NHA. In geological terms the site is described as tertiary gabbro and Killala/Ross Gabbro. There is no source pathway linkage to these heritage site.

5.3.11 Geohazards

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating the slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.

Based on the GSI spatial map viewer, the site is not in an area susceptible to landslides and there have been no recorded landslide events at the site. Due to the local topography and the underlying strata, there is a negligible risk of a landslide event occurring at the site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are five permanent broadband seismic recording stations in Ireland and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed location was in County Wicklow (>1.0 Ml magnitude) due to quarry blasts. There is a very low risk of seismic activity to the Proposed Development site.

There are no active volcanoes in Ireland so there is no risk from volcanic activity.

5.3.12 Areas of Conservation

According to the NPWS (2024) on-line database there are no special protected areas (SPA) or special areas of conservation (SAC) on or within the boundary of the site. The lands in which the development is located have no formal designations. The nearest designated lands to the site are as follows:

- Killala Bay/Moy Estuary SAC (Site Code: 000458), located c. 1.26 km north-east of the site/downgradient; and

- Killala Bay/Moy Estuary SPA (Site Code: 004036), located c. 1.95 km north-east of the site/downgradient.

There is a hydrogeological connection to these Natura sites through the bedrock aquifer but as fractures are poorly connected and the pathway of flow is lengthy allowing time for attenuation and dispersion, such that there is no potential for change in water quality or levels as a result of local changes in the groundwater regime at the site.

Figure 5.9 below presents the location of these protected areas in the context of the site.

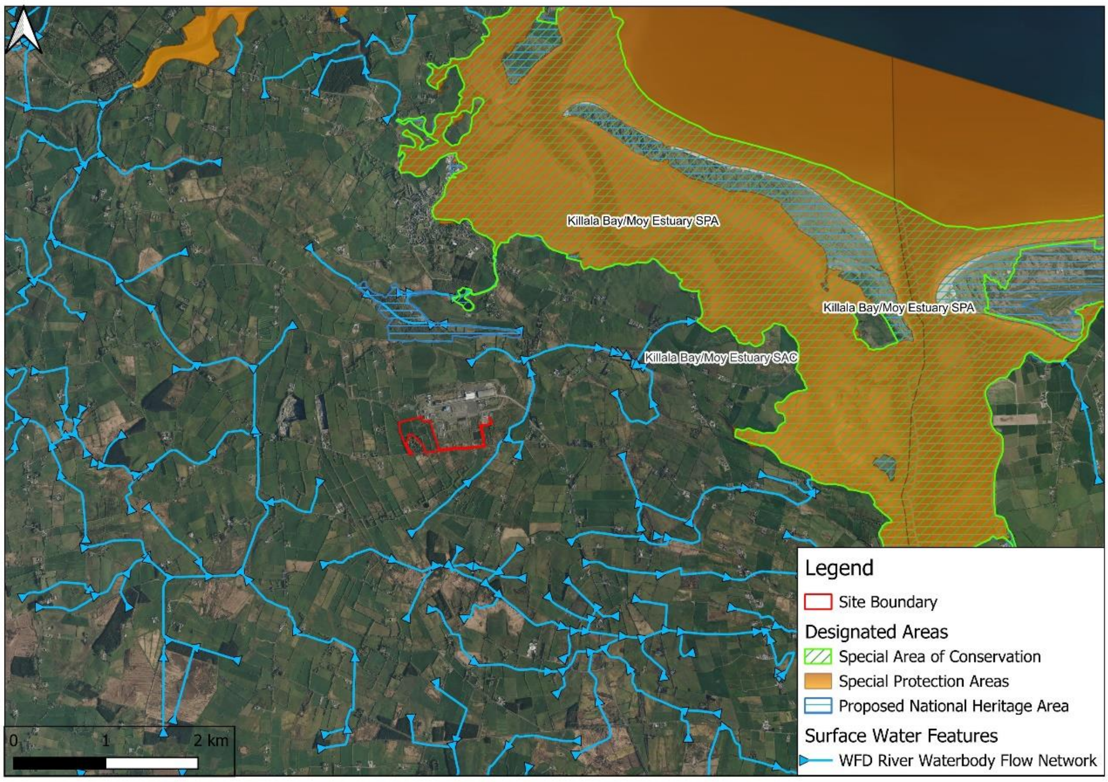

Figure 5.9 *Conservation Areas in the context of the Site (EPA, 2024)*

5.3.13 Conceptual Site Model

AWN have developed a conceptual site model (CSM) in order to identify any likely Source-Pathway-Receptor linkages relating to the site and the proposed development. A local geological cross section and the description below present the CSM which have been developed based on the information presented in aforementioned sections:

- The GSI/ Teagasc mapping shows that the soil type beneath the site comprises primarily / predominantly a combination of Deep Well Drained Mineral – Mainly shallow poorly drained mineral (BminSP) - mainly basic and mineral poorly drained (BminPD) – mainly basic to the south, western and eastern portions of the site.
- The subsoil underlying the site comprises bedrock outcrop or subcrop (Rck) and Till derived from limestones (Tls) underlying the southern and eastern portion of the site and immediate vicinity (south, west and east).

- The site specific ground investigation (Site Investigations Ltd, 2024) identified the subsoil strata to dominated by brown sandy slightly gravelly silty CLAY with
- cobbles. The locations to the south east of the site achieved depths greater than 1.00mbgl, with TP01 achieving 1.80m depth before terminating.
- Bedrock was encountered at 0.80mbgl and 0.50mbgl at BH02 (centre of site) and BH03 (north-east of site) respectively and although highly fractured core was initially encountered, the bedrock was logged as a strong grey muddy LIMESTONE, with calcite veins and fossils recorded and is part of the Ballina Limestone Formation.
- The site is underlain by a "Locally Important (LI) Aquifer – Bedrock which is Moderately Productive only in Local Zones".
- The GSI's aquifer vulnerability classifications of "*Rock at or near Surface or Karst*" (X) for the majority of the site and "*Extreme*" (E) to the south and eastern portion of the site is relatively consistent with data obtained from the site investigations carried out by Site Investigations Limited between August and September 2024 at the site, where the natural ground conditions are dominated by brown sandy slightly gravelly silty CLAY with cobbles ranging in depth between 0.4m BGL at BH04 and 0.6m BGL at TP05 (north-west of site) to 1.8m BGL at TP01 and 1.6m BGL at TP02 (south & south-east of site).
- The site is underlain by the Bellacorick-Killala Groundwater Body (EU code: IE_WE_G_0041), which Based on the most recent data (www.epa.ie) the Bellacorick-Killala GWB for which the site is located entirely within, has a WFD status of "*Good*" (2016-2021) and a risk score of "*Not at Risk*".
- Regional groundwater flow is most likely to discharge to the northeast towards Killala Bay, located c. 1.26 km north-east (downgradient) of the site and the Natura 2000 sites located therein (Killala Bay /Moy Estuary SAC/SPA's). However fracture flow in this type of aquifer is poorly connected and as such the travel time to the estuary would be very slow allowing for attenuation and dispersion along the pathway.
- Groundwater ingresses were recorded in the south-east of the site at 1.60m BGL at TP01 and 1.20m BGL at TP02 and SA01. However, it should be noted that the groundwater ingresses were located within the bedrock interface and due to the discrete nature of fracturing and lengthy pathway of flow allowing time for attenuation and dispersion, there is no potential for change in water quality or levels as a result of local changes in the groundwater regime at the site. In addition, the groundwater ingresses were recorded in the south-east of the site and were not located near the proposed data centre building towards the north of the site. Therefore, there is no potential for change in water quality or levels as a result of local changes in the groundwater regime at the site.
- As expected based on the greenfield site location and previous agricultural use, soil quality at the site was classified as non-hazardous and suitable to be treated as inert waste at an Irish landfill, based off the 1 no. soil sample scheduled for analysis (TP01). No groundwater quality testing has been conducted to date.

A local cross section of the sites current profile can be seen in Figure 5.10 below.

Refer to Drawing Reference Number: 24_078 - CSE – V1 - XX - DR - C – 0012 and 24_078 - CSE – V1 - XX - DR - C – 0013 for the site cross sections (CSEA, 2024).

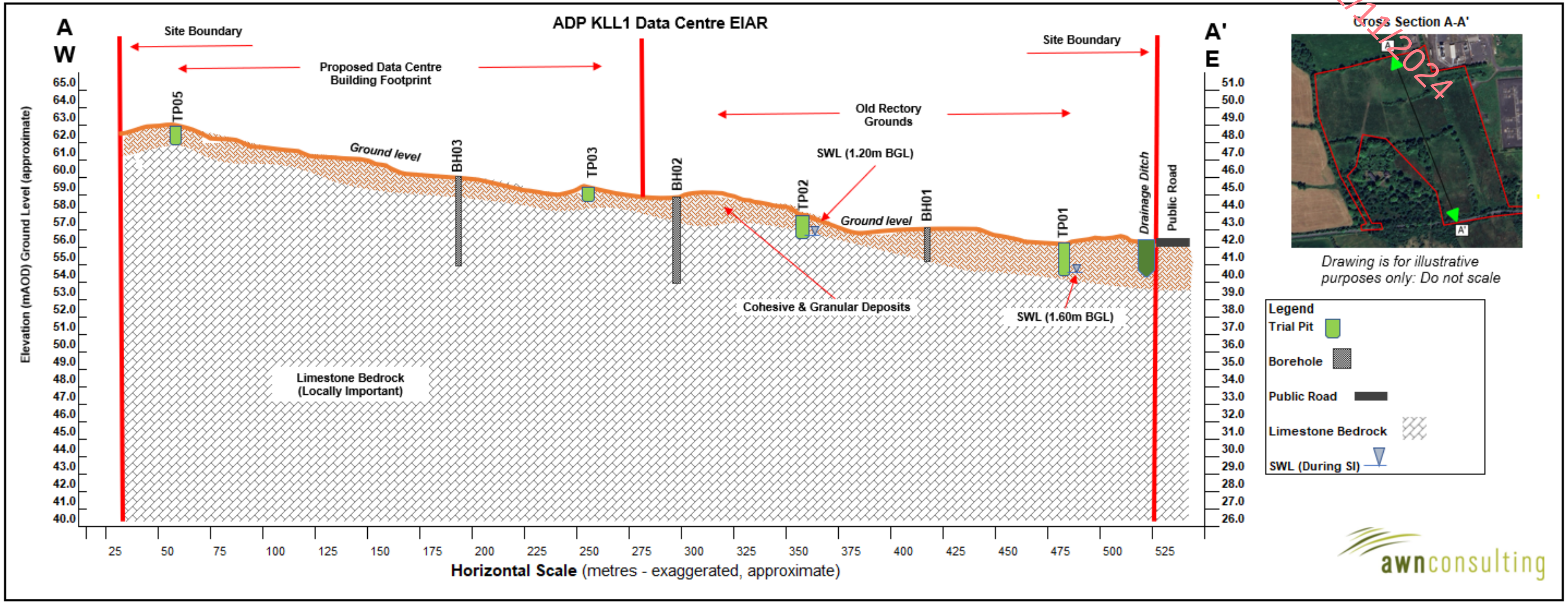

Figure 5.10 Local Cross Section "A (North) – A' (South)", (AWN, 2024)

5.3.14 Rating of Importance of Geological and Hydrogeological Attributes

Based on the TII (previously NRA) methodology (2009), criteria for rating site importance of geological features, the importance of the bedrock and soil features at this site is rated as *'Low Importance'* due to local geological attribute has a low quality, significance or value on a local scale. There are no extractable minerals or areas of geological heritage and the soils are suitable for agricultural use but are typical of surrounding agricultural land.

Based on the TII methodology (2009) (See Appendix 5.1) the importance of the hydrogeological features at this site is rated as '*Medium Importance*' based on the assessment that the attribute has a medium quality significance or value on a local scale. In addition, the aquifer does not host / contain any groundwater dependent ecosystems (SACs/NHAs). The aquifer is a '*Locally Important Aquifer'* and is not widely used for public water supply or generally for potable use. In addition, as explained in Section 5.3.13 above, there is a '*direct'* hydrogeological connection between the site and the underlying aquifer.

5.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

A detailed description of the proposed development is set out in Chapter 2 of this EIAR (Description of the Proposed Development).

The details of the construction and operation of the proposed development in terms of Land, Soils Geology and Hydrogeology are detailed in the subsections below.

As outlined below the activities required for the construction phase of the proposed development represents the greatest risk of potential impact on the geological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation, and infilling activities required to facilitate construction of the proposed development.

5.4.1 Construction Phase

The activities required for the construction phase of the proposed development represents the greatest risk of potential impact on the geological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation and infilling activities required to facilitate construction of the proposed development.

<u>Site Levelling and Excavations</u>

Excavations and levelling of the site to the necessary foundation base level (c. 2.5m BGL) for construction will require the excavation of an estimated c. 27,962 m^3 of topsoil. After the removal of topsoil, it is predicted that a further c. 36,150 m^3 of subsoil and c. 22,648 m^3 of rock will be removed and transported off site. This material will be disposed of at a fully authorised soil recovery site, while c. 36,150 m^3 of material will be re-used as fill material in landscaping areas. The construction will require excavations down to a maximum depth of 4.5m BGL from existing ground levels.

Following the completion of site clearance and levelling, all structures will require foundations to structural engineer specifications. Building structures will comprise standard structural steel frames.

As stated above, it is estimated that c. 22,648 m^3 of rock will be excavated and transported off site. This will increase the aquifer vulnerability which is already classified as during construction prior to paving and installation of stormwater drainage and services.

Local minor dewatering may be required during excavation works and groundworks (depending on the time of year development works are carried out). However, there is no potential for change in groundwater levels as a result of local changes in the groundwater regime at the site due to the discrete nature of fracturing within the bedrock and lengthy pathway of flow allowing time for attenuation and dispersion. In addition, the groundwater ingresses were recorded in the south-east of the site at 1.60m BGL (TP01) and 1.20m BGL at (TP02 and SA01) within the bedrock interface and did not occur near the proposed data centre building towards the north of the site.

Storage of soils/aggregates

The employment of good construction management practices and full adherence to the Construction Management Plan (CMP) will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. Such practices include the proper storage of spoil / loose materials on site, such as stockpiled excavated materials to be used for landscaping purposes; Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site.

Temporary storage of spoil will be managed to prevent accidental release of dust emissions and uncontrolled surface water run-off which may contain sediment and solid matter. Any excavated material temporarily stockpiled onsite for re-use during reinstatement will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

Storage of hazardous Material

Temporary storage of fuel required for on site for construction traffic. Liquid materials i.e., fuel storage will be located within the site compound in temporary designated bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage.

Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.

Import/Export of Materials

There will be a requirement for deliveries and refuelling of imported engineering fill (sands and gravels), and other construction materials include, steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site by road. Refuelling will be completed in accordance with the best standard practice refuelling procedure. To support the construction of proposed roads, car parks, and buildings, additional fill material may need to be imported.

A 'Just in Time' delivery system will operate to minimise storage of materials. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances.

Soil requiring removal offsite will be removed from site regularly to ensure there is minimal need for stockpiling. Some of the topsoil removed will be re-used on site for backfill. Any surplus topsoil, subsoil and bedrock material will be transported off site and disposed of at a fully authorised soil recovery site or licenced landfill based on the waste soil classification.

5.4.2 Operational Phase

The proposed development will result in the increase in hardstanding area. Increase in hardstand could have a local effect on groundwater recharge.

It should be noted that there is a requirement for bulk fuels (HVO), no diesel storage will be required.

There is no requirement for discharge to ground and no requirement for abstraction of groundwater during operational phase.

5.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

An analysis of the potential impacts of the Proposed Development on the land, soils, geology and hydrogeological environment during the construction and operation is outlined below. Due to the inter-relationship between soils, geology and hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both Chapter 5 and 6 of the EIA Report. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 5.6.

There is no likely potential impact on any protected habitat based on the design criteria and distance of any hydrological or hydrogeological pathways.

5.5.1 Construction Phase

5.5.1.1 Potential impacts on Land, Soils, Geology and Hydrogeology

Soil requiring removal offsite will be removed from site regularly to ensure there is minimal need for stockpiling. Some of the material will be re-used on site for backfill Any surplus material will be transported off site and disposed of at a fully authorised soil recovery site. It is predicted that c. c. 27,962 m^3 of topsoil will be excavated. After the removal of topsoil, it is predicted that a further c. 36,150 m^3 of subsoil and c. 22,648 m^3 of rock will be removed and transported off site. This material will be disposed of at a fully authorised soil recovery site, while c. 36,150 m^3 of material will be re-used as fill material. To support the construction of proposed roads, car parks, and buildings, additional fill (sands and gravels) material may need to be imported.

There is potential for groundwater to become locally contaminated with pollutants associated with construction activity as the aquifer vulnerability is extreme to high. The potential main contaminants include:

- Pollution due to discharges or spillages during the construction phase;
  - Cement/concrete (increase turbidity and pH) – arising from construction materials;
  - Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage
  - Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms.

As stated above, the excavation of topsoil, subsoil and rock and near-surface rock head will be required for levelling of the site. Local removal and reinstatement (including infilling) of the 'protective' topsoil and subsoil cover across the development area will increase the aquifer vulnerability during construction prior to paving and installation of stormwater drainage and services. Capping of significant areas of the site by hardstand/building following construction and installation of drainage will minimize the potential for contamination of the aquifer beneath the site.

Local minor dewatering may be required during excavation works and groundworks. However, there is no potential for change in water quality or levels as a result of local changes in the groundwater regime at the site due to the discrete nature of fracturing within the bedrock and lengthy pathway of flow allowing time for attenuation and dispersion. In addition, the groundwater ingresses were recorded in the south-east of the site at 1.60m BGL (TP01) and 1.20m BGL at (TP02 and SA01) within the bedrock interface, and did not occur near the proposed data centre building towards the north of the site. Therefore, there is no potential for change in water quality or levels as a result of local changes in the groundwater regime at the site.

In the absence of mitigation measures the potential impacts during the construction phase on land, soils and geology, hydrogeology (groundwater) are ***negative***, ***not significant*** and ***short term***.

5.5.1.2 Potential Impacts on Human Health and Populations

As stated in Section 5.3.5 above, there are no groundwater source protection zones, which are zones defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution, located within the proposed development site or in the immediate vicinity. A group scheme borehole was identified c. >1.5 km north of the site (well no. 1131NWW004). However according to the latest GSI and EPA online mapping there is no groundwater source protection zone associated with this supply. Due to the discrete nature of fracturing withing the bedrock aquifer there is no potential for temporary dewatering or contamination to impact on any group or public water scheme. Therefore, there are no risks to water supplies from the proposed development.

The area is also serviced by Local Authority / Public Mains therefore it is unlikely that any wells are used for potable supply.

No contamination was detected in the site specific ground investigation report (Site Investigations Ltd, 2024).

On this basis in the absence of mitigation measures the potential impacts during the construction phase on human health and populations due to changes to soil and groundwater regime are ***neutral imperceptible*** and ***short term***.

5.5.1.3 Potential Impacts on Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Report that is included with the application documentation (see Appendix 6.2 of this EIAR). The WFD assessment indicates that there is no potential for adverse or minor temporary or localised effects on the Bellacorick- Killala groundwater body. Therefore, it has been assessed that the proposed development will not cause any significant deterioration or change on its groundwater body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

No further assessment of WFD is recommended given that no significant deterioration or change in water body status is expected based on the current understanding of the proposed development during construction.

There is a potential of accidental discharges during the construction phase (as set out in Section 5.5.1.1), however these are temporary short-lived events will not impact on the water status of the underlying bedrock aquifer long-term and as such will not impact on trends in water quality and over all status assessment.

5.5.2 Operational Phase

5.5.2.1 Potential impacts on Land, Soils, Geology and Hydrogeology

As HVO is to be used rather than bulk diesel for the 25 no. backup generators there is minimal impact for contamination of the underlying aquifer in the event of a spill/leak. The required HVO to operate the generators will be supplied by individual double lined/bunded tanks or ‘belly tanks’ (c. 36,000 litres) within the container at each generator. All areas where accidental leaks could occur are drained to oil interceptors prior to discharge to public storm sewer via an oil interceptor. The refuelling area is drained to the foul sewer.

The proposed incorporation of hardstand area and the use of SUDs design measures will have a minor effect on local recharge to ground; however, the impact on the overall groundwater regime will be insignificant considering the proportion of the site area in relation to the total aquifer area. It is noted that a significant proportion of the site is paved and recharge will continue as current, as SuDS measures have been incorporated in the design to facilitate recharge to ground.

In the absence of mitigation measures (or design measures) the potential impacts during the operational phase on land, soils, geology and hydrogeology are ***negative***, ***imperceptible,*** and ***long-term***

5.5.2.2 Potential Impacts on Human Health and Populations

As stated in Section 5.3.5 above, there are no groundwater source protection zones, which are zones defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution, located within the proposed development site or in the immediate vicinity. A group scheme borehole was identified c. >1.5 km north of the site (well no. 1131NWW004). However according to the latest GSI and EPA online mapping there is no groundwater source protection zone associated with this supply. Due to the discrete nature of fracturing withing the bedrock aquifer there is no potential for temporary dewatering or contamination to impact on any group or public water scheme. Therefore, there are no risks to water supplies from the proposed development.

The nearest groundwater source protection zones mapped by the GSI are located c. >13 km south-west of the site (Ref: Crossmolina Eskeragh GWS & Killeen Errew GWS). The proposed development site is located outside the zone of contribution of these supplies. The area is also serviced by Local Authority / Public Mains therefore it is unlikely that any wells are used for potable supply.

As there is no potential for impact on drinking water resources or leisure uses of water bodies there is no potential for impact on human health and population

Therefore, on this basis in the absence of mitigation measures the potential impacts during the operational phase on human health and populations due to the potential for contamination of soil and groundwater are ***neutral, imperceptible*** and ***long term***.

5.5.2.3 Potential Impacts on Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Report that is included with the application documentation (see Appendix 6.2 of this EIAR). The WFD Screening Report outlines that the project-specific CMP includes robust mitigation measures to protect the underlying hydrogeological environment. There are mitigation and design measures to protect the hydrological and hydrogeological environment. In terms of the operational phase, the risk to the aquifer is considered to be low due to the use of oil interceptors on the stormwater system prior to discharge from the site.

It has been established (Section 5.5.2.3) that while, there is a potential of accidental discharges during the operational phase (of HVO only) this will not impact on trends in water quality and overall WFD status assessment.

It is noted that, as set out in Chapter 6 (Hydrology) the surface water discharges from the site are indirect, and will be adequately attenuated via SuDS measures i.e. hydrocarbon interceptors, pollutant traps, swales, permeable paving, and attenuation pond, to ensure there is no long-term negative impact to the WFD water quality status of the Moyne 34 Stream, Killala Bay and the Bellacorick-Killala Groundwater Body.

Therefore, it has been assessed that it is unlikely that the proposed development will cause any significant deterioration or change in water body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

There is no potential impact on Water Framework Directive status, therefore no specific mitigation measures are required.

5.6 REMEDIAL AND MITIGATION MEASURES

The design has taken account of the potential impacts of the development on the soils, geology and hydrogeology environment local to the area where construction is taking place and containment of contaminant sources during operation. Measures have been incorporated in the design to mitigate the potential effects on the surrounding land, soils, geology and hydrogeology.

5.6.1 Construction Phase

Clifton Scannell Emerson Associates (CSEA) have prepared an Outline Construction Management Plan (CMP) in respect of the proposed development. This outlines and explains the construction techniques and methodologies which will be implemented during construction of the proposed development.

Construction works and the proposed mitigation measures are informed by best practice guidance from Inland Fisheries Ireland on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741); and
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005).

The CMP sets out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The CMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Environmental Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures.

All mitigation measures outlined here, and within the CMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

5.6.1.1 Land, Soils, Geology, Hydrogeology

All excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. A temporary drainage system shall be established prior to the commencement of the initial infrastructure construction works to collect and discharge any treated construction water during construction.

Cement/concrete works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 meters of an existing surface water drainage point. Wash-outs will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer subject to agreement with Uisce Éireann (Irish Water) / MCC.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. Relevant personnel working on the Site will be suitably trained in the implementation of the procedures.

Hydrocarbons and other construction chemicals

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages to ground of fuels and other construction chemicals and prevent any resulting to surface water (and groundwater) systems:

- Designation of bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used, the following measures will be taken:
    - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
    - The pump or valve will be fitted with a lock and will be secured when not in use;
    - All bowsers to carry a spill kit and relevant operatives must have spill response training;
    - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.
- In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such

as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area or within the construction compound (or where possible off the site) which will be away from surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

Wastewater Management

Foul wastewater discharge from the site will be managed and controlled for the duration of the construction works.

Foul water from the offices and welfare facilities on the site will be collected in portable sanitary facilities and disposed of appropriately by licenced contractor.

The construction contractor will implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

5.6.1.2 Human Health and Populations

As there is no source pathway linkage, no mitigation is required.

5.6.1.3 Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Report that is included with the application documentation (see Appendix 6.2 of this EIAR). The WFD Screening Report outlines that the project-specific CMP includes robust mitigation measures to protect the underlying hydrogeological environment. There are mitigation and design measures to protect the hydrological and hydrogeological environment.

It has been established (Section 5.5.1.3) that while, there is a potential of accidental discharges during the construction phase this will not impact on trends in water quality and overall WFD status assessment. On a precautionary basis, the mitigation measures set out in Section 5.6.1.1 will be implemented during the construction works for the protection of groundwater quality.

5.6.2 Operational Phase

5.6.2.1 Land, Soils, Geology, and Hydrogeology

The required HVO to operate the 25 no. generators will be supplied by individual double lined tanks or 'belly tanks' within the container at each generator. The generator yard will be drained through an oil interceptor. Tanker loading area will be drained to the foul sewer.

The proposed incorporation of hardstand area and the use of SUDs design measures i.e. 4,500m^3 attenuation pond (including a forebay berm and a permanent pond feature), Pollutant traps and bypass hydrocarbon interceptors installed upstream of all attenuation systems and interceptors installed in fuel delivery areas will have a minor effect on local recharge to ground; however, the impact on the overall groundwater regime will be insignificant considering the proportion of the site area in relation to the total aquifer area.

Therefore, the risk of accidental discharge has been adequately addressed through design. No further mitigation is required.

Refer to Chapter 6 (Hydrology) and Appendix 6.2 - Engineering Planning Report – Proposed Killala Data Centre Development (CSEA, 2024) of the EIAR for further information on the proposed SUDs design measures.

5.6.2.2 Human Health and Populations

As there is no source pathway linkage no mitigation is required.

5.6.2.3 Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Report that is included with the application documentation (see Appendix 6.2 of this EIAR). The WFD Screening Report outlines that the project-specific CMP includes robust mitigation measures to protect the underlying hydrogeological environment. There are mitigation and design measures to protect the hydrological and hydrogeological environment. In terms of the operational phase, the risk to the aquifer is considered to be low due to the use of oil interceptors on the stormwater system prior to discharge from the site.

It has been established (Section 5.5.2.3) that while, there is a potential of accidental discharges during the operational phase this will not impact on trends in water quality and overall WFD status assessment. On a precautionary basis, the mitigation measures set out in Section 5.6.2.1 will be implemented during the operational phase to control of the bulk storage of HVO. It is noted that, as set out in Chapter 6 (Hydrology) the surface water discharges from the site are indirect, and will be adequately attenuated via SuDS measures, hydrobrake (or equivalent) and oil/water interceptor to ensure there is no long-term negative impact to the WFD water quality status of the Moyne 34 Stream or Killala Bay and the Bellacorick-Killala Groundwater Body.

5.7 MONITORING

5.7.1 Construction Phase

During construction phase the following monitoring measures will be implemented:

- Regular inspection of water run-off and sediments controls (e.g., silt traps);
- Soil sampling to confirm disposal options for excavated soils to ensure correct disposal
- Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc) to minimse potential for discharge to ground

5.7.2 Operational Phase

Maintenance of the surface water drainage system, including interceptors, and foul sewers is recommended to minimise any accidental discharges to soil or groundwater.

5.8 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

5.8.1 Construction Phase

5.8.1.1 Land, Soils, Geology, Hydrogeology

The implementation of the mitigation and monitoring measures detailed in Section 5.6.1 and 5.7.1, will ensure that the potential impacts on land, soils, geology, hydrogeology during the construction phase are adequately mitigated. The residual effect on land, soils, geology and hydrogeology during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

Following the TII criteria (refer to Appendix 5.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

5.8.1.2 Human Health and Populations

As there is no source pathway linkage, there are no potential impacts on human health and populations during the construction phase. The residual effect on human health and populations during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

5.8.1.3 Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Report that is included with the application documentation. The WFD Screening Report concludes there is no potential for adverse or minor temporary or localised effects on the Bellacorick-Killala groundwater body. Therefore, it has been assessed that it is unlikely that the proposed development will cause any significant deterioration or change on its water body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

Even in the absence of the mitigation and monitoring measures detailed in Section 5.6.1 and 5.7.1, there will be no predicted degradation of the current groundwater body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

There are appropriately designed mitigation measures which will be implemented during the construction phase to protect the hydrogeological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of groundwater bodies long-term and as such will not impact on trends in water quality and over all status assessment.

The residual effect on Water Framework Directive status during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

5.8.2 Operational Phase

5.8.2.1 Land, Soils, Geology, Hydrogeology

The implementation of the mitigation and monitoring measures detailed in Section 5.6.2 and 5.7.2, will ensure that the potential impacts on land, soils, geology, hydrogeology once the proposed development is constructed and operational are adequately mitigated. The residual effect on surface water quality during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term***.

Following the TII criteria (refer to Appendix 5.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

5.8.2.2 Human Health and Populations

As there is no source pathway linkage no mitigation is required. The residual effect on human health and populations during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term***.

5.8.2.3 Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Report that is included with the application documentation. The WFD Screening Report concludes there is no potential for adverse or minor temporary or localised effects on the Bellacorick-Killala groundwater body. Therefore, it has been assessed that it is unlikely that the proposed development will cause any significant deterioration or change on its water body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

Even in the absence of the mitigation and monitoring measures detailed in Section 5.6.2 and 5.7.2, there will be no predicted degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

There are appropriately designed mitigation and design measures which will be implemented during the construction phase to protect the hydrogeological environment. There is a potential of accidental discharges during the construction and operational phases, however these are temporary short-lived events that will not impact on the water status of underlying aquifer long-term and as such will not impact on trends in water quality and over all status assessment.

There are no planned discharges to groundwater during the operational phase and no long-term groundwater dewatering for the Project. The proposed development design includes hardstand cover across the site.

5.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2, Section 2.8.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

Any future application on these lands will be subject to planning approval and environmental assessment as required. Any new development proposed on the lands after the submission of the proposed development would be accompanied by an EIA, or EIA Screening as required and take into consideration the development of this site.

5.9.1 Construction Phase

In relation to the potential cumulative impact on land, soil, geology and hydrogeology during the construction phases, the construction works which would have potential cumulative impacts are as follows:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.
- Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage system.
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

The works contractors for other planned or permitted developments will be obliged to ensure that measures are in place to protect soil and water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016).

The implementation of mitigation and monitoring measures previously detailed above in section 5.6.1; and 5.7.1 as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the land, soils, geology, hydrogeological environment during the construction phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***short-term***.

5.9.2 Operational Phase

In relation to the potential cumulative impact on hydrology during the operational phases, the operational activities which would have potential cumulative impacts are as follows:

- Increased hard standing areas will reduce local recharge to ground and increase surface water run-off potential if not limited to the green field run-off rate from the site. Cumulatively this development and others in the area will result in localised reduced recharge to ground and increase in surface run-off.
- Increased risk of accidental discharge of hydrocarbons from car parking areas, and along roads is possible unless diverted to surface water system with petrol interceptor.
- There will be a small loss of greenfield area locally as part of the proposed development.

The proposed development and the other permitted development listed in Chapter 2, Section 2.8 and Appendix 2.1 of this EIA Report will result in an increase in hard standing which will result in localised reduced recharge to ground. The site is underlain by a "Locally Important (LI) Aquifer – Bedrock which is Moderately Productive only in Local Zones". Due to the discrete nature of fracturing and lengthy pathway of flow allowing time for attenuation and dispersion, there is no potential for change in water quality or levels as a result of local changes in the groundwater regime at the site. The cumulative impact is considered to be imperceptible. The implementation of SuDs measures on site will mitigate against and reduce the recharge rate to ground.

All developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (Water Framework Directive and associated legislation) such that they would be required to manage run-off and fuel leakages.

The implementation of mitigation and monitoring measures detailed in Section 5.6.1; and 5.7.1 as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the land, soils, geology, hydrogeological environment during the operational phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***long-term***.

5.10 REFERENCES

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- Appendix 5.2 - Killala Project, Killala, Co. Mayo – Site Investigation Report (Site Investigation Ltd, October 2024).
- Engineering Planning Report – Proposed Killala Data Centre Development (CSEA, 2024).

CHAPTER 06:

HYDROLOGY

06

6.0 CONTENTS

6.0 HYDROLOGY

6.1 INTRODUCTION

This chapter assesses and evaluates the likely significant effects of the development on the hydrological aspects of the site and surrounding area. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

6.2 METHODOLOGY

6.2.1 Criteria for rating of effects

This chapter evaluates the effects, if any, which the proposed development will have on Hydrology as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022). In addition, the document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII, 2009, previously NRA) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the hydrological environment is based on the standard EIAR impact predictions table included in Chapter 1 of the EIAR which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication).

As outlined in the EPA Guidance, the duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The TII criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-3 in Appendix 6.1.

The principal attributes (and effects) to be assessed include the following:

- Water Body Status and source- pathway linkage to any area of the waterbody where the ecosystem is protected by EU or National legislation;
- Surface water features within the area of the site and potential impact on surface water quality arising from proposed development related works including any discharge of surface water run-off/dewatering etc;
- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any); and
- Surface water features within the area of the site.

6.2.2 Sources of Information

Desk-based hydrological information in the vicinity of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area;
- Draft River Basin Management Plan for Ireland 2022-2027.
- Mayo County Development Plan 2022-2028.
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW).
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie).
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001).
- National Parks and Wildlife Services (NPWS) – Protected Site Register; and
- Strategic Flood Risk Assessment (SFRA) Mayo County Development Plan 2022-2028.

Site specific data was derived from the following sources:

- Engineering Planning Report – Proposed Killala Data Centre Development (CSEA, 2024).
- Various design site plans and drawings; and
- Consultation with design engineers.

6.2.3 Difficulties Encountered / Forecasting Methods

There were no significant difficulties encountered in compiling the specified information for this EIAR chapter.

6.3 RECEIVING ENVIRONMENT

The proposed development comprises a single data centre building and ancillary services located towards the north of the site.

The site is currently a greenfield site comprising c. 10.58 hectares of undeveloped, agricultural lands adjacent to the southwester portion of Killala Business Park, traversing the townlands of Mullafarry and Tawnaghmore Upper, Killala, Co. Mayo, just west of the main Ballina/Killala Road (R314), c. 1.8km south of Killala town, c. 10.5 km north of Ballina, c. 46 km west of Sligo town and c. 39 km north of Castlebar.

In the south west corner of this parcel of land there is an old rectory house (Ballysakeery Glebe House) and associated structures (sheds). The rectory and associated structures occupy approximately 800 m^2 of this parcel of land, none of which will be impacted by the proposed development. The area of land between the Glebe House and the Mullafarry Road is boggy and contains a stand of trees and shrubs. There is a compacted gravel access road leading from Mullafarry Road to the old rectory house.

A small drainage ditch is located along the southern boundary, adjacent to the Mullafarry Road, which eventually discharges into the Moyne 34 Stream. The only other feature observed across this area of land was improved grassland (for grazing), hedgerows and a historic Lime Kiln, located c. 110 m east of the old rectory house.

The existing ground is characterised by a steep gradient, descending from the highest point at approximately 61.0 m along the northern boundary to the lowest point at around 42.0 m, resulting in a level change of nearly 20 m.

Refer to Figure 6.1 below for the proposed site location and surrounding land use/environment.

Figure 6.1 *Site Location and Surrounding Land Use Map (Google Earth Pro, 2024)*

6.3.1 Hydrology

The TII criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-3 in Appendix 6.1.

The proposed development site is located within the former ERBD (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). The proposed development site is located in the Western River Basin District (WRBD).

According to the EPA maps, the proposed development site lies within the Moy and Killala Bay Catchment (Catchment ID: 34) and the Abbeytown_SC_010 Sub-Catchment (Sub-Catchment ID: 34_19).

A small drainage ditch is located along the southern boundary of the site, adjacent to the Mullafarry Road, which eventually discharges into the Moyne 34 Stream located c.

3.5 km downstream (0.55 km south-east of the site - linear distance). The Moyne 34 Stream flows in a north-easterly direction and eventually discharges to Killala Bay coastal waterbody a further c. 3.25 km downstream (c. 2.52 km north-east/linear distance), where the receiving environment is designated as part of the Killala Bay/Moy Estuary SAC and the Killala Bay/Moy Estuary SPA.

There is a disused area of land to the immediate east which contains a reservoir (c. 450 m to the east), associated with former Asahi activities. The reservoir was used by the Asahi Company to receive raw water from Lough Conn, located c. 12 km south of the proposed development site.

Figure 6.2 below presents the regional drainage as per the latest EPA mapping.

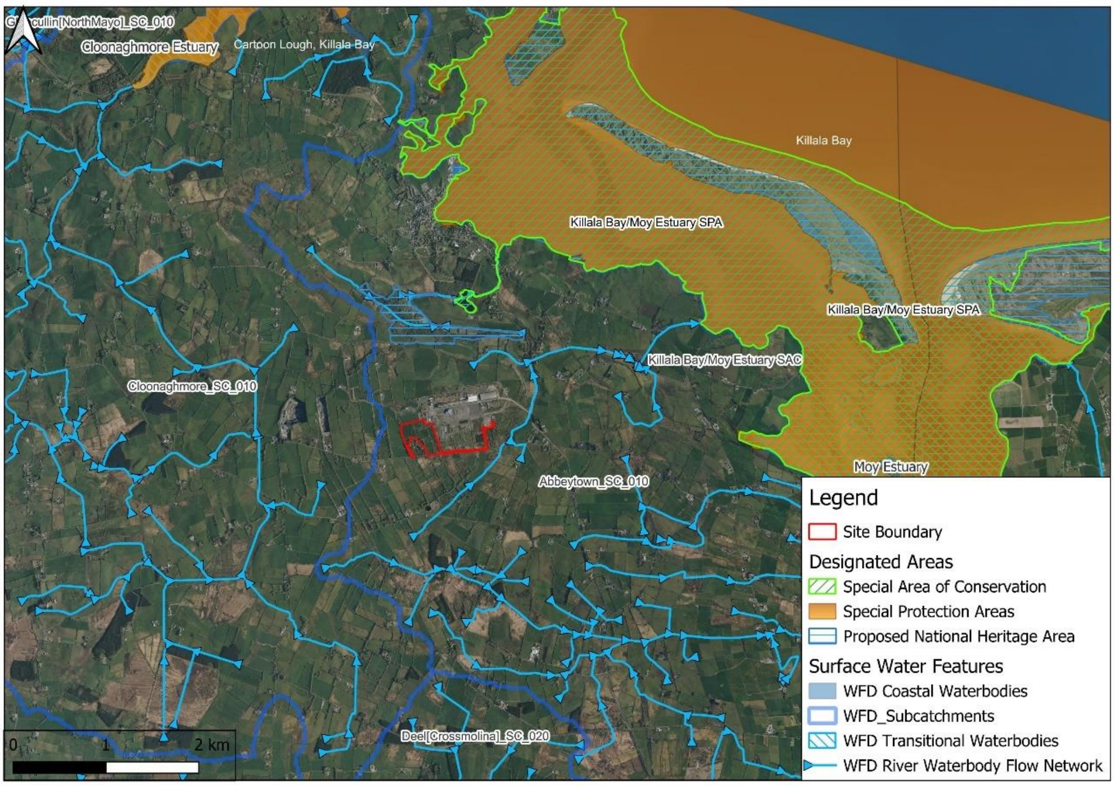

Figure 6.2 *Hydrological Environment (EPA, 2024).*

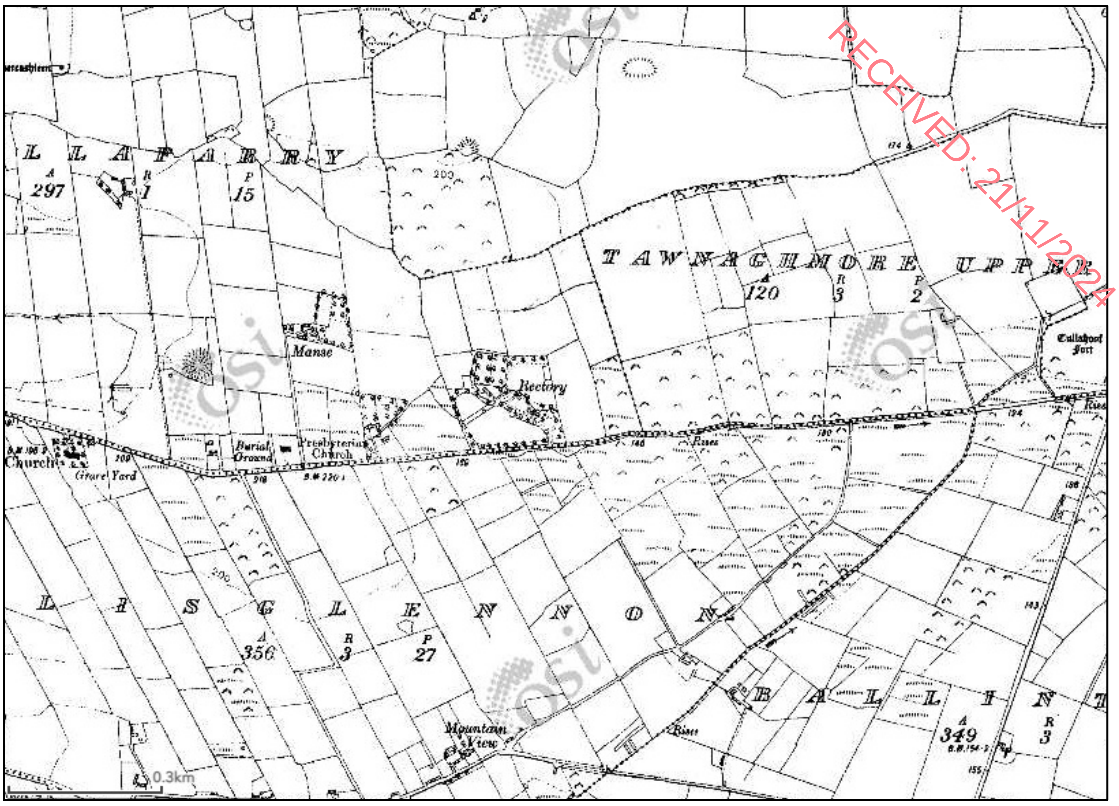

Figure 6.3 *Historic 6 inch Black and White Map Showing The Moyne 34 Stream Course (OSI, 2024)*

As shown in the historical mapping dated 1829-1841 in Figure 6.3 above, the Moyne 34 stream course is unchanged to date. The streams rise is located in agricultural lands c. 0.84 km south of the site (OSI, 2024). Refer to Figure 6.4 below extracted from the Killala Ecology Report showing the local drainage on site and the old rectory house grounds.

Figure 6.4 *Local Hydrological Environment Showing the Drainage Ditch Located Along the Southern Boundary of the Site*

6.3.2 Surface Water Quality

The proposed development is located within the Irish River Basin District, as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). The proposed development site is situated in Hydrometric Area No. 34 of the Irish River Network and is located within the Moy and Killala Bay Catchment (Catchment ID: 34) and the Abbeytown_SC_010 Sub-Catchment (Sub-Catchment ID: 34_19).

The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'. In 2009 the first River Basin Management Plan (RBMP) 2009-2015 was published. The second cycle river basin management plan was carried out between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD). The third cycle (2022-2027) is currently being undertaken.

During the development of this Plan, a prioritisation exercise was undertaken by the local authorities, the EPA and other stakeholders to identify those water bodies that require immediate action within this plan cycle to 2027. During the catchment characterisation, the EPA identified those water bodies either *'At Risk'* of not achieving their objectives or *'Under Review'*. The outcome of this prioritisation process was the selection of 190 Areas for Action across the 5 Local Authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle. There are 832 water bodies identified as being '*At Risk'* of not achieving their environmental objectives under this Plan that have not been included in the Areas for

Action. For most of these water bodies, targeted actions will be undertaken in the third cycle RBMP from 2022-2027. The draft 3rd cycle RBMP has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the proposed development.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation and regulations. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014);
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019)
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010); and
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011)
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988
- Local Government (Water Pollution) Acts 1977-1990
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers;
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of Water Pollution from Constructional Sites;
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA/TII, 2006).

The Moyne 34 Stream belongs to the Moyne_010 WFD surface water body (European Code: IE_WE_34M190890), with a most recent WFD River (surface) water status (WFD Period: 2016-2021) of '*Moderate*' and its current WFD risk score (3rd risk cycle) is currently under '*Review'*. This '*Moderate*' status is related to its ecological status or potential. The most recent Sub-Catchment Assessment (2019) carried out by the EPA on the Abbeytown_SC_010 Sub-Catchment states there are no significant pressures on the Moyne_010 WFD surface water body.

Killala Bay coastal waterbody (European Code: IE_WE_420_0000), is currently classified by the EPA as having '*Good*' WFD water quality status (WFD Period: 2016–2021) and is '*Not at Risk'* of not achieving good status. This '*Good*' status is related to its ecological status or potential. The most recent Sub-Catchment Assessment (2019) carried out by the EPA on the Abbeytown_SC_010 Sub-Catchment states that the main pressure on Killala Bay is from anthropogenic pressures.

Surface water quality is monitored periodically by the EPA at various regional locations along with principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

In relation to the proposed development site, there are no active EPA monitoring stations in the vicinity or located on the Moyne 34 Stream. The nearest active EPA monitoring station is located in a separate sub-catchment (Cloonaghmore_SC_010) as follows:

- Tonrehown Bridge (Station Code: RS34C030200), located in the Cloonaghmore 34 river waterbody c. 4.35 km west of the site (Sub-Catchment: Cloonaghmore_SC_010). The most recent status recorded by the EPA (2022) is classified as *Q3-4/Moderate*.

Refer to Figure 6.5 below for locations of these EPA quality monitoring points in the context of the site.

Figure 6.5 *EPA Surface Water Quality Stations (EPA, 2024)*

6.3.3 Bathing Waters and Recreational Waterbodies

The local environment also includes areas of natural resources that relate to populations and human health that may be impacted by the proposed development, this includes economic resources, recreational and bathing waters, and drinking water resources.

A review of Environmental Sensitivity Mapping online mapping that includes the Register of Protected Areas (RPA) under the Water Framework Directive (WFD) has shown that there are no Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located in the vicinity of the site. There is a bathing location at Ross Beach, Killala in Killala Bay coastal waterbody c. 4.58 km north of the site. However, there are no hydrological pathways / linkages between the site and this location due to the distance of removal and significant dilution factors within Killala Bay coastal waterbody.

6.3.4 Existing Drainage Infrastructure

6.3.4.1 <u>Existing Potable Water Infrastructure</u>

There is an existing 225mm uPVC water main located on site. The proposed development is anticipated to be supplied from this main. However, further investigation is required to assess the prospect of getting the water supply for the proposed development from this network.

6.3.4.2 <u>Existing Foul Wastewater Drainage Infrastructure</u>

The closest Uisce Éireann WWTP, Killala WWTP (Licence Number: D0067-01) is located in the east section of Killala Business Park. Killala WWTP serves as the municipal wastewater treatment plant for Killala village and environs.

There is an existing 750mm concrete outfall pipe (which formerly served Asahi Chemical Plant) to Killala Bay coastal waterbody. The outfall pipe is located c. 850 m east of the site. Foul water from the proposed development will be limited and from services and administration areas only.

6.3.4.3 <u>Existing Surface Water Drainage Infrastructure</u>

There is an existing 750mm concrete outfall pipe (which formerly served Asahi Chemical Plant) to Killala Bay coastal waterbody. The outfall pipe is located just north of the Killala Waste Water Treatment Plant (WWTP) (Active Licence No. D0067-01) c. 850 to the east of the site.

The surface water network records indicate no surface water infrastructure is located within the site. An existing drainage ditch is located along the southern boundary of the site where it is the proposed to discharge surface water, post attenuation.

6.3.5 Flood Risk Assessment

The EU Floods Directive (2007/60/EC) required Member States to undertake a national preliminary flood risk assessment by 2011 to identify areas where significant flood risk exists or might be considered likely to occur. Members States were also required to prepare catchment-based Flood Risk Management Plans by 2018 that will set out flood risk management objectives, actions and measures. The OPW in co-operation with various Local Authorities produced a number of PFRAs which aimed to map out current and possible future flood risk areas and develop risk assessment plans. As part of the CFRAM programme provisional flood maps had been produced by the OPW which have been used in this assessment.

A Site-Specific Flood Risk Assessment (SSFRA) has been undertaken for the proposed development by Clifton Scannell Emerson Associates (CSEA) in October 2024. The main aim of this SSFRA is to determine the risk of flooding to the site and the impact the development will have on the upstream and downstream levels and any mitigation measures necessary. The OPW CFRAM online mapping and the Mayo County Development Plan 2022-2028 – Strategic Flood Risk Assessment (SFRA, 2022) were used to consider the risk of flooding for the site.

The Flood Risk Assessment (FRA) is undertaken over several stages with the need for progression to a more detailed stage dependent on the outcomes of the former stage. The sequential approach, as outlined in The Planning System and Flood Risk Management guidelines, was undertaken. The online OPW flood maps display the areas throughout Ireland which are susceptible to flooding events. They can display sites which are liable to flooding in low, medium and high probability flood events. In this online tool the development site is outside any identified flood zones and does not indicate the site is at risk from any fluvial, pluvial or coastal flooding events.

The review of the available data on fluvial, pluvial and groundwater flooding shows that the site has no historical flood hazards or past flood events identified in the vicinity of the site. The nearest recorded flooding event is a recurring flood event located c. 2.69 km north of the site in the Greenpark Area associated with coastal and estuarine waters from Killala Bay (Flood Summary ID: 10229).

The site is located entirely within the CFRAM Flood Zone C i.e. the probability of flooding is low (less than 0.1% AEP or in 1 in 1000 chance a year) for river and coastal flooding. No residual risk on or offsite is foreseen as the development is located outside any flooding zones associated with future scenarios (MRFS and HEFS). The development includes the implementation of SUDS and an attenuation system. The design includes for a 10% climate change allowance.

According to the FRM Guidance, the development is considered to be an essential infrastructure category (‘*utilities distribution, including power stations and substations*’); as such it is classified as ‘*Highly Vulnerable*’ development which requires a Justification test for Flood Zones A and B, and is appropriate for Flood Zone C. As such, it was determined that a Justification Test was not required for the proposed development site. It is concluded that there is no conflict between flood risk and the proposed development.

Based on this information the proposed development complies with the appropriate policy guidelines for the area which included the Mayo County Development Plan 2022-2028.

Refer to Figure 6.6 below for OPW (floodinfo.ie) river and coastal flooding extents and past flood events in the region (CFRAM, 2024).

Figure 6.8 *Past Flood Events & River and Coastal Flood Zone Extents in the Region of the Site (OPW, 2024)*

6.3.6 Areas of Conservation

According to the NPWS (2024) on-line database there are no special protected areas (SPA's) or special areas of conservation (SAC's) on or within the boundary of the site. The lands in which the development is located have no formal designations. The nearest designated lands to the site are as follows:

- Killala Bay/Moy Estuary SAC (Site Code: 000458), located c. 1.26 km north-east of the site/downgradient; and
- Killala Bay/Moy Estuary SPA (Site Code: 004036), located c. 1.95 km north-east of the site/downgradient.

There is an existing hydrological pathway/connection between the site and Killala Bay SAC/SPA through the drainage ditch located along the sites southern boundary which discharges to the Moyne 34 Stream c. 3.5 km downstream (0.55 km south-east of the site - linear distance). The proposed surface water drainage network will discharge to the existing drainage ditch. The Moyne 34 Stream eventually discharges to Killala Bay coastal waterbody a further c. 3.25 km downstream (c. 2.52 km north-east/linear distance), where the receiving environment is designated as part of the Killala Bay/Moy Estuary SAC/SPA. Albeit at a significant hydrological distance and large dilution factor through the existing drainage ditch, the Moyne 34 Stream and Killala Bay. There is also an indirect pathway through the WWTP discharge to the bay (post treatment and in accordance with EPA licence conditions).

Figure 6.7 below presents the location of these protected areas in the context of the site.

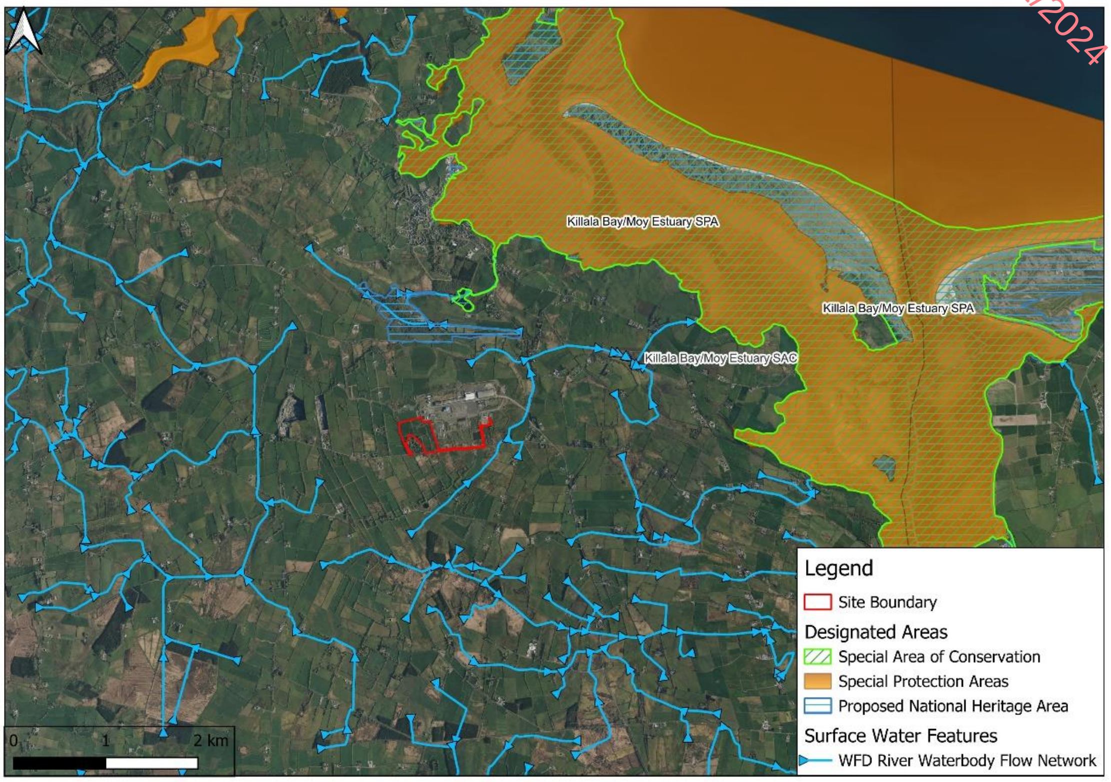

Figure 6.7 *Conservation Areas in the Context of the Site (EPA, 2024)*

6.3.7 Rating of Importance of Hydrological Attributes

Based on the TII methodology (2009) (See Appendix 6.1), the importance of the hydrological features at this site is rated as '*Medium'* based on the assessment that the attribute has a low-quality significance or value on a local scale, based on the fact that it is not an area of water supply, within a flood zone or an amenity area.

6.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

A detailed description of the proposed development is set out in Chapter 2 of this EIAR (Description of the Proposed Development). The details of the construction and operation of the development in terms of Hydrology are detailed in the subsections below.

6.4.1 Construction Phase

The key civil engineering works which relate to the water and hydrological environment during construction of the proposed development are summarised below:

- Excavations and levelling of the site to the necessary foundation base level (c. 2.5m BGL) for construction will require the excavation of an estimated c. 27,962 m^3 of topsoil.

- After the removal of topsoil, it is predicted that a further c. 36,150 m^3 of subsoil and c. 22,648 m^3 of rock will be removed and transported off site. This material will be disposed of at a fully authorised soil recovery site, while c. 36,150 m^3 of material will be re-used as fill material in landscaping areas.
- The construction will require excavations down to a maximum depth of 4.5m BGL from existing ground levels in places.
- The proposed development will require a temporary crossing of the drainage ditch for the proposed foul sewer that will connect to Killala WWTP to the east of the site.
- Temporary storage of fuel required for on site for construction traffic. Liquid materials i.e., fuel storage will be located within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage;
- Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.
- Possible discharge of collected rainwater/ minor dewatering during excavation works and groundworks (the extent of which is dependent on the time of year development works are carried out).
- All plant, machinery and equipment will be stored on site within the works area or within the temporary construction compounds (see Chapter 2, Section 2.4 for further details).
- Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site. Liquid materials, such as fuels for construction vehicles, will be stored within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications) to prevent spillage.
- Welfare facilities will be provided for the construction workers on site during the construction works. It is anticipated that for the duration of construction portable sanitary facilities will be provided. The facilities will need to have the foul water collected by a licensed waste sewerage contractor. There are no predicted adverse impacts on wastewater during construction.
- Based on a review of the local information and historical and present-day knowledge on the ground conditions near the site, it is not anticipated that any exceptional or unusual risks are posed by the ground conditions which would cause difficulties during construction operations at the site.

6.4.2 Operational Phase

The proposed development characteristics which relate to the hydrological environment during operation of the proposed development are summarised below.

There is no required bulk diesel store on site. HVO will be utilised to power backup generators.

The proposed drainage network and surface runoff will comply with the Mayo County Council and SUDs requirements including the following:

- All surface water is to be attenuated on site and discharge to the surrounding natural drainage ditches at restricted green field run off rates.
- Surface water runoff will be directed through the entirety of the treatment train.
- No surface water will be permitted to enter the foul water network.

There will be an increase in hardstand area of and a result an increase in run-off for storm water due to the proposed development at a local scale.

The management of surface water for the proposed development will be designed to the policies and guidelines of the Greater Dublin Strategic Drainage Study (GDSDS) and, where practical, with the requirements of Mayo County Council (MCC). These policies and guidelines require a sustainable approach to drainage to manage the surface water runoff from rainfall near to where it lands, at source, and to consider carefully where excess runoff is discharged by following a hierarchical approach.

The surface water network has been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100-year event to the attenuation basins without any overland flooding. The proposed drainage plan will also employ a treatment train approach to enhance the effectiveness of the proposed stormwater management, addressing both quantity and quality aspects of runoff.

This approach involves a sequence of techniques categorized into four main elements: pollution prevention, source control, site control, and regional control, as follows:

Pollution Prevention

- **Silt Traps:** Silt traps are proposed upstream of the attenuation basin as a pollution measure to screen rubbish, debris and sediment. This reduces the risk of a reduction in storage capacity over time, mitigating the potential for flooding in the long term.
- **Surfsep Pollutant Traps:** Pollutant traps are provided to capture a wide range of pollutants such as hydrocarbons, silts, and other debris from the surface water runoff before the flows enter the attenuation basin.
- **Bypass Hydrocarbon Interceptors:** A bypass hydrocarbon interceptor is provided upstream of the attenuation basin to remove any oil, grease, and other hydrocarbons from the surface water runoff that may have entered the system.
- **Fuelling Area:** A fuelling area is proposed in the lay-by area of the site to the south of the generator yard. Surface water that enters this part of the treatment train is to be drained to the foul sewer instead of the main surface water network. Full Retention Separators will be proposed before the discharge to the foul sewer.

Source Control

- **Permeable Pavement:** Permeable paving is proposed across car parking areas within the development in order to reduce the hard standing impervious areas contributing to the surface water drainage network as far as possible. Porous asphalt is also proposed in suitable road areas within the development in order to reduce the hard standing impervious areas contributing to the surface water drainage network as far as possible.

Site Control

- **Attenuation Basin:** An attenuation basin with a forebay is proposed to the north of the future development portion of the site to meet the remaining storage requirements for the 1 in 100-year storm event with 40% climate change. Sediment build-up in the forebay is easily monitored and concentrates sediment removal of suspended solids and biological pollutants in a small area. This minimises potential damage to the rest of the pond and reduces the risk for a reduction in storage capacity over time, mitigating the potential risk of flooding.

- **Permeable Paving:** A permeable paving system with bottom layers of granular materials (stone-fill) are proposed for the car parking areas. While the permeable paving system is also a source control, the stone-fill layer provides rainwater storage, which is designed to attenuate all the volume entering these systems, ultimately reducing the need for any further downstream attenuation. Permeable paving is proposed for the carpark areas.
- **Swale:** A swale is proposed to run alongside the access road on the north. In addition to the this, a second swale has been included alongside the proposed emergency road.

As stated above, the collected run-off will be conveyed via the proposed gravity surface water sewer system towards the proposed attenuation pond (4500 m^3) in the south east of the site, including a forebay berm and a permanent pond feature located in the south-eastern section of the development lands.

All foul water generated on the proposed development will be collected in the sealed piping system and conveyed to this holding tank. The proposed pumping station and adjoining rising main will send the foul water flows to the existing Killala Waste Water Treatment Plant (WWTP) (Licence Number: D0067-01), located c. 550m to the east of the site in Killala Business Park. A Pre Connection Enquiry (PCE) has been submitted to Irish Water in relation to this development. Connection to the WWTP is subject to permission from Irish Water.

Refer to the various drawings and infrastructure report prepared by Clifton Scannell Emerson Associates (CSEA, 2024) in support of this planning application which applicable to Stormwater and wastewater drainage.

6.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

6.5.1 Construction Phase

6.5.1.1 Potential Impacts on Surface Water Quality

There is potential for water (rainfall and/or groundwater) to become contaminated with pollutants released during construction activity. If not mitigated, contaminated water can pose a temporary risk to the Moyne 34 Stream and the downstream Natura 2000 sites located within Killala Bay coastal waterbody.

During construction of the development, there is a risk of accidental pollution incidences from the following sources if not adequately mitigated:

- Suspended solids (muddy water with increase turbidity) – arising from exposed ground, stockpiles and access roads and ground disturbance.
- Cement/concrete (increase turbidity and pH) – arising from construction materials.
- Hydrocarbons and other construction chemicals (ecotoxic) – accidental spillages from construction plant or onsite storage.

It is necessary for the measures (set out in Section 6.6.1) to be implemented to reduce and prevent accidental discharges from occurring during construction, including the implementation of effective containment and monitoring procedures.

The establishment and use of portable sanitary facilities during construction will be provided. The facilities will have the foul water collected by a licensed waste sewerage contractor.

It can be expected minor ingress of groundwater from weathered rock and collected rainfall will occur during construction phase excavations. During construction run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions.

There is no potential impact from wastewater as this will be collected and discharged of appropriately.

There would be an '*indirec*t' discharge to Killala Bay coastal waterbody from the proposed development site through the surface water drainage, albeit at a significant distance with a large dilution factor in the drainage ditch, the Moyne 34 Stream and Killala Bay coastal waterbody.

There will be a temporary crossing of the drainage ditch for the proposed foul sewer that will connect to Killala WWTP to the east of the site.

In the absence of mitigation measures the potential impacts during the construction phase on surface water quality are ***negative***, ***not significant*** and ***short term***.

6.5.1.2 Potential Impacts on Human Health and Populations

There are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the Moyne 34 Stream or Killala Bay coastal waterbody where the Moyne 34 Stream discharges to the sea. The nearest Bathing waterbody is located at Enniscrone Beach c. 8.2 km north-east of the proposed development site.

Therefore, there is no potential for impacts on human health and populations.

6.5.1.3 Potential Impacts on Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Report that is included with the application documentation (Appendix 6.2 of the EIAR).

The WFD assessment indicates that, based on the current understanding of the proposed development, there is no potential for adverse or minor temporary/ long-term or localised effects on the Moyne 34 Stream or Killala Bay. Therefore, it has been assessed that the proposed development will not cause any significant deterioration or change in water body status or prevent attainment, or potential to achieve, future good status or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

No further assessment of WFD is recommended given that no significant deterioration or change in water body status is expected based on the current understanding of the proposed development during construction.

There is a potential of accidental discharges during the construction phase (as set out in Section 6.5.1.2), however these are temporary short-lived events that will not impact on the surface water status of the Moyne 34 Stream and the downstream Killala Bay coastal waterbody long-term and as such will not impact on trends in water quality and overall WFD status assessment.

In the absence of mitigation measures the potential impacts during the construction phase on the Water Framework Directive (WFD) status due to changes to the hydrological environment are ***neutral***, ***imperceptible*** and ***short term***.

6.5.2 Operational Phase

6.5.2.1 Potential Impacts on Surface Water Quality

Surface Water Drainage

Surface water runoff from roads, car parking, and hardstanding areas, can potentially contain minor levels of contaminants such as hydrocarbons from trafficked areas.

The surface water runoff during the operational phase will more likely impact stormwater drainage, rather than directly impact surface water bodies, due to the hardstand and drainage infrastructure proposed. The surface water drainage strategy includes the proposed development to be served by a sustainable drainage system that is to be integrated with the developments landscaping features and is typically to comprise a combination of multiple measures comprising pollutant traps, hydrocarbon interceptors, hydrobrakes, swales, forebay berms and an attenuation pond. Any surface water flows from the development will be routed to the existing drainage ditch located along the south-eastern boundary of the site.

As HVO is to be used rather than bulk diesel for the 25 no. backup generators there is minimal impact for contamination of surface waterbodies in the event of a spill/leak. The required HVO to operate the generators will be supplied by individual double lined/bunded tanks or 'belly tanks' (c. 36,000 litres) within the container at each generator. Bulk fuel (HVO) will be stored in bunded areas with hardstanding floors. All areas where accidental leaks could occur are drained to oil interceptors prior to discharge to public storm sewer via an oil interceptor. The refuelling area is drained to the foul sewer.

There is a hydrological connection, via the proposed stormwater network and existing drainage ditch to the Moyne 34 Stream and Killala Bay coastal waterbody during the operational phase.

Refer to the various drawings prepared by Clifton Scannell Emerson Associates (CSEA, 2024) included with this application, specifically Drawing Ref: 24_078 - CSE - V1 - XX - DR - C – 1100 "Surface Water Drainage Layout" and Drawing Ref: 24_078 - CSE - V1 - XX - DR - C - 1200 " Foul Water Drainage" for further information on the proposed surface water and foul water drainage design.

In the absence of mitigation measures (or design measures) the potential impacts during the operational phase on surface water quality are ***negative***, ***not significant,*** and ***long-term***.

Potential Impacts on Surface Water Flow and Quantity

The proposed increase in hardstanding area has the potential to resulting in increase in run-off from the site if not adequately mitigated. An increase in surface water run off can have an adverse effect on the hydrological regime of downstream environments via flooding and inundation to downstream properties.

As described in Section 6.3.5 above the proposed development lies outside of the 0.1% AEP event for river and coastal flooding and is therefore located within Flood Zone C, which indicates the lowest level of flood risk. The design of the proposed development and drainage infrastructure proposed will ensure that the run-off rate is restricted to greenfield run-off. No residual risk on or offsite is foreseen as the development is located outside any flooding zones associated with future scenarios (MRFS and HEFS). The development includes the implementation of SUDS and an attenuation system. The design includes for a 10% climate change allowance

There are no surface water abstractions proposed, therefore no potential impacts on the quantity of surface water.

The proposed measures ensures that the proposed development will not be impacted by predicted flood events. In the absence of mitigation measures (or design measures) the potential impacts during the operational phase on surface water flow and quantity are ***negative***, **not *significant,*** and ***long-term***.

6.5.2.2 Foul Wastewater Discharge

As described in Section 6.4.2 above, there is an '*indirect*' hydrological connection to Killala Bay coastal waterbody, via the proposed foul wastewater arising at the site. A foul water holding tank has been included within the design along the southern boundary of the site. This tank will provide 24-hour storage and buffering capacity to ensure that there is no peak pressure on the Killala Wastewater treatment system. The proposed pumping station and adjoining rising main will send the foul water flows to the existing Killala Waste Water Treatment Plant (WWTP) (Licence Number: D0067-01), located c. 550m to the east of the site in Killala Business Park.

According to the Killala Waste Water Treatment Plant (WWTP) Annual Environmental Report (AER, 2021) and Uiscé Éireann's (Irish Water) 10 Year Water Supply Capacity Register (June 2023) , there is capacity available at Killala WWTP.

Due to the distance of removal and the dilution factor within the drainage ditch, the Moyne 34 Stream and Killala Bay, no potential impacts are anticipated. The potential impacts on Natura 2000 sites located within Killala Bay coastal waterbody are further explained in Chapter 7 (Biodiversity).

On the basis of the design and characteristics of the proposed development, and feasibility of the connection with Irish Water to Killala WWTP, in the absence of mitigation measures (or design measures) the potential impacts during the operational phase on Killala Bay WWTP and Killala Bay coastal waterbody from the proposed foul water drainage are ***neutral, imperceptible, long-term*** in respect of wastewater loading.

6.5.2.3 Potential Impacts on Human Health and Populations

There is no potential for unmitigated off-site flooding as a result of the increased hardstanding areas due to the proposed design and drainage infrastructure proposed. In addition, the site is located entirely within the CFRAM Flood Zone C i.e. the probability of flooding is low (less than 0.1% AEP or in 1 in 1000 chance a year) for river and coastal flooding.

As there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the Moyne 34 Stream or Killala Bay coastal waterbody where the Moyne 34 Stream discharges to the sea, there is no potential for impacts on human health and populations.

6.5.2.4 Potential Impacts on Water Framework Directive Status

There are limited '*indirect*' discharges of water during the operational phase to the Moyne 34 Stream through the drainage ditch along the sites southern boundary. These discharges will be adequately treated via SuDS measures, hydrobrake (or equivalent) and oil/water interceptor to ensure there is no long-term negative impact to the WFD water quality status of the receiving watercourses. The SuDS and proposed measures have been designed in detail with the ultimate aim of protecting the hydrological (& hydrogeological) environment. The SuDS and project design measures will be maintained correctly as per specifications to ensure long-term/ on-going integrity of same.

In the scenario of an accidental release of HVO or unmitigated leak of fuel from car park areas and roads (mentioned above in Section 6.5.2.1), there is potential for a temporary impact only which would not be of a sufficient magnitude to effect a change in the current water body status.

According to the Killala Waste Water Treatment Plant (WWTP) Annual Environmental Report (AER, 2021), the annual mean hydraulic loading and the annual maximum hydraulic loading is less than the peak Treatment Plant Capacity. The design of Killala WWTP allows for peak values and therefore the peak loads have not impacted on compliance with Emission Limit Values. Therefore, the proposed peak effluent discharge calculated for the proposed development at 0.25 l/s is not likely to have an impact on the capacity at Killala WWTP or the overall water quality within Killala Bay coastal waterbody or the Natura 2000 sites located herein, and therefore would likely not have any impact on the current Water Body Status (as defined within the Water Framework Directive). In addition, the proposed development will not contribute any additional stormwater drainage to Killala WWTP.

In the absence of mitigation measures the potential impacts during the operation phase on the Water Framework Directive (WFD) status due to changes to the hydrological environment are ***neutral***, ***imperceptible*** and ***long term***.

6.6 REMEDIAL AND MITIGATION MEASURES

The design has taken account of the potential impacts of the development on the hydrological environment local to the area where construction is taking place and containment of contaminant sources during operation. Measures have been incorporated in the design to mitigate the potential effects on the surrounding water bodies.

6.6.1 Construction Phase

Clifton Scannell Emerson Associates (CSEA) have prepared an Outline Construction Management Plan (CMP) in respect of the proposed development. This outlines and explains the construction techniques and methodologies which will be implemented during construction of the proposed development.

Construction works and the proposed mitigation measures are informed by best practice guidance from Inland Fisheries Ireland on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);

- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741); and
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005).

The CMP sets out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The CMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Ecological Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

All mitigation measures outlined here, and within the CMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

Suspended solids

As there is potential for run-off to indirectly discharge to a watercourse (Moyne 34 Stream via the existing drainage ditch along the southern boundary of the site and eventually to Killala Bay), in order to manage the potential impact associated with sediment and sediment runoff the following mitigation measures will be implemented during the construction phase.

- During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.
- Run-off water containing silt will be contained on site and conveyed to the attenuation pond, which will be constructed during the first stage of works.
- Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, attenuation pond).
- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate,
- The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection.
- Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent contamination.
- Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.
- Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations.
- Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site.
- Any surface water run-off collecting in excavations will likely contain a high sediment load. This will not be allowed to directly discharge directly to any stormwater sewer, drainage ditch or watercourse.

In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. A drainage system shall be established prior to the commencement of the initial infrastructure construction works ,whereby the proposed attenuation pond will be installed utilising water quality control measures i.e. silt traps to collect and discharge treated construction water to the drainage ditch during construction.

Cement/concrete works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 meters of an existing surface water drainage point. Wash-outs will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer subject to agreement with Uisce Éireann (Irish Water) / MCC.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. Relevant personnel working on the Site will be suitably trained in the implementation of the procedures.

Hydrocarbons and other construction chemicals

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages to ground of fuels and other construction chemicals and prevent any resulting to surface water (and groundwater) systems:

- Designation of bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used, the following measures will be taken:
    - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
    - The pump or valve will be fitted with a lock and will be secured when not in use;
    - All bowsers to carry a spill kit and relevant operatives must have spill response training;
    - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in designated bunded refuelling areas, which will be away from surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

Wastewater Management

Foul wastewater discharge from the site will be managed and controlled for the duration of the construction works.

Foul water from the offices and welfare facilities on the site will be collected in portable sanitary facilities and disposed of appropriately by licenced contractor.

The construction contractor will implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

6.6.1.1 Surface Water Flow and Quantity

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. A drainage system shall be established prior to the commencement of the initial infrastructure construction works, whereby the proposed attenuation pond will be installed in the early stage of works utilising water quality control measures i.e. silt traps to collect and discharge treated construction water to the drainage ditch during construction.

The construction contractor will be required to manage suspended solids during the construction phase and will be permitted to discharge treated construction water to the established stormwater network.

The proposed development will require a temporary crossing of the drainage ditch for the proposed foul sewer that will connect to Killala WWTP to the east of the site. The construction activity will require surface water management to prevent pollution and degradation of habitats from a chemical spill or run off containing excessive suspended solids that complies with guidelines and best practices such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) and "Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016)".

6.6.1.2 Human Health and Populations

It has been established (refer to Section 6.5.1.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the Moyne 34 Stream or Killala Bay coastal waterbody. The nearest Bathing waterbody is located at Enniscrone Beach c. 8.2 km north-east of the proposed development site. There are no hydrological pathways / linkages between the site and this location.

As there is no source pathway linkage, no mitigation is required.

6.6.1.3 Potential Impacts on Water Framework Directive Status

It has been established (refer to Section 6.5.1.4 above) that while, there is a potential of accidental discharges during the construction phase this will not impact on trends in water quality and overall WFD status assessment. On a precautionary basis, the mitigation measures set out in Section 6.6.1.1, and Section 6.6.1.2 will be implemented during the construction works for the protection of surface water quality.

6.6.2 Operational Phase

6.6.2.1 Surface Water Quality and Flow

The design has taken account of the potential impacts of the development on surface water quality; measures have been incorporated in the design to mitigate these potential impacts. The surface water design approach taken will comply with the key design criteria set out in the Greater Dublin Regional Code of Practice for Drainage Works. The proposed surface water SUDS approach will attenuate the rate of surface water runoff from the development, intercept first flush flows and improve the quality of water that is intercepted by the surface water drainage network through biodegradation, pollutant adsorption and settlement and retention of solids.

The surface water network has been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100-year event to the attenuation basin without any overland flooding. The proposed drainage plan will also employ a treatment train approach to enhance the effectiveness of the proposed stormwater management, addressing both quantity and quality aspects of runoff. This approach involves a sequence of techniques categorized into four main elements:

pollution prevention, source control, site control, and regional control. Refer to Section 6.4.2 above or the Engineering Planning Report – Proposed Killala Data Centre Development (CSEA, 2024), for further information on the proposed stormwater management.

The proposed development stormwater drainage network design includes sustainable drainage systems (SuDS). These measures by design ensure the stormwater leaving the site is to be attenuated and treated within the new development site boundary to ensure suitable quality, before discharging to the existing drainage ditch (post attenuation), located along the sites southern boundary and eventually to the Moyne 34 Stream.

SuDS are drainage systems that are environmentally beneficial, causing minimal or no long-term detrimental damage. The proposed surface water drainage system for this development has been designed as a sustainable urban drainage system and uses an attenuation pond (4,500 m^3) together with a forebay berm, flow control device (Hydrobrake or equivalent), swale, permeable paving, and hydrocarbon interceptors to:

- Treat runoff and remove pollutants to improve quality.
- Restrict outflow and to control quantity, flow control devices.
- Increase amenity value.

The attenuation pond (4,500 m^3) will help to reduce the risk of flooding, improve water quality by acting as natural filters and removing pollutants and excess nutrients. The incorporation of a permanent pond feature into the basin design will enhance the environmental benefits even more in the proposed development. Wetlands will not only contribute to flood mitigation and water quality improvement but also serve as crucial ecosystems, fostering the growth of wetland-specific flora and fauna.

During extreme rainfall events the application of SuDs features will ensure surface water is managed adequately and sustainably discharged to the drainage network and ultimately to the Moyne 34 Stream in accordance with GDSDS. With these mitigation measures in place pluvial flood risk is not considered to be significant.

There is a low potential loading of hazardous substances during operation (mainly leaks for vehicles at parking areas and roads) and the drainage design incorporates SuDs measures to treat normal run-off water quality in order to meet surface water regulations at the outfall to the existing drainage ditch along the sites southern boundary. The discharge to this drainage ditch and ultimately to the Moyne 34 Stream shall comply with surface water regulations and as may be conditioned by Mayo County Council.

In the event of an accidental leakage of oil on the site, this will be intercepted and treated by the interceptors within the drainage infrastructure. All storage tanks will be bunded in accordance with EPA best practice. Strict separation of surface water and wastewater will be implemented within the development.

Refer to the various drawings prepared by Clifton Scannell Emerson Associates (CSEA, 2024) included with this application, specifically Drawing Ref: 24_078 - CSE - V1 - XX - DR - C – 1100 "Surface Water Drainage Layout" for further information on the proposed surface water drainage management.

6.6.2.2 Human Health and Populations

It has been established (refer to Section 6.5.2.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the Moyne 34 Stream or Killala Bay coastal waterbody. The nearest Bathing waterbody is located at Enniscrone Beach c. 8.2 km north-east of the proposed development site. However, there are no hydrological pathways / linkages between the site and this location given the distance of removal (>8 km) and significant dilution factors within the drainage ditch, the Moyne 34 Stream and Killala Bay.

As there is no source pathway linkage, no mitigation is required.

6.6.2.3 Potential Impacts on Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Report that is included with the application documentation (Appendix 6.2 of the EIAR). The WFD Screening Report outlines that the project-specific CMP includes robust mitigation measures to protect the underlying hydrogeological environment. In terms of the operational phase, the risk to the waterbodies is considered to be low due to the use of oil interceptors on the stormwater system prior to discharge from the site.

It has been established (Section 6.5.2.4) that while, there is a potential of accidental discharges during the operational phase this will not impact on trends in water quality and overall WFD status assessment. On a precautionary basis, the mitigation measures set out in Section 6.6.3.1, and Section 6.6.3.2 will be implemented during the post construction for the management of surface water flows the indirect discharges.

The surface water discharges from the site are "*indirect*", and will be adequately attenuated via SuDS measures i.e. hydrocarbon interceptors, pollutant traps, swales, permeable paving, and attenuation pond (4,500m^3), to ensure there is no long-term negative impact to the WFD water quality status of the Moyne 34 Stream or Killala Bay coastal waterbody. No further mitigation is required.

6.7 MONITORING

6.7.1 Construction Phase

During construction phase the following monitoring measures will be considered. Monitoring will be undertaken in accordance with planning conditions and undertaken by the contractor in compliance with the project CMP.

- Contractors will carry out regular inspections to confirm compliance with the CMP. Daily inspections by contractors will address potential environmental impacts including dust, litter, waste management and general housekeeping.
- Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items.
- Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt control measures during construction phase is crucial to ensuring that they work as intended. They will remain in place throughout the entire.
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off; and
- Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc).

6.7.2 Operational Phase

No future surface water monitoring is proposed for the proposed development due to the low hazard potential at the site.

Hydrocarbon interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions.

Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

6.8 RESIDUAL IMPACTS OF THE PROPOSED DEVELOPMENT

The residual impacts are those that would occur after the mitigation measures have taken effect. The following is a summary of the residual impacts associated with the hydrological environment:

6.8.1 Construction Phase

6.8.1.1 Surface Water Quality

The implementation of the mitigation and monitoring measures detailed in Section 6.6.1 and 6.7.1, will ensure that the potential impacts on surface water quality during the construction phase are adequately mitigated. There will be no change to overall flow and quality within the hydrological regime as a result of construction. The residual effect on surface water quality during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

6.8.1.2 Surface Water Flow and Quantity

The implementation of the mitigation and monitoring measures detailed in Section 6.6.1 and 6.7.1, will ensure that the potential impacts on surface water flow and quantity during the construction phase are adequately mitigated. There will be no change to overall flow and quality within the hydrological regime as a result of construction. The residual effect on surface water flow and quantity during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

6.8.1.3 Human Health and Populations

It has been established (refer to Section 6.5.1.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the Moyne 34 Stream or Killala Bay coastal waterbody. The nearest Bathing waterbody is located at Enniscrone Beach c. 8.2 km north-east of the proposed development site. There are no hydrological pathways / linkages between the site and this location.

As there is no source pathway linkage, no residual impacts are anticipated on human health and populations.

6.8.1.4 Water Framework Directive Status

Even in the absence of the mitigation and monitoring measures detailed in Section 6.6.1 and 6.7.1, there will be no predicted degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

There are appropriately designed mitigation measures which will be implemented during the construction phase to protect the hydrological environment. There is a potential of accidental discharges during the construction phase.

However, these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment. There is no residual effect on Water Framework Directive status during the construction phase.

6.8.2 Operational Phase

6.8.2.1 Surface Water Quality

The implementation of the mitigation and monitoring measures detailed in Section 6.6.2 and 6.7.2, will ensure that the potential impacts on surface water quality once the proposed development is constructed and operational are adequately mitigated. The residual effect on surface water quality during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term***.

There will be no impact to the quality of downstream designated / protected conservation sites due to the lack of direct hydraulic connectivity / pathway and the mitigation measures cited. Overall the management of the riparian zone, improvement measures to the stream and SuDS, attenuation proposed for the project will improve water quality and habitat requirements in the stream.

6.8.2.2 Surface Water Flow and Quantity

The implementation of the mitigation and monitoring measures detailed in Section 6.6.2 and 6.7.2, will ensure that the potential impacts on surface water flow and quantity once the proposed development is constructed and operational are adequately mitigated. The residual effect on surface water flow and quantity during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term***.

Overall, the attenuation proposed for the project and installation of hydrocarbon interceptors will improve flood management and water quality.

6.8.2.3 Human Health and Populations

It has been established (refer to Section 6.5.2.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the Moyne 34 Stream or Killala Bay coastal waterbody. The nearest Bathing waterbody is located at Enniscrone Beach c. 8.2 km north-east of the proposed development site. However, there are no hydrological pathways / linkages between the site and this location given the distance of removal (>8 km) and significant dilution factors within the drainage ditch, the Moyne 34 Stream and Killala Bay.

As there is no source pathway linkage, no residual impacts are anticipated on human health and populations.

The residual effect on human health and populations during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term***.

6.8.2.4 Water Framework Directive Status

Even in the absence of the mitigation and monitoring measures detailed in Section 6.6.2 and 6.7.2, there will be no predicted degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

There are appropriately designed mitigation measures which will be implemented during the operational phase to protect the hydrological environment (receptors). There is a potential of accidental discharges during the operational phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

There are no untreated discharges of wastewater during the operational phase to any open waterbody / watercourse receptors. The discharges to surface water will be adequately treated via SuDS measures i.e. hydrocarbon interceptors, pollutant traps, swales, permeable paving, and attenuation pond, to ensure there is no long-term negative impact to the WFD water quality status of the receiving watercourses (Moyne 34 Stream via unnamed drainage ditch and eventually to Killala Bay).

The SuDS and proposed measures have been designed in detail with the ultimate aim and objective of protecting the hydrological (& hydrogeological) environment. The SuDS and project design measures will be maintained correctly as per specifications to ensure long-term / on-going integrity of same. Therefore, no residual impacts are anticipated on the Water Framework Directive status.

6.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2 (section 2.8) of this EIA Report.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

Any future application on these lands will be subject to planning approval and environmental assessment as required. Any new development proposed on the lands after the submission of the proposed development would be accompanied by an EIA, or EIA Screening as required and take into consideration the development of this site.

6.9.1 Construction Phase

In relation to the potential cumulative impact on hydrology during the construction phases, the construction works which would have potential cumulative impacts are as follows:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.
- Stockpiled material will be stored on away open drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage system.
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

The works contractors for other planned or permitted developments as set out in Chapter 2, Section 2.8 and Appendix 2.1 of this EIA Report. will be obliged to ensure that measures are in place to protect water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019).

A review of the permitted developments set out in Chapter 2, Section 2.8 and Appendix 2.1 of this EIA Report has been undertaken and there are no proposed developments capable of combining with the proposed development and resulting in significant cumulative effects.

The implementation of mitigation and monitoring measures detailed in Section 6.6.1; and 6.7.1 as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change in surface water during the construction phase of the proposed development.

The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***short-term***.

6.9.2 Operational Phase

In relation to the potential cumulative impact on hydrology during the operational phases, the operational activities which would have potential cumulative impacts are as follows:

- Increased hard standing areas will reduce local recharge to ground and increase surface water run-off potential if not limited to the green field run-off rate from the site.
- Increased risk of accidental discharge of hydrocarbons from car parking areas, and along roads is possible unless diverted to surface water system with petrol interceptor.
- Additional foul discharges to be discharged to the foul sewer system.

Increase in wastewater loading and water supply requirement is an impact of all developments. Each development will require approval from the Uisce Éireann (confirming available capacity in the water and wastewater infrastructure). The foul drainage infrastructure and water supply requirements for the proposed development have been designed to accommodate the proposed development and a confirmation of feasibility received from Uisce Éireann.

The proposed development will result in an increase in hard standing which will result in localised reduced recharge to ground and increase in run-off rate. Each permitted development is required by the Local Authority to provide suitable attenuation on-site and ensure that there is no increase in off-site flooding as a result of the development in question.

All developments are required to operate in compliance with relevant legislation - Water Framework Directive and Surface water Regulations.

The implementation of mitigation and monitoring measures detailed in Section 6.6.1; and 6.7.1 as well as the compliance of the other permitted developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change in surface water during the operational phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***long-term***.

6.10 REFERENCES

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CHAPTER 07:

BIODIVERSITY

07

CONTENTS

7.0 BIODIVERSITY

7.1 INTRODUCTION

This chapter provides an assessment of the effects of the Proposed Development on the ecological environment, i.e., Biodiversity; flora and fauna. It has been compiled in compliance with 2014 EIA Directive, the Planning and Development Act 2000 as amended, and the European Commission's *Guidance on the preparation of the Environmental Impact Assessment Report* (2017) and follows the EPA *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2022).

7.1.1 Legislation, Policy & Guidance

7.1.1.1 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. The Habitats Directive provides for the designation, conservation and protection of sites comprising Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), collectively forming the Natura 2000 network of 'European sites'. Article 3 of the Habitats Directive obliges Member States to designate as SACs sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II of the Habitats Directive. Article 10 of the Habitats Directive requires that Member States endeavour to improve the ecological coherence of the Natura 2000 network to manage and conserve features of the landscape which are of major importance for wild fauna and flora, for example ecological corridors or stepping-stones which are important for the migration, dispersal and genetic exchange of species.

Article 6(2) obliges Member States to take the necessary measures to avoid the deterioration of an SAC, or disturbance of a species for which the site is designated. Article 6(3) sets out the requirement for an "Appropriate Assessment", to ensure that a proposed plan or project will not have an adverse effect on the integrity of a SAC. Article 7 applies the requirements of Article 6(2) and 6(3) of the Habitats Directive to SPAs designated under the Birds Directive.

In addition and separate to the Appropriate Assessment requirements, Article 12 of the Habitats Directive obliges Member States to establish a regime of strict protection for certain species listed in Annex IV of the Directive, wherever they occur within their natural range. The protection for species under Article 12 of the Habitats Directive is not confined to the boundary of SACs. Species listed in Annex IV include the otter and certain species of bat.

7.1.1.2 EU Birds Directive

The "Birds Directive" (European Council (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds) confers legal protection to all naturally occurring wild birds within the EU territory. Member States are obliged to adopt the necessary measures to maintain the population of bird species, and that includes, in accordance with Article 3, an obligation to create, maintain and manage habitats for birds, and specifically for the species of Bird listed in Annex I of the Directive, Article 4 requires Member States to create SPAs which, by virtue of Article 7 of the Habitats Directive, form part of the Natura 2000 network of European sites and are subject to the Appropriate Assessment requirements under Article 6(3) of the Habitats Directive.

Additionally, Article 5 of the Birds Directive requires that Member States establish a general system of protection for all naturally occurring wild birds within the EU territory, similar to the system of strict protection required for Annex IV species under the Habitats Directive.

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.

7.1.1.3 Birds and Natural Habitats Regulations

The European Communities (Birds and Natural Habitats) Regulations 2011 are also a key piece of legislation (S.I. No. 477/2011) included in the Planning and Development Acts containing legal direction on the protection of flora and fauna . The Planning and Development Acts also incorporates the AA requirements into the planning regime.

The Habitats Directive and the Birds Directive have been transposed into Irish law by Part XAB of the Planning and Development Acts and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

7.2 METHODOLOGY

This chapter of the EIA Report concentrates on ecological features within the development area of significance, primarily designated habitats and species. This includes habitats/species listed in Annex I, II and IV of the EU Habitats Directive.

The objectives of the assessment are achieved by:

- Identifying baseline conditions of the site and its environs.
- Identifying the sensitivity of receptors with potential to be affected by changes in the baseline conditions.
- Predicting the magnitude of likely changes to the baseline receiving environment.
- Assessing the significance of effect taking into account sensitivity of receptors and magnitude of effect.
- Identifying and assessing appropriate mitigation measures, including alternatives.
- Assessing the significance of residual effects, taking account of any mitigation measures.

Surveys included habitat surveys, badger surveys, otter surveys, bat surveys and breeding bird surveys. Winter birds were not surveyed for extended periods given the linear nature of the project; however, notes on species encountered during the winter period habitat surveys were recorded.

Desktop research to determine existing records in relation to habitats and species present in the study areas was firstly undertaken. This included research on the National Parks and Wildlife Services (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 study areas.

Other environmental information for the area was reviewed, e.g. in relation to soils, geology, hydrogeology and hydrology (Chapter 5 and Chapter 6 of this EIA Report). 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. For example the determination of water courses and pathways to offsite water bodies or pathways to ground an potentially sensitive aquifers if present.

The potential effects on European sites are assessed in this chapter of the EIA Report in relation to the requirements of the EIA Directive and Irish legislation and does not purport to comprise information for the purposes of the screening assessment to be carried out by the competent authority or authorities pursuant to Article 6(3) of the Habitats Directive. The obligation to undertake appropriate assessment derives from Article 6(3) of the Habitats Directive and is the subject of an Appropriate Assessment Screening Report.

7.2.1 Study Area

While the main focus of biodiversity was on the Proposed Development site within the red line boundary, see Figure 7.1 below. The surrounding environment up to 150m from the redline boundary was taken into account in addition to potential biological and hydrological connectivity in relation to European sites in a Zone of Influence which is detailed further in Section 7.2.2 below.

The ecological surveys were designed based upon the characteristics of the Proposed Development and its likely significant impacts on the baseline environment during construction and/or operation. The study areas are described as follows.

Habitats

The area within or immediately adjacent to the Proposed Development footprint where fauna species could be directly or indirectly affected during construction/operation.

The study area of this assessment included the footprint of the pipeline route and extended linear searches along field boundaries as detailed below and shown on Figure 7.1 below.

Rare and/or Protected Flora

The area within or immediately adjacent to the Proposed Development footprint where rare and/or protected flora could be directly or indirectly affected during construction/operation.

Fauna species

The area within or immediately adjacent to the Proposed Scheme footprint where fauna species could be directly or indirectly affected during construction/operation. Other than those listed below (includes badger, otter, amphibians)

Bats

The area suitable for roosting, foraging and/or commuting bats (e.g. bridges, hedgerows, treelines, woodland and/or watercourses) within or immediately adjacent to the Proposed Development footprint where bats could be directly or indirectly affected during construction/operation.

Breeding Birds

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the Birds Directive, and / or as SCIs within designated European sites.

Species considered to be Key Ecological Receptors (KER); including floral and faunal species of conservation concern of the Proposed Development include the following.

- Red and Amber Birds of Conservation Concern in Ireland (BoCCI) (Gilbert et)
- Bats
- Otters

Figure 7.1 *Site Location and redline boundary of the Proposed Development.*

7.2.2 Zone of Influence

The ZoI, or distance over which a likely significant effect may occur will differ across the subject ecological receptors, depending on the predicted impacts and the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken have established the habitats and species present along the Proposed Development. The ZoI is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Proposed Development. In some instances, the ZoI extends beyond the study area (e.g. surface water quality effects of a sufficient magnitude can extend, and affect, receptors at significant distances downstream). For example, the pollution of a water course by a significant quantity of a substance that could have an effect on a sensitive habitat or species where the substance was carried downstream to a receiving environment such as a protected coastal estuary.

The ZoI of the Proposed Development in relation to terrestrial habitats is generally limited to the footprint of the Proposed Development and the immediate environs (to take account of shading or other indirect impacts, such as air quality). Hydrogeological / hydrological linkages (e.g. rivers or groundwater flows) between impact sources and wetland / aquatic habitats can often result in impacts occurring at significant distances.

The ZoI of air quality effects is generally local to the Proposed Development construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m (refer to Chapter 8 (Air Quality) for more detail).

With regards to hydrological impacts, the distances over which water-borne pollutants are likely to remain in sufficient concentrations to have a likely significant effect on receiving waters and associated wetland / terrestrial habitat is highly site-specific and related to the predicted magnitude of any potential pollution event. Evidently, it will depend on volumes of discharged waters, concentrations and types of pollutants (in this case sediment and/or hydrocarbons), volumes of receiving waters, and the ecological sensitivity of the receiving waters.

The ZoI of the Proposed Development in relation to likely significant effects on most breeding bird species is generally limited to habitat loss within the footprint of the Proposed Development.

7.2.3 Ecology Surveys

7.2.3.1 Habitat Surveys

The habitat assessment was carried out in two stages. The first stage comprised desktop research to determine existing records in relation to habitats and species present in the study area as defined by the area of the Proposed Development, site boundaries and surrounding buffer zones up to 150m away. The second stage involves an evaluation of the site to establish the existing environment in the footprint of the Proposed Development area.

Habitat types were identified during fieldwork on 30 June 2024, 27 August 2024 and 6 November 2024.

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).

7.2.3.2 Mammals (Excluding Bats)

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.

7.2.3.3 Bats

An assessment of the suitability of the site for usage by bats was undertaken by MKO Environmental Consultants in August 2023 which included the Proposed Development areas. The bat survey report presented as Appendix 7.1 to this chapter and contains a detailed methodology of the surveys undertaken.

In order to assess the site and particularly trees for bat roost potential, the approach is to survey trees at Ground Level first. A ‘Ground Level Tree Assessment (GLTA) was undertaken in conjunction with the Project Arborist, Rik Pannett, who has a high level of experience in surveying trees both for arboreal value and bat roosting potential. All tree marked for removal were surveyed by both the Project Ecologist and Arborist on 6 November 2024 which is an appropriate time with reduced leaf cover. Any trees marked for removal with bat roost potential can then be targeted for further detailed survey via PRF aerial inspection survey (Climbing/ladders).

7.2.3.4 Otters

An assessment of the suitability of water courses crossed for usage by otters was undertaken searching for signs of usage e.g. holts, couches, resting places or slides.

7.2.3.5 Breeding Birds

Breeding Birds were surveyed using standard walked transects and signs were recorded where encountered during the field walkover survey. A desk study was carried out to identify any potential suitable inland feeding and / or roosting sites for winter birds located within or directly adjacent to the Proposed Development areas.

Field surveys carried out (see Section 7.3 below) deemed the overall lands to be unsuitable feeding and/or roosting sites for wintering birds, due to habitat conditions being dominated by improved and semi-improved wet agricultural grassland or subject to relatively high levels of grazing disturbance. As such it was not deemed necessary to carry out detailed Wintering Bird surveys in these areas. The proposed development lands were walked on 8 November 2024 during the early Winter bird season and any presence noted. The results of the desk-based study have primarily informed the assessment of potential impacts on wintering bird species arising from the Proposed Development.

7.2.4 Categorisation of the Baseline Environment

Desktop research to determine existing records in relation to habitats and species present in the study areas included research on the National Parks and Wildlife

Services (NPWS) metadata website, and the National Biodiversity Data Centre (NBDC) database. The following resources assisted in the production of this chapter of the report.

- 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;
- Digital Elevation Model over Europe (EU-DEM);
- Google Earth and Bing aerial photography 1995-2024;
- 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;
  - Mayo County Development Plan 2022-2028

7.2.5 Assessment Methodology

Following desktop assessment and fieldwork, an evaluation of the development area and determination of the potential effects on the flora and fauna of the area is based on the following guidelines and publications:

- Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC (EC, 2007);
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC, 2021);
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, December 2009, Rev 2010);
- EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (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);
- Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2019).

7.2.6 Difficulties Encountered

Leaf cover during tree surveys in August made it difficult to completely assess the value of older mature trees for roost potential. As such an early winter ground level tree assessment was undertaken for bat roost potential.

7.3 RECEIVING ENVIRONMENT

The Proposed Development is located at Mullafarry and Tawnaghmore Upper, Killala, Co. Mayo in agricultural land to the southwest of the former Asahi Plant, now Killala Business Park. The subject site is located immediately adjacent to EirGrid/ESB's Tawnaghmore 110kV substation. The surrounding area is primarily defined by agricultural uses to the west and south, industrial uses to the north and east and dispersed residential development to the southwest.

Immediately to the south of the site is an old Rectory known as Ballysakeery Glebe House which is listed with regional importance on the National Inventory of Architectural Heritage (31302208).

Access to the site is proposed from the south with a gatehouse located on the easternmost of two entrances along with a turning area to allow vehicles to return to the road safely. Access will be provided around the site for delivery and emergency vehicle access. Car parking is proposed to the east of the building in line with the future users' requirements. Safe and secure cycle parking is also proposed to the east, close to the building entrance.

An attenuation pond is proposed to the south of the site to facilitate sustainable drainage and a range of planting will be incorporated to screen the site and to increase biodiversity across the site.

A link to the existing WWTP at Killala Business Park is proposed along the local road and through land adjacent to the Listglennon Water Treatment Plant.

There are a number of field boundaries with associated hedgerows with drainage predominantly flowing south toward the local road where it is conveyed in a drainage ditch toward the 'Moyne 34' Stream which ultimately discharges to Killala Bay approximately 3.25 river kilometres downstream where the receiving environment is designated as part of the Killala Bay/Moy Estuary SAC (Site code 000458) and the Killala Bay/Moy Estuary SPA (Site code 004036).

7.3.1 Designated Areas

The European Commission's "*Assessment of plans and projects in relation to Natura 2000 sites guidance on Article 6(3) and (4) of the Methodological Habitats Directive 92/43/EEC*" published 28 September 2021 states at section 3.1.3, that:

"Identifying the Natura 2000 sites that may be affected should be done by taking into consideration all aspects of the plan or project that could have potential effects on any Natura 2000 sites located within the zone of influence of the plan or project. This should take into account all of the designating features (species, habitat types) that are significantly present on the sites and their conservation objectives. In particular, it should identify:

- *any Natura 2000 sites geographically overlapping with any of the actions or aspects of the plan or project in any of its phases, or adjacent to them;*
- *any Natura 2000 sites within the likely zone of influence of the plan or project Natura 2000 sites located in the surroundings of the plan or project (or at some distance) that could still be indirectly affected by aspects of the project, including as regards the use of natural resources (e.g. water) and various types of waste, discharge or emissions of substances or energy;*

- *Natura 2000 sites in the surroundings of the plan or project (or at some distance) which host fauna that can move to the project area and then suffer mortality or other impacts (e.g. loss of feeding areas, reduction of home range);*
- *Natura 2000 sites whose connectivity or ecological continuity can be affected by the plan or project".*

The range of Natura 2000 sites to be assessed, i.e. the zone in which impacts from the plan or project may arise, will depend on the nature of the plan or project and the distance at which effects may occur. For Natura 2000 sites located downstream along rivers or wetlands fed by aquifers, it may be that a plan or project can affect water flows, fish migration and so forth, even at a great distance. Emissions of pollutants may also have effects over a long distance. Some projects or plans that do not directly affect Natura 2000 sites may still have a significant impact on them if they cause a barrier effect or prevent ecological linkages. This may happen, for example, when plans affect features of the landscape that connect Natura 2000 sites or that may obstruct the movements of species or disrupt the continuity of a fluvial or woodland ecosystem. To determine the possible effects of the plan or project on Natura 2000 sites, it is necessary to identify not only the relevant sites but also the habitats and species that are significantly present within them, as well as the site objectives.

The Zone of Influence may be determined by considering the Proposed Development's potential connectivity with European sites, in terms of:

- Nature, scale, timing and duration of all aspects of the proposed works and possible impacts, including the nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of potential pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and
- Location of ecological features and their sensitivity to the possible impacts.

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 presented Figures 7.2. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on 8 October 2024. 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.

There are a number of field boundaries with associated hedgerows with drainage predominantly flowing south toward the local road where it is conveyed in a drainage ditch toward the 'Moyne 34' Stream which ultimately discharges to Killala Bay approximately 3.25 river kilometres downstream where the receiving environment is designated as part of the Killala Bay/Moy Estuary SAC (Site code 000458) and the Killala Bay/Moy Estuary SPA (Site code 004036).

There are no pathways or connectivity to any other European sites and so only these two sites were brough forward for further consideration in Stage 2 AA and an NIS provided as part of the planning application.

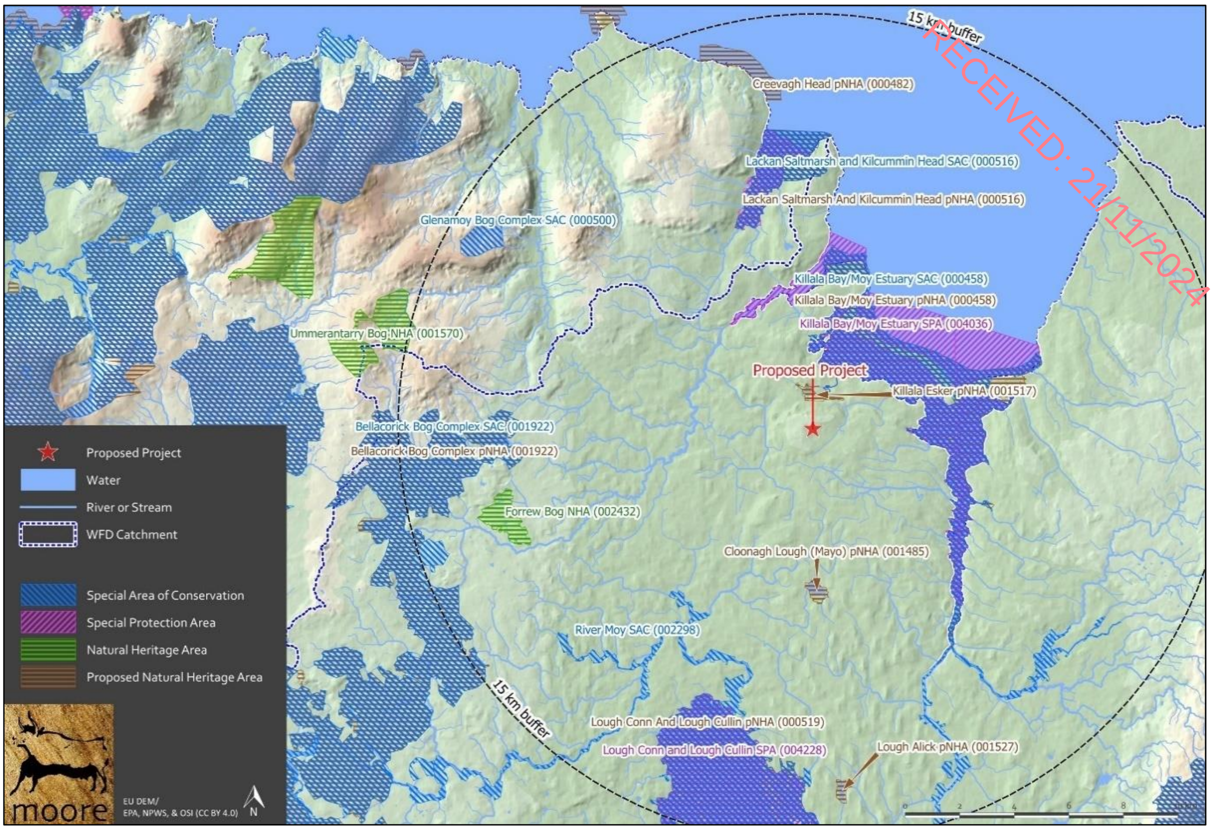

Figure 7.2 *Showing European sites and NHAs/pNHAs within the wider Potential Zone of Influence of the Proposed Development.*

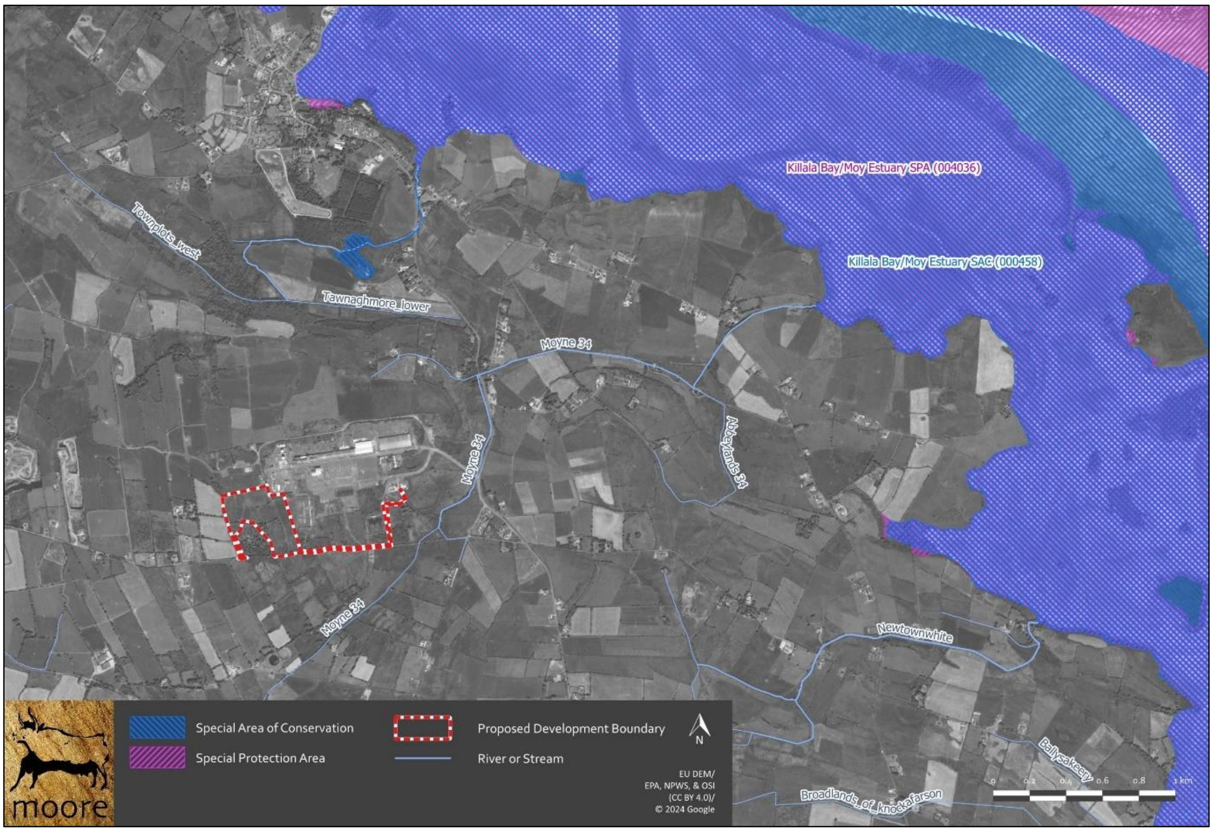

Figure 7.3 *Detail of European sites and NHAs/pNHAs in the nearer Potential Zone of Influence of the Proposed Development.*

7.3.2 Non-designated Areas

The proposed development areas comprise agricultural grassland (GA1), artificial surfaces along the local road and adjacent areas at Killala Business Park and drainage ditches leading to the Moyne Stream. A list of habitats recorded and their corresponding Fossitt codes is presented in Table 7.1 below and in the Habitat Map in Figure 7.4.

Table 7.1 *Details of habitats recorded and their corresponding Fossitt codes.*

Habitat	Habitat Category	Habitat Type
(W) Freshwater	(FW) Watercourses	(FW4) Drainage ditch
(G) Grassland	(GA) Improved grassland	(GA1/Si-GS4) Improved agricultural grassland/Semi-improved Wet grassland
		(GS4) Wet grassland
(W) Woodland and Scrub	(WD1) Highly modified/non-native woodland	(WD1) Mixed broadleaved woodland
	(WS) Scrub and transitional woodland	(WS1) Scrub
	(WL) Linear woodland	(WL1) Hedgerows
(B) Cultivated and built land	(BC) Built land	(BL3) Buildings and artificial surfaces

7.3.2.1 (FW4) Drainage ditches

Overall site drainage is from north to south with a marginal drainage ditch on the western boundary of the Rectory site. This very small water course was historically redirected into the Rectory garden as a water feature and on to the roadside drainage ditch to the south. The line of this water course is still visible with a small earth covered rock mini-bridge now overgrown and with natural rewilding of the Rectory grounds, a more diffuse spread over this section of the site, which is under the footprint of the wester access road.

The habitat classification applies more so to the shallow ditch which runs along the roadside boundary of the site. These water courses have marginal species with Fools Watercress (*Apium nodiflorum*) and Water Starwort (*Callitriche stagnalis*) in stagnant sections along with Duckweed (*Lemna minor*) and with higher ground having Meadowsweet (*Filipendula ulmaris*), Nettle (*Urtica diocia*), occasional Water mint (*Mentha aquatica*), Bulrush (*Typha latifolia*), Yellow-flag Iris (*Iris pseudacorus*) and abundant rushes as noted in the description of Wet grassland and Marsh below.

At the southern end of two fields of semi-improved wet grassland the grassland merges with the drainage ditch areas to form a mosaic marsh type habitat.

The roadside drainage ditch is culverted under access to land along the route of the proposed link to the Wastewater Treatment Plant and continues to the 'Moyne 34' Stream which ultimately discharges to Killala Bay approximately 3.25 river kilometres downstream to the east at Moyne Abbey where the receiving environment is designated as part of the Killala Bay/Moy Estuary SAC and the Killala Bay/Moy Estuary SPA.

Figure 7.4 *Showing habitats in the Proposed Development areas.*

7.3.2.2 (GA1 & SiGS4) Improved (and semi-improved) agricultural grassland

The majority of the fields within the proposed development area are improved with relatively high levels of grazing with the exception of the lower or southern portions of the two most southeasterly fields in the main data centre site which grade to wet grassland and wetter sections form a Marsh mosaic adjacent to the local access road.

The improved grassland fields are essentially large, in most cases, open fields of grassland which are managed for either silage or grazing dominated by common forage grasses such as Perennial Rye-Grass and Yorkshire Fog with little in the way of herbs present along with Creeping Thistle, Meadow Buttercup, Nettle and Silverweed (*Potentilla anserina*). The edges of the fields contain some well grown Hawthorn (*Crataegus monogyna*) and Ash (*Fraxinus excelsior*). Wetter areas have elements of semi-improved wet grassland with similar species described below.

7.3.2.3 (GS4) Wet grassland

Wet grassland (GS4), with characteristic species such as abundant Soft Rush (*Juncus effusus*), Meadowsweet (*Filipendula ulmaria*), Yorkshire Fog (*Holcus lanatus*), Star Sedge (*Carex echinata*), Marsh Thistle (*Cirsium palustre*) and Creeping Buttercup (*Ranunculus repens*) is present in the lower wetter sections of the two most southeastern fields closest to the local road and divided by outgrown hedgerows (WL1). The roadside ditch has Floating Sweet Grass (*Glyceria fluitans*) and Bulrush (*Typha latifolia*) was common along Meadowsweet and Yellow-flag Iris (*Iris pseudoacorus*) form a Marshy mosaic.

7.3.2.4 (WD1 & WS1) Woodland & Scrub

The land surrounding the old Rectory and attendant buildings is classed as Mixed broadleaf woodland (WD1). Trees are generally outgrown garden or landscape features with a mix of native species such as Beech, Common Alder, Ash, Willow, Wych Elm, Hawthorn, Scot's Pine and with Silver Fir (*Abies alba*). The proposed western access route runs through an area of mature trees, with Scots Pine, Aspen, Alder and Beech. There is a small centrally located area of conjoining hedgerows which forms a spread of woodland, c. 75m NW of the Rectory House with Sycamore predominant.

The woodland understorey generally comprises abundant Nettle (*Urtica dioica*), Yorkshire Fog (*Holcus lanatus*), Rough Meadow Grass (*Poa trivialis*) and Creeping Thistle (*Cirsium arvense*), False Oat Grass (*Arrhenatherum elatior*), while wetter areas comprise tall Wet grassland (GS4), with Meadowsweet, Great Willowherb (*Epilobium hirsutum*), Iris, False Oat-Grass and Reed Canary Grass. The areas fringing the main roadside are scrubby in patches with frequent Gorse. Gorse scrub is abundant in the line of the proposed access to the WWTP.

The proposed access to the WWTP to the east comprises dense Willow and Gorse scrub with pockets of Cocks-foot grass, Thistle, Meadowsweet and Bush Vetch (*Vicia sepium*).

7.3.2.5 (WL1) Hedgerows

The fields, including the roadside boundary are lined by hedgerows (WL1), which have largely been allowed to develop into taller treelines. Ash is the predominant species (much of it diseased) with Sycamore and Hawthorn, Willow, Elder (*Sambucus nigra*) and Blackthorn (*Prunus spinosa*).

7.3.2.6 (BL3) Buildings and artificial surfaces

These areas refer to road crossings and hardstanding areas of tracks and existing pathways.

7.3.3 Invasive Species

A large infestation of Japanese knotweed (*Reynoutria japonica*) was recorded growing in two patches on the property of the former Rectory House adjacent to the eastern facade. The stand is located at least 45m from the site boundary to the east and is noted for avoidance only.

7.3.4 Fauna

7.3.4.1 Bats

The report on bat roost potential and commuting potential prepared by MKO is presented as Appendix 7.1. The main findings of the report are presented visually in Figure 7.5 and summarised as follows.

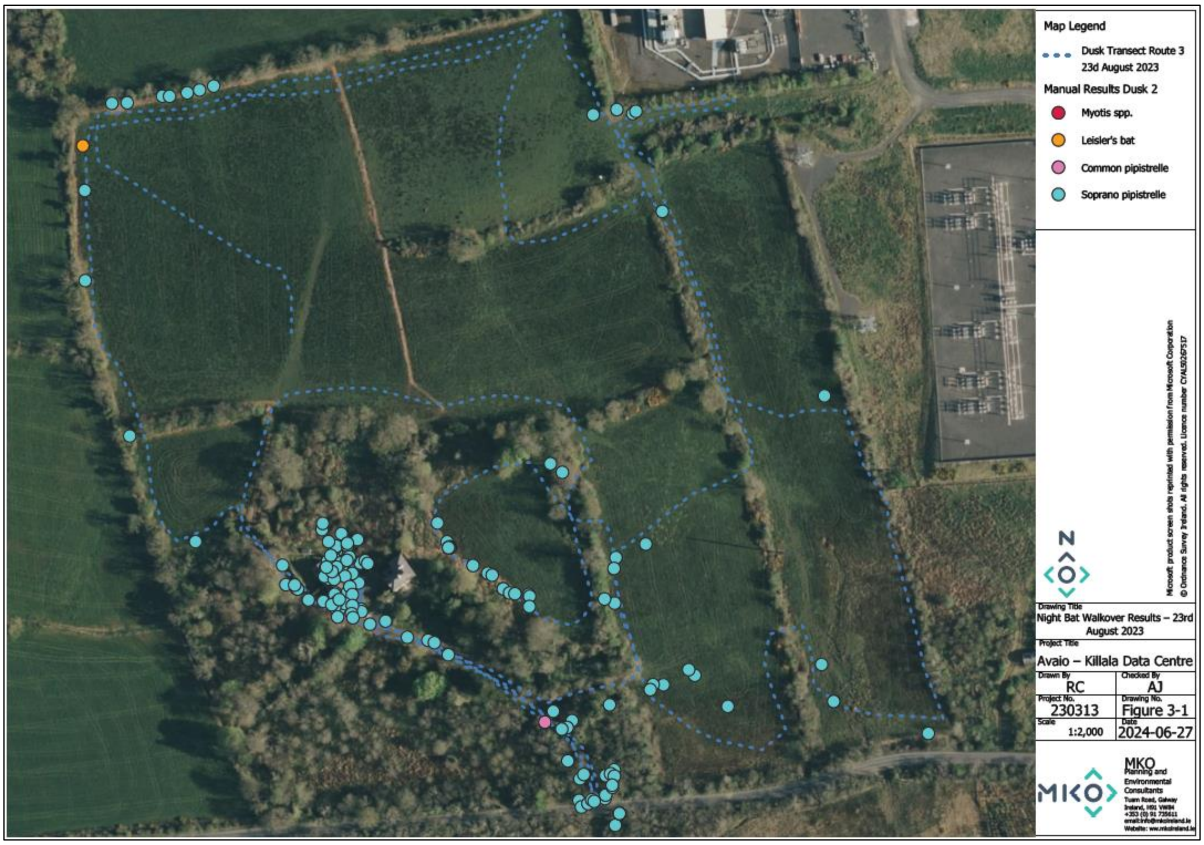

Figure 7.5 *Showing bat records in the vicinity of the Rectory buildings and surrounding environment equal to the subject site (MKO, 2023).*

Bat activity within the site was relatively high overall. Activity was dominated by soprano pipistrelle. There were lower numbers of four other bat species/species group recorded, which included Common pipistrelle, Leisler's bat, Myotis spp. and Brown long-eared bat.

The Rectory site supports significant roosting: any proposed development within the site will need to be designed with consideration to the existing roosts and their commuting corridors and incorporate best practice mitigation measures to ensure there is no significant impact on the local environment.

The Ground Level Bat Roost Survey of trees completed in November 2024 did not record any potential features in trees to be removed under the footprint of the proposed development. One Ash (xref Arborist Report T1151, see also Figure 7.4.) is on the site boundary due north of the Rectory Stables. The nearest proposed development are the retaining walls indicated in purple to the north and west and there will be no impact on this tree.

7.3.4.2 Otters

No evidence of Otter holts was identified along the watercourses surveyed as part of the proposed development. The primary receiving watercourse, the Moyne Stream, is largely characterised by steep banks comprised of rank grassland and dense vegetation. It is culverted in several sections and literally runs underneath Moyne Abbey which likely precludes access from the bay to otters otherwise recorded in and associated with the main channel of the River Moy and Moy Estuary.

7.3.4.3 Badgers

There were no signs of badgers in the survey area and no setts were encountered during hedgerow surveys.

7.3.4.4 Breeding Birds

There are abundant woodland habitats available for breeding birds in the proposed development area.

Table 7.2 *Birds recorded during fieldwork in July 2024.*

Birds	Scientific name	BWI Status	Habitat Type
Magpie	*Pica pica*	Green	Anywhere in lowland areas
Woodpigeon	*Columba palumbus*	Green	Gardens, woods, hedges
Wren	*Troglodytes troglodytes*	Green	Gardens, woods, hedges
Blackbird	*Turdus merula*	Green	Woods, gardens, hedgerows
Hooded Crow	*Corvus cornix*	Green	Woods, gardens, hedgerows
Goldfinch	*Carduelis carduelis*	Green	Hedgerows, parks, gardens
Starling	*Sturnus vulgaris*	Green	Hedgerows, parks, gardens
Swallow	*Hirundo rustica*	Amber	Summer migrant

7.3.5 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) in the TII Guidelines (formerly NRA) for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009) which 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 outlined as follows:

Ecological valuation: Examples –

International Importance:

- 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
- Site that fulfills the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
- Features essential to maintaining the coherence of the Natura 2000 Network.
- Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
- Resident or regularly occurring populations (assessed to be important at the national level) of the following:
    - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
    - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
- Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
- World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
- Biosphere Reserve (UNESCO Man & The Biosphere Programme).
- Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
- Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
- Biogenetic Reserve under the Council of Europe.
- European Diploma Site under the Council of Europe.
- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).

National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.
- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA);
- Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level) of the following:
    - Species protected under the Wildlife Acts; and/or
    - Species listed on the relevant Red Data list.

- Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive County Importance:
- Area of Special Amenity.
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level) of the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level) of the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

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.

7.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The purpose of this section is to provide an overview of the key details of the construction phase and operational phase of the proposed development relevant to biodiversity. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

7.4.1 Construction Phase

The proposed development comprises a single datacentre building towards the north of the site, and also auxiliary infrastructure, parking, and access roads.

Site clearing, excavation, and levelling will be required across the 10.58 ha site. The construction phase will likely result in the loss of vegetation such as trees and including short sections of linear features; outgrown hedgerows.

The Proposed Development will require a temporary crossing of the drainage ditch leading to the Moyne Stream. The construction activity will require surface water management to prevent pollution and degradation of habitats from a chemical spill or smothering from excessive suspended solids.

7.4.2 Operational Phase

The Proposed Development includes embedded landscape and visual impact mitigation strategies, including retention and enhancement of existing site vegetation, earthwork bunding, additional woodland areas, belts and wildflower meadows, to enhance visual screening and biodiversity. These measures ensure that the development integrates with the surrounding environment while providing opportunities for future growth.

7.5 POTENTIAL EFFECTS OF THE PROPOSED DEVELOPMENT

There are no rare or protected habitats recorded in the study area. The field development areas may be considered of Low Local Ecological Value with Hedgerows of Low to Moderate ecological value.

There are no direct pathways to water courses leading to European sites. Significant effects on any European sites as a result of the proposed development are unlikely given the distance of removal. However, best practice construction management will be employed to control surface water leading to the Moyne Stream and Killala Bay.

7.5.1 Construction Phase

7.5.1.1 Habitats

Sites of Conservation Concern

The Proposed Development will require a temporary crossing of the drainage ditch leading to the Moyne Stream. The construction activity will require surface water management to prevent pollution and degradation of habitats from a chemical spill or smothering from excessive suspended solids.

In the absence of mitigation measures during construction to control potential pollution of surface water, the potential effect on the Killala Bay/Moy Estuary SAC (Site code 000458) and the Killala Bay/Moy Estuary SPA (Site code 004036) is uncertain.

It cannot be excluded at the Screening Stage of AA, 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.

Construction management will be employed to avoid potential impacts on the Moyne Stream leading to the Killala Bay, and a Natura Impact Statement has been prepared for the proposed development.

Streams and Water Quality

The drainage ditches and water courses crossed by the proposed pipeline all lead to the Moyne Stream. As previously established, the Moyne Stream leads to Killala Bay and its associated conservation areas.

There will be **no significant direct effects** on these water courses.

Deterioration in water quality as a result of elevated suspended solids or from earth movement has the potential to have an effect on downstream habitats and ultimately species discussed under 'Fauna' below.

Improved and Wet Grassland

The predominant habitat in fields in which the data centre is to be located comprises improved grassland or rush dominated wet grassland and the relatively small loss of these habitats will **not be significant**.

Woodland and Scrub

The majority of lands surrounding the Rectory and curtilage classed as Mixed broadleaf woodland (WD1) will not be affected. A small linear potion of this woodland will be affected by a proposed access road link on the western boundary. The area lost will be c. 130m in length and covers an area of c.0.14 Ha. The woodland comprises predominantly Ash trees which are undergoing early stages of ash die-back along with non-native Beech. The effect of loss will **not be significant.**

Hedgerows

The proposed development will result in the short term loss of c.150m of Low value internal hedgerows.

The hedgerows are of relatively low value given the high degree of gaps and relatively low species composition and the effect will **not be significant**.

7.5.1.2 Fauna

Badgers

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

Otters

No evidence of Otter holts or other protected mammal dwellings were present within or proximal to the development boundary.

The overall effect on Otter as a result of the construction phase of the proposed development in the absence of mitigation is considered to be a **temporary, slight, negative effect** at the local level.

Bats

The construction phase will likely result in the loss of vegetation such as trees and including short sections of linear features; outgrown hedgerows.

There will be no loss of trees with roost potential. One Ash tree with bat roost potential is located outside the zone of influence.

Vegetation removal and illumination of retained vegetation will impact foraging and commuting bats that use hedgerows and other similar features. Hedgerows and treelines maintain landscape connectivity and provide commuting bats with waypoints and corridors through which they commute to and from roosts/foraging areas. The loss of these linear hedgerow features on site will cause a minor reduction in landscape connectivity in the immediate vicinity of the proposed site.

The overall effect on bats as a result of the construction phase of the proposed development in the absence of mitigation is considered to be a **temporary, slight, negative effect** at the local level.

Breeding Birds

Potential effects on nesting birds may occur as a result of vegetation cutting. The majority of birds encountered are typical open farmland birds of BWI Green status which are not susceptible to habitat loss. The potential effects on local bird populations are **not significant** and will be avoided.

Field surveys carried out deemed the overall lands to be unsuitable feeding and/or roosting sites for Wintering Birds, due to habitat conditions being dominated by semi-improved agricultural grassland or subject to relatively high levels of grazing disturbance.

This was supported by no records during the early Winter survey of lands while assessing bat roost potential of trees.

7.5.2 Operational Phase

7.5.2.1 Habitats

Following the construction phase, including the reinstating of hedgerows ***no negative operational effects*** on habitats during the operational phase are anticipated.

There will be ***no negative operational effects*** on local biodiversity.

7.5.2.2 Fauna

Inappropriate or excessive illumination of hedgerow areas at night can cause disturbance to roosting, commuting and foraging bats. Artificial lighting is thought to increase the chances of bats being predated upon by avian predators of bats (e.g. owls), and therefore bats may modify their behaviour to avoid illuminated areas.

The overall effect on bats as a result of the construction phase of the proposed development in the absence of mitigation is considered to be a **permanent, moderate, negative effect** at the local level.

There will be ***no negative operational effects*** on any other species of fauna including, badgers, otters or birds during the operational phase.

7.6 MITIGATION MEASURES

7.6.1 Construction Phase

7.6.1.1 Habitats

The measures associated with the construction phase required to avoid or reduce any potential harmful effects on biodiversity are set out below. The Site manager shall ensure that all personnel working on-site are trained and aware of the mitigation measures detailed below.

The mitigation measures outlined in Chapter 5 (Land Soils, Geology and Hydrogeology) Section 5.6.1, and Chapter 6 (Hydrology) Section 6.6.2 will be implemented in full during the construction. These mitigation measures will be implemented as part of the site Construction Environmental Management Plan (CEMP). The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Environmental Clerk of Works where relevant. These measures are designed to prevent the contamination of groundwater, surface water, and downstream ecosystems.

Any trees or areas of mature vegetation that are removed to facilitate the full footprint of the proposed development will be quantified and replanted on a like-for-like basis. Any additional mature trees that are to be replaced will be planted in the surrounds of the offtake location. A landscape plan has been prepared by KFLA architects showing the location of the proposed compensatory planting around the site (ref Chapter 11 landscape Figure 11.15). All replacement planting is of native stock and of local provenance for the promotion of biodiversity.

The construction work areas will be clearly delineated prior to the commencement of any works taking place on site. No vegetation clearance will occur outside the designated areas within the proposed development site. All trees that are to be retained, both within and adjacent to the Proposed Development boundary (where the root protection area of the tree extends into the Proposed Development boundary), will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist.

Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it;

The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas will not be undertaken within 10m of any retained trees, hedgerows and treelines;

The construction contractor will seek to avoid removing any hedges or trees during the nesting season and where this is not possible, an ecologist will be engaged to ensure compliance with the Wildlife Act 1976, as amended. The Applicant will engage with the Local Authority to identify and agree suitable biodiversity measures and/or lands to achieve biodiversity net gain before completion of the project.

The retention of existing green corridors such as hedgerows and promotion of biodiversity through native species landscaping will be undertaken where feasible. All areas of hedgerow vegetation removed will be fully reinstated with an appropriate native planting mix of local provenance including the following species:

- Elder *Sambucus nigra*
- Hawthorn *Crataegus monogyna*
- Rowan *Sorbus aucuparia*
- Birch *Betula Spp.* (wetter areas)
- Guelder Rose *Viburnum opulus*

7.6.1.2 Fauna

Otters

Standard surface water control measures as outlined in CIRIA (2001) and the CEMP are considered are considered sufficient to avoid any indirect impacts on foraging and commuting Otter as a result of surface water contamination.

Bats

Boundary habitats and trees which are to be retained will be fenced off prior to the commencement of works to protect these habitats from accidental ingress and damage to the root zone in order to preserve connectivity for commuting and foraging bats.

Other Taxa

Any ponding water, including drainage ditches associated with the Moyne Stream will be inspected regularly by the Environmental Manager for the presence of frogspawn during the relevant season. If frog spawn is found to be present and likely to be disturbed by the proposed works, a licence from NPWS will be sought prior to moving to a suitable location locally.

7.6.2 Operational Phase

7.6.2.1 Habitats

In addition to retention of existing green areas where feasible, the proposed development includes a Landscape Plan which provides for biodiversity offset through the additional planting. These planting works will be undertaken in the next available planting season after completion of the main civil engineering works.

7.6.2.2 Fauna

Bats

As a precaution the design of lighting will follow the Bat Conservation Trust in partnership with the Institution for Lighting Professionals (ILP) Best Practice Guidance (BTC & ILP, 2018) on considering the impact on bats when designing lighting schemes.

The following best practice measures will be included in the lighting design:

- Incorporate specialist bollard or low-level downward directional luminaires;
- Where low-level downward directional luminaires are not appropriate, installation of luminaires with warm white spectrum LEDs (<2700 Kelvin) to reduce blue light, with peak wavelengths higher than 550nm will be included.
- Mounted luminaires will not tilt upward, with an upward light ratio of 0% and with good optical control;
- Incorporate cowls to lighting throughout the proposed development site to spill away from the site boundaries;
- Maximise the separation distance between light mast locations and vegetated features at the boundary of the site.

7.7 MONITORING OR REINSTATEMENT

7.7.1 Construction Phase

Ecological monitoring will be required during the construction phase of development as set out in the CEMP. The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Environmental Clerk of Works where relevant.

7.7.2 Operational Phase

No ecological monitoring is required during the operational phase.

7.8 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

7.8.1 Construction Phase

With the implementation of the prescribed mitigation measures set out above, the residual effects on the local bat population are predicted to be **not significant** overall.

With the employment of appropriate mitigation measures with regard to local biodiversity, the Proposed Development effect on biodiversity is anticipated to be **short term, neutral** and **not significant**.

7.8.2 Operational Phase

Reinstated hedgerows are expected to grow sufficiently in the short-term period to provide reconnection between sections of removed hedgerows during the construction of the pipeline. The loss of a number of mature trees will have a temporary effect on bat habitat.

With the employment of appropriate mitigation measures with regard to local biodiversity, the Proposed Development will have a ***neutral, imperceptible*** and ***long-term effect*** on biodiversity.

7.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

A review of the National Planning Application Database was undertaken. The database was queried for developments granted planning permission within the zone of impact of the Proposed Development (Chapter 2 Appendix 2.1).

7.9.1 Construction Phase

Given the inclusion of strict Best Practice Construction Measures to be included and enforced through a Construction Environmental Management Plan, the proposed development will have ***no significant negative construction effects*** on local ecology and biodiversity or on hydrologically linked European sites, therefore cumulative impacts can be ruled out.

7.9.2 Operational Phase

There will be ***no significant negative operational effects*** on biodiversity, habitats or fauna therefore, there are no cumulative effects.

The Mayo County Development Plan 2022-2028 in complying with the requirements of the Habitats Directive and Habitats Regulations requires that all Projects and Plans that could affect European sites and/or Biodiversity in the same zone of influence of the Proposed Development would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, or where potential effects on Biodiversity are identified, that appropriate, industry standard, successfully employable mitigation measures are put in place to avoid, reduce or ameliorate negative effects. In this way any cumulative or in-combination effects with other Plans or Projects in the same zone of influence, will be avoided.

CHAPTER 08:

AIR QUALITY

08

CONTENTS

8.0 AIR QUALITY

8.1 INTRODUCTION

This chapter of the EIAR was prepared to assess the potential significant effects on air quality of the proposed datacentre development adjacent to the Killala Business Park, Mullafarry and Tawnaghmore Upper, Killala, Co. Mayo.

8.2 METHODOLOGY

8.2.1 Relevant Legislation & Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on Air Quality is summarised below.

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022);
- Guidance on the Assessment of Dust from Demolition and Construction Version 2.2 (Institute of Air Quality Management (IAQM), 2024);
- A Guide to The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1) (IAQM, 2020);
- TII Guidance Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2022)
- TII Road Emissions Model (REM) online calculator tool and TII Road Emissions Model (REM): Model Development Report – GE-ENV-01107 (TII, 2024).

8.2.1.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, National and European statutory bodies, the Department of the Environment, Heritage and Local Government in Ireland (DEHLG, 2004) and the European Parliament and Council of the European Union, have set limit values in ambient air for a range of air pollutants. These limit values or “Air Quality Standards” are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed based on compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2022, which incorporate European Commission Directive 2008/50/EC, which has set limit values for numerous pollutants with the limit values for NO_2, PM_{10}, and $PM_{2.5}$ being relevant to this assessment. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC) and includes ambient limit values relating to $PM_{2.5}$. The applicable limit values for NO_2, PM_{10}, and $PM_{2.5}$ are set out in Table 8.1.

Table 8.1 *Ambient Air Quality* Standards *& TA Luft*

Pollutant	**Regulation** Note1	**Limit Type**	**Value**
Dust Deposition	TA Luft (German VDI, 2002)	Annual average limit for nuisance dust	350 $mg/m^2/day$
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 $\mu g/m^3$
		Annual limit for protection of human health	40 $\mu g/m^3$
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 $\mu g/m^3$ PM_{10}
		Annual limit for protection of human health	40 $\mu g/m^3$ PM_{10}
Particulate Matter (as $PM_{2.5}$) – Stage 1	2008/50/EC	Annual limit for protection of human health	25 $\mu g/m^3$ $PM_{2.5}$
Particulate Matter (as $PM_{2.5}$) – Stage 2 Note 2	2008/50/EC	Annual limit for protection of human health	20 $\mu g/m^3$ $PM_{2.5}$

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

Note 1 Stage 2 indicative limit value for $PM_{2.5}$ to be applied from 1 January 2020 after review by the European Commission

In April 2023, the Government of Ireland published the Clean Air Strategy for Ireland (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026, the IT4 targets by 2030 and the final targets by 2040 (shown in Table 8.2). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 $\mu g/m^3$. The strategy also acknowledges that "*meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both* $PM_{2.5}$ *and* NO_2". Ireland will revise its air quality legislation in line with the proposed EU revisions to the CAFE Directive, which will set interim 2030 air quality standards and align the EU more closely with the WHO targets.

Table 8.2 *WHO Air Quality Guidelines*

Pollutant	**Regulation**	**Limit Type**	**IT3 (2026)**	**IT4 (2030)**	**Final Target (2040)**
NO_2	WHO Air Quality Guidelines	24-hour limit for protection of human health	50$\mu g/m^3$ NO_2	50$\mu g/m^3$ NO_2	25$\mu g/m^3$ NO_2
		Annual limit for protection of human health	30$\mu g/ m^3$ NO_2	20$\mu g/ m^3$ NO_2	10$\mu g/m^3$ NO_2
PM (as PM_{10})		24-hour limit for protection of human health	75$\mu g/ m^3$ PM_{10}	50$\mu g/m^3$ PM_{10}	45$\mu g/m^3$ PM_{10}
		Annual limit for protection of human health	30$\mu g/ m^3$ PM_{10}	20$\mu g/ m^3$ PM_{10}	15$\mu g/m^3$ PM_{10}

Pollutant	Regulation	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
PM (as $PM_{2.5}$)		24-hour limit for protection of human health	37.5µg/m³ $PM_{2.5}$	25µg/m³ $PM_{2.5}$	15µg/m³ $PM_{2.5}$
		Annual limit for protection of human health	15µg/m³ $PM_{2.5}$	10µg/m³ $PM_{2.5}$	5µg/m³ $PM_{2.5}$

8.2.1.2 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust, which are less than 10 microns, and the EU ambient air quality standards outlined in Section 8.2.1.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regard to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

However, guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m²/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled 'Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m²/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust effects from construction of the Proposed Development.

8.2.1.3 Air Quality and Traffic Impact Significance Criteria

The TII document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on the percentage change in pollutant concentrations relative to the 'Do Nothing' scenario. The TII significance criteria are outlined in Table 4.9 of *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) and reproduced in Table 8.3 below. These criteria have been adopted for the proposed development to predict the effect of NO_2 and PM_{10} emissions as a result of the proposed development.

Table 8.3 *Air Quality Significance Criteria*

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Limit Value (AQLV)			
	1%	**2-5%**	**6-10%**	**>10%**
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Source *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022)

8.2.2 Construction Phase Methodology

8.2.2.1 Construction Traffic Assessment

Construction phase traffic also has the potential to affect air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

The construction stage traffic will not result in increases or decreases by 1,000 AADT, or 200 HDV AADT. In addition, there are no proposed changes to the traffic speeds or road alignment. As a result, a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality.

8.2.2.2 Construction Dust Assessment

The Institute of Air Quality Management in the UK (IAQM) guidance document *'Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) outlines an assessment method for predicting the effect of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development in order to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site-specific mitigation required. The use of UK guidance is recommended by Transport Infrastructure Ireland in their guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022).

The major dust generating activities are divided into four types within the IAQM guidance (IAQM, 2024) to reflect their different potential effects. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into Large, Medium or Small scale depending on the nature of the activities involved. The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

8.2.3 Operational Phase Methodology

8.2.3.1 Operational Traffic Assessment

Operational phase traffic has the potential to affect local air quality as a result of increased vehicle movements associated with the proposed development. The TII scoping criteria detailed in Section 8.2.2.1 were used to determine if any road links are affected by the proposed development and require inclusion in a detailed air quality modelling assessment. The proposed development will not result in the operational phase traffic increasing by more than 1,000 AADT or 200 HGV. Therefore, a detailed air quality modelling assessment of operational phase traffic emissions was not conducted.

8.2.3.2 Air Dispersion Modelling

Existing emissions from the facility have been modelled to establish the existing baselines, or Do-Nothing scenario, and the operational phase, or Proposed Operations scenario, using the AERMOD dispersion model (Version 23112) which has been developed by the U.S. Environmental Protection Agency (USEPA) (USEPA, 2022) and following guidance issued by the EPA (EPA, 2020).

The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources and has replaced ISCST3 (USEPA, 1995) as the regulatory model by the USEPA for modelling emissions from industrial sources in both flat and rolling terrain (USEPA, 1998; USEPA, 2000; USEPA, 2005). The model has more advanced algorithms and gives better agreement with monitoring data in extensive validation studies (USEPA, 1998; USEPA, 1999; Paine 1997a; Paine 1997b; Schulman, 2000). An overview of the AERMOD dispersion model is outlined in Appendix 6-A.

The air dispersion modelling input data consisted of information on the physical environment (including building dimensions and terrain features), design details from all emission points on-site and five years of appropriate hourly meteorological data. Using this input data the model predicted ambient ground level concentrations beyond the site boundary for each hour of the modelled meteorological years. The model post-processed the data to identify the location and maximum of the worst-case ground level concentration. This worst-case concentration was then added to the background concentration to give the worst-case predicted environmental concentration (PEC). The PEC was then compared with the relevant ambient air quality standard to assess the significance of the releases from the site.

The modelling aims to achieve compliance with the guidance outlined within the EPA document *AG4 Guidance for Air Dispersion Modelling* (EPA, 2020) for the maximum permissible process contribution: "*When modelling a facility, the uncertainty in the model should be considered. If the facility is operated continually at close to the maximum licenced mass emission rate (i.e. maximum concentration and maximum volume flow) the process contribution (PC) should be less than 75% of the ambient air quality standard and less than this where background levels account for a significant fraction of the ambient air quality standard*".

This approach allows for inherent uncertainty in air dispersion modelling to be taken into account in order to avoid a risk of exceeding the air quality standards. The modelling assessment has aimed to achieve a process contribution that is less than 75% of the ambient air quality standard under the scenarios modelled (see Section 8.2.3.2 *Process Emissions* for details on modelling scenarios).

Throughout this study a conservative approach was taken. This will most likely lead to an over-estimation of the levels that will arise in practice. The conservative assumptions are outlined below:

- Maximum predicted concentrations were reported in this study, even if no residential receptors were near the location of this maximum;
- Conservative background concentrations were used in the assessment; and
- The effects of building downwash, due to on-site buildings, has been included in the model.

The United States Environmental Protection Agency (USEPA) approved AERMOD dispersion model has been used to predict the ground level concentrations (GLC) of compounds emitted from the principal emission sources on-site.

The modelling incorporated the following features:

- Modelled receptors included the proposed development boundary, gridded receptors and discrete sensitive receptors. These are described in more detail in Section 8.3.3.2 .
- All on-site buildings and significant process structures were mapped into the computer to create a three-dimensional visualisation of the site and its emission points. Buildings and process structures can influence the passage of airflow over the emission stacks and draw plumes down towards the ground (termed building downwash). The stacks themselves can influence airflow in the same way as buildings by causing low pressure regions behind them (termed stack tip downwash). Both building and stack tip downwash were incorporated into the modelling.
- Detailed terrain has been mapped into the model using SRTM data with 30m resolution. The site is located in an area of relatively simple terrain. All terrain features have been mapped in detail into the model using the terrain pre-processor AERMAP (USEPA, 2017).
- Hourly-sequenced meteorological information has been used in the model. Meteorological data over a five year period (Belmullet 2019 – 2023) was used in the model (see Figure 8.1 and Appendix 8.2).
- The source and emissions data, including stack dimensions, gas volumes and emission temperatures have been incorporated into the model.

Terrain

The AERMOD air dispersion model has a terrain pre-processor AERMAP (USEPA, 2017) which was used to map the physical environment in detail over the receptor grid. The digital terrain input data used in the AERMAP pre-processor was obtained from SRTM. This data was run to obtain for each receptor point the terrain height and the terrain height scale. The terrain height scale is used in AERMOD to calculate the critical dividing streamline height, H_{crit}, for each receptor. The terrain height scale is derived from the Digital Elevation Model (DEM) files in AERMAP by computing the relief height of the DEM point relative to the height of the receptor and determining the slope. If the slope is less than 10%, the program goes to the next DEM point. If the slope is 10% or greater, the controlling hill height is updated if it is higher than the stored hill height.

In areas of complex terrain, AERMOD models the impact of terrain using the concept of the dividing streamline (H_c). As outlined in the AERMOD model formulation (USEPA, 2022) a plume embedded in the flow below H_c tends to remain horizontal; it might go around the hill or impact on it. A plume above H_c will ride over the hill. Associated with this is a tendency for the plume to be depressed toward the terrain surface, for the flow to speed up, and for vertical turbulent intensities to increase.

AERMOD model formulation states that the model “captures the effect of flow above and below the dividing streamline by weighting the plume concentration associated with two possible extreme states of the boundary layer (horizontal plume and terrain-following). The relative weighting of the two states depends on: 1) the degree of atmospheric stability; 2) the wind speed; and 3) the plume height relative to terrain. In stable conditions, the horizontal plume "dominates" and is given greater weight while in neutral and unstable conditions, the plume traveling over the terrain is more heavily weighted” (USEPA, 2005).

Geophysical Considerations

AERMOD simulates the dispersion process using planetary boundary layer (PBL) scaling theory (USEPA, 2022). PBL depth and the dispersion of pollutants within this layer are influenced by specific surface characteristics such as surface roughness, albedo and the availability of surface moisture. Surface roughness is a measure of the aerodynamic roughness of the surface and is related to the height of the roughness element. Albedo is a measure of the reflectivity of the surface whilst the Bowen ratio is a measure of the availability of surface moisture.

AERMOD incorporates a meteorological pre-processor AERMET (USEPA, 2018) to enable the calculation of the appropriate parameters. The AERMET meteorological pre-processor requires the input of surface characteristics, including surface roughness (z_0), Bowen Ratio and albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. The values of albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc) and vary with seasons and wind direction. The assessment of appropriate land-use type was carried out to a distance of 10 km from the meteorological station for Bowen Ratio and albedo and to a distance of 1 km for surface roughness in line with USEPA recommendations (USEPA, 2008; USEPA, 2018) as outlined in Appendix 8.2.

In relation to AERMOD, detailed guidance for calculating the relevant surface parameters has been published (USEPA, 2018). The most pertinent features are:

- The surface characteristics should be those of the meteorological site (Belmullet) rather than the installation;
- Surface roughness should use a default 1 km radius upwind of the meteorological tower and should be based on an inverse-distance weighted geometric mean. If land use varies around the site, the land use should be sub-divided by sectors with a minimum sector size of 30º;
- Bowen ratio and albedo should be based on a 10 km grid. The Bowen ratio should be based on an un-weighted geometric mean. The albedo should be based on a simple un-weighted arithmetic mean.

AERMOD has an associated pre-processor, AERSURFACE (USEPA, 2008) which has representative values for these parameters depending on land use type. The AERSURFACE pre-processor currently only accepts NLCD92 land use data which covers the USA. Thus, manual input of surface parameters is necessary when modelling in Ireland. Ordnance survey discovery maps (1:50,000) and digital maps such as those provided by the EPA, National Parks and Wildlife Service (NPWS) and Google Earth® are useful in determining the relevant land use in the region of the meteorological station. The Alaska Department of Environmental Conservation has issued a guidance note for the manual calculation of geometric mean for surface roughness and Bowen ratio for use in AERMET (ADEC, 2008). This approach has been applied to the current site with full details provided in Appendix 8.2.

Building Downwash

When modelling emissions from an industrial installation, stacks which are relatively short can be subjected to additional turbulence due to the presence of nearby buildings. Buildings are considered nearby if they are within five times the lesser of the building height or maximum projected building width (but not greater than 800 m).

The USEPA has defined the “Good Engineering Practice” (GEP) stack height as the building height plus 1.5 times the lesser of the building height or maximum projected building width. It is generally considered unlikely that building downwash will occur when stacks are at or greater than GEP (USEPA, 1985).

When stacks are less than this height, building downwash will tend to occur. As the wind approaches a building it is forced upwards and around the building leading to the formation of turbulent eddies. In the lee of the building these eddies will lead to downward mixing (reduced plume centreline and reduced plume rise) and the creation of a cavity zone (near wake) where re-circulation of the air can occur. Plumes released from short stacks may be entrained in this airflow leading to higher ground level concentrations than in the absence of the building.

The Plume Rise Model Enhancements (PRIME) (Paine, 1997a; Paine, 1997b) plume rise and building downwash algorithms, which calculates the impact of buildings on plume rise and dispersion, have been incorporated into AERMOD. The building input processor BPIP-PRIME produces the parameters which are required in order to run PRIME. The model takes into account the position of each stack relative to each relevant building and the projected shape of each building for 36 wind directions (at 10º intervals). The model determines the change in plume centreline location with downwind distance based on the slope of the mean streamlines and coupled to a numerical plume rise model (Paine, 1997a).

Given that the proposed stacks are less than 2.5 times the lesser of the building height or maximum projected building width, building downwash will need to be taken into account and the PRIME algorithm run prior to modelling with AERMOD. The dominant building for each relevant stack will vary as a function of wind direction and relative building heights.

Designated Habitat Sites

The impact of emissions of NO_X, and nitrogen and acid deposition (as N) on ambient ground level concentrations within designated habitat sites within 20 km of the facility was assessed using AERMOD. The 20 km distance was selected based on maximum extent of the impact zone from the air emissions onsite. After 20 km, the ambient air concentration of NO_X, and nutrient and acid deposition due to emissions from the facility are imperceptible.

Annual average concentrations for NO_X, nutrient and acid deposition from all emission points at the facility were predicted at receptors within the designated sites for all five years of meteorological data modelled (2019 – 2023). With receptor spacing of 500 m, 2,173 discrete receptors were modelled in total within the sensitive ecosystems. The designated habitats modelled are detailed in Section 8.4.2.4.

In order to consider the effects of nitrogen and acid deposition (as N) owing to emissions from the facility on the designated habitat sites, the maximum annual mean NO_2 predicted environmental concentrations must be converted firstly into a dry deposition flux using the equation below which is taken from UK Environment Agency publication *AGTAG06 – Technical Guidance On Detailed Modelling Approach For An Appropriate Assessment For Emissions To Air* (UKEA, 2014):

Dry deposition flux (µg/m²/s) = ground-level concentration (µg/m³) x deposition velocity (m/s)

The deposition velocities for NO_2 are outlined in AQTAG06 and shown below in Table 8.4. The dry deposition flux is then multiplied by the conversion factors shown in Table 8.4 (taken from AQTAG06) to convert it to a nitrogen (N) deposition flux (kg/ha/yr), and to an acid deposition (as N) flux (keq/ha/yr).

Table 8.4 *Dry deposition fluxes for NO_2.*

Chemical Species	Habitat Type	Recommended Deposition Velocity (m/s)	Nitrogen Deposition Conversion factor µg/m2/s to kg/ha/yr	Nitrogen Deposition to Acid Deposition Conversion factor kg/ha/yr to keq/ha/yr
NO_2	Grassland	0.003	95.9	0.0714

Background concentrations for NO_X, nitrogen and acid deposition at the worst-case designated habitat were derived from the 1 km grid square concentrations provided on the Air Pollution Information System (APIS) website, in line with UKEA (2014) and UK Defra (2022) guidance. The background concentrations are added directly to the modelled NO_X and nitrogen deposition process contributions to give a total predicted environmental concentration.

<u>Process Emissions</u>

The operational phase scenario, or Proposed Development scenario, considers a total of 25 no. standby generators which will each have 1 no. associated stack, which will be built to a minimum height of 21.164 m above ground level to provide for adequate dispersion of pollutants. For the purpose of this assessment, all of the 25 standby generators are assumed to be running simultaneously in the event of a power failure to the site. The process emissions used in the modelling assessment, including stack heights for each source, are outlined in Table 8.5 and Table 8.6.

Regarding emergency operations, USEPA Guidance suggests an average hourly emission rate should be used rather than the maximum hourly rate (USEPA, 2011). As a result, the maximum hourly emission rates from the generators were reduced by $\frac{400}{8760}$ and the generators were modelled over a period of one full year. However, in reality it is expected that the generators will be operated for less than this.

Three testing regimes have also been included in the model:

- Testing of each generator on an individual basis once per month for 15 minutes unloaded – for the purposed of the model emissions have been modelled at 10% load.

- Testing of each generator on an individual basis once per quarter for one hour unloaded. For the purposes of this modelling assessment it was assumed that each generator operated for 1 hour at 10% load e.g. Gen 1 operates for one day each week in January, Gen 2 operates for one day each week in February etc. Thus emissions from load bank testing have been over-estimated as a conservative approach.

- Annual load bank testing, once per year, of each generator on an individual basis, for 4 hours at 100% load. For the purposes of this modelling assessment it was assumed that each generator operated for 4 hours, one day per week, one month of the year. E.g. Gen 1 operates for one day each week in January, Gen 2 operates for one day each week in February etc. Thus emissions from load bank testing have been over-estimated as a conservative approach.

- All testing was assumed to occur from 8am to 5pm, Monday to Friday only.

The Ozone-Limited Method (OLM) was used to model NO_2 concentrations. The OLM is a regulatory option in AERMOD (Hanrahan, 1999a; 1999b) which assumes that the amount of NO converted to NO_2 is proportional to the ambient ozone (O_3) concentration. The concentration is usually limited by the amount of ambient O_3 that is entrained in the plume. Thus, the ratio of the moles of O_3 to the moles of NO_X gives the ratio of NO_2/NO_X that is formed after the NO_X leaves the stack. In addition, it has been assumed that 10% of the NO_X in the stack gas from the boilers is already in the form of NO_2 before the gas leaves the stack. The equation used in the algorithm to derive the ratio of NO_2/NO_X is:

$$NO_2/NO_X = (\text{moles } O_3/\text{ moles } NO_X) + 0.10$$

A background ozone concentration of 59 µg/m^3 was used in the modelling assessment, based on a review of background ozone data for Zone D sites (EPA, 2024).

In relation to the annual average background, the ambient background concentration (see Section 8.3.2.1) was added directly to the process concentration with the short-term peaks assumed to have an ambient background concentration of twice the annual mean background concentration.

Table 8.5 *Summary of stack information for the facility.*

Stack	Stack Location (UTM Zone N 29)	Stack Diameter (m)	Stack height (m)	Stack	Stack Location (UTM Zone N 29)	Stack Diameter (m)	Stack height (m)
	485377, 6004876				485452, 6004892		
	485379, 6004876				485453, 6004893		
	485380, 6004877				485454, 6004893		
	485382, 6004877				485456, 6004893		
	485383, 6004877				485457, 6004894		
G1-G13	485384, 6004878	0.6	21.164	G1-G12	485483, 6004899	0.6	21.164
	485411, 6004883				485484, 6004900		
	485418, 6004883				485485, 6004900		
	485413, 6004884				485486, 6004900		
	485414, 6004884				485487, 6004900		
	485415, 6004884				485488, 6004901		

Stack	Stack Location (UTM Zone N 29)	Stack Diameter (m)	Stack height (m)	Stack	Stack Location (UTM Zone N 29)	Stack Diameter (m)	Stack height (m)
	485417, 6004885				485510, 6004900		
	485451, 6004892						

Table 8.6 *Summary of process emission information for the facility.*

Generators G1-G25		Operations				
		Testing (monthly)	**Testing (quarterly)**	**Testing (annual load banking)**	**Emergency (USEPA)**	**Emergency (UKEA)**
Hours of Operations (per generator)		15 mins	1 hour	4 hours	400	8760
Temp (K)		532.15	532.15	733.85	733.85	733.85
Volume Flow (Nm^3/hr Note 1)		3,887	3,887	26,399	26,399	26,399
Exit Velocity (m/sec actual)		8.9	8.9	41.5	41.5	41.5
NO_2	**Concentration at 15% O_2 (mg/Nm^3)**	867	867	871	871	871
	Mass Emission (g/s)	0.234	0.234	6.386	0.292	6.386
PM	**Concentration at 15% O_2 (mg/Nm^3)**	317	317	2	2	2
	Mass Emission (g/s)	0.003	0.00331	0.01252	0.0006	0.013
CO	**Concentration at 15% O_2 (mg/Nm^3)**	12	12	95	95	95
	Mass Emission (g/s)	0.09	0.09	0.69	0.032	0.032

Note 1 Combustion emissions referenced to 273.15 K, 101.3 Pa, dry gas and 15% oxygen.

The potential for cumulative impact of the emissions from the facility with Industrial Emissions (IE) licenced or Integrated Pollution Control (IPC) installations has been considered, in line with the methodology of AG4 (EPA, 2020). There are two EPA licenced installation within 1 km of the facility, SSE Generation Ireland Limited (P0566-02) and Mayo Renewable Power Limited (P1077-01) with the potential for cumulative impact with the proposed development. There also two proposed developments with planning applications and with the potential for cumulative impact with the proposed development; Killala Hydrogen Project (MCC Planning Ref. 2360266, planning application ongoing) and Lisgennon anaerobic digestion biogas facility (MCC Planning Ref. 2193, planning permitted in 2014).

The process emissions used in the cumulative modelling assessment are outlined in Table 8.5. The gas turbines, the biomass CHP and the boilers were assumed to operate continuously 24 hours per day, 7 days per week as a worst-case. The gas engine which will operate as catchers will alternate – emissions have therefore been reduced (assuming 7 of 9 engines operational) and applied to all 9 no. engines.

Table 8.7 *Summary of process emission information for the cumulative assessment.*

Installation	Emission Source	Stack height (m)	Stack Diameter (m)	Temp (K)	Velocity (m/s)	NO_x Emission rate (g/s)	PM Emission rate (g/s)
Killala DC	25 no. generators	21.1	0.6	As per Table 8.6			
SSE Generation Ireland Limited IE Reg. No. P0566-02	4 no. gas turbines	20	3	794.15	23.6	11.25	1.25

Installation	Emission Source	Stack height (m)	Stack Diameter (m)	Temp (K)	Velocity (m/s)	NO_x Emission rate (g/s)	PM Emission rate (g/s)
Mayo Renewable Power Limited IE Reg. No. P1077-01	Biomass CHP	66.3	2.13	345.15	16.49	10.15	1.01
Killala Hydrogen Project	9 no. gas engines	25	1.26	674.15	36.24	1.185	-
Lisgennon anaerobic digestor	HHW boiler	9	0.17	503.15	14.5	0.054	-
	Boiler	7.5	1	1073.15	17.5	0.520	-

8.2.4 Forecasting Methods and Difficulties Encountered

There were no difficulties encountered in compiling this assessment.

8.3 RECEIVING ENVIRONMENT

8.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Belmullet meteorological station, which is located approximately 50 km west of the site of the site. Belmullet meteorological data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 8.1). For data collated during five representative years (2019 – 2023), the predominant wind direction is westerly to south-westerly with a mean wind speed of 6.4 m/s over the 30-year period 1991–- 2020 (Met Éireann, 2023).

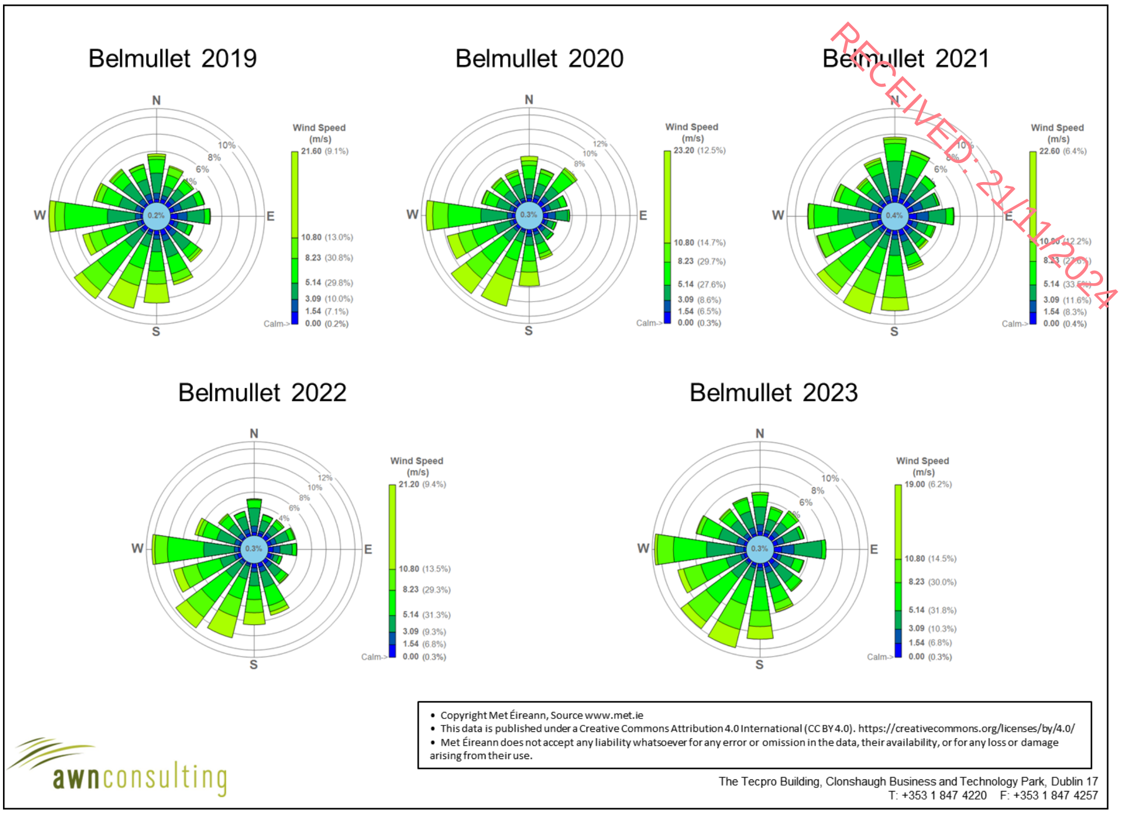

Figure 8.1 *Belmullet Windrose 2019-2023 (Source: Met Éireann, 2023)*

8.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is "*Air Quality In Ireland 2023"* (EPA, 2024). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2024).

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2022). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone D (EPA, 2024). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

8.3.2.1 NO_2

Long-term NO_2 monitoring was carried out at the Zone D rural background locations of Emo Court and Kilkitt, which are considered representative of the area of the proposed development for the period 2019 – 2023 (EPA, 2024).

The NO_2 annual average in 2023 for both rural background locations of Emo Court and Kilkitt was 2 µg/m^3. Therefore, long-term average concentrations measured at all locations were significantly lower than the annual average limit value of 40 µg/m^3. Sufficient data is available to observe the long-term trend over the period 2019 – 2023, with annual average results ranging from 2 – 5 µg/m^3 . A conservative estimate of the background NO_2 concentration for the region of the proposed development is therefore 5 µg/m^3, as derived from these long-term trends.

Table 8.8 *Trends in Air Quality – Nitrogen Dioxide (NO_2)*

Station	Averaging Period Note 1	Year				
		2019	**2020**	**2021**	**2022**	**2023**
Emo Court	Annual Mean NO_2 (µg/m^3)	4	3	4	3	2
Kilkitt	Annual Mean NO_2 (µg/m^3)	5	2	2	2	2

Note 1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022). 1-hour limit value - 200 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

8.3.2.2 PM_{10}

Long-term PM_{10} monitoring was carried out at the Zone D rural background locations of Claremorris and Kilkitt which are considered representative of the area of the proposed development for the period 2019 – 2023 (EPA, 2024).

The PM_{10} annual average in 2023 for the rural background locations of Claremorris and Kilkitt ranged from 7 – 8 µg/m^3. Therefore, long-term average concentrations measured at all locations were significantly lower than the annual average limit value of 40 µg/m^3. In addition, there were at most 1 exceedances (in Kilkitt) of the 24-hour limit value of 50 µg/m^3 in 2019, albeit 35 exceedances are permitted per year (EPA, 2024). Sufficient data is available observe the long-term trend over the period 2019 – 2023, with annual average results ranging from 7 – 11 µg/m^3 (**Table 8.9).**

A conservative estimate of the background PM_{10} concentration, for the region of the proposed development is therefore 11 µg/m^3, as derived from these long-term trends.

Table 8.9 *Trends in Air Quality – PM_{10}*

Station	Averaging Period Note 1	Year				
		2019	**2020**	**2021**	**2022**	**2023**
Claremorris	Annual Mean PM_{10} (µg/m^3)	11	10	8	8	8
	90th%ile of 24-hr Means	20	16	13	13	-
Kilkitt	Annual Mean PM_{10} (µg/m^3)	7	8	8	9	7
	90th%ile of 24-hr Means	13	14	13	14	-

Note1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022). Daily limit value - 50 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

In relation to the annual averages, the ambient background concentration is added directly to the process concentration. However, in relation to the short-term peak concentration, concentrations due to emissions from elevated sources cannot be combined in the same way. Guidance from the UK DEFRA (2022) and the EPA (2020) advises that for PM_{10} an estimate of the maximum combined pollutant concentration can be obtained as shown below:

PM_{10} - The 90.4th%ile of total 24-hour mean PM_{10} is equal to the maximum of either A or B below:

a) 90.4th%ile of 24-hour mean background PM10 + annual mean process contribution PM10
b) 90.4th%ile 24-hour mean process contribution PM10 + annual mean background PM10

A 90.4th percentile 24-hour background concentration of 20 µg/m^3 was used in the assessment, based on average concentrations for rural background locations of Claremorris and Kilkitt over the period 2019 – 2023.

8.3.2.3 $PM_{2.5}$

Long-term $PM_{2.5}$ monitoring was carried out at the Zone D rural background locations of Claremorris and Shannon Estuary/Askeaton, Limerick which are considered representative of the area of the proposed development for the period 2019 – 2023 (EPA, 2024).

The $PM_{2.5}$ annual average in 2023 for the Zone D rural background locations of Claremorris and Shannon Estuary/Askeaton, Limerick ranged from 4.8 – 5.2 µg/m^3. Therefore, long-term average concentrations measured at all locations were significantly lower than the annual average limit value of 25 µg/m^3. Sufficient data is available to observe the long-term trend over the period 2019 – 2023, with annual average results ranging from 4 – 8 µg/m^3 (

Table **8.10**).

A conservative estimate of the background $PM_{2.5}$ concentration, for the region of the proposed development is therefore 8 µg/m^3, as derived from these long-term trends.

Table 8.10 *Trends in Air Quality – $PM_{2.5}$*

Station	Averaging Period Note 1	Year				
		2019	**2020**	**2021**	**2022**	**2023**
Claremorris	Annual Mean $PM_{2.5}$ (µg/m^3)	4.0	5.1	8.2	6.1	5.2
Shannon Estuary/Askeaton, Limerick	Annual Mean $PM_{2.5}$ (µg/m^3)	-	4.4	5.7	5.5	4.8

Note1 Annual average limit value - 25 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

8.3.2.4 CO

In terms of CO, monitoring has been conducted at the suburban traffic Zone D site of Birr over the period 2020 – 2023. There are no other suitably representative CO monitoring stations within Zone D. Monitored concentrations are significantly below the ambient limit value of 10 mg/m^3. Maximum 8-hour concentrations at the Birr site ranged from 1.2 mg/m^3 – 3.4 mg/m^3 over the period 2020 – 2023 (EPA, 2024).

Based on these results a background 8-hour CO concentration of 3.4 mg/m^3 has been used in the modelling assessment.

This estimated background concentration has been added directly to the modelled 8-hour maximum result to produce the predicted environmental concentration in terms of CO.

Based on the above information the air quality in Zone D locations, such as the Killala area is generally good, with concentrations of the key pollutants generally well below the relevant limit values. However, the EPA have indicated that road transport emissions are contributing to increased levels of NO_2 with the potential for breaches in the annual NO_2 limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM_{10} and $PM_{2.5}$). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2024).

8.3.2.5 Sensitive Designated Habitats

Background concentrations for NO_X, and nitrogen and acid deposition at the most impacted modelled designated habitat, the Killala Esker pNHA, were derived from the 1 km grid square concentrations provided on the Air Pollution Information System (APIS) website (APIS, 2023), in line with UKEA (2014) and UK Defra (2022) guidance, and are shown in

Table **8.11**. The background concentrations are added directly to the modelled process contributions to give a total predicted environmental concentration.

Table 8.11 *Background Concentrations for NO_X, Nitrogen and Acid Deposition (Grid Average) (APSI, 2023)*

Closest Sensitive Designated Habitat	NO_x ($\mu g/m^3$)	Nitrogen Deposition (kg/ha/yr)	Acid Deposition (keq/ha/yr)
Killala Esker pNHA	1.7	4.4	0.3

8.3.3 Sensitivity of the Receiving Environment

8.3.3.1 Construction Phase

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) prior to assessing the impact of dust from a Proposed Development the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time, schools and hospitals.

In terms of receptor sensitivity to dust soiling, there are 2 no. high sensitivity residential properties within 250 m of the site boundary (shown in Figure 8.2). Therefore, the overall sensitivity of the area to dust soiling impacts is considered **low** based on the IAQM criteria outlined in Table 8.12.

Table 8.12 *Sensitivity of the Area to Dust Soiling Effects on People and Property*

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Source(IAQM, 2024) Guidance on the Assessment of Dust from Demolition and Construction

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health effects. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the Proposed Development is 11 $\mu g/m^3$ and there are 2 no. high sensitivity residential properties within 250 m of the site boundary (shown in Figure 8.2). Based on the IAQM criteria outlined in

Table **8.13**, the worst-case sensitivity of the area to human health is considered **low**.

Table 8.13 *Sensitivity of the Area to Dust Related Human Health Impacts*

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from Source (m)				
			<20	<50	<100	<200	<250
High	< 24 µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	< 24 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 µg/m³	>1	Low	Low	Low	Low	Low

Source IAQM, 2024) Guidance on the Assessment of Dust from Demolition and Construction

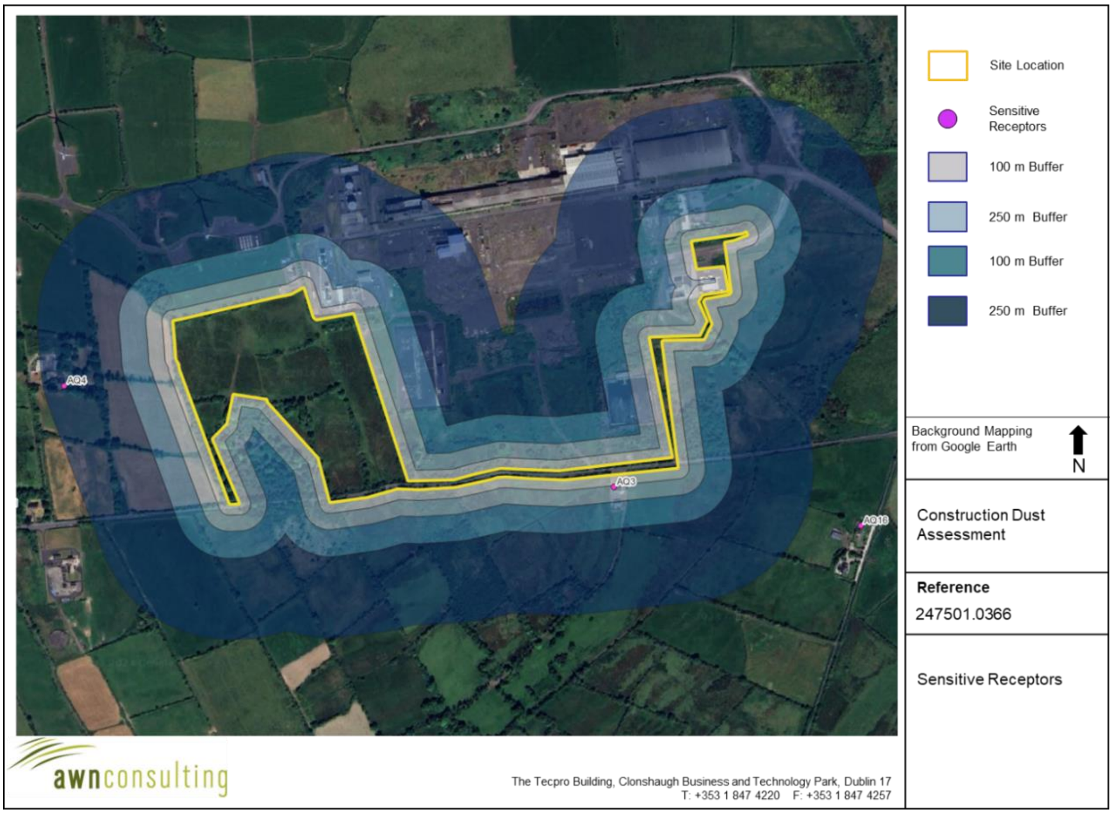

Figure 8.2 *Construction Dust Assessment - Sensitive Receptors*

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological effects. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability of the plant as well as other effects. The guidance states that dust impacts to vegetation can occur up to 50 m from the site and 50 m from site access roads, up to 500 m for the site entrance. The sensitivity of the area is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present. There are no designated habitat sites within 50 m away from the proposed development which is the area of potential impact as per IAQM guidelines (IAQM, 2024). There are therefore, no potential effects on ecology from construction dust due to the proposed development.

8.3.3.2 Operational Phase

Modelled receptors included the proposed development boundary, gridded receptors and discrete sensitive receptors.

Two receptor grids were created at which concentrations would be modelled. Receptors were mapped with sufficient resolution to ensure all localised “hot-spots” were identified without adding unduly to processing time. The receptor grids were based on Cartesian grids with the site at the centre. An outer grid measured 4 x 4 km with the site at the centre and with concentrations calculated at 100 m intervals. A smaller grid measured 1 x 1 km with concentrations calculated at 25 m intervals. Boundary receptor locations were also placed along the boundary of the site, at 25 m intervals.

The impact of the emission sources was also measured at nearby sensitive receptors (all residential) which were added to the model as discrete receptors see (Table 8.14 and Figure 8.3).

All receptors were modelled at 1.5 m to represent breathing height.

Table 8.14 *Modelled Discrete Sensitive Receptors*

Receptor	Co-Ordinates (UTM Zone 29 N)		Receptor	Co-Ordinates (UTM Zone 29 N)		Receptor	Co-Ordinates (UTM Zone 29 N)	
	X	Y		X	Y		X	Y
AQ1	484995	6004620	AQ12	486763	6004903	AQ23	484066	6004288
AQ2	484932	6004622	AQ13	486753	6004870	AQ24	484370	6004754
AQ3	486136	6004661	AQ14	486736	6004840	AQ25	484423	6005001
AQ4	485122	6004847	AQ15	486721	6004809	AQ26	484361	6005779
AQ5	486136	6005706	AQ16	486592	6004589	AQ27	485020	6006663
AQ6	486462	6005753	AQ17	485967	6004110	AQ28	485059	6006658
AQ7	486640	6005678	AQ18	486452	6004175	AQ29	485099	6006656
AQ8	486771	6005634	AQ19	485425	6004025	AQ30	485442	6006901
AQ9	486790	6005464	AQ20	485015	6003927	AQ31	485479	6006880
AQ10	486791	6004978	AQ21	484575	6003934	AQ32	485568	6006886
AQ11	486859	6004927	AQ22	484112	6004144	AQ33	485772	6006830

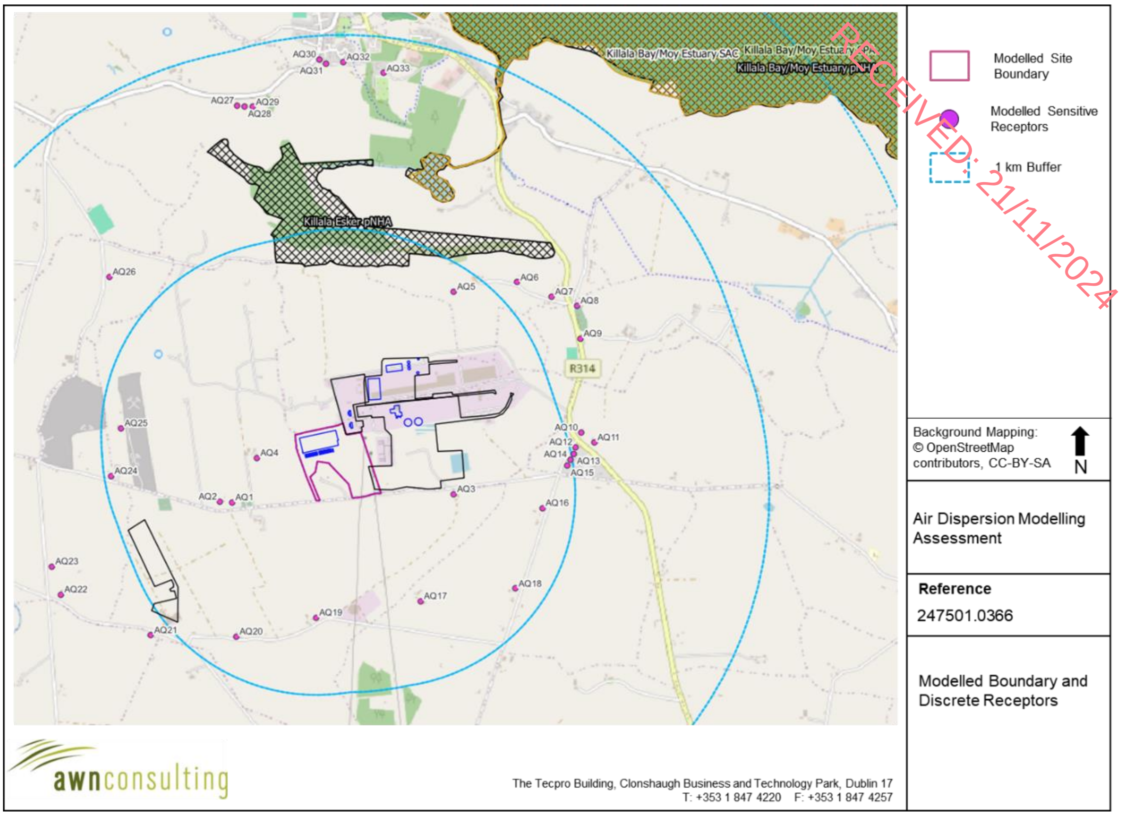

Figure 8.3 *Modelled Boundary and Discrete Receptors*

The following designated habitats within 20 km of the facility were modelled (at 0 m height) to determine the impact of emissions of NO_X and nitrogen and acid deposition (as N) on ambient ground level concentrations within the sites:

- **Natural Heritage Areas (NHA)** – Forrew Bog NHA, Inagh Bog NHA, Ummerantarry Bog NHA;
- **Proposed Natural Heritage Areas (pNHA)** – Bellacorick Bog Complex pNHA, Bellacorick Iron Flush pNHA, Benaderreen Cliffs pNHA, Cloonagh Lough (Mayo) pNHA, Creevagh Head pNHA, Downpatrick Head pNHA, Easky River pNHA, Glenamoy Bog Complex pNHA, Killala Bay/Moy Estuary pNHA, Killala Esker pNHA, Lackan Saltmarsh And Kilcummin Head pNHA, Lough Alick pNHA, Lough Conn And Lough Cullin pNHA, Lough Hoe Bog pNHA, Moy Valley pNHA, Ox Mountains Bogs pNHA;
- **Special Areas of Conservation (SAC)** – Bellacorick Bog Complex SAC, Bellacorick Iron Flush SAC, Glenamoy Bog Complex SAC, Killala Bay/Moy Estuary SAC, Lackan Saltmarsh and Kilcummin Head SAC, Lough Hoe Bog SAC, Ox Mountains Bogs SAC, River Moy SAC; and
- **Special Protection Area (SPA)** – Killala Bay/Moy Estuary SPA, Lough Conn and Lough Cullin SPA.

The closest designated habitats to the facility is the Killala Esker pNHA, which is 830 m north of the proposed development.

8.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

8.4.1 Construction Phase

The Proposed Development comprises the construction of a single data centre building along with all associated and ancillary development, sprinkler tank and pump house, and all associated works.

During the construction phase construction dust emission have the potential to affect air quality. Dust emissions will primarily occur as a result of site preparation works, earthworks and the movement of trucks on site and exiting the site. There is also the potential for engine emissions from site vehicles and machinery to affect air quality. Construction phase impacts will be short-term in duration.

8.4.2 Operational Phase

Engine emissions from vehicles accessing the site have the potential to affect air quality during the operational phase of the development through the release of nitrogen dioxide (NO_2) and particulate matter (as PM_{10} and $PM_{2.5}$).

Emissions of NO_2, PM_{10}, $PM_{2.5}$ and carbon monoxide (CO) from 25 no. standby backup generators have the potential to affect air quality during the operational phase of the development Operational phase effects will be long-term in duration.

8.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

8.5.1 Construction Phase

<u>8.5.1.1 Construction Dust Assessment</u>

The greatest potential impact on air quality during the construction phase of the Proposed Development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 250 m of a construction site, the majority of the deposition occurs within the first 50 m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Belmullet meteorological data indicates that the prevailing wind direction is westerly to south-westerly and wind speeds are generally moderate in nature (see Section 8.3.1). In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30 year average data for Belmullet meteorological station indicates that on average 256 days per year have rainfall over 0.2 mm (Met Éireann, 2023) and therefore it can be determined that 70% of the time dust generation will be reduced due to natural meteorological conditions.

In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (see Section 8.3.3). As per Section 8.2.2, the major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

Demolition

There are no demolition activities associated with the Proposed Development. Therefore, there is no demolition impact predicted as a result of the works.

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total site area > 110,000m^2, potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 6m in height;
- **Medium:** Total site area 18,000m^2 – 110,000m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 3m – 6m in height;
- **Small:** Total site area < 18,000m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 3m in height.

The dust emission magnitude for the proposed earthwork activities can be classified as **large** as the total construction site area will be more than 110,000m^2.

The sensitivity of the area, as determined in Section 8.3.3, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 8.15 and

Table **8.16**, combining the large dust emission magnitude with a low sensitivity to dust soiling and low sensitivity to human health impacts results in a low risk of dust soiling impacts and a low risk of dust-related human health impacts. This is as a result of the proposed earthworks activities in the absence of mitigation.

Table 8.15 *Criteria for Rating Risk of Dust Impacts – Earthworks (IAQM, 2024)*

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 8.16 *Risk of Dust Impacts – Earthworks*

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Earthworks	Risk of Dust-Related Impacts
Dust Soiling	Low	Large	Low Risk
Human Health	Low		Low Risk

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large**: Total building volume > 75,000 m^3, on-site concrete batching, sandblasting;
- **Medium:** Total building volume 12,000m^3 – 75,000 m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching;
- **Small:** Total building volume < 12,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude for the proposed construction activities can be classified as **large** as the total building volume is more than 75,000 m^3. As outlined in Table **8.17** and Table 8.18, combining the large dust emission magnitude with a low sensitivity to dust soiling and low sensitivity to human health impacts results in a low risk of dust soiling impacts and a low risk of dust-related human health impacts. This is as a result of the proposed construction activities in the absence of mitigation.

Table 8.17 *Criteria for Rating of Risk of Dust Impacts – Construction (IAQM, 2024)*

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 8.18 *Risk of Dust Impacts – Construction*

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Construction	Risk of Dust-Related Impacts
Dust Soiling	Low	Large	Low Risk
Human Health	Low		Low Risk

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100m;

- **Medium:** 20 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;
- **Small:** < 20 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

The dust emission magnitude for the proposed trackout can be classified as **large**, as at worst-case peak periods there will be more than 50 outward HGV movements per day. As outlined in Table 8.19 and Table 8.20, combining the large dust emission magnitude with a low sensitivity to dust soiling and low sensitivity to human health impacts results in an overall low risk of dust soiling impacts and a low risk of dust-related human health impacts. This is as a result of the proposed trackout activities in the absence of mitigation.

Table 8.19 *Criteria for Rating of Risk of Dust Impacts – Trackout (IAQM, 2024)*

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 8.20 *Risk of Dust Impacts – Trackout*

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Trackout	Risk of Dust-Related Impacts
Dust Soiling	Low	Large	Low Risk
Human Health	Low		Low Risk

<u>Summary of Dust Emission Risks</u>

The risk of dust impacts as a result of the Proposed Development are summarised in Table 8.21 for each activity. The magnitude of risk determined is used to prescribe the level of site-specific mitigation required for each activity in order to prevent significant impacts occurring.

There is at most a low risk of dust soiling and at most a low risk human health impacts associated with the proposed works. Best practice dust mitigation measures will be implemented to ensure there are no significant impacts at nearby sensitive receptors. In the absence of mitigation, dust impacts are predicted to be ***direct, short-term, negative*** and ***slight***, which is overall not significant in EIA terms.

Table 8.21 *Summary of Dust Impact Risk used to Define Site-Specific Mitigation*

Potential Impact	Dust Emission Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Emission Magnitude	N/A	Medium	Large	Large
Dust Soiling Risk	N/A	Low Risk	Low Risk	Low Risk
Human Health Risk	N/A	Low Risk	Low Risk	Low Risk

8.5.1.2 Construction Traffic Assessment

There is also the potential for traffic emissions to affect air quality in the short-term over the construction phase, particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as described in Section 8.2.2.

It can therefore be determined that the construction stage traffic will have a ***direct, short-term, negative*** and ***imperceptible*** impact on air quality, which is overall not significant in EIA terms.

8.5.2 Operational Phase

8.5.2.1 Operational Traffic Assessment

There is the potential for vehicles accessing the site to result in emissions of NO_2, PM_{10} and $PM_{2.5}$. The operational stage traffic has been reviewed and a detailed air quality assessment was scoped out for the operational stage of the development as per the TII screening criteria (see Section 8.2.3). Operational stage effects on air quality are predicted to be ***direct, long-term, negative*** and ***imperceptible,*** which is overall ***not significant*** in EIA terms.

8.5.2.2 Air Dispersion Model

NO_2

The NO_2 modelling results at the worst-case receptor (at the site boundary) are detailed in Table 8.22. The results indicate that the ambient ground level concentrations are in compliance with the relevant air quality standards for NO_2. For the worst-case year, emissions from the site lead to an ambient NO_2 concentration (including background) which is 74% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 87% of the annual limit value at the worst-case receptor (at the site boundary). The locations of the maximum concentrations for NO_2 are close to the boundary of the site with concentrations decreasing with distance from the facility.

The geographical variations in ground level NO_2 predicted environmental concentrations (PEC) concentrations beyond the facility boundary for the worst-case years modelled are illustrated as concentration contours in Figure 8.4 and Figure 8.5, to demonstrate the direction and extent of the emission plume.

In summary, emissions to atmosphere of NO_2 from the site will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health. The effect of proposed operations NO_2 emissions on air quality is considered ***direct, long-term, negative*** and ***not significant***, which is overall ***not significant*** in EIA terms.

Table 8.22 *Proposed Operations - Dispersion Model Results for Nitrogen Dioxide (NO_2)*

Pollutant / Year	Averaging Period	Process Contribution NO_2 (µg/m^3)	Background (µg/m^3)	Predicted Emission Concentration NO_2 (µg/m^3)	Limit Value (µg/m^3) Note 1	PEC as a % of Limit Value
NO_2 / 2019	Annual mean	29.0	5	34.0	40	85%

Pollutant / Year	**Averaging Period**	**Process Contribution NO_2 (µg/m³)**	**Background (µg/m³)**	**Predicted Emission Concentration NO_2 (µg/m³)**	**Limit Value (µg/m³)** Note 1	**PEC as a % of Limit Value**
	99.8th%ile of 1-hr means	138.8	10	148.8	200	74%
NO_2 / 2020	Annual mean	28.7	5	33.7	40	84%
	99.8th%ile of 1-hr means	124.1	10	134.1	200	67%
NO_2 / 2021	Annual mean	28.6	5	33.6	40	84%
	99.8th%ile of 1-hr means	125.2	10	135.2	200	68%
NO_2 / 2022	Annual mean	29.7	5	34.7	40	87%
	99.8th%ile of 1-hr means	116.9	10	126.9	200	63%
NO_2 / 2023	Annual mean	29.2	5	34.2	40	86%
	99.8th%ile of 1-hr means	125.8	10	135.8	200	68%

Note 1 Air Quality Standards 2022 (from EU Directive 2008/50/EC and S.I. 739 of 2022).

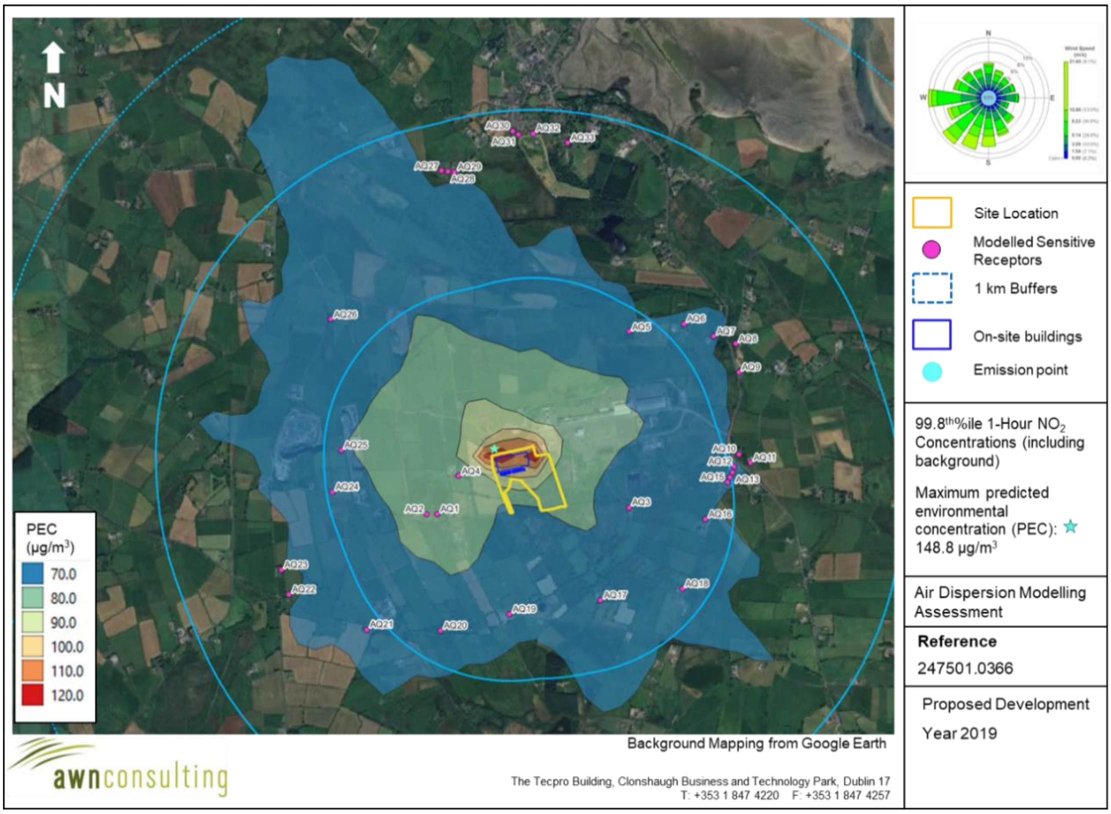

Figure 8.4 *Proposed Development - Maximum 1-Hour NO_2 Concentrations (as 99.8th%ile) (µg/m³)*

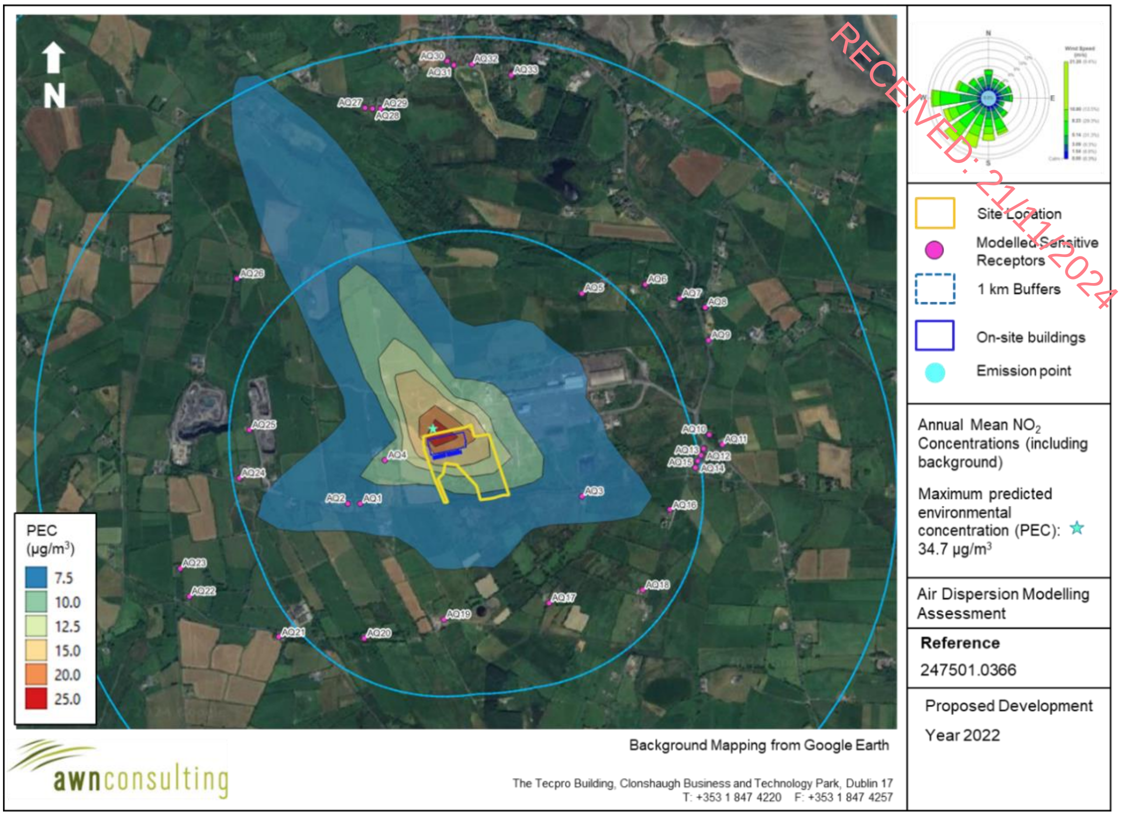

Figure 8.5 *Proposed Development - Annual Mean NO_2 Concentrations (µg/m³)*

Impact on Designated Habitat Sites

The ecological habitat site closest to and most impacted by the facility, and where the highest modelled concentrations are predicted, is the Killala Esker pNHA.

The NO_X modelling results are detailed in Table 8.23. Emissions from the facility lead to an ambient NO_X concentration (including background) which is at most 22% of the annual limit value the worst-case location within the most impacted ecological habitat site over the five years of meteorological data modelled. The effects of NO_X on designated sites due to the proposed operations of the facility are ***direct, long-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

Table 8.23 *NO_X Designated Habitat Dispersion Model Results – Proposed Development*

Pollutant / Year	Averaging Period	Process Contribution (PC) NO_X (µg/m3)	Background (µg/m³)	Predicted Emission Concentration (PEC) NO_X (µg/m3)	Limit Value (µg/m³)	PEC as a % of Limit Value
NO_X / 2019	Annual mean	4.55	1.7	6.25	30	21%
NO_X / 2020	Annual mean	4.88	1.7	6.58	30	22%
NO_X / 2021	Annual mean	4.74	1.7	6.44	30	21%
NO_X / 2022	Annual mean	3.80	1.7	5.50	30	18%
NO_X / 2023	Annual mean	4.70	1.7	6.40	30	21%

In order to consider the effects of nitrogen and acid deposition (as N) owing to emissions from the facility on the designated habitat sites, the maximum annual mean NO_2 predicted environmental concentrations are converted into the dry deposition fluxes and then nitrogen and acid deposition (as N) fluxes (as described in Section 8.2.3.2 *Designated Habitat Sites*) and shown in

Table **8.24** and Table 8.25.

The nitrogen deposition flux for the worst-case year is 4.837 kg/ha/yr, shown in

Table **8.24**, and is below the range in worst-case critical loads of 5-10 kg/ha/yr (APIS, 2023) for the various habitat types (calcareous grassland, *vertigo angustior*, estuaries, Atlantic salt meadows (*glauco-puccinellietalia maritimae*), embryonic shifting dunes, shifting dunes along the shoreline with *ammophila arenaria* (white dunes), fixed coastal dunes with herbaceous vegetation (grey dunes), humid dune slacks) in the Killala Esker pNHA, indicating that the effects of nitrogen deposition on designated sites due to the proposed operations of the facility are ***direct, long-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

Table 8.24 *Nitrogen Deposition Designated Habitat Dispersion Model Results – Proposed Development*

Year	NO_2 Annual Mean PC (µg/m3)	Dry Deposition Flux (µg/m²/s)	PC Nitrogen Deposition Flux (kg/ha/year)	APIS Background Nitrogen Deposition (kg/ha/yr)	PEC Nitrogen Deposition kg/ha/yr
2019	2.38	0.0036	0.342	4.4	4.742
2020	2.53	0.0038	0.363	4.4	4.763
2021	2.76	0.0041	0.397	4.4	4.797
2022	3.04	0.0046	0.437	4.4	4.837
2023	2.40	0.0036	0.346	4.4	4.746

The acid deposition (as N) flux for the worst-case year is 0.331 keq/ha/yr, shown in Table 8.25, and is below the worst case maximum critical load range of 0.714 – 5.589 keq/ha/yr for the various habitat types (*vertigo angustior*, *petromyzon marinus*, fixed coastal dunes with herbaceous vegetation (grey dunes), humid dune slacks) in the Killala Esker pNHA (APIS, 2023), indicating that the effects of acid deposition (as N) on designated sites due to the proposed operations of the facility are ***direct, long-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

Table 8.25 *Acid Deposition Designated Habitat Dispersion Model Results – Proposed Development*

Year	NO_2 Annual Mean PC (µg/m3)	Dry Deposition Flux (µg/m²/s)	PC Acid Deposition keq/ha/yr	APIS Background Acid Deposition (keq/ha/yr)	PEC Acid Deposition (as N) keq/ha/yr)
2019	2.38	0.0036	0.024	0.3	0.324
2020	2.53	0.0038	0.026	0.3	0.326
2021	2.76	0.0041	0.028	0.3	0.328
2022	3.04	0.0046	0.031	0.3	0.331
2023	2.40	0.0036	0.025	0.3	0.325

PM₁₀

Ambient Ground Level Concentrations (GLCs) of PM_{10} have been predicted below in

Table **8.26**. The results indicate that the ambient ground level concentrations are below the relevant air quality standards for all modelled years for PM_{10}. For the worst-case year, emissions from the site lead to an ambient PM_{10} concentration (including background) which is 41% of the maximum ambient 24-hour limit value (measured as a 90.4th%ile) at the worst-case receptor and 29% of the annual limit value at the worst-case receptor.

In summary, emissions to atmosphere of PM_{10} from the site will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health. Therefore, the effect of the Do Nothing scenario on air quality is predicted to be ***direct, long-term, negative*** and ***not significant***, which is overall ***not significant*** in EIA terms

The geographical variation in the 24-hour mean (90.4th%ile) ground level process contribution (PC) concentrations and annual mean PM_{10} ground level predicted environmental (PEC) concentrations are illustrated as concentration contours in Figure 8.6 and Figure 8.7, to demonstrate the direction and extent of the emission plume.

The 24-hour mean PM_{10} predicted environmental concentration contours is not displayed in Figure 8.6 due to the methodology for calculating the PEC. This is calculated in line with guidance from the UK DEFRA (2022) and EPA (2020), explained in detail in Section 8.3.2.2, which states that the 90.4th%ile of 24-hour mean PM_{10} is equal to the maximum of either A or B below:

a) 90.4th%ile of 24-hour mean background PM_{10} + annual mean process contribution PM_{10}

b) 90.4th%ile 24-hour mean process contribution PM_{10} + annual mean background PM_{10}

Calculating the 24-hour mean (90.4th%ile) PM_{10} PEC using the above two methods results in a maximum PEC based on method A. This is presented in

Table **8.26**. Therefore, a contour plot of the 24-hour mean (90.4^{th}%ile) PEC would be based on the annual mean rather than demonstrate the plume behaviour of the 24-hour mean (90.4^{th}%ile) process contribution.

Table 8.26 *Proposed Development – Dispersion Model Results for Particulate Matter (PM_{10})*

Pollutant / Year	**Averaging Period**	**Process Contribution (µg/m³)**	**Background (µg/m³)**	**Predicted Environmental Concentration (µg/m³) Note 2**	**Limit Value (µg/m³) Note 1**	**PEC as % of Limit Value**
PM_{10} / 2019	Annual Mean	0.29	11	11.29	40	28%
	90.4th%ile of 24-hr means	0.91	20	20.29	50	41%
PM_{10} / 2020	Annual Mean	0.31	11	11.31	40	28%
	90.4th%ile of 24-hr means	0.87	20	20.31	50	41%
PM_{10} / 2021	Annual Mean	0.28	11	11.28	40	28%
	90.4th%ile of 24-hr means	0.83	20	20.28	50	41%
PM_{10} / 2022	Annual Mean	0.49	11	11.49	40	29%
	90.4th%ile of 24-hr means	0.52	20	20.49	50	41%
PM_{10} / 2023	Annual Mean	0.30	11	11.30	40	28%
	90.4th%ile of 24-hr means	0.85	20	20.30	50	41%

Note 1 Air Quality Standards 2022 (from EU Directive 2008/50/EC and S.I. 739 of 2022)

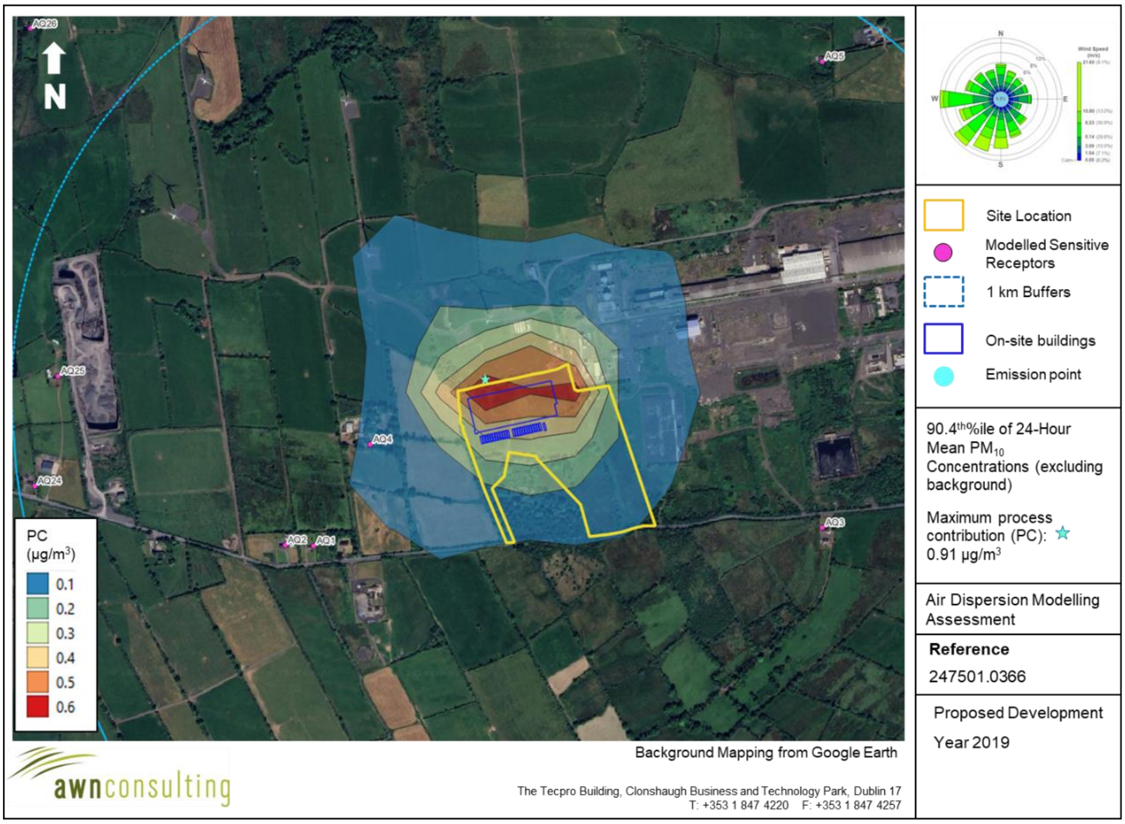

Figure 8.6 *Proposed Development – Maximum 24-Hour PM_{10} Concentration (µg/m³)*

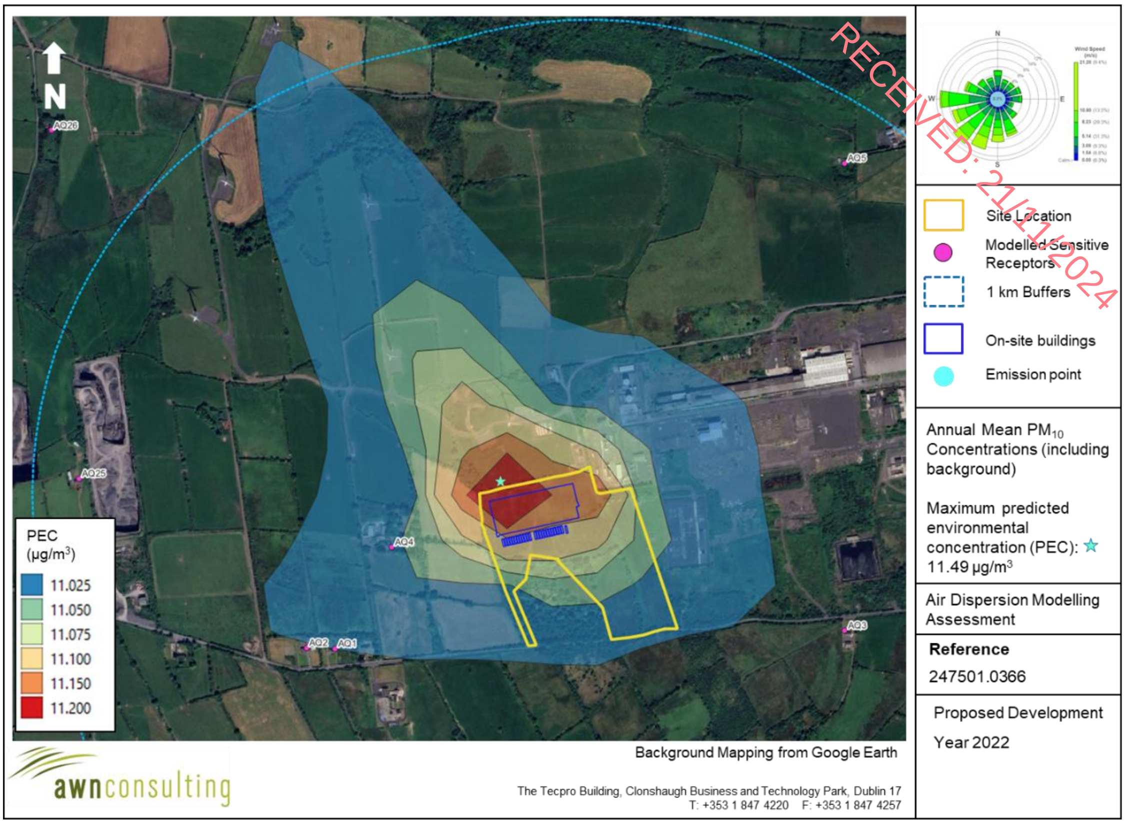

Figure 8.7 *Proposed Development – Annual Mean PM_{10} Concentration (µg/m³)*

$PM_{2.5}$

The $PM_{2.5}$ modelling results are detailed in Table 8.27. These are derived from a worst-case assumption that all PM_{10} emissions from the facility are of a particle size of 2.5 microns or less ($PM_{2.5}$). This assumption is necessitated due to the lack of availability of $PM_{2.5}$ emission concentration data for emission sources and therefore $PM_{2.5}$ emissions could not be directly modelled. In reality, particles greater than 2.5 microns will also be present and thus the mass of $PM_{2.5}$ released has been overestimated.

For the worst-case year, ambient concentrations (including background) will be 34% of the annual mean $PM_{2.5}$ limit value of 25 µg/m³ or 42% of the Stage 2 annual mean limit value of 20 µg/m³ at the worst-case receptor. As the annual mean $PM_{2.5}$ concentrations have been conservatively assumed equal to the annual mean PM_{10} concentrations, the direction and extent of the emission plume is identical to that shown in Figure 8.7.

In summary, emissions to atmosphere of $PM_{2.5}$ from the site will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health. Therefore, the effect of the Proposed Development on air quality is predicted to be ***direct, long-term, negative*** and ***not significant***, which is overall ***not significant*** in EIA terms.

Table 8.27 *Proposed Development – Dispersion Model Results for Particulate Matter ($PM_{2.5}$)*

Pollutant / Year	**Averaging Period**	**Process Contribution (µg/m³)**	**Background (µg/m³)**	**Predicted Environmental Concentration (µg/m³)**	**Limit Value (µg/m³) Note 1**	**PEC as % of Limit Value**
$PM_{2.5}$ / 2019	Annual Mean	0.29	8	8.29	25	33%
$PM_{2.5}$ / 2020	Annual Mean	0.31	8	8.31	25	33%
$PM_{2.5}$ / 2021	Annual Mean	0.28	8	8.28	25	33%
$PM_{2.5}$ / 2022	Annual Mean	0.49	8	8.49	25	34%
$PM_{2.5}$ / 2023	Annual Mean	0.30	8	8.30	25	33%

Note 1 Air Quality Standards 2022 (from EU Directive 2008/50/EC and S.I. 739 of 2022)

CO

The CO modelling results at the worst-case receptor are detailed in

Table **8.28**. The results indicate that the ambient ground level concentrations are in compliance with the relevant air quality standards for CO. For the worst-case year, emissions from the site lead to an ambient CO concentration (including background) which is 39% of the maximum ambient 8-hour limit value at the worst-case receptor. The locations of the maximum concentrations for CO are close to the boundary of the site with concentrations decreasing with distance from the facility.

The geographical variations in ground level CO predicted environmental concentrations (PEC) beyond the facility boundary for the worst-case year modelled are illustrated as concentration contours in Figure 8.8, to demonstrate the direction and extent of the emission plume.

In summary, emissions to atmosphere of CO from the site will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health. The effect of proposed operations CO emissions on air quality is considered direct, long-term, negative and not significant, which is overall not significant in EIA terms.

Table 8.28 *Proposed Operations – Dispersion Model Results for Carbon Monoxide (CO)*

Pollutant / Year	Averaging Period	Process Contribution (mg/m³)	Back-ground (mg/m³)	Predicted Environmental Concentration (mg/m³)	Limit Value (mg/m³) Note 1	PEC as a % of Limit Value
CO / 2019	Maximum 8-Hour	0.39	3.4	3.79	10	38%
CO / 2020	Maximum 8-Hour	0.36	3.4	3.76	10	38%
CO / 2021	Maximum 8-Hour	0.25	3.4	3.65	10	37%
CO / 2022	Maximum 8-Hour	0.49	3.4	3.89	10	39%
CO / 2023	Maximum 8-Hour	0.37	3.4	3.77	10	38%

Note 1 Air Quality Standards 2022 (from EU Directive 2008/50/EC and S.I. 739 of 2022)

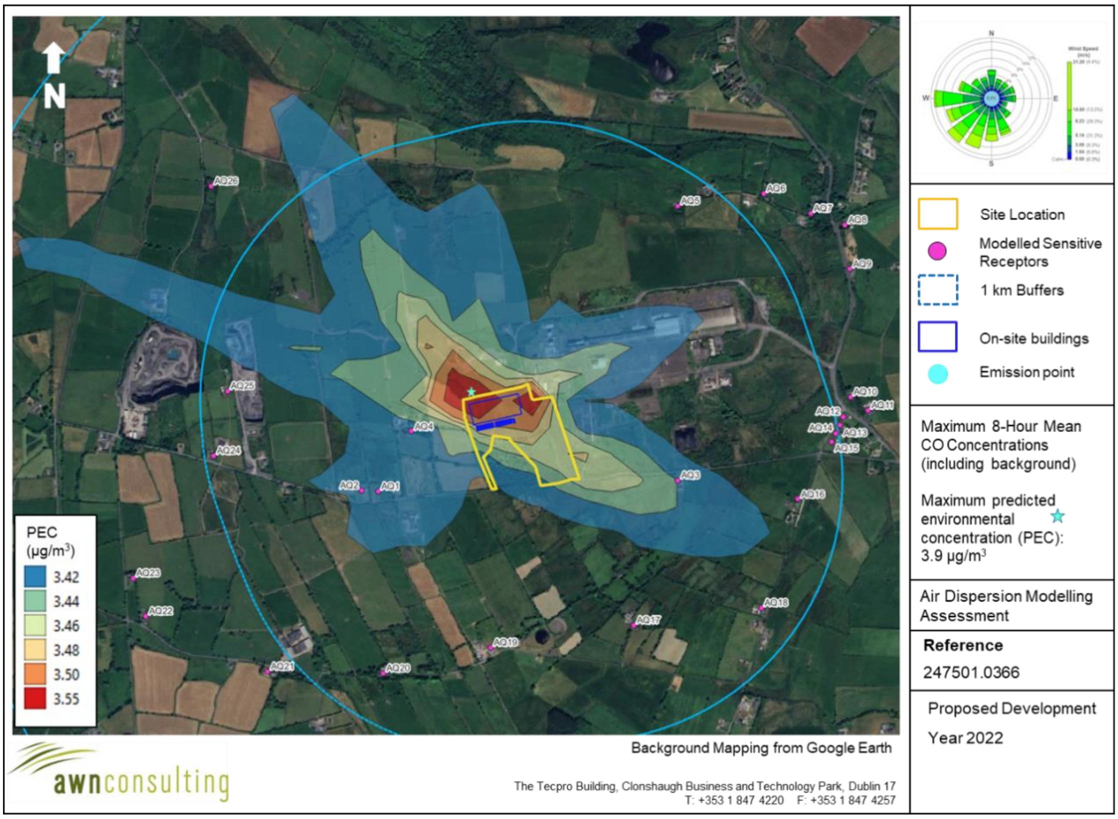

Figure 8.8 *Proposed Operations – Maximum 8-Hour CO Concentrations (mg/m³)*

8.6 MITIGATION MEASURES

8.6.1 Construction Phase

The proposed development has been assessed as having a low risk of dust soiling impacts and a low risk of dust related human health impacts during the construction phase as a result of earthworks, construction and trackout activities (see Section 8.3.3).

Therefore, the following dust mitigation measures shall be implemented during the construction phase of the proposed development. These measures are appropriate for sites with a low risk of dust impacts and aim to ensure that no significant nuisance occurs at nearby sensitive receptors.

The mitigation measures draw on best practice guidance from Ireland, *Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition* (DCC, 2018), the UK, *Guidance on the Assessment of Dust from Demolition and Construction Version 2.2* (IAQM, 2024), *Controlling Particles, Vapours & Noise Pollution from Construction Sites* (BRE, 2003), *Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings* (The Scottish Office, 1996), *Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance* (ODPM, 2002)) and the USA, *Fugitive Dust Technical Information Document for the Best Available Control Measures* (USEPA, 1997). These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared for the site. The measures are divided into different categories for different activities.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details.

Site Management

- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions. Dry and windy conditions are favourable to dust suspension therefore mitigations must be implemented if undertaking dust generating activities during these weather conditions.
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out. Make the complaints log available to the local authority when requested.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 250m of the site boundary where feasible, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

- A speed restriction of 15 kph will be applied as an effective control measure for dust for on-site vehicles.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Monitoring

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary. Carry out regular site inspections to monitor compliance with the CEMP, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Where possible commence baseline monitoring at least three months before work commences on this phase of the development. Refer to Section 8.7.1 for more detail on this monitoring.

8.6.2 Operational Phase

There is no mitigation required for the operational phase of the development as effects on air quality are predicted to be ***direct, long-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

8.7 MONITORING OR REINSTATEMENT MEASURES

8.7.1 Construction Phase

During working hours, dust control methods will be monitored as appropriate depending on the prevailing meteorological conditions as outlined in Section 6.

Monitoring of construction dust deposition at nearby sensitive receptors during the construction phase of the proposed development will be carried out to ensure mitigation measures are working satisfactorily. This will be done using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. Dust deposition monitoring will be carried out on a monthly basis (between 28 - 32 days) for at least one month (ideally three months) in order to capture baseline conditions pre enabling works, as well as for the duration of the enabling works and construction period. An independent contractor will be appointed to carry out this monitoring. The TA Luft limit value is 350 mg/m^2/day during this monitoring period. Following the laboratory analysis of the monthly monitoring samples (typically 15 day turnaround), results will be reported on a monthly basis. If requested by Limerick City and County Council this monitoring report will be made available. If dust deposition rates exceed 350 mg/m^2/day, Limerick City County Council will be notified of any exceedance within 24 hours. In the event of an exceedance the procedures, site activities and appropriate application of dust mitigation measures will be reviewed in consultation with Limerick City and County Council and improved to achieve a level below 350 mg/m^2/day in future monitoring.

8.7.2 Operational Phase

There is no proposed monitoring during the operational phase.

8.8 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

8.8.1 Construction Phase

In order to minimise dust emissions during construction, a series of mitigation measures have been prepared. Once the dust minimisation measures outlined in Section 8.6.1 are implemented, the effect of the proposed development in terms of dust soiling will be ***direct, short-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

Best practice mitigation measures are proposed for the construction phase of the proposed development, which will focus on the proactive control of dust and other air pollutants, to minimise generation of emissions at source. The mitigation measures that will be put in place during construction will ensure that the impact complies with all EU ambient air quality legislative limit values, which are based on the protection of human health (see Table 8.1). Therefore, the predicted residual, dust-related, human health effect of the construction phase of the proposed development is ***direct, short-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

A detailed air quality assessment of the construction stage traffic has been scoped out (as per Section 8.2.2.1) and it can therefore be determined that the construction stage traffic will have a residual ***direct, short-term, negative*** and ***not significant*** effect on air quality, which is overall not significant in EIA terms.

8.8.1.1 Risk to Human Health

Dust emissions from the construction phase of the proposed development have the potential to affect human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Section 8.4.3, the surrounding area is of low sensitivity to dust related human health impacts. It was determined that there is an overall low risk of dust related human health effects as a result of the construction phase of the proposed development.

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the residual effect of the construction phase of the proposed development is likely to be ***direct, short-term, negative*** and ***not significant*** with respect to human health, which is overall not significant in EIA terms.

8.8.2 Operational Phase

A detailed air quality assessment of the construction stage traffic has been scoped out (as per Section 8.2.3.1) and it can therefore be determined that the operational stage traffic will have a residual ***direct, long-term, negative*** and ***not significant*** effect on air quality, which is overall not significant in EIA terms.

Emissions of air pollutants during the operational phase are predicted to be significantly below the ambient air quality standards, which are based on the protection of human health. Therefore, residual effects on human health related to air quality will be ***direct, long-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

8.8.2.1 Risk to Human Health

Emissions of air pollutants during the operational phase are predicted to be significantly below the ambient air quality standards, which are based on the protection of human health. Therefore, residual effects to human health related to air quality will be ***direct, long-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

8.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

8.9.1 Construction Phase

According to the IAQM guidance (IAQM, 2024) should the construction phase of the proposed development coincide with the construction phase of any other development within 500m then there is the potential for cumulative construction dust impacts. A review of relevant planning applications and projects listed in Chapter 2 Description of Proposed Development of the EIAR within 1km of the site was conducted in order to identify sites with the potential for cumulative impacts.

The proposed development has been assessed as having at most a low risk of dust soiling and a low risk of human health impacts during the construction phase. A number of mitigation measures have been proposed in order to ensure significant dust impacts do not occur. However, provided the mitigation measures outlined in Section 8.6, are implemented throughout the construction phase of the proposed development significant cumulative dust impacts are not predicted. Impacts are predicted to be

direct, short-term, negative and ***not significant***, which is overall not significant in EIA terms.

8.9.2 Operational Phase

The traffic data supplied for the operational phase assessment included data for cumulative development within the area. The traffic was reviewed and a detailed air quality assessment of vehicle exhaust emissions was scoped out as there were no receptors within 200m of the affected road links (see Section 8.5.2). The effect on air quality during the operational phase of the proposed development, including the cumulative effect, will be ***direct, long-term, negative*** and ***imperceptible,*** which is overall ***not significant*** in EIA terms***.***

8.9.2.1 Air Dispersion Model

NO_2

The NO_2 modelling results at the worst-case receptor (at the site boundary) are detailed in

Table 8.29. The results indicate that the ambient ground level concentrations are in compliance with the relevant air quality standards for NO_2. For the worst-case year, emissions from the site lead to an ambient NO_2 concentration (including background) which is 74% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 91% of the annual limit value at the worst-case receptor (at the site boundary). The locations of the maximum concentrations for NO_2 are close to the boundary of the site with concentrations decreasing with distance from the facility.

The geographical variations in ground level NO_2 predicted environmental concentrations (PEC) concentrations beyond the facility boundary for the worst-case years modelled are illustrated as concentration contours in Figure 8.9 and Figure 8.10, to demonstrate the direction and extent of the emission plume.

In summary, emissions to atmosphere of NO_2 from the site will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health. The effect of cumulative NO_2 emissions on air quality is considered ***direct, long-term, negative*** and ***not significant***, which is overall ***not significant*** in EIA terms.

***Table 8.29** Cumulative - Dispersion Model Results for Nitrogen Dioxide (NO_2)*

Pollutant / Year	Averaging Period	Process Contribution NO2 (µg/m3)	Background (µg/m3)	Predicted Emission Concentration NO2 (µg/m3)	Limit Value (µg/m³) Note 1	PEC as a % of Limit Value
NO_2 / 2019	Annual mean	30.5	5	35.5	40	89%
	99.8th%ile of 1-hr means	138.8	10	148.8	200	74%
NO_2 / 2020	Annual mean	31.4	5	36.4	40	91%
	99.8th%ile of 1-hr means	126.7	10	136.7	200	68%
NO_2 / 2021	Annual mean	30.3	5	35.3	40	88%
	99.8th%ile of 1-hr means	125.2	10	135.2	200	68%
NO_2 / 2022	Annual mean	30.4	5	35.4	40	88%
	99.8th%ile of 1-hr means	116.9	10	126.9	200	63%
NO_2 / 2023	Annual mean	30.9	5	35.9	40	90%
	99.8th%ile of 1-hr means	125.8	10	135.8	200	68%

Note 1 Air Quality Standards 2022 (from EU Directive 2008/50/EC and S.I. 739 of 2022).

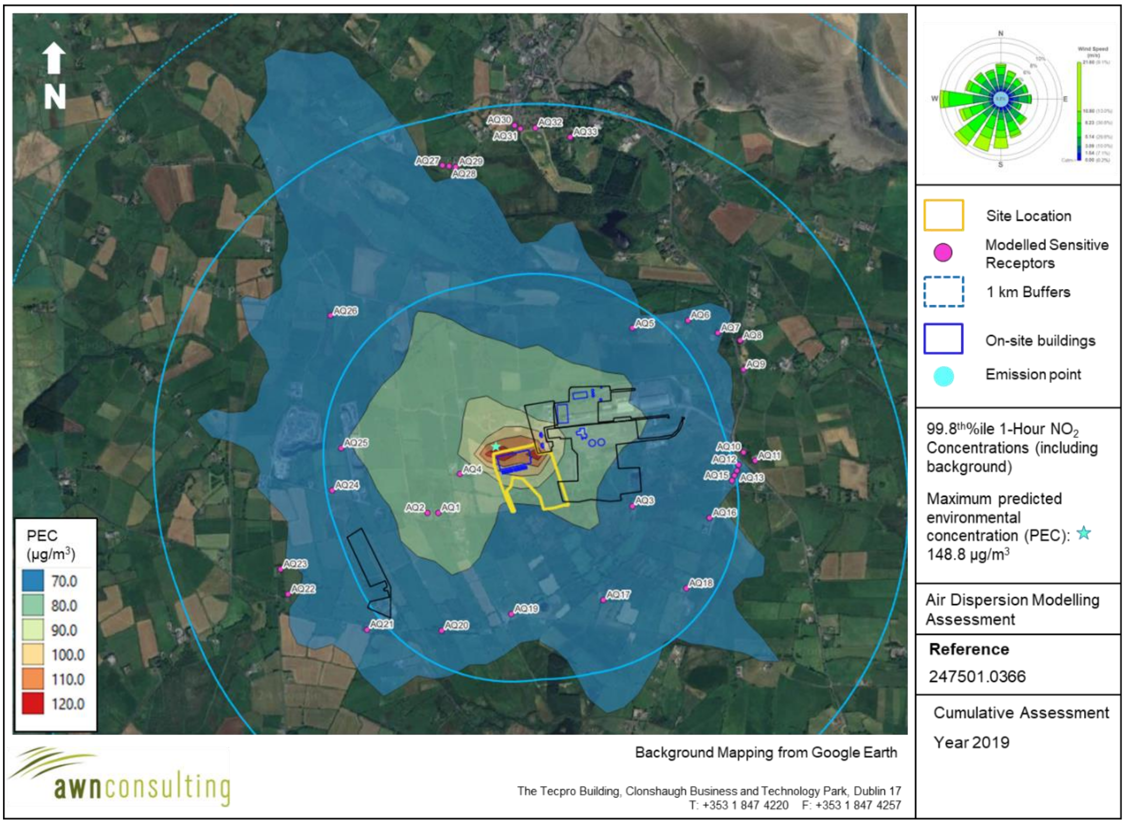

Figure 8.9 *Cumulative - Maximum 1-Hour NO_2 Concentrations (as 99.8th%ile) (µg/m³)*

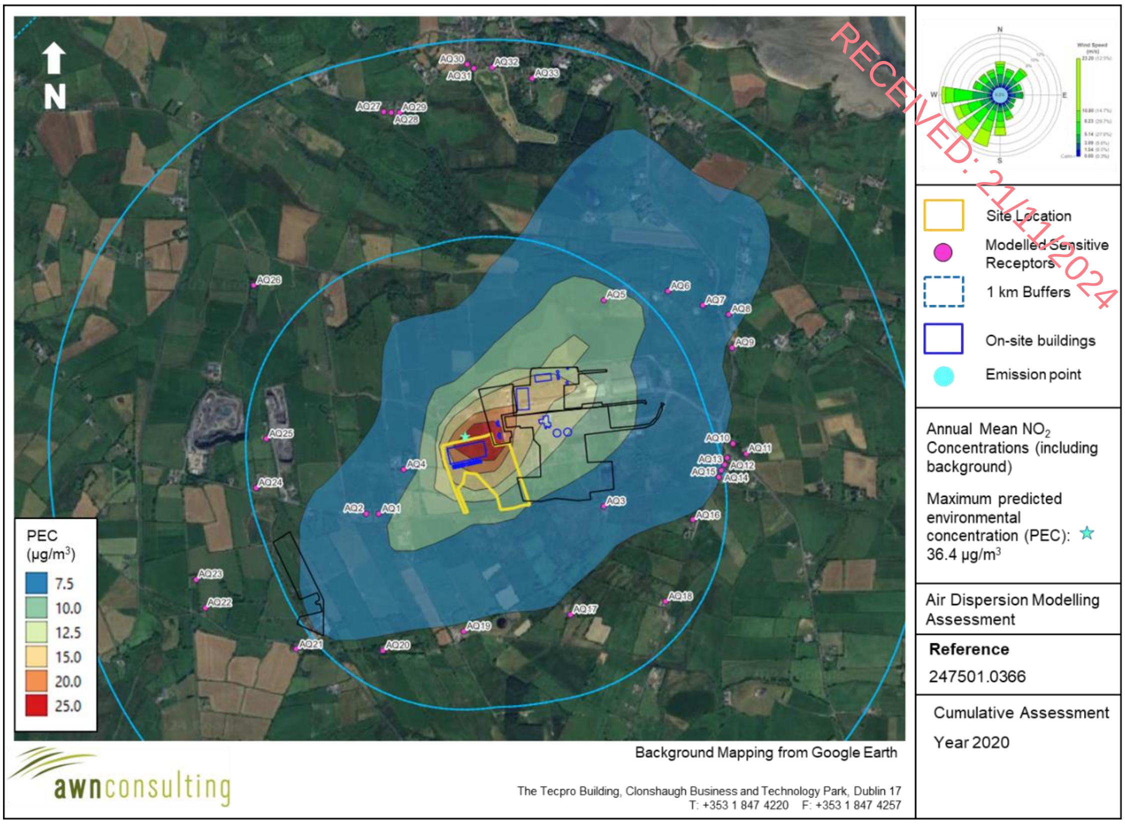

Figure 8.10 *Cumulative - Annual Mean NO_2 Concentrations (µg/m³)*

<u>Impact on Designated Habitat Sites</u>

The ecological habitat site closest to and most impacted by the facility, and where the highest modelled concentrations are predicted, is the Killala Esker pNHA.

The NO_X modelling results are detailed in

Table **8.30**. Emissions from the facility lead to an ambient NO_X concentration (including background) which is at most 22% of the annual limit value the worst-case location within the most impacted ecological habitat site over the five years of meteorological data modelled. The effects of NO_X on designated sites due to the facility in combination with the nearby IE licenced installation are ***direct, long-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

Table 8.30 *NO_X Designated Habitat Dispersion Model Results – Cumulative*

Pollutant / Year	Averaging Period	Process Contribution (PC) NO_X (μg/m3)	Background (μg/m^3)	Predicted Emission Concentration (PEC) NO_X (μg/m3)	Limit Value (μg/m^3)	PEC as a % of Limit Value
NO_X / 2019	Annual mean	4.55	1.7	6.25	30	21%
NO_X / 2020	Annual mean	4.88	1.7	6.58	30	22%
NO_X / 2021	Annual mean	4.74	1.7	6.44	30	21%
NO_X / 2022	Annual mean	3.80	1.7	5.50	30	18%
NO_X / 2023	Annual mean	4.70	1.7	6.40	30	21%

In order to consider the effects of nitrogen and acid deposition (as N) owing to emissions from the facility on the designated habitat sites, the maximum annual mean NO_2 predicted environmental concentrations are converted into the dry deposition fluxes and then nitrogen and acid deposition (as N) fluxes (as described in Section 8.2.3.2 *Designated Habitat Sites*) and shown in Table 8.31 and Table 8.32.

The nitrogen deposition flux for the worst-case year is 5.032 kg/ha/yr, shown in Table 8.31, and is within the range in worst-case critical loads of 5-10 kg/ha/yr (APIS, 2023) for the various habitat types (calcareous grassland, *vertigo angustior*, estuaries, Atlantic salt meadows (*glauco-puccinellietalia maritimae*), embryonic shifting dunes, shifting dunes along the shoreline with *ammophila arenaria* (white dunes), fixed coastal dunes with herbaceous vegetation (grey dunes), humid dune slacks) in the Killala Esker pNHA, indicating that the effects of nitrogen deposition on designated sites due to the facility in combination with the nearby IE licenced installation are ***direct, long-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

Table 8.31 *Nitrogen Deposition Designated Habitat Dispersion Model Results – Cumulative*

Year	NO_2 Annual Mean PC (μg/m3)	Dry Deposition Flux (μg/m^2/s)	PC Nitrogen Deposition Flux (kg/ha/year)	APIS Background Nitrogen Deposition (kg/ha/yr)	PEC Nitrogen Deposition kg/ha/yr
2019	4.09	0.0061	0.589	4.4	4.989
2020	4.40	0.0066	0.632	4.4	5.032
2021	4.26	0.0064	0.614	4.4	5.014
2022	3.41	0.0051	0.491	4.4	4.891
2023	4.23	0.0063	0.608	4.4	5.008

The acid deposition (as N) flux for the worst-case year is 0.345 keq/ha/yr, shown in Table 8.32, and is below the worst case maximum critical load range of 0.714 – 5.589 keq/ha/yr for the various habitat types (*vertigo angustior*, *petromyzon marinus*, fixed coastal dunes with herbaceous vegetation (grey dunes), humid dune slacks) in the Killala Esker pNHA (APIS, 2023), indicating that the effects of acid deposition (as N) on designated sites due to the facility in combination with the nearby IE licenced installation are ***direct, long-term, negative*** and ***not significant***, which is overall not significant in EIA terms.

Table 8.32 *Acid Deposition Designated Habitat Dispersion Model Results – Cumulative*

Year	NO_2 Annual Mean PC (µg/m3)	Dry Deposition Flux (µg/m²/s)	PC Acid Deposition keq/ha/yr	APIS Background Acid Deposition (keq/ha/yr)	PEC Acid Deposition (as N) keq/ha/yr)
2019	4.09	0.0061	0.042	0.3	0.342
2020	4.40	0.0066	0.045	0.3	0.345
2021	4.26	0.0064	0.044	0.3	0.344
2022	3.41	0.0051	0.035	0.3	0.335
2023	4.23	0.0063	0.043	0.3	0.343

PM<u>10</u>

Ambient Ground Level Concentrations (GLCs) of PM_{10} have been predicted below in

Table 8.33. The results indicate that the ambient ground level concentrations are below the relevant air quality standards for all modelled years for PM_{10}. For the worst-case year, emissions from the site lead to an ambient PM_{10} concentration (including background) which is 41% of the maximum ambient 24-hour limit value (measured as a 90.4th%ile) at the worst-case receptor and 29% of the annual limit value at the worst-case receptor.

In summary, emissions to atmosphere of PM_{10} from the site will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health. Therefore, the effect of the cumulative scenario on air quality is predicted to be ***direct, long-term, negative*** and ***not significant***, which is overall ***not significant*** in EIA terms

The geographical variation in the 24-hour mean (90.4th%ile) ground level process contribution (PC) concentrations and annual mean PM_{10} ground level predicted environmental (PEC) concentrations are illustrated as concentration contours in Figure 8.11 and Figure 8.12, to demonstrate the direction and extent of the emission plume.

The 24-hour mean PM_{10} predicted environmental concentration contours is not displayed in Figure 8.6 due to the methodology for calculating the PEC. This is calculated in line with guidance from the UK DEFRA (2022) and EPA (2020), explained in detail in Section 8.3.2.2, which states that the 90.4th%ile of 24-hour mean PM_{10} is equal to the maximum of either A or B below:

c) 90.4th%ile of 24-hour mean background PM_{10} + annual mean process contribution PM_{10}

d) 90.4th%ile 24-hour mean process contribution PM_{10} + annual mean background PM_{10}

Calculating the 24-hour mean (90.4th%ile) PM10 PEC using the above two methods results in a maximum PEC based on method A. This is presented in

Table 8.33. Therefore, a contour plot of the 24-hour mean (90.4th%ile) PEC would be based on the annual mean rather than demonstrate the plume behaviour of the 24-hour mean (90.4th%ile) process contribution.

Table 8.33 *Cumulative - Dispersion Model Results for Particulate Matter (PM_{10})*

Pollutant / Year	Averaging Period	Process Contribution ($\mu g/m^3$)	Background ($\mu g/m^3$)	Predicted Environmental Concentration ($\mu g/m^3$) Note 2	Limit Value ($\mu g/m^3$) Note 1	PEC as % of Limit Value
PM_{10} / 2019	Annual Mean	0.33	11	11.33	40	28%
	90.4th%ile of 24-hr means	0.96	20	20.33	50	41%
PM_{10} / 2020	Annual Mean	0.32	11	11.32	40	28%
	90.4th%ile of 24-hr means	0.86	20	20.32	50	41%
PM_{10} / 2021	Annual Mean	0.31	11	11.31	40	28%
	90.4th%ile of 24-hr means	0.83	20	20.31	50	41%
PM_{10} / 2022	Annual Mean	0.49	11	11.49	40	29%
	90.4th%ile of 24-hr means	0.52	20	20.49	50	41%
PM_{10} / 2023	Annual Mean	0.35	11	11.35	40	28%
	90.4th%ile of 24-hr means	0.99	20	20.35	50	41%

Note 1 Air Quality Standards 2022 (from EU Directive 2008/50/EC and S.I. 739 of 2022)

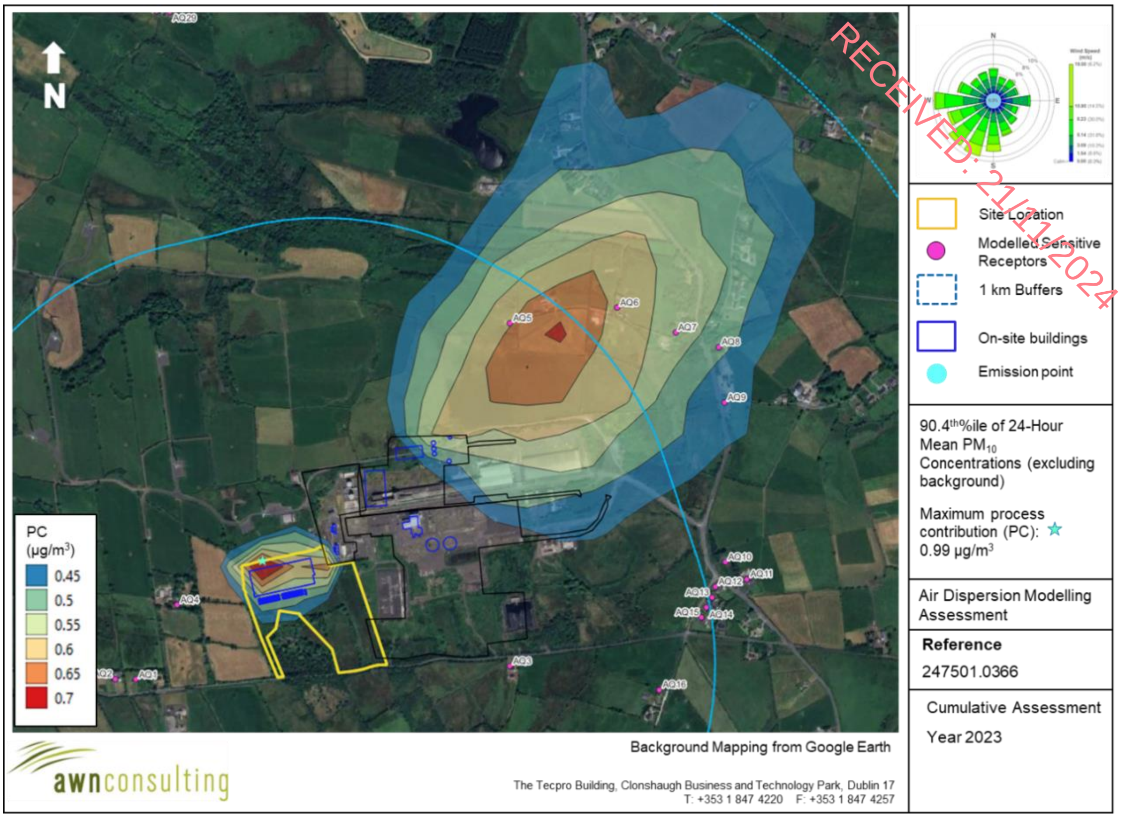

Figure 8.11 *Cumulative - Maximum 24-Hour PM_{10} Concentration (µg/m³)*

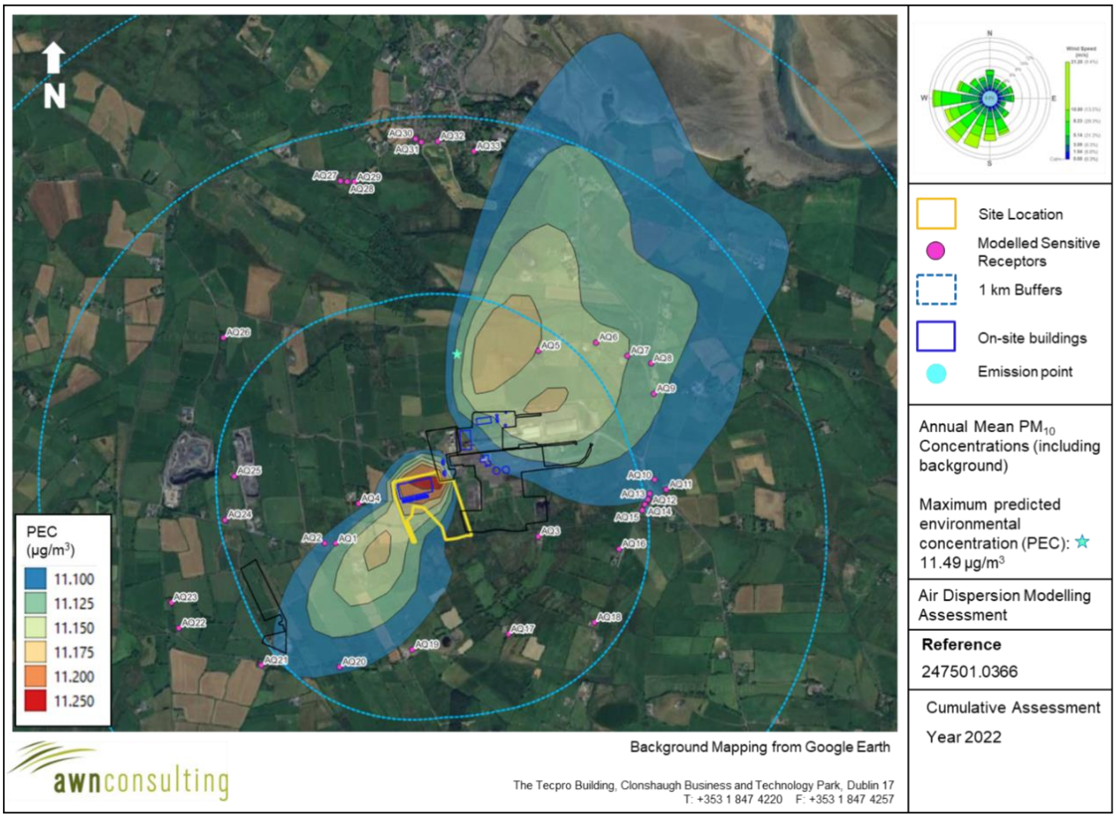

Figure 8.12 *Cumulative - Annual Mean PM_{10} Concentration (µg/m³)*

<u>$PM_{2.5}$</u>

The $PM_{2.5}$ modelling results are detailed in

Table 8.34. These are derived from a worst-case assumption that all PM_{10} emissions from the facility are of a particle size of 2.5 microns or less ($PM_{2.5}$). This assumption is necessitated due to the lack of availability of $PM_{2.5}$ emission concentration data for emission sources and therefore $PM_{2.5}$ emissions could not be directly modelled. In reality, particles greater than 2.5 microns will also be present and thus the mass of $PM_{2.5}$ released has been overestimated.

For the worst-case year, ambient concentrations (including background) will be 34% of the annual mean $PM_{2.5}$ limit value of 25 µg/m^3 or 42% of the Stage 2 annual mean limit value of 20 µg/m^3 at the worst-case receptor. As the annual mean $PM_{2.5}$ concentrations have been conservatively assumed equal to the annual mean PM_{10} concentrations, the direction and extent of the emission plume is identical to that shown in Figure 8.12.

In summary, emissions to atmosphere of $PM_{2.5}$ from the site will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health. Therefore, the effect of the cumulative scenario on air quality is predicted to be ***direct, long-term, negative*** and ***not significant***, which is overall ***not significant*** in EIA terms.

Table 8.34 *Cumulative - Dispersion Model Results for Particulate Matter ($PM_{2.5}$)*

Pollutant / Year	Averaging Period	Process Contribution (µg/m^3)	Background (µg/m^3)	Predicted Environmental Concentration (µg/m^3)	Limit Value (µg/m^3) Note 1	PEC as % of Limit Value
$PM_{2.5}$ / 2019	Annual Mean	0.33	8	8.33	25	33%
$PM_{2.5}$ / 2020	Annual Mean	0.32	8	8.32	25	33%
$PM_{2.5}$ / 2021	Annual Mean	0.31	8	8.31	25	33%
$PM_{2.5}$ / 2022	Annual Mean	0.49	8	8.49	25	34%
$PM_{2.5}$ / 2023	Annual Mean	0.35	8	8.35	25	33%

Note 1 Air Quality Standards 2022 (from EU Directive 2008/50/EC and S.I. 739 of 2022)

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CHAPTER 09:

CLIMATE

09

CHAPTER CONTENTS

9.0 CLIMATE

9.1 INTRODUCTION

This chapter evaluates the impacts which the Proposed Development may have on Climate during the construction and operational stages as defined in the Environmental Protection Agency (EPA) documents *Guidelines on the Information to be contained in Environmental Impact Statements* (EPA, 2022).

9.2 METHODOLOGY

The climate assessment has been carried out in line with the guidance outlined in the European Commission publications "*Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*" (EC, 2013) and "*Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report*" (EC, 2017) and the EPA publication "*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports"* (EPA, 2022a).

The climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.
- Climate Change Risk Assessment (CCRA) – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

The significance criteria for each assessment are described below.

The assessment methodology has been derived with reference to the most appropriate guidance documents relating to climate which are set out in the following sections of this report. An overview of the methodology undertaken for the climate impact assessment is outlined below:

- A detailed baseline review of GHG emissions has been undertaken in order to characterise the baseline environment. This has been undertaken through review of available published GHG emission data;
- A review of the most applicable guidelines for the assessment of GHG emissions has been carried out in order to define the significance criteria for the Construction and Operational Phases of the Proposed Development. These guidelines describe appropriate methods for quantifying the emissions of GHGs from the Proposed Development;
- Predictive calculations and impact assessments relating to the likely Operational Phase climatic impacts of the Proposed Development have been undertaken;
- An assessment of the vulnerability of the Proposed Development to climate change has been undertaken; and

- A schedule of mitigation measures has been incorporated where required to reduce, where necessary, the identified potential climatic impacts associated with the Proposed Development.

9.2.1 Relevant Guidelines, Policy and Legislation

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading System (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

Following on from the recently published European Climate Law (EU, 2021), and as part of the EU's "*Fit for 55*" legislative package where the EU has recently committed to a domestic reduction of net greenhouse gas emissions by at least 55% compared to 1990 levels by 2020, the Effort Sharing Regulation is proposed to be strengthened with increased ambition by the year 2030. The proposal for Ireland is to increase the GHG emission reduction target from 30% to 42% relative to 2005 levels whilst the ETS market will also have more stringent reductions from the currently proposed reduction of 43% by 2030 compared to 2005 to a 61% reduction by 2030 based on annual reductions of 4.2% compared to the previous annual reduction level of 2.2% per year (EU, 2021) with levels in 2022 reducing to 1,285 million tonnes CO_{2eq}. The EU, in May 2023, published Directive (EU) 2023/959 Amending Directive 2003/87/EC Establishing A System For Greenhouse Gas Emission Allowance Trading Within The Union And Decision (EU) 2015/1814 Concerning The Establishment And Operation Of A Market Stability Reserve For The Union Greenhouse Gas Emission Trading System. As part of this Directive, the cap on emissions has been tightened again to reduce emissions covered by the EU ETS by 62% by 2030 compared to 2005.

The Sharm el-Sheikh Implementation Plan was drafted at COP27 in November 2022. This plan included a new funding arrangement for "loss and damage" for vulnerable countries hit hard by climate disasters. No significant agreements were made regarding the phasing out of fossil fuels or limiting global heating to 1.5°C above pre-industrial levels, however the plan resolves to pursue further efforts to limit the rise to 1.5°C. In order to limit global warming to 1.5 °C rapid, deep and sustained reductions in global greenhouse gas emissions of 43% by 2030 relative to the 2019 level will be required. The latest COP (COP28) meeting took place in Dubia in November 2023.

9.2.2 Emission Trading System

The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing, heavy industry and facilities which have greater than 20MW thermal input capacity (which is applicable to the Proposed Development). Under the ETS, there are no country-specific targets. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS and thus includes GHG emissions from transport, residential and commercial buildings and agriculture. In contrast to the ETS, Ireland has a country-specific obligation under the Regulation of a 42% reduction in non-ETS GHG emissions by 2030 relative to its 2005 levels.

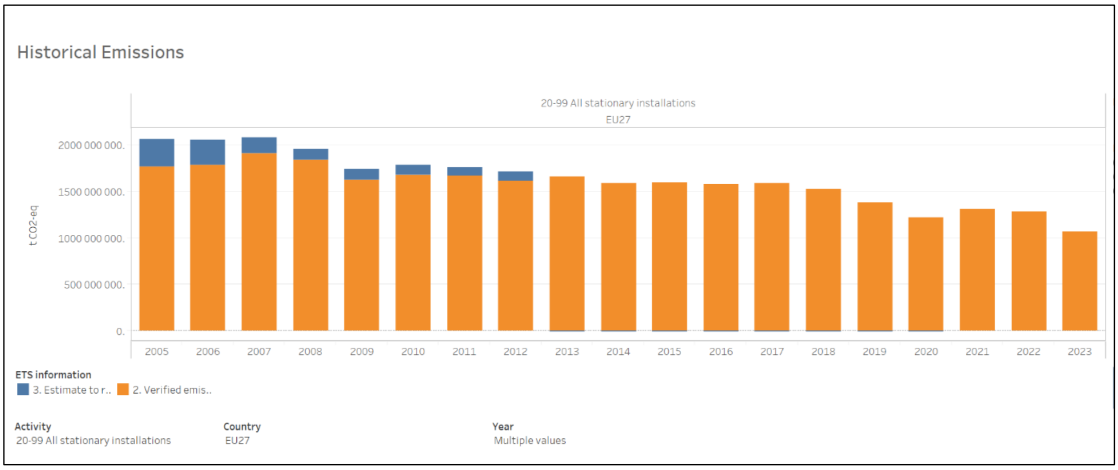
As outlined in European Commission publication "*Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*" (EC, 2013) the context of global or EU-wide emissions, the GHG emissions associated with the Proposed Development should be assessed in the context of the ETS. The approach that has been adopted at EU level is the EU Climate and Energy Package. In this regard, the EC guidance (EC, 2013) has stated that:

"The EU Emissions Trading System, the backbone of the EU mitigation effort, which sets a cap on emissions from the most polluting sectors including over 11,000 factories, power plants and other installations, including airlines. By 2020, the cap should result in a 21% reduction relative to 2005 levels. The EU ETS covers about 40% of all EU emissions." (EC, 2013).

As outlined in the EU publication "*The EU Emissions Trading System in 2020: trends and projections*" (EU, 2020), the European Union's energy system is decarbonising rapidly. The report states:

"*Total ETS emissions from stationary installations declined by 9.1% between 2018 and 2019, the largest drop in a decade, driven by a strong decrease in coal use for power production*" (EU, 2020)

As shown in Figure 9.1 in the most recent verified emissions from the ETS covering 2005 – 2023 this trend is continuing with the exception of 2021 due to COVID impacts in 2020. On an EU-wide basis, the ETS market in 2023 was approximately 1,064 million tonnes CO_{2eq}.



Taken from https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1

Figure 9.1 *Historical ETS Verified Emissions 2005 - 2023*

The European Topic Centre on Climate report entitled "*Trends and projections in the EU ETS in 2020*" (ETC, 2020) indicates that the reduction in GHG emissions is predicted to continue up to at least 2030 due to current policies in place. As shown in Figure 9.2, both the energy industries and "other industries" are predicted to decrease significantly by 2030.

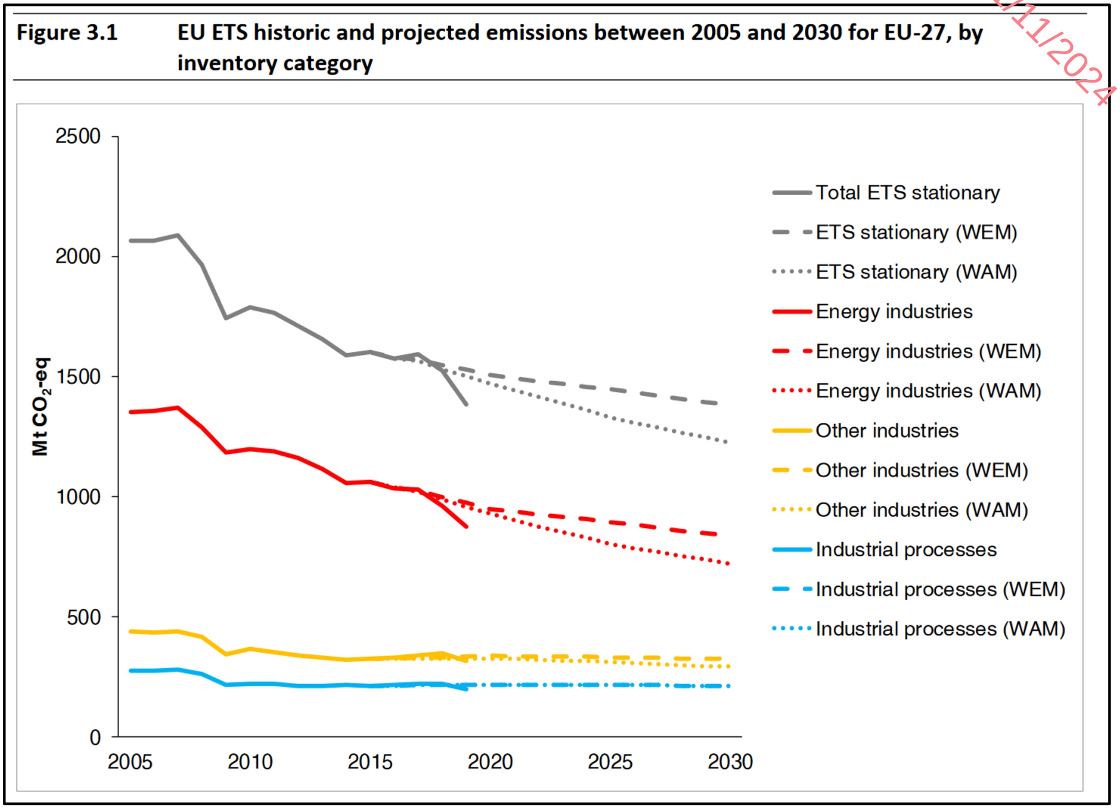


Figure 9.2 *Historical ETS Verified Emissions & Project Emissions 2005 – 2030 (WEM = with existing measures, WAM = with additional measures)*

9.2.3 National Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the 2015 Act). The purpose of the Act was to enable Ireland 'to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050' (3.(1) of No. 46 of 2015). This is referred to in the Act as the 'national transition objective'.

The 2019 *Climate Action Plan* (CAP) (Government of Ireland, 2019), published in June 2019, outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The 2019 CAP set a built environment sector reduction target of 40 - 45% relative to 2030 pre-NDP (National Development Plan) projections.

In June 2020, the Government published the Programme for Government – Our Shared Future (Government of Ireland, 2020). In relation to climate, there is a commitment to an average 7% per annum reduction in overall greenhouse gas emissions from 2021 to 2030 (51% reduction over the decade) with an ultimate aim to achieve net zero emissions by 2050. Policy changes include the acceleration of the electrification of the transport system, including electric bikes, electric vehicles and electric public transport, alongside a ban on new registrations of petrol and diesel cars from 2030. In addition, there is a policy to ensure an unprecedented model shift in all areas by a reorientation of investment to walking, cycling and public transport.

The Climate Action and Low Carbon Development (Amendment) Act 2021 (the 2021 Climate Act) (No. 32 of 2021) was published in July 2021. The purpose of the 2021 Climate Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050'*. The 2021 Climate Act will also '*provide for carbon budgets and a sectoral emissions ceiling to apply to different sectors of the economy'*. The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority. The 2021 Climate Act has set a target of a 51% reduction in the total amount of greenhouse gases over the course of the first two carbon periods ending 31 December 2030 relative to 2018 annual emissions. The 2021 Climate Act defines the carbon budget as 'the total amount of greenhouse gas emissions that are permitted during the budget period'

The Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) outlines a series of specific actions including:

- To make a strategy to be known as the 'National Long Term Climate Strategy' not less than once in every five-year period with the first to be published for the period 2021 to 2035 and with each subsequent Strategy covering the next three five-year carbon budgets and also include a longer term perspective of at least 30 years;
- To adopt a system of carbon budgets which will be determined as part of a grouping of three five-year periods calculated on an economy-wide basis, starting with the periods 2021 to 2025, 2026 to 2030, and 2031 to 2035;
- To introduce a requirement for Government to adopt "sectoral emission ceilings" for each relevant sector within the limits of each carbon budget;
- To request all local authorities to prepare climate action plans for the purpose of contributing to the national climate objective. These plans should contain mitigation and adaptation measures that the local authority intends to adopt;
- Increasing the power of the Advisory Council to recommend the appropriate climate budget and policies;
- Requiring the Minister to set out a roadmap of actions to include sector specific actions that are required to comply with the carbon budget and sectoral emissions ceiling for the period to which the plan relates; and
- Reporting progress with the CAP on an annual basis with progress including policies, mitigation measures and adaptation measures that have been adopted.

In terms of wider energy policy, as outlined in the EPA publication "*Ireland's Greenhouse Gas Projections 2022-2040*" (EPA, 2023b) under the *With Additional Measures* scenario, emissions from the energy industries sector are projected to decrease by 62% to 3.9 Mt CO_{2eq} over the period 2020 to 2030 including the proposed increase in renewable energy generation to approximately 80% of electricity consumption:

- In this scenario it is estimated that renewable energy generation increases to approximately 80% of electricity consumption. This is mainly a result of further expansion in wind energy (comprising 7 GW offshore). Expansion of other renewables (e.g. solar photovoltaics) also occurs under this scenario.
- Under the With Additional Measures, one power station operates to the end of 2023 with 30% co-firing.
- In this scenario the Moneypoint power station is assumed to operate in the market up to end 2025 at which point it no longer generates electricity from coal.
- In terms of inter-connection, it is assumed that the Greenlink 500MW interconnector to the UK to come on stream in 2025 and the Celtic 700MW interconnector to France to come on stream in 2027 (EPA, 2023).

The 2024 Climate Action Plan (CAP24) (DECC, 2023a) provides a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and setting us on a path to reach net-zero emissions by no later than 2050, as committed to in the Programme for Government and set out in the Climate Act 2021. The plan outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. CAP24 also detailed the required governance arrangements for implementation including carbon-proofing of policies and establishment of sectoral emission ceilings and carbon budgets. In relation to data centres, CAP24 provides that emissions from industry sectors covered by the ETS are subject to EU-wide rather than national targets set out under EU Effort Sharing Regulation. Box 2.1 states:

"emissions from electricity generation and large industry in the ETS are subject to EU-wide targets which require that emissions from these sectors be reduced by 42% by 2030, relative to 2005 levels".

In relation to CAP24, under Section 11.2.1.1 EU Emission Trading System, it states:

"The EU ETS is an important mechanism to drive emissions reductions in Ireland. Revisions for the EU ETS proposed under the EU Fit for 55 package were formally approved in April 2023 and include significant changes that aim at strengthening the decarbonisation incentive in industry. EU ETS emissions are set to reduce by 62% (previously 43%) compared to 2005, further tightening the cap on all participants. In addition, while industrial emitters currently receive a proportion of free allocation of emissions permits, the updated EU ETS will see free allocation for many industries phased out from 2026, adding further upward pressure to the carbon price." (CAP24, page 191).

As part of the preparation of a 'local authority climate action plan', each local authority shall consult and co-operate with an adjoining local authority in making a local authority climate action plan and co-ordinate the mitigation measures and adaptation measures to be adopted, where appropriate. Each local authority is also required to consider any significant effects the implementation of the local authority climate action plan may have on the adjoining local authority.

Individual county councils in Ireland have also published their own Climate Change Strategies which outline the specific climate objectives for that local authority and associated actions to achieve the objectives. The Mayo County Council (MCC) Climate Action Plan 2024-2029 (MCC, 2023) (the MCC Plan) outlines a number of goals and plans to prepare for and adapt to climate change. The MCC Plan has outlined a target of a 51% reduction in carbon emissions and an energy efficiency improvement of 50%

in MCC operations by 2030, creating a pathway to net zero by 2050. The MCC Plan also outlines three strategic priorities: future proof our council, future proof our place & future proof our communities.

The carbon budget programme was published in November 2021 and comprises three successive 5-year carbon budgets. In relation to carbon budgets, the Climate Action and Low Carbon Development (Amendment) Act 2021 states 'A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')'. The carbon budget is to be produced for 3 sequential budget periods with the third carbon budget in draft format. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. The total emissions allowed under each budget is set out below in Table 9.1, as well as the average annual reduction for each 5-year period.

Table 9.1 *5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025*

Period	Mt CO_2eq	Emission Reduction Target
2021-2025	295 Mt CO_2eq	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2eq	Reduction in emissions of 15.3% per annum for the second budget period.
2031-2035	151 Mt CO_2eq	Reduction in emissions of 3.5% per annum for the third provisional budget.

CAP24 provides that the economy-wide carbon budgets will be supplemented by sectoral emissions ceilings, setting the maximum amount of GHG emissions that are permitted in a given sector of the economy during each five-year carbon budget. The recently agreed Sectoral Emission Ceilings for each Sector are shown in Table 9.2. It should be noted that 5.25 $MtCO_{2eq}$ of annual emissions reductions are currently unallocated on an economy-wide basis for the second carbon budget period (2026-2030). These will be allocated following a mid-term review and identification of additional abatement measures. The electricity sector emitted approximately 10.5 $MtCO_{2eq}$ in 2018 and has a ceiling of 3 $MtCO_{2eq}$ in 2030 which is a 71% reduction over this period.

Table 9.2 *Sectoral Emission Ceiling 2030*

Sector	Baseline ($MtCO_2$eq)	Carbon Budgets ($MtCO_2$eq)		2030 Emissions ($MtCO_2$eq)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25

Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach.			
Total	68				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	**-**	**295**	**200**	**-**	**51**

The 2024 CAP has outlined the path towards the electricity target by 2030. The core measures are:

- Increasing the share of renewable electricity to 80%,
- Indicative Onshore Wind Capacity of up to 9GW,
- Indicative Offshore Wind Capacity of at least 5GW,
- Indicative Solar PV Capacity of 8GW.

ESB Networks has recently published "Networks For Net Zero – Delivering the Electricity Network for Ireland's Clean Electric Future" (ESB Networks, 2023) which outlines a glidepath to net zero by 2050. UCC / MaREI have also separately published the report "Our Climate Neutral Future – Zero by 50" (UCC / MaREI, 2021) which details how the energy system can achieve net zero by 2050 by using technologies, concepts and interventions will already exist today. As shown in Figure 9.4, the report predicts that the energy system will be dominated by renewable energy in 2050.

Although the pathway may vary somewhat depending on future policy decisions, it is likely that net zero electricity (shown in green in Figure 9.3) will be achieved prior to 2040 compared to the conservative assumption that net zero electricity would not be achieved until 2050. Thus, the GHG emissions in this EIAR should be viewed as a reasonable worst-case assessment in line with IEMA guidance (IEMA, 2022).

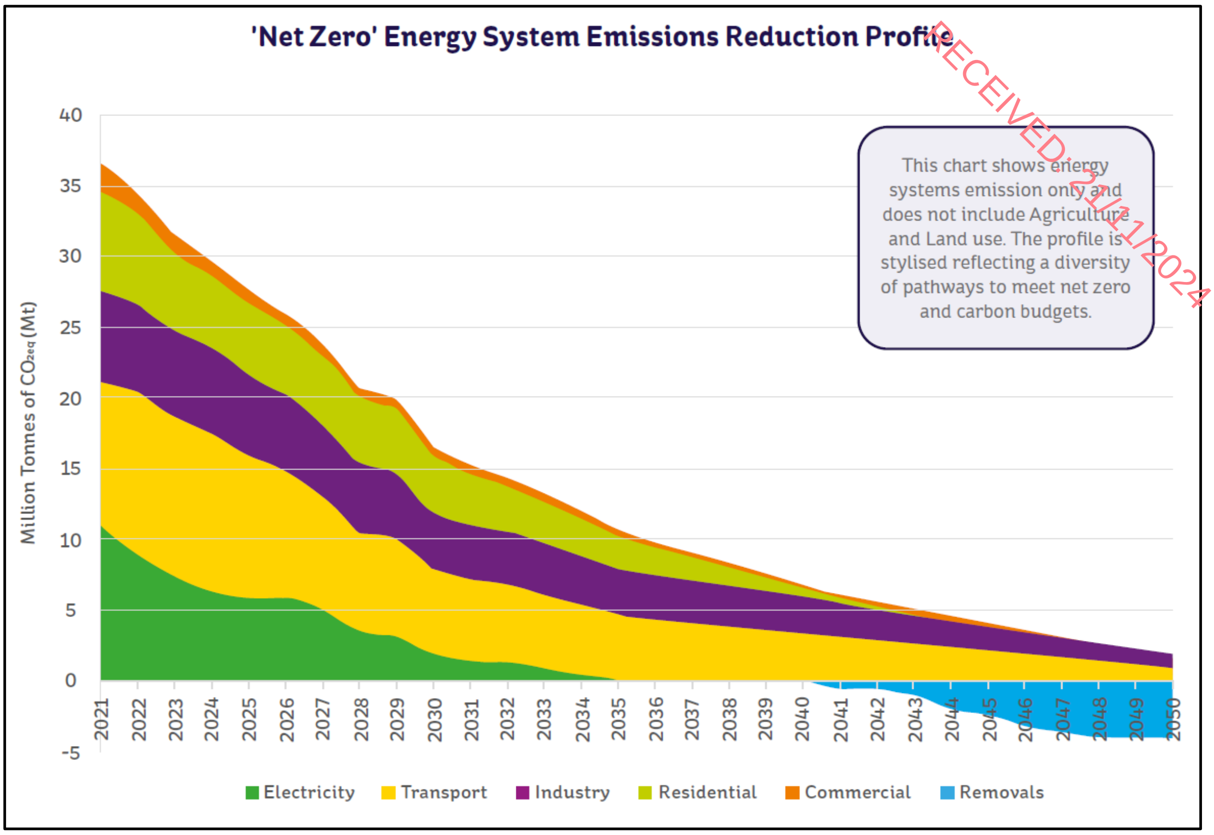


Figure 9.3 *Net Zero Energy System Emissions Reduction Profile (UCC / MaREI) (ESB Networks, 2023)*

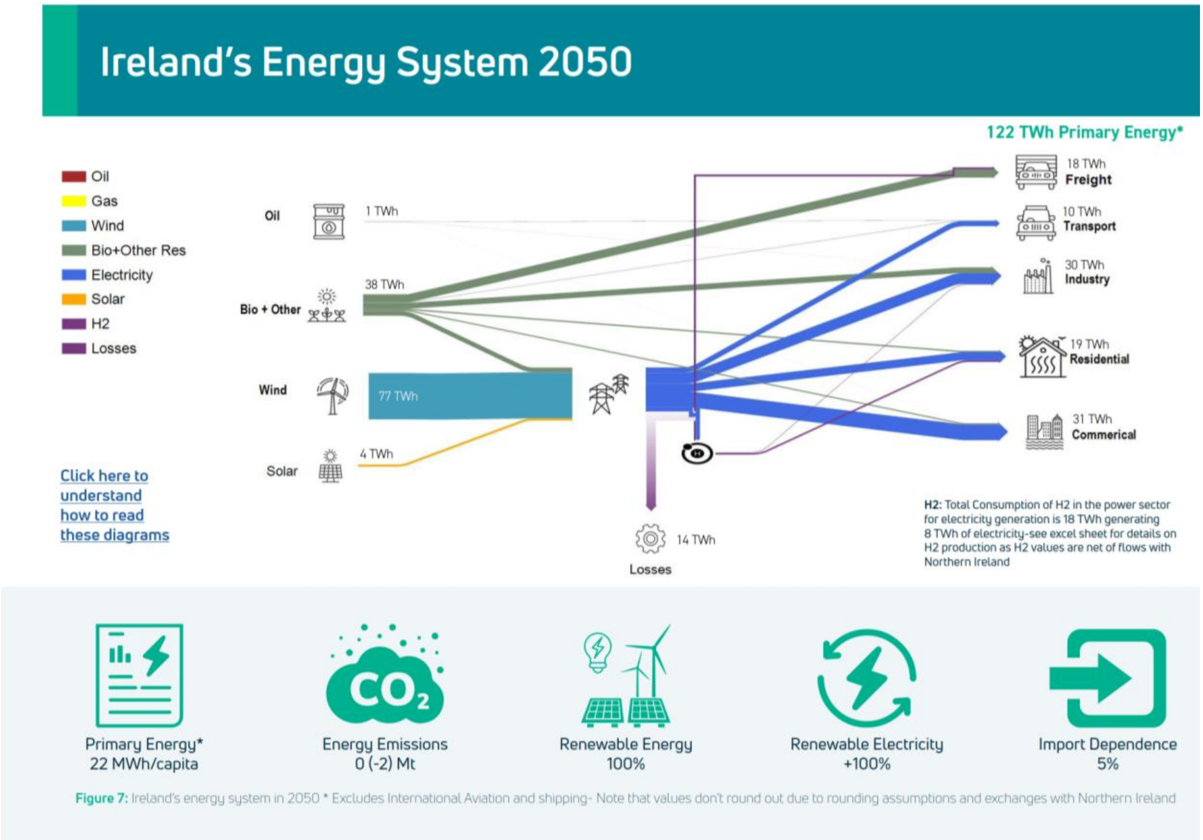


Figure 9.4 *Ireland's Energy System 2050 (UCC / MaREI, 2021)*

The GHG emission factor of electricity is based on current reported levels (Year 2023) with the assumption that the GHG emission factor will decrease in a linear fashion to reach 100 gCO_2/kWh by 2030 in line with government policy as shown in Table 9.3 below and thereafter linearly reduce to meet net zero by 2050.

Table 9.3 *Electricity GHG Emission Intensity 2022 - 2030 (SEAI, 2023)*

Year	Electricity Note 1 ($g\ CO_2$ / kWh)
2028	145
2029	123
2030	100
2031	95
2032	90
2033	85
2034	80
2035	75

Note 1 Based on a carbon intensity of 259 g CO_2 / kWh in 2023 and assuming linear interpolation to 100 g CO_2 / kWh by 2030.

The Long-term Climate Action Strategy was published on the 28th April 2023. In relation to electricity the Government commits to the full decarbonisation of the electricity system by 2050. In relation to the EU ETS, the Long-term Climate Action Strategy states that “A strong price signal, as part of a reformed EU ETS, including progressively more restrictive rules on how many allowances will be available within the EU ETS, is expected to drive decarbonisation over the coming decade by increasing the cost to firms in the EU ETS of doing nothing to reduce their emissions” (DOECC, 2023). The Long-term Climate Action Strategy 2024 (DOECC, 2024), published in August 2024, outlines a range of policies and strategies to address GHG emissions. In relation to electricity the Government commits to the full decarbonisation of the electricity system by 2050 by means of a range of measures including flexibility, grid expansion and increase in renewable power capacity.

The 2024 Climate Action Plan (CAP24) (DECC, 2023a) builds on CAP23 with further specific details on the actions required to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and setting Ireland on a path to reach net-zero emissions by no later than 2050, as committed to in the Programme for Government and set out in the Climate Act 2021. There is more specific focus on the roadmap to align with the legally binding economy-wide carbon budgets and sectoral ceilings compared to previous climate action plans.

CAP24 states that measures included in CAP21 and CAP23 would lead to a projected emissions reduction in 2030 of 42% which is 9% points below the 2030 target. Thus, CAP24 has set out further policies, measures and actions to close this gap and ensure compliance with the carbon budgets and sectoral emissions ceilings.

CAP24 in tandem with the Long-term Strategy on Greenhouse Gas Emissions Reductions will set the strategic direction for meeting Ireland’s climate targets, with CAP24 assisting in delivering the required greenhouse gas emissions abatement to meet the climate targets.

In terms of the unallocated savings gaps first identified in CAP21, CAP24 has set out an approach to deal with these unallocated savings no later than 2025. The approach is focused on exploring emerging technologies where there is evidence of technical/commercial readiness and the deployment of carbon removal technologies.

In the Electricity Sector, CAP24 states that corrective actions to accelerate renewable electricity generation and grid flexibility, and manage electricity demand growth, were implemented in 2023. The Offshore Wind Delivery Taskforce is developing a system-wide plan for delivery of Offshore Wind in Ireland, and an Implementation Plan for Future Arrangements for System Services Consultation Paper, and an Interconnection Policy were published. ESB Networks published their platform roadmap for the provision of tools and supports for community participation in flexibility measures that works towards managing electricity demand growth.

Transformational policies, measures and actions, and societal change are required to increase the deployment of renewable energy generation, strengthen the electricity grid, and meet the demand and flexibility needs required for the challenges of:

- Increasing renewable generation to supply 80% of demand by 2030 through the accelerated expansion of onshore wind and solar energy generation, developing offshore renewable generation, and delivering additional grid infrastructure,
- Developing micro-and small-scale generation, as well as community projects, through actions such as grant funding and enabling small-scale production to participate in energy markets,
- Transforming the flexibility of the electricity system by improving system services and increasing storage capacity,
- Developing tools and mechanisms that support demand side flexibility services which leverage smart metering, including market incentives and smart tariffs, reducing/removing regulatory barriers, and focusing on flexibility-ready standards for smart technology,
- Delivery of at least 2 GWs of new flexible gas-fired generation.

To reach 80% of electricity demand from renewable sources by 2030, CAP24 has outlined the following targets:

- Accelerate the delivery of utility-scale onshore wind, offshore wind, and solar projects through a competitive framework;
- Develop non-utility scale generation and community projects through actions such as grant funding and enabling such projects to participate in energy markets and flexibility schemes;
- Target 6 GW of onshore wind and up to 5 GW of solar by 2025;
- Target 9 GW of onshore wind, 8 GW of solar, and at least 5 GW of offshore wind by 2030;
- All new or repowered renewable electricity generation projects shall implement a Community Benefit Fund equivalent to the RESS requirements of €2/MWh;
- Deliver a streamlined electricity generation grid connection policy and process and remove barriers, where possible, for the installation of renewables and flexible technologies reducing the need to build new grid, including hybrid (wind/solar/storage) connections;
- Publish a new Electricity Generation Grid Connection Policy;
- Publish the Draft Renewable Electricity Spatial Policy Framework White Paper;
- Publish the revised methodology for Local Authorities Renewable Energy Strategies;
- Publish Draft Revised Wind Energy Development Guidelines;

- Commence drafting of Solar Energy Development Guidelines;
- Map and designate Renewable Acceleration Areas for onshore renewables as required following transposition once the relevant provisions have been transposed into Irish law;
- Deliver the Small-scale Renewable Electricity Support Scheme to support non-domestic renewable electricity generators above 50 kW, and community energy and small and medium-sized enterprises' projects up to 6 MW;
- Target 1.6 GW of installed micro-generation capacity (≤ 50 kW) by 2030;
- Production of 2 GW of renewable hydrogen sourced from offshore wind to be in development by 2030, which will help to provide greater certainty for investors, and create the production scales needed to enable greater infrastructure deployment.
- Ensure that 15-20% of the electricity system demand is flexible by 2025, increasing to 20-30% by 2030, to reduce the peak demand and shift the demand to times of high renewable output.

In the Built Environment Sector, CAP24 states that significant efforts were made to advance the decarbonisation of the building sector. The Heat and Built Environment Delivery Taskforce focuses on acceleration of system-wide programme and project delivery for the measures identified. The Energy Efficiency Directive takes the principle of "energy efficiency first" as a key policy requirement for buildings. The impending publication of a National Heat Policy Statement, informed by the National Heat Study, will outline the comprehensive approach to decarbonising the heat sector by the end of 2023. The District Heating Steering Group issued recommendations to enhance district heating.

In the Industry Sector, the key targets identified in CAP24 are:

- Carbon-neutral heating in industry: 50-55% share in 2025 rising to 70-75% by 2030,
- Decrease embodied carbon in construction materials: decrease by 10% embodied carbon for material produced in Ireland in 2025 rising to 30% by 2030,
- Reduce fossil fuel demand through energy efficiency: reduce by 7% in 2025 rising to 10% by 2030,

In addition specific actions and measures identified include:

- Electrification of new and current manufacturing processes displacing the use of fossil fuels where possible and as soon as possible,
- Continue to develop policies for hydrogen to support its deployment, predominantly for the third carbon budget period and beyond. Renewable hydrogen is envisaged to play a key role in decarbonising Ireland's heating needs, particularly for high temperature heating needs with an expected date for supply to the market being early 2030s,
- Implementation of carbon capture, utilisation and storage (CCUS), framework product substitution for construction materials and reduction of clinker content in cement,
- Energy management systems will be mandatory for organisations who use more than 85 TJ of energy per annum. The SEAI's Large Industry Energy Network will support organisations in adopting energy management systems, developing emissions management systems, improving energy performance metrics, and adopting best practice in energy efficiency and emissions reductions,

- Utilisation of biomass, and low and zero emission gas as key fuels for decarbonisation, noting that these are limited resources and priority will be given to its use in areas where alternative methods of decarbonisation (e.g. electrification) are not commercially or technically viable. The Biomethane Working Group has started to develop a National Biomethane Strategy, likely to be published in Q1 2024, which will set out the pathway to supplying up to 5.7 TWh of biogenic methane by 2030. This gas will be prioritised for difficult to abate emissions where alternatives are not readily available, such as high temperature heat in manufacturing.

In summary, the CAP24 envisages that in tandem with the *Long-term Strategy on Greenhouse Gas Emissions Reductions*, and on the basis that carbon budgets and sectoral emission ceilings will assist with delivering the required greenhouse gas emissions abatement, the 2030 and 2050 climate targets are achievable. The current project is in line with this strategy as the GHG emissions associated with electricity supplied to the project will reduce in line with national policy to obtain net zero by 2050.

9.2.4 Climate Criteria For The Rating Of Impacts

Significance Criteria for GHGA

The Transport Infrastructure Ireland (TII) guidance document entitled PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022) outlines a recommended approach for determining the significance of both the construction and operational phases of a development. The approach is based on comparing the 'Do Something' scenario and the net project GHG emissions (i.e. Do Something – Do Minimum) to the relevant carbon budgets (Department of the Taoiseach, 2022). With the publication of the Climate Action Act in 2021, sectoral carbon budgets have been published for comparison with the Net CO_2 project GHG emissions from the Proposed Development. The Electricity sector emitted approximately 10.5 $MtCO_{2eq}$ in 2018 and has a ceiling of 3 $MtCO_{2eq}$ in 2030 which is a 72% reduction over this period (see Table 9.2)

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022) is based on IEMA guidance (IEMA, 2022) which is broadly consistent with the terminology contained within Figure 3.4 of the EPA's (2022) '*Guidelines on the information to be contained in Environmental Impact Assessment Reports*'.

The Institute of Environmental Management and Assessment (IEMA) guidance note on "*Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition*" (IEMA, 2022) states that:

"the crux of significance regarding impact on climate is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050".

Mitigation has taken a leading role within the Guidance compared to the previous edition published in 2017. Early stakeholder engagement is key and therefore mitigation should be considered from the outset of the project and continue throughout the project's lifetime in order to maximise GHG emissions savings.

The assessment aims to quantify the difference in GHG emissions between the proposed project and the baseline scenario (the alternative project/solution in place of the proposed project). This is done by calculating the difference in whole life net GHG emissions between the two options. The IEMA EIA guidance (IEMA, 2022) does not recommend a particular approach for this due to variations of situations but instead it sets out advice for the key common components necessary for undertaking a GHG emissions assessment. During the assessment IEMA recommend use of a reasonable worst-case scenario rather than an absolute worst-case scenario. The IEMA Guidance (IEMA, 2022) states that a GHG emissions assessment should incorporate the following steps into any climate assessment:

1. Set the scope and boundaries of the GHG assessment;
2. Develop the baseline;
3. Decide upon the emissions calculation methodologies;
4. Data collection;
5. Calculate/determine the GHG emissions inventory; and
6. Consider mitigation opportunities and repeat steps 4 & 5.

Activities that do not significantly change the result of the assessment can be excluded where expected emissions are less than 1% of total emissions, and where all such exclusions should be clearly stated and total a maximum of 5% of total emissions.

When considering the cumulative assessment, all global cumulative GHG sources are relevant to the effect on climate change. As a result, the effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed. This is due to the fact that there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other. The following section details the specific appraisal methods utilised in order to complete the assessment in accordance with the IEMA Guidance (IEMA, 2022).

9.2.5 Construction Phase

The impact of the construction phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the Proposed Development.

9.2.6 Operational Phase

9.2.6.1 Greenhouse Gas Assessment (GHGA)

The data centre will operate using electricity from the national grid with the back-up HVO generators used infrequently. As a worst-case it is assumed that the backup generators are used for 400 hours per year.

When assessing significance, the *2010 IEMA Principles Series on Climate Change Mitigation & EIA* (IEMA, 2010) defines three overarching principles:

- The GHG emissions from all projects will contribute to climate change, the largest interrelated cumulative environmental effect;
- The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (e.g. human health, biodiversity, water, land use, air quality); and
- GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit; as such any GHG emissions or reductions from a project might be considered to be significant. The environmental limit is the national global GHG emission budget that defines a level of dangerous climate change, and any GHG emission that contributes to

exceedance of that budget or threatens efforts to stay within it can be considered as significant.

The 2022 Guidance (IEMA, 2022) document builds on those principles with three points:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors. In relation to climate, there is no project specific assessment criteria, but the project will be assessed against the recommended IEMA (IEMA, 2022) significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

- Major or moderate adverse impact (significant): A project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the net zero[a] trajectory by 2050 or sectoral based transition to net zero targets, results in a significant adverse effect. It is down to the consultant completing the assessment to differentiate between the 'level' of significant adverse effects e.g. 'moderate' or 'major' adverse effects. A project's impact can shift from significant adverse to nonsignificant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing but declining emissions towards net zero. Meeting the minimum standards set through existing policy or regulation cannot necessarily be taken as evidence of avoiding a significant adverse effect. This is particularly true where policy lags behind the necessary levels of GHG emission reductions for a science based 1.5°C compatible trajectory towards net zero.
- Minor adverse impact (not significant): A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that has a minor adverse effect that is not significant. The project may have residual impacts but is doing enough to align with and contribute to the relevant transition scenario. A 'minor adverse' or 'negligible' non-significant effect conclusion does not necessarily refer to the magnitude of GHG emissions being carbon neutral[b] (i.e. zero on balance) but refers to the likelihood of avoiding severe climate change and achieving net zero by 2050. A 'minor adverse' effect or better is a high bar and indicates exemplary performance where a project meets or exceeds measures to achieve net zero earlier than 2050.

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[a] Net Zero: "When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period." Net zero is achieved where emissions are first educed in line with a 'science-based' trajectory with any residual emissions neutralised through offsets.
[b] Carbon Neutral: "When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period irrespective of the time period or magnitude of offsets required."

- Negligible Impact (not significant): A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a negligible effect that is not significant.
- Beneficial Impact (significant): A project that causes GHG emissions to be avoided or removed from the atmosphere has a beneficial effect that is significant. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.

TII (TII, 2022) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. In line with IEMA Guidance (IEMA, 2022), TII state that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

Significance is determined using the criteria outlined in Table 9.4 (derived from Table 6.7 of PE-ENV-01104 (TII 2022)) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

Table 9.4 *GHGA Significance Criteria*

Effects	Significance level Description	Description
Significant adverse	Major adverse	• The project's GHG impacts are not mitigated. • The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies; and • No meaningful absolute contribution to Ireland's trajectory towards net zero[c].
	Moderate adverse	• The project's GHG impacts are partially mitigated. • The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and • Falls short of full contribution to Ireland's trajectory towards net zero.
Not significant	Minor adverse	• The project's GHG impacts are mitigated through 'good practice' measures. • The project has complied with existing and emerging policy requirements; and • Fully in line to achieve Ireland's trajectory towards net zero.

[c] Net Zero: "When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period." Net zero is achieved where emissions are first educed in line with a 'science-based' trajectory with any residual emissions neutralised through offsets.

Effects	Significance level Description	Description
	Negligible	• The project's GHG impacts are mitigated beyond design standards. • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	• The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration. • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

The impact of the operational phase of the Proposed Development on climate was determined by an assessment of the indirect CO_2 emissions associated with electricity and the direct CO_2 emissions associated with the HVO operation of the backup generators over the period 2028 (first full year of operation) to 2035. The details and results of the assessment are provided in Section 9.7.2.

9.2.6.2 Climate Change Risk Assessment (CCRA)

The operational phase assessment involves determining the vulnerability of the Proposed Development to climate change. This involves an analysis of the sensitivity and exposure of the development to climate hazards which together provide a measure of vulnerability.

PE-ENV-01104 (TII, 2022) states that the CCRA is guided by the principles set out in the overarching best practice guidance documents:

- EU (2021) Technical guidance on the climate proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021); and
- The Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (IEMA, 2020).

The baseline environment information provided in Section 9.3, future climate change modelling and input from other experts working on the Proposed Development (i.e. hydrologists) should be used in order to assess the likelihood of a climate risk.

First an initial screening CCRA based on the operational phase is carried out, according to the TII guidance PE-ENV-01104. This is carried out by determining the sensitivity of proposed development assets (i.e. receptors) and their exposure to climate change hazards.

The project asset categories must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 (TII, 2022) provide the below list of asset categories and climate hazards to be considered. The asset categories will vary for project type and need to be determined on a project-by-project basis.

- **Asset categories** - Pavements; drainage; structures; utilities; landscaping; signs, light posts, buildings, and fences.

- **Climate hazards** - Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

The sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below.

- **High sensitivity:** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.
- **Medium sensitivity:** It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2.
- **Low sensitivity:** It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

Once the sensitivities have been identified the exposure analysis is undertaken. The exposure analysis involves determining the level of exposure of each climate hazard at the project location irrespective of the project type for example: flooding could be a risk if the project location is next to a river in a floodplain. Exposure is assigned a level of High, Medium or Low as per the below criteria.

- **High exposure:** It is almost certain or likely this climate hazard will occur at the project location i.e. might arise once to several times per year. This is an exposure score of 3.
- **Medium exposure:** It is possible this climate hazard will occur at the project location i.e. might arise a number of times in a decade. This is an exposure score of 2.
- **Low exposure:** It is unlikely or rare this climate hazard will occur at the project location i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability.

<u>Significance Criteria for CCRA</u>

The CCRA involves an initial screening assessment to determine the vulnerability of the Proposed Development to various climate hazards. The vulnerability is determined by combining the sensitivity and the exposure of the Proposed Development to various climate hazards.

Vulnerability = Sensitivity x Exposure

The vulnerability assessment takes any proposed mitigation into account. Table 9.5 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale.

TII guidance (TII, 2022a) and the EU technical guidance (European Commission, 2021a) note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. The impact from climate change on the proposed development can therefore considered to be not significant.

Where residual medium or high vulnerabilities exist the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks. An assessment of construction phase CCRA impacts is only required according to the TII guidance (TII, 2022a) if a detailed CCRA is required.

Table 9.5 *Vulnerability Matrix*

		Exposure		
		High (3)	**Medium (2)**	**Low (1)**
Sensitivity	**High (3)**	9 - High	6 – High	3 - Medium
	Medium (2)	6 - High	4 - Medium	2 - Low
	Low (1)	3 - Medium	2 – Low	1 - Low

The screening CCRA, detailed in Section 9.5.4, did not identify any residual medium or high risks to the proposed development as a result of climate change. Therefore, a detailed CCRA for the construction and operational phase were scoped out.

While a CCRA for the construction phase was not required, best practice mitigation against climate hazards is still recommended in Section 9.6.1.

9.2.7 Difficulties Encountered In Compiling Information

No significant difficulties were encountered in the process of compiling the climate chapter of the EIAR.

9.3 RECEIVING ENVIRONMENT

Climate is defined by the IPCC (IPCC, 2023) as the average weather over a period of time, whilst climate change is a significant change to the average weather. Climate change is a natural phenomenon but in the industrial age human activities, through the release of GHGs, have impacted on the climate (EPA, 2023a). The release of anthropogenic GHGs is altering the Earth's atmosphere resulting in a 'Greenhouse Effect'. This effect is causing an increase in the atmosphere's heat trapping abilities resulting in increased average global temperatures over the past number of decades. The release of CO_2 as a result of burning fossil fuels, has been one of the leading factors in the increase of the 'Greenhouse Effect'. The most significant GHGs are CO_2, methane (CH_4) and nitrous oxide (N_2O).

For the purposes of this assessment, the definition outlined in Council Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (hereafter referred to as the Renewable Energy Directive) for GHGs has been used. In Annex V, C. Methodology Point 5 of the Renewable Energy Directive the relevant GHGs are defined as CO_2, CH_4 and N_2O. CO_2 accounted for 63.7% of total GHG emissions in Ireland in 2018 while CH_4 and N_2O combined accounted for 34.4%. The main source of CH_4 and N_2O is from the agricultural sector. Perfluorocarbons are not relevant in the context of the Renewable Energy Directive as they are not emitted in significant quantities by energy sources.

GHGs have different efficiencies in retaining solar energy in the atmosphere and different lifetimes in the atmosphere. In order to compare different GHGs, emissions are calculated on the basis of their Global Warming Potential (GWPs) over a 100-year period, giving a measure of their relative heating effect in the atmosphere. The IPCC AR6 Synthesis Report: Climate Change 2021 (IPCC, 2023) sets out the global warming potential for a 100-year time period (GWP100) for CO_2 as the basic unit (GWP = 1) whereas CH_4 has a global warming potential equivalent to 29.8 units of CO_2 (for fossil sources) and N_2O has a GWP100 of 273. These values have been refined since the AR5 report.

9.3.1 Climate Baseline

TII guidance PE-ENV-01104 (TII, 2022) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline (i.e. Do Minimum scenarios).

Given the circumstances of Ireland's declaration of a climate and biodiversity emergency in May 2019 and the November 2019 European Parliament approval of a resolution declaring a climate and environment emergency in Europe, in conjunction with Ireland's current failure to meet its EU binding targets under the GHG Regulation, changes in GHG emissions either beneficially or adversely are of more significance than previously viewed prior to these declarations. Thus, the baseline climatic environment should be considered a highly sensitive environment for the assessment of impacts.

Anthropogenic emissions of greenhouse gases (GHGs) in Ireland included in the European Union's Effort Sharing Regulation (ESR) (EU 2018/842) are outlined in the most recent review by the EPA which details emissions up to 2022 (EPA, 2023a). The greenhouse gas emission inventory for 2022 is the second of ten years over which compliance with targets set in the ESR will be assessed. This Regulation sets 2030 targets for emissions outside of the Emissions Trading System (known as ESR emissions) and annual binding national limits for the period 2021-2030. Ireland's target is to reduce ESR emissions by 42% by 2030 compared with 2005 levels, with a number of flexibilities available to assist in achieving this. Ireland's 2022 GHG ESR emissions are 42.36 Mt CO_2eq, this is 3.72 Mt CO_2eq more than the annual limit for 2022 (EPA, 2023a). Agriculture continues to be the largest contributor to overall emissions at 38.4% of the total. Transport, energy industries and the residential sector are the next largest contributors, at 19.1%, 16.6% and 10.0%, respectively.

National total emissions (including LULUCF) for 2023 are 60.62 Mt CO_2eq, thus 2021 to 2023 have used 63.9% of the 295 Mt CO_2eq Carbon Budget for the five-year period 2021-2025. This leaves 36.1% of the budget available for the succeeding three years, requiring an 8.3% average annual emissions reduction from 2024-2025 to stay within budget.

The EPA 2023 GHG Emissions Projections Report for 2022 – 2040 (EPA, 2023b) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the Climate Action Plan published in 2021. Implementation of these are classed as a "*With Additional Measures"* scenario for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2021 to 2030 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Regulations (Regulation (EU) 2018/842) 2030 targets by approximately 63.6 $MtCO_{2eq}$ under the "*With Existing Measures*" scenario. However, the projections indicate that Ireland can meet its non-ETS EU targets over the period 2022 – 2030 assuming full implementation of the Climate Action Plan and the use of the flexibilities available (EPA, 2023b).

The EPA has recently reported that the 2023 energy industries GHG emissions have decreased from 10.08 Mtonnes in 2022 to 7.8 Mtonnes in 2023 (EPA, 2024) which is a record 21.6% reduction. Comparing the 2023 reported data to the projected data undertaken for the Sectoral Emission Ceiling in Figure 9.5 indicates that the actual emissions are slightly higher to the target value in 2023. In order to comply with the 2021-2025 target annual reductions of 10.3% are required in 2024 and 2025.

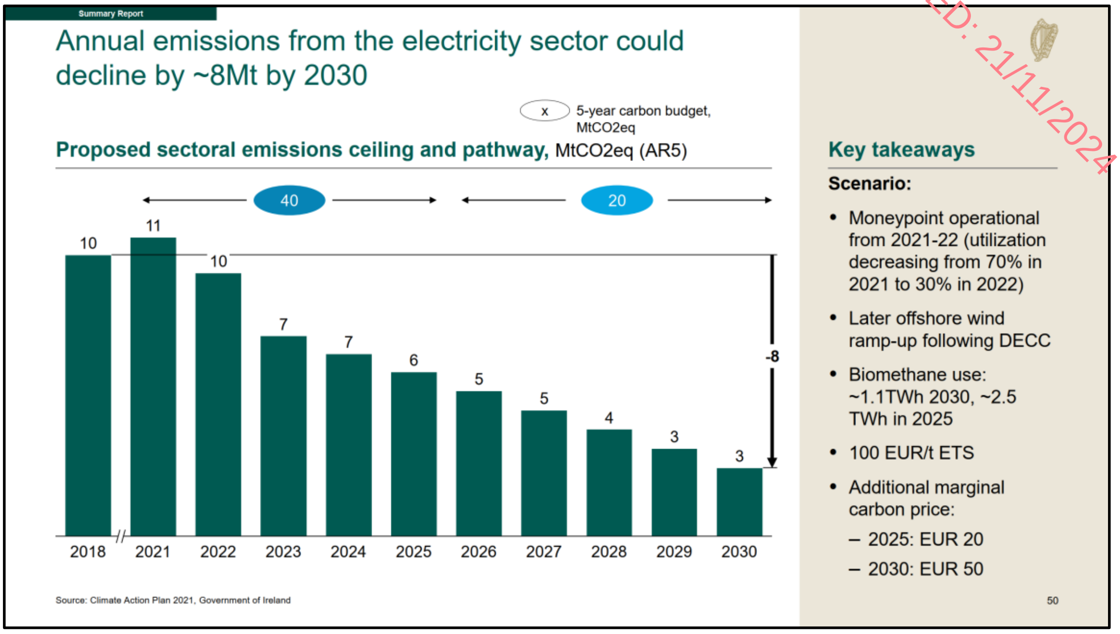


Figure 9.5 *Proposed sectoral emissions ceiling and pathway 2018 to 2030 (DECC, 2022)*

9.3.2 Vulnerability of the Project to Climate Change

The Proposed Development study area for assessing a project's vulnerability to climate change should be based on the construction footprint / project boundary. Impacts as a result of climate change involve increases in global temperatures and increases in the number of rainfall days per year. Ireland has seen increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east (EPA, 2015). The EPA have compiled a list of potential adverse impacts as a result of climate change including the following which may be of relevance to the Proposed Development:

- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species.

The historical regional weather data for Belmullet which is representative of the current climate in the region of the Proposed Development is shown in Table 9.6 (Met Eireann, 2022). The region of the Proposed Development has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Belmullet, is the nearest weather and climate monitoring station to the Proposed Development that has meteorological data recorded for the 30-year period from 1991 to 2020. Belmullet meteorological station is located approximately 40 km west of the Proposed Development at the closest point. Meteorological data recorded at Belmullet over the 30-year period from 1991 to 2020 indicates that the wettest months were January and October, and the driest month on average was April. August was the warmest month with a mean temperature of 14.1°C.

The recent weather patterns and extreme weather events recorded by Met Éireann have been reviewed. A noticeable feature of the recent weather has been an increase in the frequency and severity of storms with notable events including Storm Darwin in February 2014, Storm Ellen in Augusy 2020 and Storm Barra in December 2021. The maximum wind gust for Belmullet for Storm Barra peaked at 102 km/hr with a 10-minute speed of 69 km/hr.

Met Éireann's 2023 Climate Statement (Met Éireann, 2023a) states 2023's average shaded air temperature in Ireland is provisionally 11.20 °C, which is 1.65°C above the 1961-1990 long-term average. Previous to this 2022 was the warmest year on record; however, 2023 was 0.38 °C warmer (see Figure 9.6).

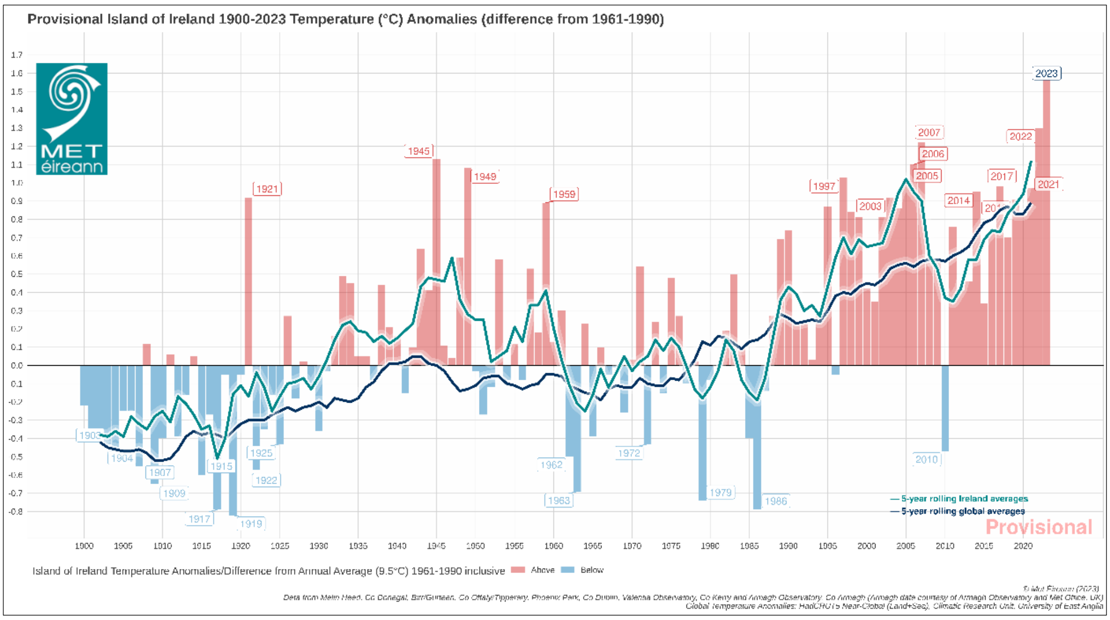


Figure 9.6 *1900-2023 Temperature (°C) Temperature Anomalies (Differences from 1961-1990)*

The year 2023 also had above average rainfall, this included the warmest June on record and the wettest March and July on record. Record high sea surface temperatures (SST) were recorded since April 2023 which included a severe marine heatwave[1] to the west of Ireland during the June 2023. This marine heatwave contributed to the record rainfall in July.

Recent weather patterns and records of extreme weather events recorded by Met Éireann have been reviewed. Considering the extraordinary 2023 data, Met Éireann states that the latest Irish climate change projections indicate further warming in the future, including warmer winters. The record temperatures means the likelihood of extreme weather events occurring has increased. This will result in longer dry periods and heavy rainfall events. Storm surges and coastal flooding due to sea level rise. Compound events, where coastal surges and extreme rainfall events occur simultaneously will also increase. Met Éireann has high confidence in maximum rainfall rates increasing but not in how the frequency or intensity of storms will change with climate change.

Future climate predictions undertaken by Met Éireann have been published in 'Ireland's Climate: the road ahead (Met Eireann, 2013) based on four scenarios

[1] https://www.met.ie/marine-heat-wave-2023-a-warning-for-the-future

(RCP2.6, RCP4.5, RCP6.0 and RCP8.5) which is named with reference to a range of radiative forcing values for the year 2100 (i.e. 2.6, 4.5, 6.0 and 8.5 W/m^2 (watts per square metre)) respectively with focus on RCP4.5 (medium-low) and RCP8.5 (high) scenarios. In terms of mean temperatures, it is predicted that increases of between 1°C to 3°C will occur under RCP4.5 rising to 2°C to 4°C under RCP8.5. Warm extremes are expected to rise by 2°C to 3°C (RCP4.5) but by up to 5°C under RCP8.5.

The EPA sponsored Report No.159 '*Ensemble of regional climate model projections for Ireland'* (EPA, 2015) which has projected significant decreases in mean annual, spring and summer precipitation amounts with extended dry periods. The decreases are largest for summer, with reductions ranging from 0% to 13% and from 3% to 20% for the medium-to-low and high emission scenarios, respectively. Conversely increases of heavy precipitation of up to 20% are projected to occur during the winter and autumn months. The number of extended dry periods is projected to increase substantially by mid-century during autumn and summer.

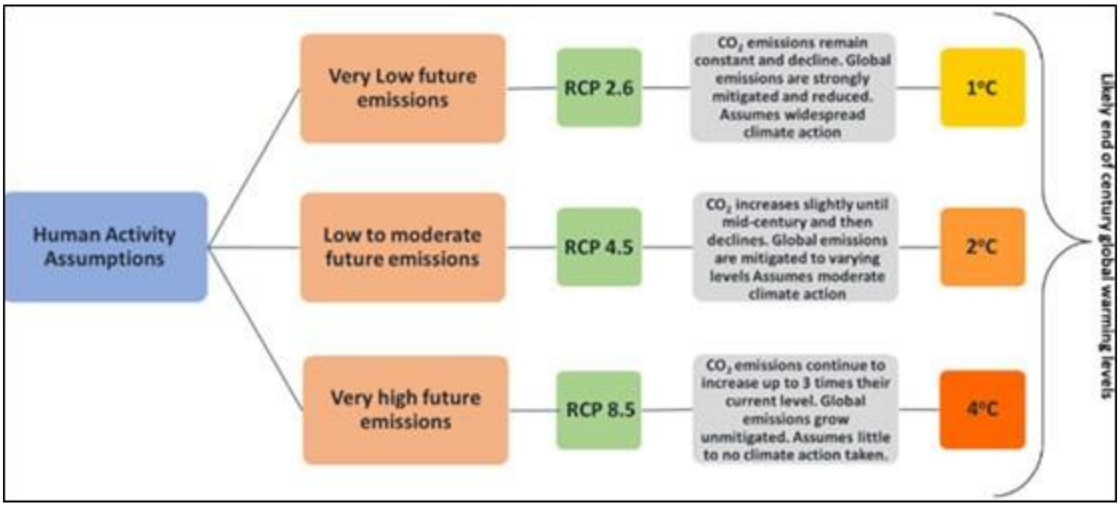
In relation to storms, '*Report No.159 – Ensemble of regional climate model projections for Ireland*' (EPA, 2015) indicates that the overall number of North Atlantic cyclones is projected to decrease by 10% coinciding with a decrease in average mean sea-level pressure of 1.5 hectopascals (hPa) for all seasons by mid-century. Wind energy is also predicted to decrease for spring, summer and autumn with a projected increase in winter.

EPA's *State of the Irish Environment Report (Chapter 2: Climate Change)* (EPA, 2020a) notes that projections show that full implementation of additional policies and measures, outlined in the 2019 Climate Action Plan, will result in a reduction in Ireland's total GHG emissions by up to 25 per cent by 2030 compared with 2020 levels. Climate change is not only a future issue in Ireland, as a warming of approximately 0.8°C since 1900 has already occurred. The report (EPA, 2020a) underlines that the next decade needs to be one of major developments and advances in relation to Ireland's response to climate change in order to achieve these targets and that Ireland must accelerate the rate at which it implements GHG emission reductions. The report states that mid-century mean annual temperatures in Ireland are projected to increase by between 1.0°C and 1.6°C (subject to the emissions trajectory). In addition, heat events are expected to increase by mid-century (EPA, 2020a). While individual storms are predicted to have more severe winds, the average wind speed has the potential to decrease (EPA ,2020a).

Future climate predictions undertaken by the EPA have been published in '*Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach*' (EPA, 2020b). The future climate was simulated under both Representative Concentration Pathway 4.5 (RCP4.5) (medium-low) and RCP8.5 (high) scenarios. This study indicates that by the middle of this century (2041–2060). Mid-century mean annual temperatures are projected to increase by 1 to 1.2°C and 1.3 to 1.6°C for the RCP4.5 and RCP8.5 scenarios, respectively, with the largest increases in the east. Warming will be enhanced at the extremes (i.e. hot days and cold nights), with summer daytime and winter night-time temperatures projected to increase by 1 to 2.4°C. There will be a substantial decrease of approximately 50% which is projected for the number of frost and ice days. Summer heatwave events are expected to occur more frequently, with the largest increases in the south. In addition, precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events. Climate change also has the potential to impact future energy supply which will rely on renewables such as wind and hydroelectric. Wind turbines need a specific range of wind speeds to operate within and droughts or low ground water levels may impact hydroelectric energy generating sites. More frequent storms have the potential to damage the communication networks requiring additional investment to create resilience within the network.

Thus, in summary, the recent research into the changing climate as outlined above shows that the facility will need to incorporate into its design the likely future increases in weather variability including increased frequency and intensity of storms and high winds, increased temperatures in summer, the potential for heat waves and flooding from heavy precipitation events.

TRANSLATE (Met Éireann, 2023) has been led by climate researchers from University of Galway – Irish Centre for High End Computing (ICHEC), and University College Cork – SFI Research Centre for Energy, Climate and Marine (MaREI), supported by Met Éireann climatologists. TRANSLATE's outputs are produced using a selection of internationally reviewed and accepted models from both CORDEX and CMIP5. Representative Concentration Pathways (RCPs) provide a broad range of possible futures based on assumptions of human activity. The modelled scenarios include for "least" (RCP2.6), "more" (RCP4.5) or "most" (RCP8.5) climate change, as shown in Figure 9.7.



Source: TRANSLATE project storymap (Met Éireann 2023)

Figure 9.7 *Representative Concentration Pathways associated emission levels*

TRANSLATE (Met Éireann, 2023) provides the first standardised and bias-corrected national climate projections for Ireland to aid climate risk decision making across multiple sectors (for example, transport, energy, water), by providing information on how Ireland's climate could change as global temperatures increase to 1.5˚C, 2˚C, 2.5˚C, 3˚C or 4˚C. Projections broadly agree with previous projections for Ireland. Ireland climate is dominated by the Atlantic Meridional Overturning Circulation (AMOC), a large system of ocean currents – including the Gulf Stream – characterised by a northward flow of warm water and a southward flow of cold water. Due to the AMOC, Ireland does not suffer from the extremes of temperature experienced by other countries at a similar latitude. Recent studies have projected that the AMOC could decline by 30% - 40% by 2100, resulting in cooler North Atlantic sea surface temperatures (SST) (Met Éireann, 2023). Met Éireann projects that Ireland is nevertheless projected to continue to warm, although the influence of this cool influence may lead to reduced warming compared with continental Europe. AMOC weakening is expected to lead to additional sea level rise around Ireland. With climate change Ireland's temperature and rainfall will undergo more significant changes, for example on average summer temperature could increase by more than 2°C, summer rainfall could decrease by 9% while winter rainfall could increase by 24% as shown in Figure 9.8. Future projects also include a 10-fold increase in the frequency of summer nights (values >15°C) by the end of the century, a decrease in the frequency of cold winter nights and an increase in the number of heatwaves. A heatwave in Ireland is defined as a period of five consecutive days where the daily maximum temperature is greater than 25°C.

Source: TRANSLATE project storymap (Met Éireann, 2023)

Figure 9.8 *Change of climate variables for Ireland for different Global warming thresholds*

Table 9.6 *Belmullet Historical Meteorological Data 1991-2020*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (°C)													
daily max.	8.2	8.3	9.7	11.6	13.7	15.7	16.8	17.2	15.7	13.4	10.3	9.0	12.5
mean daily min.	3.1	2.9	3.9	4.9	7.0	9.5	11.1	11.1	9.8	8.2	5.1	4.3	6.7
mean	5.7	5.6	6.8	8.2	10.3	12.6	14.0	14.1	12.8	10.8	7.7	6.6	9.6
absolute max.	13.0	13.8	19.4	23.3	26.0	27.0	28.7	27.4	22.4	22.1	15.2	13.5	28.7
absolute min.	-8.1	-6.3	-5.7	-2.6	-0.4	1.4	5.1	3.1	0.8	-0.7	-2.5	-5.2	-8.1
mean no. of days with air frost	5.0	4.3	2.1	0.9	0.0	0.0	0.0	0.0	0.0	0.1	1.3	3.1	16.7
mean no. of days with ground frost	10.5	9.5	7.3	5.4	1.9	0.1	0.0	0.0	0.5	1.7	5.5	7.8	50.3
Relative Humidity (%)													
mean at 0900UTC	85	84	82	80	78	81	85	85	84	85	85	85	83
mean at 1500UTC	81	77	75	73	73	77	80	79	78	80	80	83	78
Sunshine (hours)													
mean daily duration	1.47	2.41	3.29	5.27	6.14	5.36	4.29	4.63	3.65	2.63	1.74	1.08	3.50
greatest daily duration	7.9	9.8	11.2	14.0	15.6	15.8	15.4	14.0	12.5	9.8	8.1	6.7	15.8
mean no. of days with no sun	10	6	5	3	2	3	3	3	4	6	8	12	66
Rainfall (mm)													
mean monthly total	123.5	80.1	95.8	58.1	68.0	67.3	67.6	93.7	108.0	132.9	127.7	119.9	1142.7
greatest daily total	32.2	23.6	25.9	20.4	26.5	35.2	44.9	57.3	56.1	67.8	56.4	40.5	67.8
mean no. of days with >= 0.2mm	23	19	23	19	18	18	19	20	21	24	23	24	249
mean no. of days with >= 1.0mm	20	15	18	13	14	12	12	15	16	19	19	19	193
mean no. of days with >= 5.0mm	9	6	7	4	5	4	4	6	7	9	9	9	80
Wind (knots)													
mean monthly speed	14.7	13.9	14.2	12.2	12.4	11.9	11.6	11.3	13.0	14.3	13.6	14.3	13.1
max. gust	91	93	88	67	69	73	67	60	84	85	76	89	93

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
max. mean 10-minute speed	58	61	58	43	47	47	45	44	57	58	50	60	61
mean no. of days with gales	5.5	4.2	3.3	1.1	1.0	0.4	0.3	0.8	2.3	3.6	3.4	4.5	30.5
Weather (mean no. of days with..)													
snow or sleet	4.6	4.4	4	1.6	0.2	0	0	0	0	0	0.7	2.6	18.1
snow lying at 0900UTC	0.8	0.6	0.3	0.1	0	0	0	0	0	0	0	0.4	2.3
hail	8.5	6.2	7.4	4	1.9	0.2	0.1	0.1	0.5	2.8	6.7	6.7	45.1
thunder	0.9	0.6	0.5	0.3	0.4	0.5	0.6	0.2	0.2	0.2	0.4	0.6	5.5
fog	1.1	0.6	0.7	1.7	1.3	2	3.3	2.4	1.1	1.2	0.6	0.6	16.6

9.3.3 Existing GHG Emissions Baseline

Data published in July 2024 (EPA, 2024) indicates that Ireland exceeded (without the use of flexibilities) its 2023 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 2.27 Mt CO_2e. However, the 2023 emissions were the first time that Ireland's emissions were below (-1.2%) 1990 levels. ETS emissions decreased (-17.0%) and ESR emissions decreased (-3.4%). Ireland's target is an emission reduction of 626 kt of CO_2e by 2030 on an average baseline of 2016 to 2018. The EPA estimate that 2023 total national greenhouse gas emissions (excluding LULUCF) have decreased by 6.8% on 2022 levels to 55.0 Mt CO_2e, with a 2.2 Mt CO_2e (-21.6%) reduction in electricity industries alone. This was driven by a 40.7% share of energy from renewables in 2023 and increasing our imported electricity. Manufacturing Combustion and Industrial Processes decreased by 5.1% to 6.3 Mt CO_2e in 2023 due to declines in fossil fuel usage. The sector with the highest emissions in 2023 was agriculture at 37.6% of the total, followed by transport at 21.4%. For 2023 total national emissions (including LULUCF) were 60.62 Mt CO_2e as shown in Table 9.7 (EPA, 2024).

The provisional 2023 figures indicate that Ireland has used 63.9% of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025.

Table 9.7 *Trends in National GHG Emissions in 2021 – 2023*

Sector Note 1	**2021 Emissions (Mt CO_2e)**	**2022 Emissions (Mt CO_2e)**	**2023 Emissions (Mt CO_2e)**	**Total Budget (Mt CO_2e) (2021-2025)**	**% Budget 2021-2025 used**	**Annual change 2022 to 2023**
Electricity	9.893	9.694	7.558	40.0	67.9%	-22.0%
Transport	11.089	11.760	11.791	54.0	64.1%	0.3%
Buildings (Residential)	6.868	5.753	5.346	29.0	62.0%	-7.1%
Buildings (Commercial and Public)	1.444	1.447	1.409	7.0	61.4%	-2.6%
Industry	7.093	6.622	6.288	30.0	66.7%	-5.0%
Agriculture	21.940	21.795	20.782	106.0	60.9%	-4.6%
Other Note 2	1.864	1.931	1.832	9.0	62.5%	-5.1%
LULUCF	4.628	3.983	5.614			40.9%
Total including LULUCF	64.819	62.986	60.620	295.0	63.9%	-3.8%

Note 1 Reproduced from latest emissions data on the EPA website July 2024 (EPA, 2024).
Note 2 Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII, 2022c) and IEMA Guidance (IEMA, 2022) the future baseline is a trajectory towards net zero by 2050, "*whether it* [the project] *contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

The future baseline will be determined by Ireland meeting its targets set out in the CAP23, and future CAPs, alongside binding 2030 EU targets.

9.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the Proposed Development particularly in areas where potential impacts to climate may occur. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the Proposed Development.

9.4.1 Construction Phase

The proposed works will comprise construction of a proposed Data Storage Facility and all associated elements. The key civil engineering works which will have a potential impact on climate during construction are summarised below:

i) During construction, machinery will be used in the site preparation works and during excavation for installation of shallow foundations, drainage services and ancillary infrastructure.

ii) Machinery will be used for the infilling and landscaping.

iii) Temporary storage of construction materials.

iv) Construction traffic accessing the site will emit greenhouse gases during transport.

As outlined in Section 9.6, a construction management plan will be formulated for the construction phase of the project to ensure greenhouse gas emissions are minimised.

9.4.2 Operational Phase

The proposed ICT Facility buildings, once fully operational, will require c. 48 MWe to operate. The data centre will be operated using electricity from the national grid.

The key works which will have a potential impact on climate during operation of the Proposed Development are summarised below:

i) Normal Operations Scenario: The data centre will operate using electricity from the national grid with the back-up HVO generators used infrequently. As a worst-case it is assumed that the backup generators are used for 400 hours per year.

ii) Road traffic accessing the site will emit greenhouse gases. However, the operational phase of the Proposed Development is not expected to contribute a significant volume of additional traffic on the local road network. Therefore, no local greenhouse gas assessment of the traffic impact is required for this development.

9.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

9.5.1 GHGA for the Construction Phase

Construction traffic would be expected to be the dominant source of greenhouse gas emissions during this phase of the Proposed Development. Construction vehicles and machinery will give rise to CO_2 and N_2O emissions during construction of the Proposed Development. The Institute of Air Quality Management document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) states that site traffic and plant is unlikely to make a significant impact on climate.

It is important to note that the potential impacts associated with the construction phase of the Proposed Development are short-term in nature. When the mitigation measures detailed in the mitigation section (see Section 9.6.1) of this report are implemented, GHG emissions from the site will not be significant. Due to the duration and nature of the construction activities, CO_2 and N_2O emissions from construction vehicles and machinery will have a *short-term* and *imperceptibly negative* impact on climate and thus have a *not significant* impact.

9.5.2 Impact of Climate Change on the Construction Phase

Appropriate flood risk measures and extreme weather events have been considered as part of the construction planning. However, the potential for changes to long-term seasonal averages as a result of climate change are not considered to be as significant. Thus, in line with the methodology outlined in Table 9.5, the likelihood of extreme weather and flooding is assessed to be of low sensitivity and with a low exposure leading to a finding of low vulnerability and thus a non-significant impact.

Examples of potential climate impacts are included in Annex D (Climate proofing and environmental impact assessment) of the *Technical Guidance on the Climate Proofing of Infrastructure* (European Commission, 2021a). Potential impacts to the Proposed Development as a result climate change include:

- Flood risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding;
- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather;
- Reduced temperatures resulting in ice or snow;
- Geotechnical impacts; and
- Major Storm Damage – including wind damage.

Each of these potential risks are considered with respect to the operational phase of the Proposed Development as detailed in Section 9.5. During the construction phase no assessment is required; however, consideration will be given to the project's vulnerability to climate impacts. During construction, the Contractor will be required to mitigate against the effects of extreme rainfall / flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind / storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction.

During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

9.5.3 GHGA for the Operational Phase

The Proposed Development has the potential, in the absence of mitigation, to release significant quantities of GHG emissions during the operational phase of the project. However, as the capacity of the Proposed Development is greater than 20 MW rated thermal input, a greenhouse gas emission permit will be required for the facility which will be regulated under the EU-wide Emission Trading System (ETS) which necessitates offsetting GHG emissions through the purchase of 'carbon credits'. Thus, the Proposed Development will operate under a system where GHG emissions will become increasingly costly and will encourage GHG emission reductions.

In relation to CAP24, under Section 11.2.1.1 EU Emission Trading System, it states:

"The EU ETS is an important mechanism to drive emissions reductions in Ireland. Revisions for the EU ETS proposed under the EU Fit for 55 package were formally approved in April 2023 and include significant changes that aim at strengthening the decarbonisation incentive in industry. EU ETS emissions are set to reduce by 62% (previously 43%) compared to 2005, further tightening the cap on all participants. In addition, while industrial emitters currently receive a proportion of free allocation of emissions permits, the updated EU ETS will see free allocation for many industries phased out from 2026, adding further upward pressure to the carbon price." (CAP24, page 191).

In addition, as outlined in the EU Climate Law (EU, 2021) under the Item (13): "*The EU ETS is a cornerstone of the Union's climate policy and constitutes its key tool for reducing greenhouse gas emissions in a cost-effective way."*

9.5.4 Impact of Climate Change on the Operational Phase

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. Changes in climate will lead to a variety of associates GHG impacts including:

- Increased average temperatures will lead to a greater requirement for cooling of the ICT Facility Buildings leading to greater energy use and associated GHG emissions;
- Increased rainfall will lead to a greater risk of flooding;
- Periods of drought may lead to reduction in water availability.

In order to determine the vulnerability of the Proposed Development to climate change the sensitivity and exposure of the development to various climate hazards must first be determined. The following climate hazards have been considered in the context of the Proposed Development: flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning, hail, landslides and fog. Wildfire and landslides were not considered relevant to the Proposed Development due to the project location and have been screened out of the assessment.

The sensitivity of the Proposed Development to the above climate hazards is assessed irrespective of the project location. Table 9.8 details the sensitivity of the Proposed Development on a scale of high (3), medium (2) and low (1). Once the sensitivity has been established the exposure of the Proposed Development to each of the climate hazards is determined, this is the likelihood of the climate hazard occurring at the project location and is also scored on a scale of high (3), medium (2) and low (1). The product of the sensitivity and exposure is then used to determine the overall vulnerability of the Proposed Development to each of the climate hazards as per Table 9.5. The results of the vulnerability assessment are detailed in Table 9.8 below.

Table 9.8 *Climate Change Vulnerability Assessment*

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (coastal, pluvial, fluvial)	1 (Low)	2 (Medium)	2 (Low)
Extreme Heat	1 (Low)	2 (Medium)	2 (Low)
Extreme Cold	1 (Low)	2 (Medium)	2 (Low)
Drought	1 (Low)	2 (Medium)	2 (Low)
Extreme Wind	1 (Low)	1 (Low)	1 (Low)
Lightning & Hail	1 (Low)	1 (Low)	1 (Low)
Fog	1 (Low)	1 (Low)	1 (Low)

The sensitivity and exposure of the area was determined with reference to a number of online tools and with input from the various discipline specialists on the project team. It was concluded that Proposed Development does not have any significant vulnerabilities to the identified climate hazards as described in the below sections. All vulnerabilities are classified as low.

Flooding

The CSEA Engineering Site Specific Flood Risk Assessment for the site concluded that for the Proposed Development there is:

- No risk associated with coastal flooding for this site;
- No fluvial flooding threat to the site;
- The subject site is located in Flood Zone C;
- The Proposed Development is classed as less vulnerable developments, and these are considered a suitable land use for Flood Zone C which also negates the need for a Justification Test.

The Proposed Development is within Flood Zone C which indicates that flooding is not a risk at the project locations. Additionally, the drainage for the development has been designed with an additional 20% to allow for increased rainfall in future years as a result of climate change.

Extreme Wind, Fog, Lightning & Hail

In relation to extreme winds, the appropriate wind loadings are to be calculated in line with the requirements of IS EN 1991-1-4. Lightning protection will be provided for the buildings and designed by a specialist. Hail and fog are not predicted to significantly affect the buildings due to their design.

Wildfires

In relation to wildfires, the *Think Hazard!* tool developed by the Global Facility for Disaster Reduction and Recovery (GFDRR) (2023), indicates that the wildfire hazard is classified as low for the Mayo area. This means that there is between a 4% to 10% chance of experiencing weather that could support a problematic wildfire in the project area that may cause disruptions and low but tangible risk of life and property loss in any given year. Future climate modelling indicates that there could be an increase in the weather conditions which are favourable to fire conditions, these include increases in temperature and prolonged dry periods. However, due to the project location the risk of wildfire is significantly lessened and it can be concluded that the Proposed Development is of low vulnerability to wildfires.

Landslides

Landslide susceptibility mapping developed by GSI indicates that the Proposed Development location is not within an area that is susceptible to landslides and there are no recorded historical landslide events at the project location. It can be concluded that landslides are not a risk to the Proposed Development site.

Extreme Temperatures (Heat & Cold)

At the detailed design stage chosen building materials will be high quality, durable and hard-wearing and chosen to withstand increased variations in temperature in the future as a result of climate change. Snow loads are to be calculated in line with the requirements of IS EN 1991-1-3 and new Met Eireann reports and mapping published in 2022.

Overall, the Proposed Development has at most low vulnerabilities to the identified climate hazards and therefore no detailed risk assessment is required.

Thus, in line with the methodology outlined in Table 9.4, the likelihood of extreme weather and flooding was assessed to be of low sensitivity and with a low or medium exposure leading to a finding of low vulnerability and thus a non-significant impact.

Under the 2021 Climate Act, the National Adaptation Framework, which aims to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts, remains in place as does the Carbon Action Plan, which will reduce GHG emissions in future years, with a number of other strategies currently being proposed.

The Electricity & Gas Networks Sector Climate Change Adaptation Plan prepared under the National Adaptation Framework has been prepared by the Department of Communications, Climate Action and Environment (DCCAE, 2019) and considers future climate change impacts on energy infrastructure and aims to reduce vulnerability by building resilience in the energy sector. The plan proposes to avoid or minimise future adverse impacts within the sector and to exploit opportunities. Steps include diversification of energy sources, improved communication between relevant bodies/stakeholders, a requirement for energy network companies to continue to ensure climate change is taken into account in planning and design standards and engineering management practices and identification of vulnerable areas and measures to take with respect to climate impacts.

9.6 MITIGATION MEASURES

9.6.1 Construction Phase

The objective of the mitigation measures outlined below is to ensure that GHG emissions are minimized wherever possible during the construction phase. The measures will include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.

- Where possible site traffic will avoid peak traffic periods to avoid congestion on local roads.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.
- Waste materials will be re-used on site where possible and where re-use is not possible on-site they will be sent off-site for recycling, re-use or recovery.
- Sourcing materials locally where possible to reduce transport related CO_2 emissions.

9.6.2 Operational Phase

The data centre will be powered by electricity from the national grid. A brief summary of some of the measures included in the Proposed Development which will help to reduce the impact to climate are:

- Artificial lighting will consist of energy efficient LED luminaires with the use of natural daylight as much as possible through the building design.
- The plant proposes to use recirculated air for Heating Ventilation and Air Conditioning (HVAC) where possible.
- A closed loop chilled water system will be used that will not consume water so there will be no impact on the local water networks aside from domestic use on admin block.
- Bicycle parking will be provided to promote more sustainable modes of travel.
- Electric vehicle charging will be provided which promotes more sustainable modes of travel.
- The PUE will be annualised to be below 1.19
- PV solar panels will be installed onsite with 50kW of input.

These above identified measures will aid in reducing the impact to climate during the operational phase of the Proposed Development in line with the goals of the Climate Action Plan.

9.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

9.7.1 Do Something Scenario - Construction Phase

The Institute of Air Quality Management document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) states that site traffic and plant is unlikely to make a significant impact on climate. Based on the scale and temporary nature of the construction works and the intermittent use of equipment, the potential impact on climate change from the direct impact of the Proposed Development is deemed to be *short-term, minor adverse* and *not significant* in relation to Ireland's obligations under the EU 2030 target.

9.7.2 Do Something Scenario - Operational Phase

9.7.2.1 Impact of Climate Change on the Operational Phase

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. A flood risk assessment has been undertaken as part of the permitted development on the site and adequate attenuation and drainage have been provided for to account for increased rainfall in future years. Therefore, the impact will be *minor adverse,* which is not significant.

9.7.2.2 Impact of the Operational Phase on Climate Change

The indirect CO_2 emissions from electricity and the direct CO_2 emissions from the backup generators has been assessed below in the context of Ireland's national annual CO_2 emissions.

The associated GHG emissions of the Proposed Development will be mainly dictated by the carbon intensity of electricity. The expected GHG emissions from electricity is shown in Table 9.3 based on the carbon intensity of electricity for the relevant year.

The indirect CO_2 emissions from electricity and the direct CO_2 emissions from the backup generators to operate the Proposed Development has been assessed below in the context of Ireland's national annual CO_2 emissions. Thus, for Year 2028, the GHG emissions from electricity will be based on the expected GHG emission rate in 2028 taking into the account the GHG reductions out to 2035.
The calculations are based on the 421 GWh from electricity, based on an average demand of 48 MWe and based on the emergency operation of the back-up HVO generators for 400 hours per year. The GHG emissions translates to approximately 62,450 tonnes of CO_2eq (including generator testing) based on the likely electricity GHG emission rate in 2028. By 2030, this is likely to decrease to 43,348 CO_2eq as the fraction of renewable gas increases on the electricity network as shown in Table 9.9. It is expected that by 2050, electricity will be carbon neutral in line with Government policy. In terms of GHG emissions relative to the Sectoral Emission Ceiling as outlined in Table 9.2

Table 9.2, the facility in 2030 will account for 1% of the 2030 electricity ceiling. In relation to the ETS 2030 target, the permitted facility will account for 0.006% of this target.

Table 9.9 *GHG Emissions (CO_{2eq}) for the Proposed Development (Tonnes CO_{2eq})*

Year	Electricity GHG Emissions (tonnes CO_2eq)	Back-Up Generator GHG Emissions (tonnes CO_2eq)	Total (tonnes CO_2eq)	% of 2030 Emission Trading System Target	% of 2030 Electricity Sectoral Emission Ceiling
2028	61150	1300	62450	0.008%	1.3%
2029	51599	1300	52899	0.006%	1.1%
2030	42048	1300	43348	0.006%	1.0%
2031	39946	1300	41246	0.006%	1.0%
2032	37843	1300	39143	0.005%	0.9%
2033	35741	1300	37041	0.005%	0.9%
2034	33638	1300	34939	0.005%	0.8%
2035	31536	1300	32836	0.008%	1.3%

9.7.3 Determination of the Impact of the Operational Phase on Climate

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors as set out in Section 9.2.4. In relation to climate, as there are no project specific assessment criteria, the Proposed Development has been assessed against the recommended IEMA (IEMA, 2022) significance determination (see Section 9.2.4).

In reference to Principle 1 of IEMA Guidance (IEMA, 2022), the Proposed Development will replace activities which have a higher GHG profile. Data centre facilities represent a significantly more efficient means of data storage when compared to a distributed model of enterprise data storage by individuals and companies (or ‘enterprise sites’). Data centres are more energy efficient than enterprise sites due to comprehensive efficiency central to the design of the Proposed Development. In a June 2020 report, the International Energy Agency noted: *“Hyperscale data centres are very efficient large-scale cloud data centres that run at high capacity, owing in part to virtualisation software that enables data centre operators to deliver greater work output with fewer servers. The shift away from small, inefficient data centres towards much larger cloud and hyperscale data centres is evident in the shrinking share of data centre infrastructure in total energy demand...”*[4]. A study published in 2020 by Science[5] Magazine, found that while cloud computing productivity has grown globally by 550% between 2010 and 2018, energy consumption rose in tandem during the same period by just 6%, demonstrating the energy efficiency improvements of the industry, most notably by hyperscale data centres, as per the current project. A report from the international Energy Agency (IEA) entitled “Data Centres & Data Transmission Networks (IEA, 2021) found that while global internet traffic surged by more than 40% in 2020, this strong growth in demandfor data centre services continues to be mostly offset by ongoing efficiency improvements for data centre infrastructure as shown in

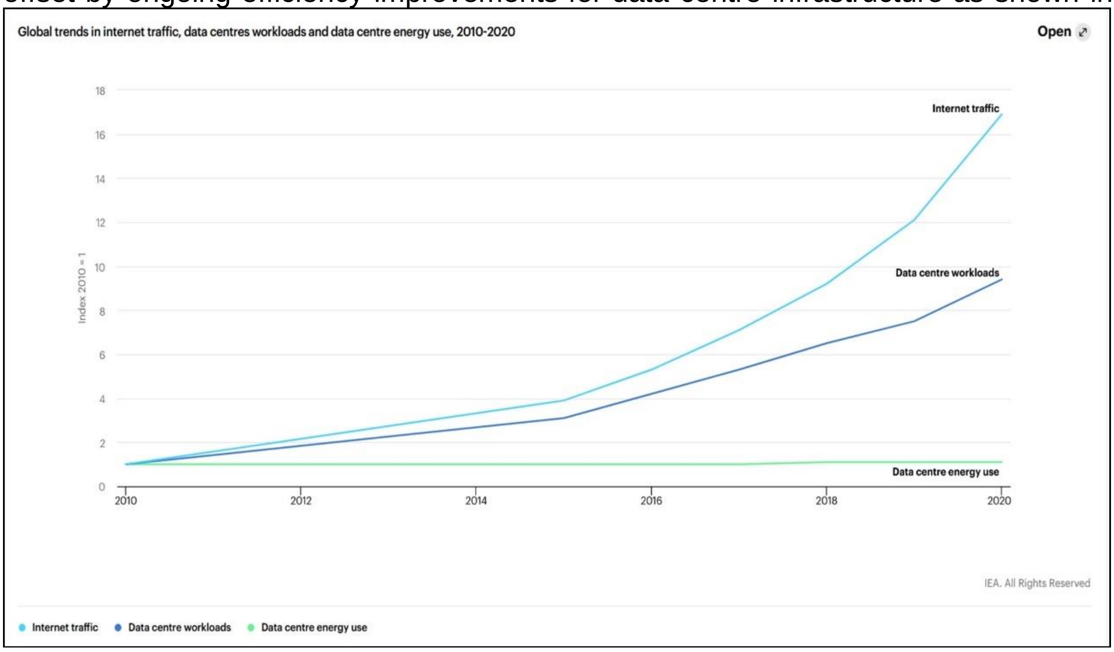


Figure **9.9**.

4 IEA Data Centres and Data Transmission Networks – June 2020

5 Masanet, Eric; Shehabi; Arman, Lei; Nuoa, Smith, Sarah; Koomey, Jonathan; “Recalibrating global data center energy-use estimates”, Sciencemag.org, February 28, 2020, Vol. 367, Issue 6481; (“Expressed as energy use per compute instance, the energy intensity of global datacenters has decreased by 20% annually since 2010….”).

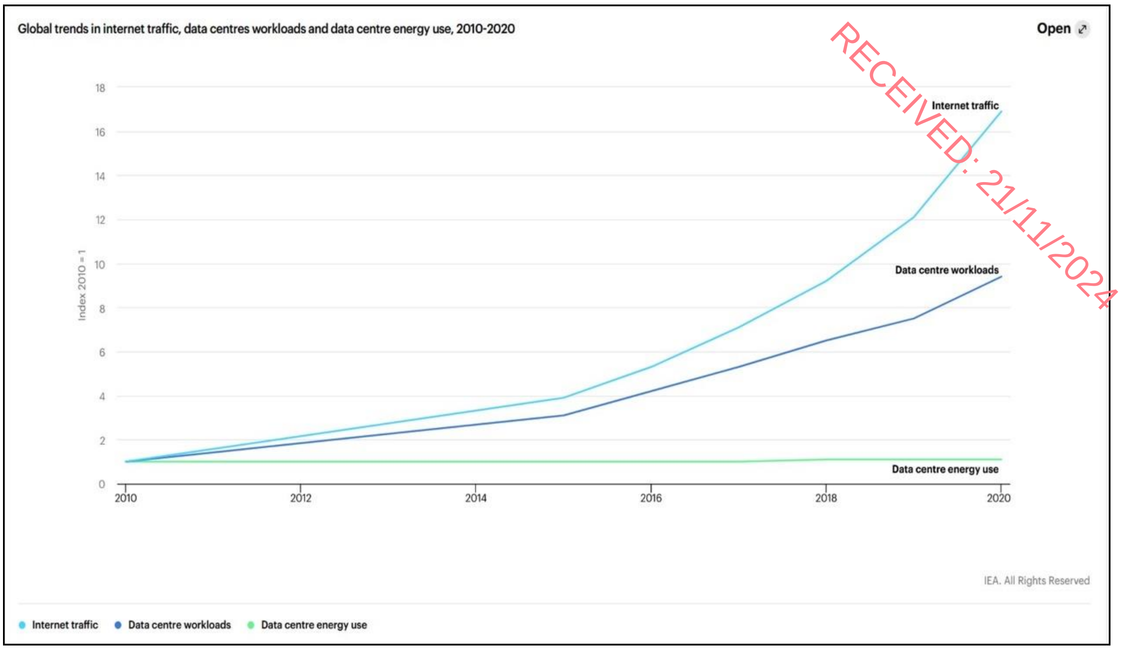


Figure 9.9 *Global Trends In Internet Traffic, Data Centres Workloads & Data Centre Energy Use,2010 – 2020 (IEA, 2021)*

In the wider context, data centres are approximately 80% more efficient than on-premises servers and the associated GHG savings have not been accounted for in the current analysis[5].

In reference to Principle 2 of IEMA Guidance (IEMA, 2022), a range of measures will be employed which will reduce GHG emissions and are in line with "best practice" as outlined in the IEMA guidance (IEMA, 2022) including the installation of PV panels and the investigation into the feasibility of a connection to a future district heating scheme.

In reference to Principle 3, it is the intention of the applicant that measures be implemented in line with "best practice" as outlined in the IEMA guidance (IEMA, 2022). The backup generators will be able to run with Hydrotreated Vegetable Oil (HVO). The phasing of the development and the period taken to reach full capacity within each planned phase will result in the 'ramping up' of demand associated with the project over a number of years during the lifetime of the permission and thus the GHG emissions in the early years of the project will be an overestimation of reality.

In addition, the project is proximal to substantial renewable generation projects (i.e.: Glenora, Sheskin, Bellacorick, etc) and the tenants of the Project would seek to enter into CPPAs with renewable (wind) generators/producers, including direct/private wire as and when it becomes available. The Project is targeting the major technology companies as its tenant, such as Microsoft, Google, Meta, Amazon, Oracle, Coreweave, Mistral. All of these companies have made commitments to offset carbon associated with the data centres and are actively seeking CPPA opportunities to do so. The project will work with local renewable developments and its customers to facilitate such CPPAs, supporting the development of additional renewable power. This will offset residual GHG emissions associated with the Proposed Development, given that the energy consumed by the development on site would be matched by renewable energy generation.

With a reduction in residual emissions through best practice and the implementation of a series of adaptive design measures, the net impact of the Proposed Development is not significant. Given that the use of electricity to power the facility will achieve net zero by 2050 and the intention to meet all interim fossil fuel derived GHG emissions associated with the Proposed Development by the purchase of Corporate Power Purchase Agreements (CPPAs) the predicted impact to climate is deemed to be ***indirect, long-term, negative and minor adverse***. Thus, the impact of the Proposed Development, in line with the IEMA methodology (IEMA, 2022), as shown in Figure 9.10 is reduced to a minor adverse, non-significant impact.

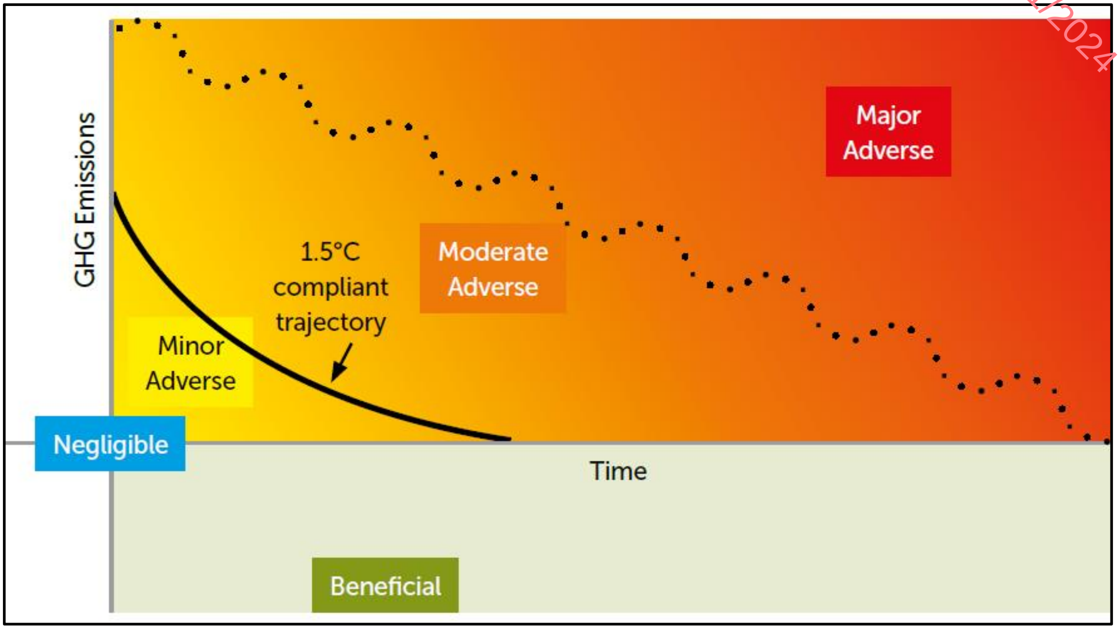


Figure 9.10 *Diagram of Significance Criteria – GHGs Emissions vs Time To 2050 (IEMA, 2022)*

Table 9.10 shows the significance of the project when compared to the 2030 ETS target and the Electricity 2030 Sectoral Emission Ceiling based on the approach set out in IEMA guidance (IEMA, 2022). The assessment is presented both prior to and post mitigation. As shown in Table 9.10, the impact of the project prior to mitigation would be deemed to be a moderately adverse impact. Although the Proposed Development prior to mitigation is better than the "do-nothing" scenario of enterprise data centres, the impact would still be significant in the absence of appropriate mitigation.

Also presented in Table 9.10 is the impact post mitigation. As outlined above the project will use "best practice" design measures and will be designed to incorporate as much HVO that is available. In addition, the project tenants will seek to enter into CPPAs to offset residual GHG emissions. With the implementation of these measures the impact of the proposed project, in line with the IEMA methodology (IEMA, 2022), will remain as a minor adverse, non-significant impact. Minor adverse is equivalent to slight under the EIAR terminology (EPA, 2022).

Table 9.10 *GHG Emissions Associated With The Proposed Development Compared To Sectoral Emission Ceiling & ETS*

Scenario	% Of 2030 ETS Total Note 1	% Of Electricity Emission 2030 Ceiling Note 2	Significance (Prior to mitigation)	Significance (After mitigation)
Do Something	0.006%	1.0%	Moderate Adverse	Minor Adverse

Note 1 ETS 2030 Total = 690.91 Million Tonnes CO_{2eq}
Note 2 Based on 2030

IEMA (2022) states in regards to significance that:

"A project's impact can shift from significant adverse to non-significant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science based emissions trajectory of ongoing but declining emissions towards net zero." (IEMA, 2022)

In addition, IEMA (2022) states that;

"*Where embedded/committed mitigation is relied upon in the assessment of effects, the practitioner must form a clear judgement that this mitigation is:*

1. *Evidenced in the design for the project,*
2. *A committed goal that is secured, e.g. forming part of the description of development, a specific planning condition/requirement, or a legal agreement,*
3. *Realistic and achievable to deliver."* (IEMA, 2022)

Thus, the mitigation measures outlined in Section 9.6 to ensure that any residual GHG emissions are mitigated in line with the IEMA guidance.

9.8 RESIDUAL IMPACTS

Once the mitigation measures outlined in Section 9.6 are implemented, the residual impacts on climate from the construction of the Proposed Development will be *short-term* and *slight* and for the operational phase of the Proposed Development will be *long-term, negative* and *slight.* Thus, in terms of climate, both the construction phase and operational phase will be *not significant*.

9.9 CUMULATIVE IMPACT

In relation to climate, all global cumulative GHG sources are relevant to the effect on climate change. As a result, the effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed. This is due to the fact that there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other (IEMA, 2022).

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CHAPTER 10:
NOISE AND VIBRATION

10

CONTENTS

10.0 NOISE AND VIBRATION

10.1 INTRODUCTION

This chapter of the EIAR was prepared to assess the potential significant effects on environmental noise and vibration of the proposed datacentre development adjacent to the Killala Business Park, within the townlands of Mullafarry and Tawnaghmore Upper, Killala, Co. Mayo.

The Proposed Development of the data centre and associated elements will include cooling and ventilation plant and stand-by generators.

10.2 METHODOLOGY

10.2.1 Proposed Approach

This Chapter has been prepared with reference to the following guidance documents:

- *EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports*, (2022)
- Environmental Protection Agencies *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)* (2016);
- BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1 – Noise* (2014);
- BS 5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 2 – Vibration* (2014);
- BS 7385-2:1993 *Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration* (1993);
- BS 6472: *Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz)* (1992);
- ISO 9613: *Acoustics – Attenuation of sound outdoors – Part 2: General method of calculation.* (1996);
- BS 4142: 2014+A1:2019: *Methods for Rating and Assessing Industrial and Commercial Sound* (2019);
- United Kingdom Highways England (now National Highways) (UKHE) *Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2* (UKHE, 2020);
- ISO 1996-2:2017 *Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels* (2017), and;
- Transport Infrastructure Ireland *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* (2014).

The following methodology has been adopted for this assessment:

- Review appropriate guidance, typical local authority planning conditions, etc. in order to identify appropriate noise criteria for the site operations;
- Carry out noise monitoring at a number of locations (e.g. in the vicinity of nearest sensitive properties/boundaries) to identify existing levels of noise in the vicinity of the development;
- Development of a detailed 3D noise model to consider the Proposed Development,; and;
- Comment on predicted levels against the appropriate criteria and existing noise levels and outline required mitigation measures (if any).

Appendix 10.1 presents a glossary of the acoustic terminology used throughout this document. In the first instance it is considered appropriate to review some basic fundamentals of acoustics.

10.2.2 Fundamentals of Acoustics

In order to provide a broader understanding of some of the technical discussion in this report, this section provides a brief overview of the fundamentals of acoustics and the basis for the preparation of this noise assessment.

A sound wave travelling through the air is a regular disturbance of the atmospheric pressure. These pressure fluctuations are detected by the human ear, producing the sensation of hearing. In order to take account of the vast range of pressure levels that can be detected by the ear, it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels (SPL) in decibels (dB).

The audible range of sounds expressed in terms of Sound Pressure Levels is 0 dB (for the threshold of hearing) to 120 dB (for the threshold of pain). In general, a subjective impression of doubling of loudness corresponds to a tenfold increase in sound energy which conveniently equates to a 10 dB increase in SPL. It should be noted that a doubling in sound energy (such as may be caused by a doubling of traffic flows) increases the SPL by 3 dB.

The frequency of sound is the rate at which a sound wave oscillates, and is expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250 Hz. In order to rank the SPL of various noise sources, the measured level has to be adjusted to give comparatively more weight to the frequencies that are readily detected by the human ear. Several weighting mechanisms have been proposed but the ‘A-weighting’ system has been found to provide one of the best correlations with perceived loudness. SPL’s measured using ‘A-weighting’ are expressed in terms of dB(A). An indication of the level of some common sounds on the dB(A) scale is presented in Figure 10.2.

The ‘A’ subscript denotes that the sound levels have been A-weighted. The established prediction and measurement techniques for this parameter are well developed and widely applied. For a more detailed introduction to the basic principles of acoustics, reference should be made to an appropriate standard text.

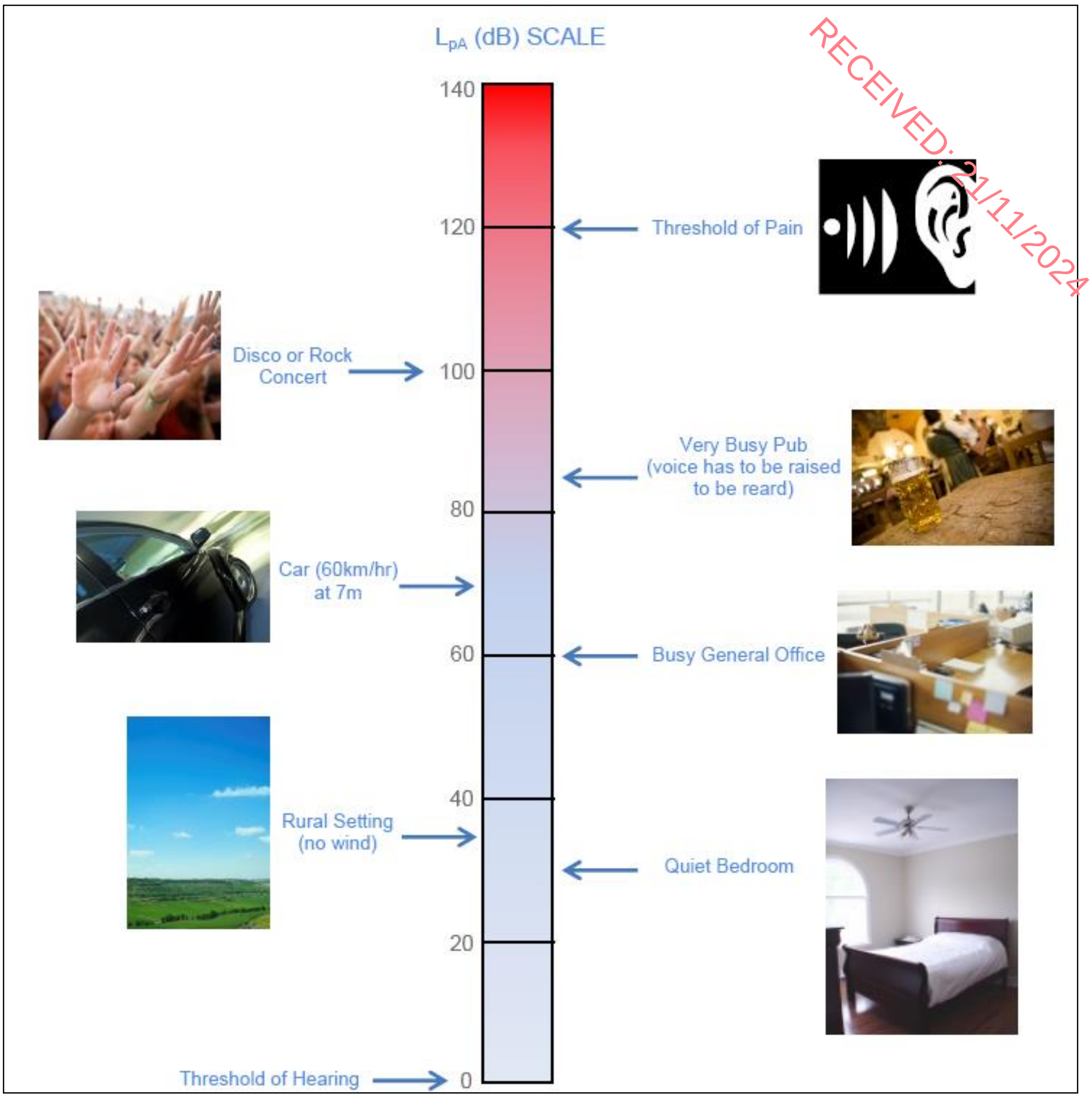

Figure 10.1 *dB(A) Scale & Indicative Noise Levels – (EPA: Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4 – 2016))*

10.2.3 Significance of Impacts

The significance of noise and vibration impacts has been assessed in accordance with the EPA Guidelines EIA Reports (2022); see Tables 10.1 to 10.3 below. As these guidelines do not quantify the impacts in decibel terms, reference has been made to the '*Guidelines for Environmental Noise Impact Assessment*' produced by the Institute of Environmental Management in 2014.

With regard to the quality of the impact, ratings may have positive, neutral or negative applications where:

Table 10.1 *Quality of Potential Effects*

Quality of Impact	Definition
Negative	A change which reduces the quality of the environment (e.g. by causing a nuisance).
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment (e.g. by removing a nuisance).

The significance of an impact on the receiving environment are described as follows:

Table 10.2 *Significance of Effects*

Significance of Impact on the Receiving Environment	Description of Potential Effect
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment.

The duration of effects as described in the EPA Guidelines are:

Table 10.3 *Duration of Effects*

Duration of Impact	Definition
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

10.2.4 Construction Phase Guidance – Noise

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities or An Bord Pleanála normally control construction activities by imposing limits on the hours of operation and/or applying noise limits for construction noise at noise-sensitive locations.

In the absence of specific noise limits, criteria relating to permissible construction noise levels for a development of this scale are taken from in the *British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise Annex E Section E.3.2*.

ABC Method

The approach adopted in *BS 5228-1* calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

The *BS 5228-1* document sets out guidance on permissible noise levels relative to the existing noise environment. Table 10.4 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors as recommended by *BS 5228-1*. These are construction noise levels only and not the cumulative noise level due to construction plus existing ambient noise.

Table 10.4 *Example Threshold of Significant Effect at Dwellings*

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A Note A	Category B Note B	Category C Note C
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends Note D	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

Note A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
Note B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
Note C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.
Note D) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

The approach is as follows: for each period (i.e. daytime, evening and night time) the ambient noise level is determined and rounded to the nearest 5 dB. Baseline monitoring carried out as part of this assessment (Refer to Section 10.4) indicates that the threshold values for Category A are appropriate in terms of the nearest noise sensitive locations being considered in this instance.

Proposed Construction Threshold Noise Levels

The following Construction Noise Threshold (CNT) levels are proposed for the construction stage of this development:

- For residential NSLs it is considered appropriate to adopt 65 dB(A) CNT for daytime periods and Saturday mornings.
- For non-residential NSLs it is considered appropriate to adopt the 70 dB(A) CNT.

Interpretation of the CNT

In order to assist with interpretation of CNTs, Table 10.5 includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is derived from Table 3.16 of DMRB: Noise and Vibration and adapted to include the relevant significance effects from the EPA Guidelines (EPA 2022).

Table 10.5 Description of the magnitude of impacts. Adapted from DMRB Table 3.16

Construction Noise Level	Magnitude of Impact (DMRB)	EPA Significance of Effect	Determination
Below or equal Baseline Noise Level	Negligible	Not Significant	Depending on range of CNL and baseline noise level
Above Baseline and below or equal to CNT	Minor	Slight – Moderate	
Above CNT and below or equal to CNT + 5dB	Moderate	Moderate – Significant	
Above CNT + 5dB	Major	Significant – Very Significant	

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely effects during the construction stages.

Construction Phase Traffic

Vehicular movement to and from the construction site for the Proposed Development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced *Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2* (UKHE, 2020) and the *EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA, 2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB document. Table 10.6 sets out the classification of changes in noise level to impact on human perception based on the guidance contained in these documents.

Table 10.6 *Classification of magnitude of traffic noise changes in the short-term*

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant
3 – 4.9	Perceptible	Moderate	Slight, Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

10.2.5 Construction Phase Guidance - Vibration

There are two aspects to the issue of vibration that are addressed in the standards and guidelines: the risk of cosmetic or structural damage to buildings; and human perception of vibration. In the case of this development, vibration levels used for the purposes of evaluating building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s. There is no published statutory Irish guidance relating to the maximum permissible vibration level. The following standards are referenced here in relation to cosmetic or structural damage to buildings:

- British Standard BS 5228-2 *Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration* (BSI 2014); and
- British Standard BS 7385-2 *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration* (BSI 1993)

Building Damage

BS7385-2 and BS5228-2 advise that, for soundly constructed residential properties and similar light-framed structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 of BS5228-2 may need to be reduced by up to 50%. On a cautious basis, therefore continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges. For buildings or structures that are structurally unsound, lower vibration magnitudes will apply, typically 50% of those for structurally sound buildings. Protected or historic buildings are not automatically assumed to be more vulnerable to vibration unless they have existing structural defects. This is summarised in Table 10.7 below.

Table 10.7 *Allowable Vibration during Construction Phase*

Type of building	**Peak component particle velocity in frequency range of predominant pulse**	
	4 Hz to 15 Hz	**15 Hz and above**
Reinforced or framed structures Industrial and heavy commercial buildings.	50 mm/s at 4 Hz and above	
Unreinforced or light framed structures. Residential or light commercial buildings.	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 1: Values referred to are at the base of the building.

Note 2: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

BS 5228-2 and BS 7385-2 state that minor structural damage can occur at vibration magnitudes greater than twice those in Table 10.7 and major structural damage can occur at vibration magnitudes greater than four times those in Table 10.7. The guide values contained in Table 10.7 relate to predominantly transient vibration which does not give rise to resonant responses in structures, and to low rise buildings.

Human Perception

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. Higher levels of vibration, however, are typically tolerated for single events or events of short duration. For example, during piling, one of the primary sources of vibration during construction, vibration levels may typically be tolerated at up to 2.5mm/s. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant to such activities during the night-time (or if they are trying to sleep during the daytime).

BS 5228-2 also provides a useful guide relating to the assessment of human response to vibration in terms of the peak particle velocity (PPV). Table 10.8 below summarises the range of vibration values and the associated potential effects on humans.

Table 10.8 Guidance on effects of human response to PPV magnitudes

Vibration Level, mm/s PPV	Description of Effect	Possible Significance Rating
≥10	Vibration is likely to be intolerable for any more than a brief exposure to a level of 10 mm/s	Very Significant
≥1 to <10	Increasing likelihood of complaints in residential environments but can be tolerated at the lower end of the scale if prior warning and explanation has been given to residents	Significant to Very Significant
≥0.3 to <1	Increasing likelihood of perceptible vibration in residential environments	Slight to Moderate
<0.3	Vibration is unlikely to be perceptible in even the most sensitive situations for most vibration frequencies associated with construction	Not significant

10.2.6 Operational Phase – Noise Guidance

EPA – NG4

An assessment of noise under the EPA NG4 guidance requires a noise survey of baseline conditions and then derives appropriate criteria for noise due to the operation of the site. The criteria apply at the façades of the noise-sensitive locations.

The first part of selecting the noise criteria is to carry out a 'quiet area' screening on the location of the site. To be considered a 'quiet area', the following three criteria are tested:

1. The site must be located **at least 3km from an urban area with a population of more than 1,000 people**: in this instance the site is approximately 2km from Killala town which has a population of less than 1000 people, therefore this criterion is met.
2. The site must be **at least 3 km away from any local industry**: Killala Business park and Tawnaghmore Power Station are adjacent to the site, therefore this criterion is not met.
3. The site must be **at least 5km away from any National Primary Route**: there is no national primary route within 5km therefore this criterion is met.

In this instance, only two of the above three criteria are met and therefore the site is not considered to be in a 'quiet area'.

Having confirmed that the site is not in a 'quiet area', the next part of the derivation of Noise criteria according to NG4 is to test whether the site meets the criteria for an 'area of low background noise'.

For a noise-sensitive location in the vicinity of the site to considered an 'area of low background noise', the noise levels measured at that location during the environmental noise survey need to satisfy <u>all three</u> the following criteria:

- Arithmetic Average of L_{A90} During Daytime Period ≤40 dB L_{A90}, and;

- Arithmetic Average of L_{A90} During Evening Period ≤35 dB L_{A90}, and;
- Arithmetic Average of L_{A90} During Night-time Period ≤30 dB L_{A90}.

Thus, depending on whether each location is considered an 'area of low background noise', Table 10.9 below outlines the noise emission limit criteria detailed in the NG4 document.

Table 10.9 *NG4 Approach for Determining Appropriate Noise Criteria*

Scenario	**Daytime Noise Criterion, dB $L_{Ar,T}$ (07:00 to 19:00hrs)**	**Evening Noise Criterion, dB $L_{Ar,T}$ (19:00 to 23:00hrs)**	**Night Noise Criterion, dB L_{Aeq} (23:00 to 07:00hrs)**
Areas of Low Background Noise	45 dB	40 dB	35 dB
All Other Areas	55 dB	50 dB	45 dB

The noise levels measured during the baseline noise surveys are presented in section 10.4.5 of this chapter. At Location UN1, Arithmetic Average of L_{A90} during the evening Period was 35 dB L_{A90} and that of the evening period was 36 dB L_{A90}. As such two of the criteria above are not met and the location is not considered an area of low background noise.

As the Proposed Development would continuously (i.e. on a '24/7' basis), the night-time noise criterion is critical to the assessment. As these nearest noise-sensitive locations are not identified as areas of low background noise as per the NG4 guidance, a 45 dB $L_{Aeq,T}$ night-time criterion applies. Note if plant noise were designed to this level, plant noise would be clearly audible and the dominant background source of noise at a number of noise sensitive locations in the vicinity of the development. It is appropriate to consider additional guidance in this instance.

Other Guidance – BS 4142: 2014+A1: 2019

BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* is the industry standard method for analysing building services plant sound emissions to residential receptors. BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. It should also be noted that the EPA NG4 document indicates that the BS 4142 assessment methodology should be used in the assessment of complaints associated with a sites' operations. As an IED licence will be sought for the site, the guidance contained therein needs to be given due regard.

For an appropriate BS 4142 assessment it is necessary to compare the measured external background sound level (i.e. the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where sound emissions are found to be tonal, impulsive, intermittent or to have other sound characteristics that are readily distinctive against the residual acoustic environment, BS 4142 advises that penalties be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal sound characteristics outlined in BS 4142 recommends the application of a 2dB penalty for a tone which is just perceptible at the receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible. In relation to intermittency, BS 4142 recommends that *If the intermittency is readily distinctive against the residual acoustic environment, a penalty* *of 3 dB can be applied.* The following definitions as discussed in BS 4142 as summarised below:

"*ambient sound level,* $L_{Aeq,T}$"	equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at any given time, usually from many sources near and far, at the assessment location over a given time interval, T.
"*residual sound level,* $L_{Aeq,T}$"	equivalent continuous A-weighted sound pressure level of the residual sound (i.e. ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound) at the assessment location over a given time interval, T.
"*specific sound level,* $L_{Aeq,T}$"	equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
"*rating level,* $L_{Ar,T}$"	specific sound level plus any adjustment for the characteristic features of the sound.
"*background sound level,* $L_{A90,T}$"	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

In order to establish an *initial estimate* of impact, BS 4142 states the following:

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level, and consider the following.

a. Typically, the greater this difference, the greater the magnitude of the impact.
b. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

The assessment methodology described above (i.e. comparison of rated sound level to background sound level) is quoted in BS 4142 as representing a methodology to '*obtain an initial estimate'* of impact. It is important to note that BS 4142 also comments that *'Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration'*. BS 4142 provides a list of potential pertinent factors that can influence the *'initial estimate'*. The plant noise assessment conducted in the following sections has been carried out with consideration of the guidance contained in BS 4142 as summarised above.

Non-residential Properties

The Old Rectory is located between the proposed development at the local road. It is currently not in use, though it is understood that it may be used as a civic centre or similar by the local authority. In terms of noise emissions from the site it is considered that an appropriate noise criterion at this location is 55dB $L_{Aeq,15min}$, which corresponds to the noise criterion for daytime periods in NG4.

Emergency Operation

In order to provide continuity of service a number of stand-by generators are integral to of the current proposal. These generators will only operate in a situation where there is a failure in the electricity supply from the national grid and will be tested routinely. Routine testing will be conducted during regular weekday daytime periods only. Section 4.4.1 of the Environmental Protection Agency (EPA) document "*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities*" (NG4 - 2016) contains the following comments in relation to emergency plant items:

> *'In some instances, …sites will have certain items of emergency equipment (e.g. standby generators) that will only operate in urgent situations (e.g. grid power failure). Depending upon the context, it may be deemed permissible for such items of equipment to give rise to exceedances in the noise criteria/limits during limited testing and emergency operation only. If such equipment is in regular use for any purposes other than intermittent testing, it is subject to the standard limit values for the site'.*

As generators will only run if there is a loss of power to the site, or for scheduled testing during daytime periods, the noise criterion of 55dB $L_{Aeq,T}$ on these emergency units is proposed. Generators will be designed and mitigated in order to achieve this design goal at nearby residential noise sensitive locations.

Recommended Criteria

Following review of relevant guidance, the following noise criteria are proposed for the Proposed Development:

Day to Day Operation (Residential Noise Sensitive) – 35dB $L_{Aeq,15min}$
Day to Day Operation (Non-residential Noise Sensitive) – 55dB $L_{Aeq,15min}$
Emergency Operation (Noise Sensitive) – 55dB $L_{Aeq,15min}$

Note plant noise emissions are to be designed such that they are not tonal and do not have impulsive characteristics at the nearest noise sensitive locations.

Assessment of Significance

The 'Guidelines for Environmental Noise Impact Assessment' produced by the Institute of Environmental Management and Assessment (IEMA) (2014) have been referenced in order to categorise the potential effect of changes in the ambient noise levels during the operational phases of the Proposed Development.

The guidelines state that for any assessment, the potential significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. Due to varying factors which effect human response to environmental noise (prevailing environment, noise characteristics, time periods, duration and level etc.) assigning a subjective response must take account of these factors.

The scale adopted in this assessment is shown in Table 10.10 below is based on an example scale within the IEMA guidelines. The corresponding significance of effect from in the EPA's EIA Report Guidelines (2022) is also presented.

Table 10.10 *Noise Effect Scale*

Noise Level Change dB(A)	Subjective Response	Impact Guidelines for Noise Impact Assessment Significance (Institute of Acoustics)	Effect Guidelines on the Information to be contained in EIARs (EPA)
0	No change	None	Imperceptible
0.1 – 2.9	Barely perceptible	Minor	Not Significant
3.0 – 4.9	Noticeable	Moderate	Slight, Moderate
5.0 – 9.9	Up to a doubling or halving of loudness	Substantial	Significant
10.0 or more	More than a doubling or halving of loudness	Major	Profound

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

It is considered that the criteria specified in the above table provide a good indication as to the likely significance of changes on noise levels and have been used to assess the impact of operational noise.

10.2.7 Operational Phase – Vibration Guidance

Guidance as to an acceptable magnitude of vibration during the operational phase of the development is taken from British Standard *BS 6472 (1992): Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz).* The Standard contains recommendations that continuous vibration in residential buildings should not exceed nominally 0.3mm/s by daytime and 0.2mm/s by night-time.

It should be noted that the Proposed Development will not give rise to any significant levels of vibration off site and therefore the associated impact is not significant.

10.2.8 Operational Phase – Additional Traffic

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, Table 10.11 offers guidance as to the likely impact associated with any particular change in traffic noise level based on the DMRB LA 111 Noise and Vibration (UKHE 2020) and the EPA Guidelines (EPA, 2022).

Table 10.11 *Classification of magnitude of traffic noise changes in the long term*

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Long-term)	EPA Significance of Effect
0.0 – 0.9	Inaudible	Negligible	Imperceptible
1.0 – 2.9	Barely Perceptible	Not Significant	
3 – 4.9	Perceptible	Minor	Slight, Moderate
5 – 9.9	Up to a doubling of loudness	Moderate	Significant
10+	Doubling of loudness and above	Major	Very Significant

10.2.9 Forecasting Methods

Construction noise calculations have been conducted generally in accordance with BS 5228: 2009+A1:2014: *Code of practice for noise control on construction and open sites - Noise.*

Prediction calculations for building services noise, car park activity and vehicle movements on site have been conducted generally in accordance with ISO 9613 (1996): *Acoustics – Attenuation of sound outdoors – Part 2: General method of calculation.*

Changes in road traffic noise on the local road network have been considered using prediction guidance contained within *Calculation of Road Traffic Noise (CRTN)* issued by the Department of Transport in 1988.

10.3 RECEIVING ENVIRONMENT

In the first instance it is considered appropriate to define a noise sensitive location. In this context, it is considered prudent to give consideration to adopt the definition supplied by the Environmental Protection Agency (EPA) which states the following in NG4 Appendix I:

> *NSL – any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.*

Figure 10.2 highlights the nearest noise sensitive locations to the proposed development. Table 10.12 presents details of each NSL.

Figure 10.2 *Noise-sensitive Locations*

Table 10.12 *Details of Noise-sensitive Locations*

NSL Ref	Approximate Distance to Proposed Building (m)	Comment
R01	145	Non-residential (the 'Old Rectory') Currently not in use.
R02	235	Residential
R03	950	Residential
R04	1,080	Residential
R05	1,210	Residential
R06	1,180	Residential
R07	650	Residential
R08	400	Residential
R09	370	Residential

10.3.1 Choice of Measurement Locations

Baseline noise monitoring has been completed at a number of representative locations in the vicinity of the development and is reviewed here to inform the characterisation of the existing noise environment. Figure 10.3 illustrates the approximate location of the noise monitoring locations.

Figure 10.3 *Baseline noise survey locations*

The monitoring locations are described as follows:

Location UN1	Located on the site and considered representative of the development site itself.
Location AT1	Located to the southwest of the site and representative of the noise sensitive locations at NSL01.
Location AT2	Located to the southeast of the site and representative noise sensitive locations at NSL02.

10.3.2 Measurement Periods

Noise measurements were conducted during typical day, evening and night-time periods. The night survey represents the time of night that provides a measure of existing background noise levels during a period where people are attempting to go to sleep or are sleeping.

An attended survey was completed at AT01 and AT02 during the following period:

- Daytime: 15:07 hrs to 17:20 hrs on 12 September 2024

An unattended survey was carried out at UN01 over the following period:

- 16:18 hrs on 12 September 2024 to 10:18 hrs on 13 September 2024.

Weather conditions were dry and calm during all periods with temperatures of the order of 19°C during the daytime period, 14°C during the evening and 12°C during the night.

10.3.3 Instrumentation

A Rion Type NL 42 Sound Level Meter (S/N 575782) was installed at UN01. Before, after and during each survey period, the measurement instrument was check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator.

A Bruel & Kjaer Type 2250 Sound Level Meter (S/N 2818091) was used for the attended noise survey completed at Locations AT01 and AT02. Before, after and during each survey period, the measurement instrument was check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator.

10.3.4 Measurement Procedure

Measurements were conducted at the locations noted above. Sample periods for the noise measurements were typically 15 minutes for the attended noise survey and 5 minutes for the unattended meters. During the attended survey the results were noted onto a Survey Record Sheet immediately following each sample and all data (for both the unattended and attended surveys) was saved to the instrument memory for post analysis. Survey personnel noted the primary noise sources contributing to noise build-up.

10.3.5 Results

The survey results for the daytime attended monitoring are given in Table 10.13.

Table 10.13 *Attended Monitoring Results*

Location	Start Time (hrs)	Sound Pressure Level (dB)	
		$L_{Aeq,15mins}$	$L_{A90,15mins}$
AT01	15:07	60	35
	15:47	65	33
	16:46	59	34
AT02	15:26	62	35
	16:27	63	36
	17:05	59	34

At AT01, Noise levels were in the range 59 to 65 dB $L_{Aeq,15min}$ and 33 to 35 dB $L_{A90,15min}$. Road traffic was infrequent, but a dominant source when audible. Distant windfarm and construction noise was also audible.

At AT02, Noise levels were in the range 59 to 62 dB $L_{Aeq,15min}$ and 34 to 36 dB $L_{A90,15min}$. The same noise sources as AT01 were noted here.

For location UN1, the measured noise levels for the evening and night-time measurements are displayed in Figure 10.4, and average results are displayed in Table 10.14.

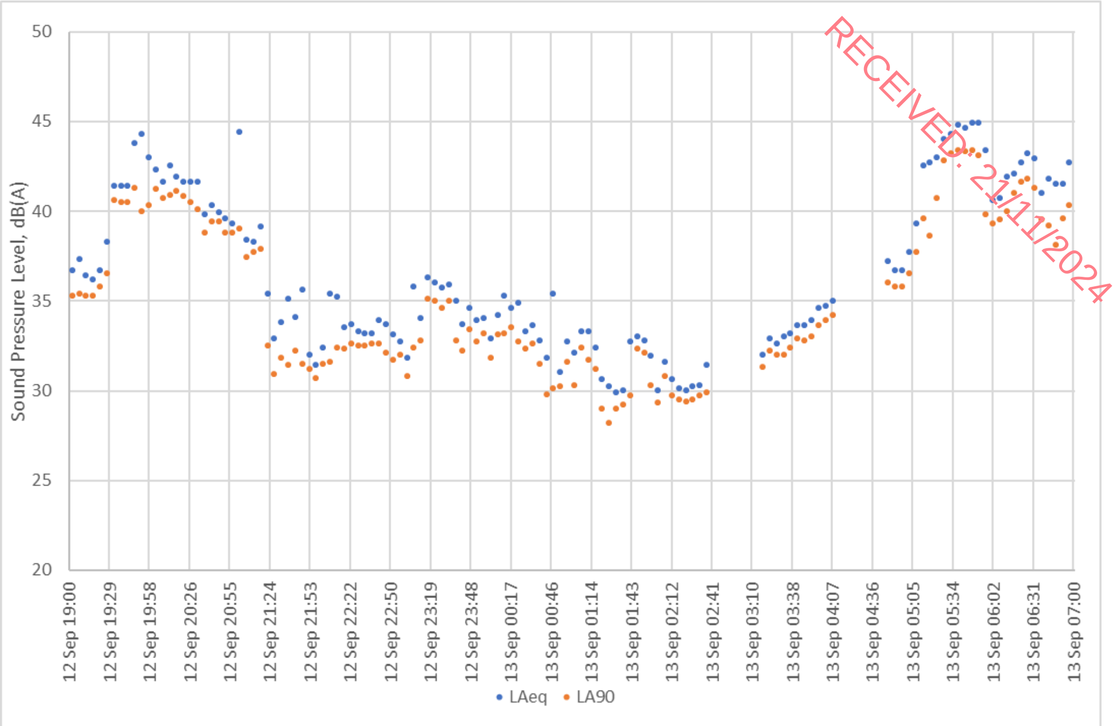

Figure 10.4 *Time History of Unattended Measured Noise Levels.*

Note: Short periods of elevated noise levels at 02:45 to 03:15 hrs and 04:15 to 04:45 hrs have been removed from the data set

Table 10.14 *Average Unattended Measured Noise Levels*

Location	Period	Sound Pressure Level (dB)	
		$L_{Aeq,15mins}$	$L_{A90,15mins}$
UN01	Evening	39	36
	Night	39	34

10.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The Proposed Development comprises the construction of a single data centre building along with all associated and ancillary development, sprinkler tank and pump house, and all associated works. A full description of the development can be found in Chapter 2: Description of the Proposed Development.

10.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

The Proposed Development will involve the construction of the proposed data centres and associated ancillary development. When considering a development of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages:

- construction phase, and;
- operational phase.

The construction phase will involve extensive excavation, rock breaking, general site preparation over the development site and the erection of the new building over a phased construction period. An assessment will also be presented in the following sections in relation to noise from construction traffic on local roads.

The primary sources of outward noise in the operational context are deemed long term and will involve:

- building services noise;
- emergency site operations, and;
- additional vehicular traffic on public roads.

These issues are discussed in detailed in the following sections.

10.5.1 Construction Phase

The construction stage will be undertaken over a number of phases from site preparation through to building construction and internal fit out. In terms of the potential noise and vibration impacts, the key stages and activities are expected to involve:

- Ground works (excavation and piling);
- Superstructure Construction; and Internal fit out.

The construction programme will create typical construction activity related noise onsite. Indicative ranges of noise levels associated with construction may be calculated in accordance with the methodology set out in British Standard Institute (BSI) BS 5228-1:2009 +A1:2014 *Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise* (2014) . This standard sets out sound power / sound pressure levels for plant items normally encountered on construction sites, which in turn enables the prediction of noise levels.

The following section discusses typical noise levels associated with the proposed development demolition/construction phase and comments on potential noise impacts at distances to the nearest Noise Sensitive Locations (NSLs) during the key stages and types of activities that will occur on site.

Excavation and Piling

For construction works associated with activities such as excavation and structural works including excavators, loaders, dozers, cranes, generators, concreting works and continuous flight augured piling etc. noise levels are typically in the range of 70 to 82 dB L_{Aeq} at 10m. Non-percussive piling methods will be employed on the site.

Construction of Proposed Structure

For construction work areas with lower noise levels such as those associated with superstructure works including site compounds (for storage, offices and material handling, generators etc.), smaller items of mobile plant (excavators, cranes, dozers), landscaping and concreting works with lower noise emissions, a total construction noise level of 80 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would include, for example two items of plant at 75 dB L_{Aeq} and three items of plant at 70 dB L_{Aeq} operating simultaneously within a work area.

Indicative Construction Noise Levels

Indicative noise calculations have been undertaken which assume that plant items are operating for 66% of the time. It must be stated that for most of the time, plant and equipment will be a greater distance from the nearest NSLs than those used within the calculations and the "on-time" of plant and equipment will be less than those assumed over a normal working day (i.e. the use of piling rigs or breakers will be in use for shorter periods than those assumed over a normal working day) and consequently will have lower noise levels. The assessment presented is therefore representative of a best estimate conservative scenario representing construction activities. Table 10.15 presents the calculated noise levels at varying distances.

Table 10.15 *Calculated Construction Noise Levels at Varying Distances*

Activity	Predicted Construction Noise Level $L_{Aeq(1hour)}$ (dB)				
	40 m	50 m	100 m	200 m	300 m
Excavations and Piling Works	63	61	53	45	41
General Site Work including Superstructure and Fit out	61	59	51	43	39

Reference to the construction noise levels in Table 10.15 indicate that the CNT of 65 dB $L_{Aeq,T}$ will be not exceeded at the closest residential NSLs when activities are occurring along the closest site boundaries. However, a range of noise levels will occur as works take place across the site. It is noted that NSL ref R01 is not currently in use. The resultant noise effects are negative, not significant and short-term.

Notwithstanding this, general measures for controlling noise from construction activity are presented in section 10.6.1.

Construction Vibration

Expected vibration levels during piling assuming augured or bored piles have been determined through reference to published empirical data. The British Standard BS 5228 – Part 2: Vibration, publishes the measured magnitude of vibration of rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock, (Table D.6, Ref. No. 106):

- 0.54 mm/s at a distance of 5m, for auguring;
- 0.22 mm/s at a distance of 5m, for twisting in casing;
- 0.42 mm/s at a distance of 5m, for spinning off, and;
- 0.43 mm/s at a distance of 5m, for boring with rock auger.

Taking into account the distance to the closest off site sensitive buildings on all perimeters, vibration emissions from this activity will be significantly reduced. Vibration levels at the closest neighbouring buildings will be orders of magnitude below the limits set out in Table 10.7 to avoid any cosmetic damage to buildings, and will be below the thresholds for human perception. The resultant vibration effects are negative, not significant and short-term.

Construction Traffic

During the construction phase of the proposed development, construction traffic will use public roads and there will be a corresponding increase in traffic noise levels. The predicted change in noise levels due to an increase in road traffic has been calculated based on information in the Traffic and Transport Assessment prepared for the proposed development.

For the purposes of assessing potential noise impact, it is appropriate to consider the relative increase in noise level associated with construction traffic movements on existing roads surrounding the subject site with and without development using, in this instance, AM and PM peak hour data. The impact from the increase in traffic from the construction of proposed development has been assessed for the year 2026, at junctions 1, 2 and 3 as refenced in the Traffic and Transport Assessment. Table 10.16 presents the changes in traffic noise levels.

Table 10.16 *Predicted Change In Noise Level associated with Construction Traffic*

Junction	Noise level Increase (dB L_{A10}) due to Construction of Proposed Development	
	AM Peak Hour	PM Peak Hour
1	+0.5	+0.5
2	+2.1	+1.7
3	+0.4	+0.4

Predicted increases in traffic noise levels are in the range 0.4 to 2.1 dB L_{A10}. In accordance with the criteria in Table 10.6, the associated effect is described as ‘not significant’. The resultant noise effects are negative, not significant and short-term.

10.5.2 Operational Phase

The primary sources of outward noise from the Proposed Development in the operational context are deemed long term and will involve:

- building services noise;
- emergency site operations; and
- additional vehicular traffic on public roads.

These issues are assessed in detailed in the following sections. See Appendix 10.4 for details of the noise modelling undertaken for this assessment and associated input information.

Building Services Noise / Emergency Site Operation

Three scenarios have been developed to consider the noise impact of the proposed operations. These are as follows:

- Scenario A: Day-to-day operations of the Data Centre;
- Scenario B: Emergency Operations in the event of an interruption in electricity supply to the site, where the backup generators are used;
- Scenario C: Generator Testing at scheduled day-time periods.

Scenario A would be considered to be the most representative of the day to day operation. Scenario B is representative of emergency situation when a power outage or issue with supply from the national grid has occurred and is therefore required to keep the data centres operation on electricity from the emergency generators. It should be noted that such an event is an extremely rare occurrence.

Scenario C considers the impact associated with the occasional testing of emergency generators. Only one generator unit will be tested at any one time. The predicted noise level for Scenario C presented here assume that the closest generator to existing noise sensitive locations is being tested.

The results of the iterations of the noise model are presented and are compared to the relevant noise criteria as adopted for this assessment in Table 10.17. Note all plant will be selected such that no tonal noise emissions are evident at noise sensitive locations.

Noise contours are presented for the scenarios described in order to demonstrate the noise impact of the Proposed Development over a wider area in Figures 10.10, 10.11 and 10.12.

It should be noted that the testing of generators shall take place only between 09.00 and 17.00 hrs.

Table 10.17 *Comparison of Predicted Noise Levels vs. Adopted Noise Criteria*

Location	Scenario A			Scenario B			Scenario C		
	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?
R01	32	35	✓	53	55	✓	43	55	✓
R02	35		✓	44		✓	46		✓
R03	23		✓	32		✓	33		✓
R04	22		✓	30		✓	32		✓
R05	19		✓	29		✓	29		✓
R06	22		✓	32		✓	32		✓
R07	25		✓	38		✓	35		✓
R08	30		✓	41		✓	40		✓
R09	30		✓	41		✓	41		✓

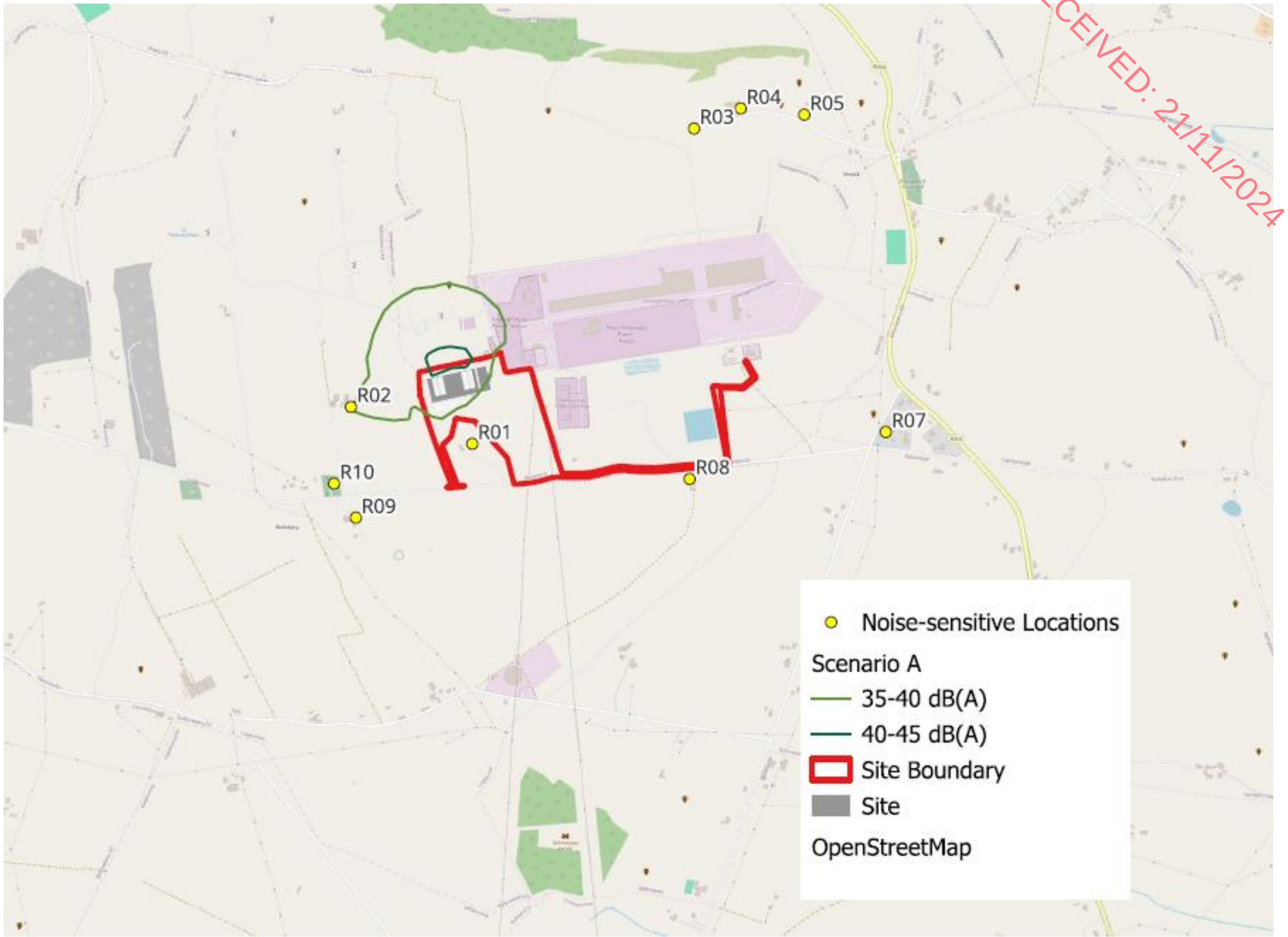

Figure 10.5 *Scenario A – Noise Contour for Day to Day Operations*

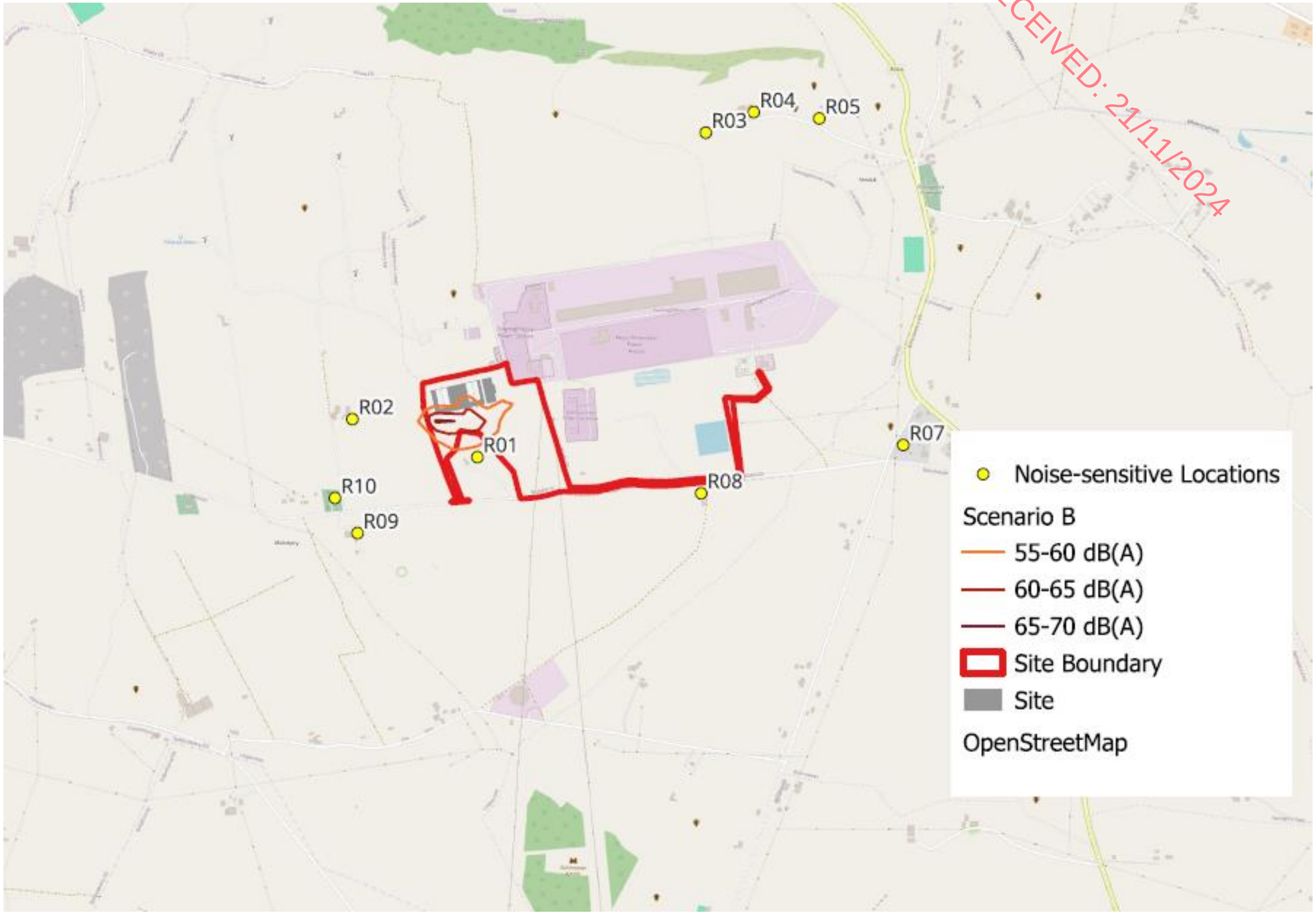

Figure 10.6. *Scenario B – Noise Contour for Emergency Operations*

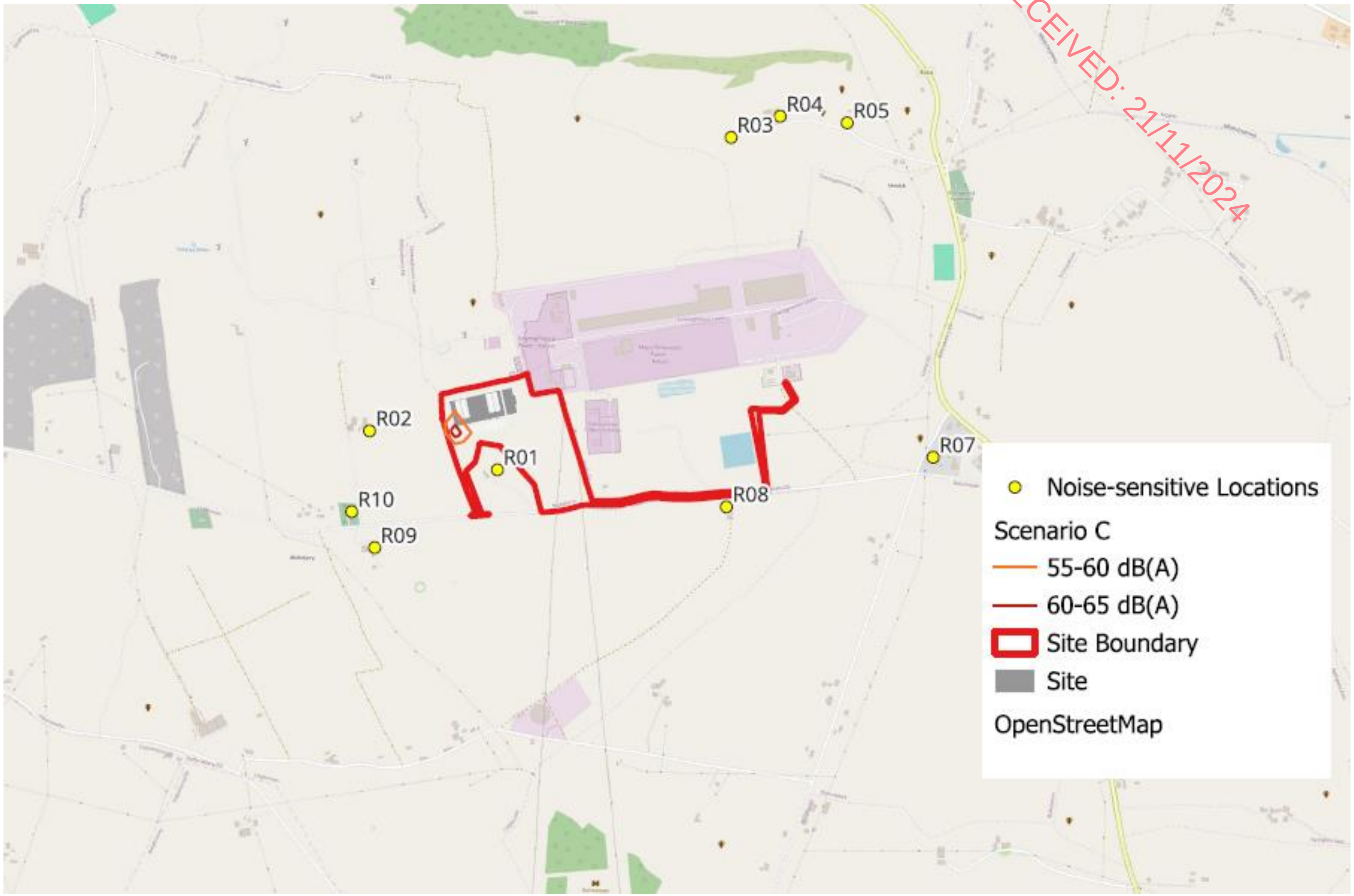

Figure 10.7. *Scenario C - Noise Contour for Generator Testing Noise Contour*

<u>Scenario A</u> Noise levels at all locations comply with the adopted criterion of 35dB $L_{Aeq,T}$ in relation to day to day operations. Figure 10.10 presents a noise contour for Scenario A.

<u>Scenario B</u> All locations are within the relevant adopted emergency operation limit of 55 dB $L_{Aeq,T}$ in the rare event that a power loss to the site occurs. Figure 10.11 presents a noise contour for Scenario B.

<u>Scenario C</u> All locations are within the relevant adopted daytime limit of 55 dB $L_{Aeq,T}$ by a significant margin during periods when a single generator is undergoing routine testing. Figure 10.12 presents a noise contour for Scenario C.

<u>Summary</u>

Scenario A is representative of the typical day to day operations envisioned for the site. Review of the predicted noise levels and associated noise contours confirms that the site-specific levels comply with the noise criterion adopted for this assessment.

Scenario B is representative of emergency situations such as a power outage on the national grid. Review of the predicted noise levels and associated noise contours confirm that the site-specific levels comply with the noise criterion that has been adopted for these situations following review of relevant guidance.

Scenario C is representative of the intermittent testing of generator units. Review of the predicted noise levels and associated noise contours confirm that the site-specific levels comply with the relevant daytime noise criterion relevant to these proposed activities.

<u>Review of Increases in Noise Level</u>

Table 10.18 presents the predicted changes in noise level associated with the development at the nearest noise sensitive locations to the site.

Table 10.18 *Review of Predicted Changes in Existing Noise Levels*

Loc.	Scenario A – Typical Operation Night Time				
	Predicted dB $L_{Aeq,T}$	Background Level dB $L_{A90,T}$	Cumulative Noise Level (dB(A))	Change in Noise Level (dB)	EPA Glossary of Effects
R01	32	34	36.1	+2.1	Not Significant
R02	35	34	37.5	+3.5	Slight - Moderate
R03	23	34	34.3	+0.3	Imperceptible
R04	22	34	34.3	+0.3	Imperceptible
R05	19	34	34.1	+0.1	Imperceptible
R06	22	34	34.3	+0.3	Imperceptible
R07	25	34	34.5	+0.5	Imperceptible
R08	30	34	35.5	+1.5	Not Significant
R09	30	34	35.5	+1.5	Not Significant

Review of the predicted increases in noise level at the nearest noise sensitive locations conclude that the associated impact is 'imperceptible' or ‘not significant’ at all locations except R02 where a slight to moderate effect is noted for night-time periods.

Additional Vehicular Traffic on Public Roads

During the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site. The predicted change in noise levels due to an increase in road traffic has been calculated based on information in the Traffic and Transport Assessment prepared for the proposed development.

For the purposes of assessing potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads surrounding the subject site with and without development using, in this instance, AM and PM peak hour data. The impact from the increase in traffic from the proposed development has been assessed for the year 2031 and the year of 2041 relative to the scenario where the development is not progressed, at junctions 1, 2 and 3 as refenced in the Traffic and Transport Assessment. Table 10.19 presents the changes in traffic noise levels

Table 10.19 *Predicted Change In Noise Level associated with Vehicular Traffic*

Junction	Noise level Increase (dB L_{A10}) due to Proposed Development			
	2031		2041	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1	+0.3	+0.3	+0.3	+0.3
2	+1.4	+1.2	+1.4	+1.2
3	+0.3	+0.3	+0.3	+0.3

Predicted increases in traffic noise levels are in the range 0.3 to 1.4 dB L_{A10}. In accordance with the criteria in Table 10.11, the associated effect is described as 'not significant'.

Summary of Operational Effects

In terms of noise associated with day to day activities the associated effect is stated to be negative, imperceptible to slight-to-moderate and long-term.

There is no source of vibration associated with the day to day operation of the development that will give rise to impacts at nearby noise sensitive locations. In terms of these the operational vibration effects of the proposed development the associated effects are neutral, imperceptible and long-term.

10.6 MITIGATION MEASURES

In order to sufficiently mitigate the likely noise impact, a schedule of noise control measures has been formulated for both construction and operational phases associated with the Proposed Development.

10.6.1 Construction Phase

With regard to construction activities, reference will be made to BS5228 Parts 1 and 2, which offer detailed guidance on the control of noise and vibration from demolition and construction activities. Various mitigation measures will be applied during the construction of the Proposed Development. Specific examples of such measures are:

- Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- Establishing channels of communication between the contractor/developer, Local Authority and residents;
- Appointing a site representative responsible for matters relating to noise and vibration;
- Monitoring levels of noise and/or vibration during critical periods and at sensitive locations; and
- All site access roads will be kept even so as to mitigate the potential for vibration from lorries.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include:

- Selection of plant with low inherent potential for generation of noise and/ or vibration;
- Erection of barriers as necessary around items such as generators or high duty compressors; and
- Situate any noisy plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

It is recommended that during any rock breaking or similar vibration-generating works, vibration from construction activities to off-site residences be limited to the values set out in Table 10.7 through monitoring of vibration at the site boundary or at noise-sensitive locations. It should be noted that these limits in Table 10.7 are not absolute, but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage these limits may need to be reduced by up to 50%, as stated in BS5228.

Note - Appendix 10.4 presents an indicative construction noise and vibration management plan that will be considered in terms of the day to day operation of the site. This will focus on opening up and maintaining lines of communication with the local community to address issues in relation to noise and/or vibration and to advise the community of periods where specific activities take place (e.g. rock breaking) that have an increased potential noise and vibration generation.

10.6.2 Operational Phase

Building Services Noise / Emergency Site Operation

Noise from external plant will be minimised by purchasing low noise generating equipment and incorporating appropriately specified in-line acoustic attenuators or ‘silencers’ for stacks and exhausts where necessary. With due consideration as part of the detailed design process, this approach will result in the site operating within the constraints of the best practice guidance noise limits that have been adopted as part of this detailed assessment.

Additional Vehicular Traffic on Public Roads

During the operational phase of the development, noise mitigation measures with respect to the effect of traffic due the development are not deemed necessary.

10.7 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

This section summarises the likely noise and vibration impact associated with the Proposed Development, taking into account the mitigation measures.

10.7.1 Construction Phase

During the construction phase of Proposed Development there will be some impact on nearby noise sensitive properties due to noise emissions from site traffic and other activities. The application of noise limits and hours of operation (i.e. as per Table 10.5, 10.6 and Section 10.2.4), along with implementation of appropriate noise and vibration control measures (as summarised in Section 10.6.1), will ensure that noise and vibration impact is kept to a minimum. Also it is reiterated that any construction noise effects will be ***negative not significant*** and ***short term*** in nature.

10.7.2 Operational Phase

Building Services Noise / Emergency Site Operation

Proprietary noise and vibration control measures have been employed including plant selection and acoustic screening, in order to ensure that noise emissions from building services plant do not exceed the adopted criterion at the façade of any nearby noise sensitive locations. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements. The resultant noise effect is ***negative, slight to moderate*** and ***long-term***.

Additional Vehicular Traffic on Public Roads

No mitigation was required, and the effect is determined to be negative, not significant and long-term.

10.8 CUMULATIVE EFFECTS OF THE PROPOSED DEVELOPMENT

A set of third-party developments is considered here for potential cumulative noise and vibration effects.

10.8.1 Construction Phase

It is not anticipated that there will be any other construction activities that would give rise to significant cumulative impacts during the construction phase. With the implementation of mitigation measures described in Section 10.6.1, the predicted construction noise emissions for the proposed development are not of enough magnitude to cause an increase in the cumulative construction noise emissions exceeding the threshold for significant impacts at any NSL.

10.8.2 Operational Phase

Ref 2360266: Hydrogen Plant (Constant Energy Limited)

Review of the noise assessment for the Hydrogen Plant shows that the noise-sensitive location R02 is referred to as NSR17 in the noise chapter for that development. As shown in Table 9.17 of that EIAR, the predicted noise level at R02/NSR17 is 33.2 dB $L_{Aeq,T}$. In the table below, the assessment of significance is repeated for location R02, taking the noise contribution from the Hydrogen Plant into account.

Table 10.20 *Review of Cumulative Noise Effects with planning application 2360266*

Parameter	Value
Predicted Noise level due to Proposed Development, dB $L_{Aeq,T}$	32
Predicted Noise level due to Hydrogen Plant, dB $L_{Aeq,T}$	33
Combined Noise Level, dB $L_{Aeq,T}$	37.1
Background Noise level, dB $L_{A90,T}$	35
Cumulative Noise Level	39.2
Increase in Noise Level	+4.2
Effect	Slight-Moderate

The cumulative noise effect is unchanged, i.e. negative, slight-moderate and long-term.

Ref 2360134: Tawnaghmore Power Station Biomass Plant (Mayo Renewable Limited)

Review of the noise assessment for the Biomass Plant does not refer to the noise-sensitive location R02, rather an NSL to the north (referred to as NS4 therein, understood to correspond to R03 in Figure 10.2). The predicted noise level due to the Biomass Plant at this location of 34 dB $L_{Aeq,T}$ is taken as also representative of noise levels at R02 due to the similar distance from the site. In the table below, the assessment of significance is repeated for location R02, taking the noise contribution from the Biomass into account.

Table 10.21 *Review of Cumulative Noise Effects with planning application 2360266*

Parameter	Value
Predicted Noise level due to Proposed Development, dB $L_{Aeq,T}$	32
Predicted Noise level due to Biomass Plant, dB $L_{Aeq,T}$	34
Combined Noise Level, dB $L_{Aeq,T}$	36.1
Background Noise level, dB $L_{A90,T}$	35
Cumulative Noise Level	38.5
Increase in Noise Level	+3.5
Effect	Slight-Moderate

The cumulative noise effect is unchanged, i.e. negative, slight-moderate and long-term.

Ref 2193: Anerobic Digestion Biogas facility (Lisglennon Ad Limited)

With reference to Table 9.7 in the Planning and Environmental Constraints report for this application, noise levels at nearest NSLs to the that site are below 30 dB LAeq,T. With the additional distance to the NSL discussed in this noise chapter, there is no likelihood of significant cumulative noise impact.

Ref 21708: Continued use of quarry

Any potential noise emissions from the quarry are captured in the baseline noise survey. The quarry does not operate during night-time periods, and such there is no likelihood of significant cumulative noise impact.

Ref 21342: Quarry Restoration

Due to additional distance and the fact that the quarry will not operate during night-time periods, and such there is no likelihood of significant cumulative noise impact.

Ref 19351: Telecoms Mast (Westland Networks)

The telecom mast does not produces any significant noise therefore there is no likelihood of significant cumulative noise impact.

Ref 17619: Killala Community Wind Farm

This site is subject to specific noise conditions for wind farms due to the dependence of the noise generated on the wind speed at any moment. The noise criteria selected for the proposed data centre development are such that there is no likelihood of significant cumulative noise impact

10.9 REFERENCES

- EPA Guidelines on *Information to be contained in Environmental Impact Statements* (2002).
- Environmental Protection Agencies *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)* (2016);
- BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1 – Noise* (2014);
- BS 5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 2 – Vibration* (2014);
- BS 7385-2:1993 *Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration* (1993);
- BS 6472: *Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz)* (1992);
- ISO 9613: Acoustics – *Attenuation of sound outdoors – Part 2: General method of calculation* (1996);
- BS 4142: 2014+A1:2019: *Methods for Rating and Assessing Industrial and Commercial Sound* (2019);
- Institute of Environmental Management and Assessment (IEMA) *Guidelines for Environmental Noise Impact Assessment* (2014);
- United Kingdom Highways England (now National Highways) (UKHE) *Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2* (UKHE, 2020);
- ISO 1996-2:2017 Acoustics - D*escription, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels* (2017);
- Transport Infrastructure Ireland Guidelines for the *Treatment of Noise and Vibration in National Road Schemes* (2014).

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CHAPTER 11:

LANDSCAPE AND VISUAL IMPACT ASSESSMENT

11

CONTENTS

11.0 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

11.1 INTRODUCTION

This chapter of the EIAR assesses the likely significant effects of the Proposed Development on landscape and visual amenity, following the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3). The assessment evaluates receptor sensitivity and predicted changes to landscape character and views within a 2km circumference of the Proposed Development. It summarises the effects during construction and operational stages, identifying any potentially unacceptable impacts and necessary mitigation. Impacts are rated on a scale ranging from Imperceptible to Profound. It should be read in conjunction with the verified photomontages contained in Appendix 11.1 of the EIAR (under separate cover).

11.2 METHODOLOGY

The chapter was prepared with reference to the Landscape Institute's *Guidelines for Landscape and Visual Impact Assessment*, 2013 (GLVIA) and the EPA *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, 2022.

11.2.1 Key Principles of the GLVIA

11.2.1.1 Use of the Term 'Effect' vs 'Impact'

The GLVIA requires that the terms 'impact' and 'effect' be clearly distinguished and consistently used. 'Impact' is defined as the action being taken, e.g. the introduction to the landscape of buildings, infrastructure or landscaping. 'Effect' is defined as the change resulting from those actions, e.g. change in landscape character or in the composition of a view.

11.2.1.2 Assessment of Both 'Landscape' and 'Visual' Effects

The GLVIA requires that effects on views and visual amenity be assessed separately from the effects on landscape, although the two topics are inherently linked.

'Landscape' results from the interplay between the physical, natural and cultural components of our surroundings. Different combinations and spatial distribution of these elements create variations in landscape character. Landscape impact assessment identifies the changes to this character which would result from the proposed development and assesses the significance of those effects on the landscape as a resource.

Visual impact assessment is concerned with changes that arise in the composition of available views, the response of people to these changes and the overall effects on the area's visual amenity.

11.2.1 Methodology for Landscape Impact Assessment

Assessment of potential landscape effects involves (a) classifying the sensitivity of the landscape resource, and (b) describing and classifying the magnitude of landscape change which would result from the development. These factors are then combined to arrive at a classification of significance of the effects.

11.2.1.1 Landscape Sensitivity

The sensitivity of landscape character is chiefly a 'fixed' attribute defined by its existing land use, patterns and scale, visual enclosure and the distribution of landscape character receptors, and the value placed on the landscape. 'Dynamic' considerations to landscape sensitivity may include evolving changes and relevant policies. Five categories are used to classify sensitivity.

Table 11.1: *Categories of Landscape Sensitivity*

Sensitivity	Description
Very High	Areas where the landscape exhibits very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The landscape character is such that its capacity to accommodate change is very low. These attributes are recognised in policy or designations as being of national or international value and the principle management objective for the area is protection of the existing character from change.
High	Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics. The landscape character is such that it has limited/low capacity to accommodate change. These attributes are recognised in policy or designations as being of national, regional or county value and the principle management objective for the area is the conservation of existing character.
Medium	Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong, or has evidence of alteration, degradation or erosion of elements and characteristics. The landscape character is such that there is some capacity for change. These areas may be recognised in policy at local or county level and the principle management objective may be to consolidate landscape character or facilitate appropriate, necessary change.
Low	Areas where the landscape has few valued elements, features or characteristics and the character is weak. The character is such that it has capacity for change; where development would make no significant change or would make a positive change. Such landscapes are generally unrecognised in policy and the principle management objective may be to facilitate change through development, repair, restoration or enhancement.
Negligible	Areas where the landscape exhibits negative character, with no valued elements, features or characteristics. The character is such that its capacity to accommodate change is high; where development would make no significant change or would make a positive change. Such landscapes include derelict industrial lands, as well as sites or areas that are designated for a particular type of development. The principle management objective for the area is to facilitate change in the landscape through development, repair or restoration.

11.2.1.2 Landscape Magnitude

Assessment of the magnitude of change that the development may cause to a view is a 'dynamic' consideration of the scale, extent and degree of change imposed on the landscape by a development, with reference to its key elements, features and characteristics (also known as 'landscape receptors'). Landscape receptors include individual aspects of the landscape, e.g. the topography, urban grain or mix of building typologies, which may be directly changed by the development. The surrounding landscape character areas are also receptors whose character may be altered by these changes. Five categories are used to classify magnitude of change.

Table 11.2: *Categories of Magnitude of Landscape Change*

Magnitude of Change	Description
Very High	Change that is large in extent, resulting in the loss of or major alteration to key elements, features or characteristics of the landscape, and/or introduction of large elements considered totally uncharacteristic in the context. Such development results in fundamental change in the character of the land scape.
High	Change that is moderate to large in extent, resulting in major alteration to key elements, features or characteristics of the landscape, and/or introduction of large elements considered uncharacteristic in the context. Such development results in change to the character of the landscape.
Medium	Change that is moderate in extent, resulting in partial loss or alteration to key elements, features or characteristics of the landscape, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context. Such development results in change to the character of the landscape.
Low	Change that is moderate or limited in scale, resulting in minor alteration to key elements, features or characteristics of the landscape, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.
Negligible	Change that is limited in scale, resulting in no alteration to key elements features or characteristics of the landscape, and/or introduction of elements that are characteristic of the context. Such development results in no change to the landscape character.

11.2.2 Methodology for Visual Impact Assessment

Assessment of visual effects involves identifying a number of representative viewpoints in the site's receiving environment, and for each one of these: (a) classifying the viewpoint sensitivity, and (b) classifying the magnitude of change which would result in the view. These factors are combined to arrive at a classification of significance of the effects on each viewpoint.

11.2.2.1 Sensitivity of the Viewpoint/Visual Receptor

Viewpoint sensitivity is a consideration of two main 'fixed' attributes within any given view of the proposed development site:

- Susceptibility of the visual receptor to change. This depends on the occupation or activity of the people typically experiencing the view, and the extent to which their attention may be focused on the views or visual amenity experienced at that location. Generally, the visual receptors that are most susceptible to change are considered to be the relevant receptor (following the 'worst case' principle). Susceptible receptors include residents at home, people engaged in outdoor recreation focused on the landscape (e.g. trail users), and visitors to heritage or other attractions and places of community congregation where the setting contributes to the experience. Visual receptors less sensitive to change, and therefore less likely to be susceptible to changes to views, include travellers on road, rail and other transport routes (unless on recognised scenic routes), people engaged in outdoor recreation or sports where the surrounding landscape does not influence the experience, and people in their place of work or shopping, where the setting does not influence their experience.
- Value attached to the view. 'Fixed' values may include factors such as policy and designations (e.g. scenic routes, protected views), or the view or setting being associated with a heritage asset, visitor attraction or having some other cultural status (e.g. by appearing in arts). As the Council of Europe Landscape

Convention (ETS No. 176), as amended by the 2016 Protocol (CETS No. 219) states, all landscapes may have value, consideration of those areas that fall outside of protected landscape depends to a large extent on subjective opinion. In the absence of any available metadata within a landscape assessment, this must out of necessity rest on the balanced opinion of a professional assessor.

Five categories are used to classify a viewpoint's sensitivity.

Table 11.3: *Categories of Viewpoint Sensitivity*

Sensitivity	Description
Very High	Iconic viewpoints (views towards or from a landscape feature or area) that are recognised in policy or otherwise designated as being of national value. The composition, character and quality of the view are such that its capacity for change is very low. The principle management objective for the view is its protection from change.
High	Viewpoints that are recognised in policy or otherwise designated as being of value, or viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features focused on the landscape). The composition, character and quality of the view may be such that its capacity for accommodating change may or may not be low. The principle management objective for the view is its protection from change that reduces visual amenity.
Medium	Views that may not have features or characteristics that are of particular value, but have no major detracting elements, and which thus provide some visual amenity. These views may have capacity for appropriate change and the principle management objective is to facilitate change that does not detract from visual amenity, or which enhances it.
Low	Views that have no valued feature or characteristic, and where the composition and character are such that there is capacity for change. This category also includes views experienced by people involved in activities with no particular focus on the landscape. For such views, the principle management objective is to facilitate change that does not detract from visual amenity or enhances it.
Negligible	Views that have no valued feature or characteristic, or in which the composition may be unsightly (e.g. in derelict landscapes). For such views, the principle management objective is to facilitate change that repairs, restores or enhances visual amenity.

<u>11.2.2.2 Magnitude of Change to the View</u>

Classification of the magnitude of change takes into account the size or scale of the intrusion of development into the view (relative to the other elements and features in the composition, i.e. its relative visual dominance), the degree to which it contrasts or integrates with the other elements and the general character of the view, and the way in which the change will be experienced (e.g. in full view, partial or peripheral view, or in glimpses). It also takes into account the geographical extent of the change, as well as the duration and reversibility of the visual effects. Five categories are used to classify magnitude of change to a view:

Table 11.4: *Categories of Magnitude of Visual Change*

Magnitude of Change	Description
Very High	Full or extensive intrusion of the development in the view, or partial intrusion that obstructs valued features or characteristics, or introduction of elements that are completely out of character in the context, to the extent that the development becomes dominant in the composition and defines the character of the view and the visual amenity.
High	Extensive intrusion of the development in the view, or partial intrusion that obstructs valued features, or introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity.
Medium	Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.
Low	Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.
Negligible	Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

11.2.2.3 Significance of Landscape Effects

To classify the significance of effects the magnitude of change is measured against the sensitivity of the landscape using the guide in Table 11.5 below. This matrix is only a guide. The assessor also uses professional judgement informed by their expertise, experience and common sense to arrive at a classification of significance that is reasonable and justifiable.

11.2.2.4 Significance of Visual Effects

As for landscape effects, to classify the significance of visual effects, the magnitude of change to the view is measured against the sensitivity of the viewpoint, also using the guide in Table 11.5 below.

Table 11.5: *Guide to Classification of Significance of Landscape and Visual Effects*

		Sensitivity of the Landscape/View				
		Very High	High	Medium	Low	Negligible
Magnitude of Change to the Landscape/View	Very High	Profound	Profound to Very Significant	Very Significant to Significant	Moderate	Slight
	High	Profound to Very Significant	Very Significant	Significant	Moderate to Slight	Slight to Not Significant
	Medium	Very Significant to Significant	Significant	Moderate	Slight	Not Significant
	Low	Moderate	Moderate to Slight	Slight	Not significant	Imperceptible
	Negligible	Slight	Slight to Not Significant	Not significant	Imperceptible	Imperceptible

Categories that are shaded beige are considered to be 'significant' impacts under the EIA regulations.

11.2.3 Quality of Effects

In addition to predicting the significance of the effects, EIA methodology requires that the quality of the effects be classified as positive/, neutral, or adverse. For landscape to a degree, but particularly for visual effects, this is an inherently subjective exercise. This is because landscape and visual amenity are *perceived* by people and are therefore subject to differences in attitude and values - including aesthetic preferences - of the receptor. One person's attitude to a development may differ from another person's, and thus their response to the effects of a development on a landscape or view may vary.

Additionally, in certain situations there might be policy encouraging a particular development in an area, in which case the policy is effectively prescribing landscape and visual change. If a development achieves the objective of the policy the resulting effect might be considered positive, even if the landscape character is profoundly changed. The classification of quality of landscape and visual effects should seek to take these variables into account and provide a reasonable and robust assessment.

11.2.4 Photomontage Methodology

10 no. photomontages have been produced by Model Works Ltd. The photomontage methodology is based on the Landscape Institute advice note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment. The method has five main steps:

- Photography
- Survey
- 3D Modelling and Camera Matching
- Rendering and Finishing of Photomontages
- Presentation

11.2.4.1 Photography

Date, Time and Conditions

The photography is timed so that the scene conditions, weather conditions and sun position allow - as far as possible - for a clear and representative baseline photograph to be captured. The date and time of each photograph are recorded so that the sun position can be accurately portrayed in the render of the 3D model.

Camera

The photographs were taken using a Canon EOS5D Mark II camera with a 21 mega pixel sensor and image resolution of 5616 x 3744 pixels. At each viewpoint, the camera was positioned on a tripod with the lens 1.65m above ground level (the level of the average adult's eyes), directed at the site and levelled in the horizontal and vertical axes.

Lenses

Prime lenses (fixed focal length with no zoom function) are used as this ensures that the image parameters for every photograph are the same and that all photographs taken with the same lens are comparable. For close-up to middle distant views a 24mm prime lens is normally usually used. This lens captures a field of view of 73 degrees. This relatively wide field of view is preferred for the purpose of Landscape and Visual Impact Assessment as it shows more of the context landscape surrounding a site. Survey.

The coordinates of each viewpoint/camera position, including the elevation, were recorded using a survey grade GPS receiver, the Trimble Geo7X, which is accurate to within 1cm. For each viewpoint, the coordinates of several static objects in the view are also surveyed (e.g. lamp posts, bollards, corners of buildings). The coordinates of these 'markers' are used as reference points later in the process, to ensure view direction of the cameras in the 3D model matches the of view of the photographs.

11.2.4.2 3D Model and Camera Matching

Creation of 3D Model

Using the information contained in the design team's drawings, a 3D model of the proposed development was built in the software package Autodesk 3DS Max. The 3D model is georeferenced to a survey drawing of the site and receiving environment.

3D Camera Positions

The surveyed camera positions and the markers for each view are inserted into the 3D model, with information on the lens focal length attributed to each. For each camera/ view, the date and time is set to match those of the original photograph, ensuring that the direction of sunlight and shadows in the 3D model match those of the photographs.

Camera Matching

The photographs are then inserted as backdrops to the views of each camera in the 3D model. The direction of view of the cameras in the 3D model are matched with the direction of view of the photographs using the surveyed markers. This ensures that the camera positions, the direction of the views and the focal length of the cameras in the 3D model are accurate, so that the proposed development appears in the correct position and scale when montaged into the photographs.

11.2.4.3 Rendering of 3D Model and Finishing of Photomontages

For each view, a render of the development is generated. This is the process of creating a photo-realistic image of the 3D model, as seen from each camera position, with sunlight and shadow applied to the model. The render of the development is then inserted into the photograph to create the photomontage. This involves masking (or cutting out) those parts of the render that are obscured by objects in the foreground of the photograph and masking distant objects behind the render – so that the render fits seamlessly into the photograph.

11.2.4.4 Presentation and Viewing

The individual photomontages are presented on A3 pages in landscape format in Appendix 11.1. For each photomontage, the viewpoint number, location description, and the date and time of photography are provided on the page.

11.2.5 Forecasting Methods and Difficulties Encountered

No difficulties were encountered in undertaking the site assessment.

11.3 RECEIVING ENVIRONMENT

11.3.1 Development Policy and Landscape Character

Figure 11.1 *Landscape context of the Subject Site (Google Earth, annotated)*

The site is located near to Killala Business Park within the townland of Mullafarry, Killala, Co. Mayo. The landscape is currently peri-urban in character, i.e. comprised of both urban-generated and rural elements but is in a process of on-going change and regeneration driven by planning policy.

The detailed description and assessment of planning policy relating to the site and proposed development are contained within the Planning Chapter of the EIAR. Development policy relevant to landscape issues are summarised as follows:

11.3.1.1 National Planning Framework – Ireland 2040

The National Planning Framework ('NPF' hereafter) was published in February 2018 and contains policies which are supportive of the development of ICT infrastructure, with particular reference made to 'data centres'.

11.3.1.2 Mayo County Development Plan 2022 – 2028

The Mayo County Development Plan 2022–2028 ('MCDP' hereafter) sets out the key provisions of local planning policy relating to the lands.

The site is located outside the settlement boundaries and is not zoned for any particular use.

Chapter 2 Core Strategy and Zoning

The vision for County Mayo is *"To create a sustainable and competitive county that supports the health and well-being of the people of Mayo, providing an attractive destination, as a place in which to live, work, invest, do business and visit, offering high quality employment and educational opportunities within strong and vibrant sustainable communities, whilst ensuring a transition to a low carbon and climate resilient county that supports high environmental quality".*

It is a 'Strategic Aim' of the CDP *"to protect, improve and provide water, wastewater, surface water and flood alleviation services throughout the county,* ***and to facilitate the provision of high-quality information communication technology, broadband, telecommunication information and electricity network required to support and enhance the key aims of best place to live, work, visit and invest".*** [**Emphasis added**].

Strategic County Development Plan Objective SO 8 is *"to promote the role of Mayo's rural countryside, by developing a sustainable synergy between the rural area and network of settlements, enhancing the rural economy with improve connectivity, broadband, rural economic development opportunities and smarter working opportunities, all within the context of the sustainable management of land and resources".*

The MCDP goes on to outline policies in regard to economic development (Chapter 4), Infrastructure (Chapter 7), Built Environment (Chapter 9), as referenced withing the Planning Chapter of the EIAR.

Chapter 10 - Natural Environment

CDP Chapter 10 – Natural Environment references the Landscape Appraisal for County Mayo, which identifies and describes the landscape character of each part of the county, dividing it into six policy areas related to landscape protection and capacity to absorb development. The Landscape Sensitivity Matrix provides a general indication of the likelihood of success for planning applications for each development type in each policy area. The policy also includes safeguarding scenic routes from inappropriate development that would detract from the enjoyment of Mayo's outstanding landscape.

Policy NEP 14 is *"To protect, enhance and contribute to the physical, visual and scenic character of County Mayo and to preserve its unique landscape character."* Landscape Objective NEO 25 is:

"To consider applications for development, along ***Mayo's' Scenic routes,*** *that can demonstrate a clear need to locate in the area concerned, whilst ensuring that it:*

- **Does not impinge in any significant way** on the character, integrity and distinctiveness of the area.
- Meets high standards in siting and design.
- Contributes to and enhances local landscape character.
- Satisfies all other criteria, with regard to, inter alia, servicing, public safety and environmental considerations." [Emphasis added]

Objective NEO 26 is:

"To consider applications for development, within ***Mayo's Coastal Areas and Lakeshores*** *and within areas along scenic routes with designated scenic views, that can demonstrate long-standing social link to the area, whilst ensuring that it:*

- Does not impinge in any significant way on the character, integrity and distinctiveness of the area.
- Cannot be considered at an alternative location.
- Meets high standards in siting and design.
- Contributes to and enhances local landscape character.
- Satisfies all other criteria, with regard to, inter alia, servicing, public safety and environmental considerations."

Objective NEO 27 is:

"To ensure all development proposals are consistent with the Landscape Appraisal of County Mayo and the associated Landscape Sensitivity Matrix and future editions thereof."

Objective NEO 29 is:

"Require a Landscape/Visual Impact Assessment to accompany significant proposals, located within or adjacent to sensitive landscapes, where appropriate."

Regarding relevant Coast Zone Policies, NEP 15 is:

"To protect the character, visual, recreational, ecological and amenity value of the coast and provisions for public access, ***while recognising the needs of coastal communities to live, work and interact with the coast.****"*

While the objectives of this policy are chiefly concerned with protection of the physical environment and prevention of harm to natural and built coastal defences, its requirement for working communities needs to be recognised are noted.

The Landscape Policy Areas are detailed in Map 10.1 of the Mayo County Development Plan 2022-2028, as copied in Figure 11.2.

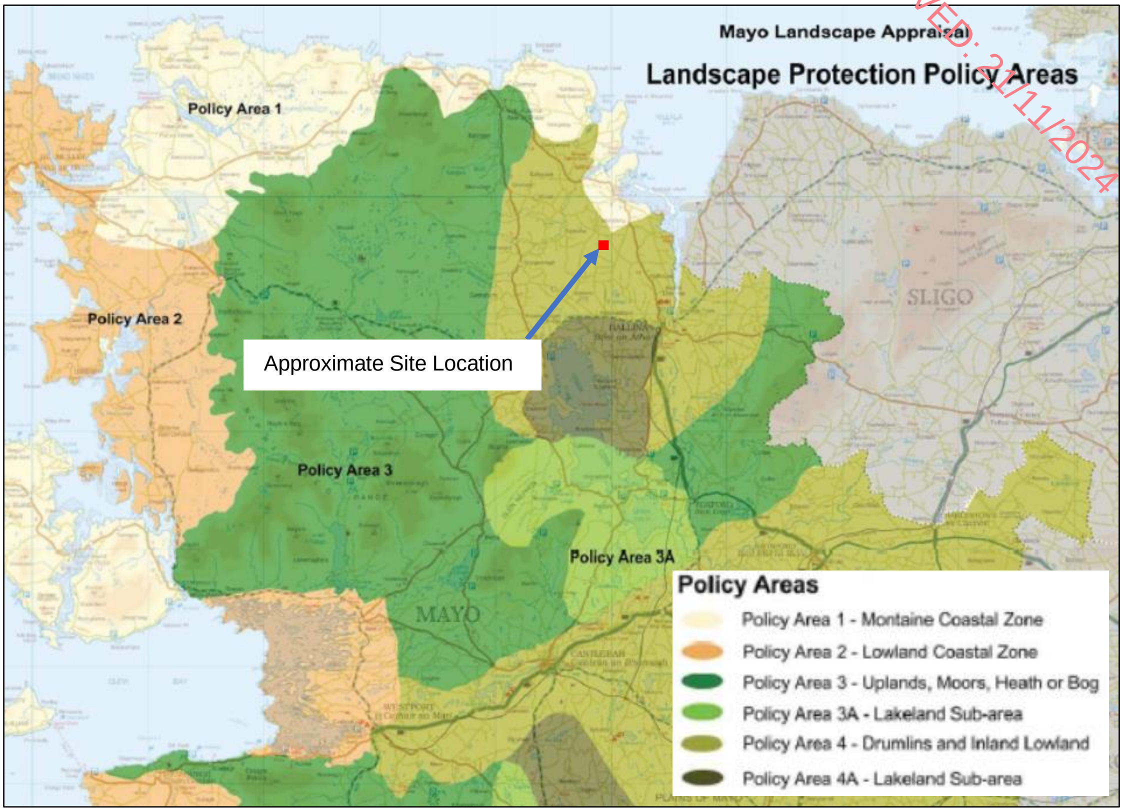

Figure 11.2 *Landscape Protection Policy Areas (Mayo Landscape Appraisal) (courtesy Mayo County Council)*

Policy Area 4: Drumlins and Inland Lowland (hereafter, LPA 4).

The subject site is located within LPA 4. Within the CPD, there are 4 key policies (nos. 21 – 24) that are recommended for LPA 4. Policy 22 is perhaps most relevant: "*Continue to permit development that can utilise existing infrastructure, whilst taking account of absorption opportunities provided by the landscape and prevailing vegetation."*

This landscape character area is considered to have the greatest capacity to accommodate development. For industrial and commercial development in Policy Area 4, the Development Plan states it has: *"Low potential to create adverse impacts on the existing landscape character. Such development is likely to be widely conceived as normal and appropriate unless siting and design are poor".*

However, there are a number of sensitivities that fall within LAP 4 including the Wild Atlantic Way tourist route, which follows the R314 Ballina to Killala Road including properties and features listed within the National Inventory of Architectural Heritage (NIAH) and Archaeological Survey of Ireland (ASI), with relevance to the subject site that are taken into consideration in Section 11.3.2, Landscape Character and Assessment.

As the GLVIA 3rd Edition indicates, indirect effects may be experienced within adjacent areas that may influence consideration of development within the host landscape character area or type. Those adjacent to LPA 4 include:

Policy Area 1: Montaine Coastal Zone (hereafter, LPA 1).

Land within LPA 1 lies to the north and northeast of LPA 4. Containing Killala township and a continuation of the Wild Atlantic Way to the east, the CMLA states:

"This area is visually distinct in County Mayo landscape terms as it incorporates, in a relatively small area, two dramatic landscape attributes being a steep and rugged shoreline and mountains rising immediately above. These elements make it a desirable setting for visitors and also particularly sensitive to inappropriate development."

There are 7 key landscape policies recommended by the County Maya Landscape Appraisal, which chiefly aim to limit new development to protect the landscape and visual amenity of the area. Perhaps most relevant is Policy 1: *"**Recognise the substantial residential development existing in some locations** and the further pressures for residential development in this policy area."*

While the site does not impinge on LPA 1, it may be subject to potential temporary landscape effects experienced there during construction as well as visual effects from within the residential areas of Killala and routes accessing the town used by tourists.

Policy Area 3: Uplands, moors, heath or bogs (hereafter, LPA 3).

Land within Policy Area 3 lies to the west of LPA 4. The CMLA states: "*These distinctive and vast areas of the County form a single policy unit due to the similar visual characteristics of smooth topography, limited shelter vegetation, often steep slopes and prominent ridge lines, rendering this policy unit similar suitability to absorb development."*

Policy 14 is most relevant with regards to the proposed development: *"Encourage development that will not interrupt or penetrate distinct linear sections of primary ridge lines when viewed from areas of the public realm."*

While the site does not impinge on LPA 3, upland areas provide a backcloth to views from the east and R 314 which traverse the subject site, as well as a vantage point from where it may be seen.

Policy Area 4a: Lakeland Sub-policy Area (hereafter, LPA 4a).

Land that falls under LPA 4a lies to the south of LPA 4. It has a landscape character similar to LPA4 but is influenced by its proximity Lough Mask to the south.

While adjacent to the host LPA4, there low potential for temporary or long-term landscape effects is negligible inter-visibility with the subject site.

11.3.2 Receiving Environment - Landscape Character

11.3.2.1 Landscape Character Definition

Whilst the description of the site provides a detailed understanding of the key components of its character, a more general assessment using publicly available information is necessary to evidence the assessment is based on commonly agreed parameters.

The European Landscape Convention defines Landscape as *“a zone or area as perceived by local people or visitors, whose visual features and character are the result of the action of natural and/or cultural (that is, human) factors. This definition reflects the idea that landscapes evolve through time, as a result of being acted upon by natural forces and human beings. It also underlines that a landscape forms a whole, whose natural and cultural components are taken together, not separately.”* ELC 2016

Landscape Character may be described as *"A distinct, recognisable and consistent pattern of elements, be it natural (soil, landform) and/or human (for example settlement and development) in the landscape that makes one landscape different from another, rather than better or worse."* (Landscape Character Assessment Guidance for England and Scotland 2014).

Impacts on the landscape may arise where the landscape character of the area is modified by the development. It is important to place the application site in its landscape context.

11.3.2.2 National Landscape Character

The National Landscape Strategy for Ireland 2015–2025 (NLSI) sets out a national policy framework for landscape management, with an emphasis on the European Landscape Convention (ELC) principles. While the production of a national landscape character assessment for Ireland at a National level is promoted within the NPF, it is yet to be produced. The NLSI provides guiding principles, which have been adopted by County Mayo.

11.3.2.3 Regional Landscape Character

The landscape of the Proposed Development Site and its immediate surroundings is diverse, reflecting a mix of landscape characters. This diversity is evident in its location on the border between two Landscape Character Areas (LCAs) as identified in the Mayo Landscape Appraisal on which is based the landscape policy within Chapter 10 – Natural Environment of the County Development Plan (CDP), as referenced in Section 11.3.1 above. It includes assessments of location-specific character typologies (Landscape Character Units, hereafter referred to as LCU’s) and sensitivities. The LCU’s have been identified using a range of physical criteria, including:

- Geology
- Soils
- Water Catchments
- Topography
- CORINE land cover

Visual criteria was also applied to identify visual units based on visual fields (e.g., bounded by ridgelines), transition of ‘one landscape type to another’ or a particularly dominant feature. A total of 16 LCUs have been identified within County Mayo, accordingly, listed by alphabetic labels and summary characteristics.

Applicable policies are based on recommendations for the management of landscape conservation and development within each with regards to landscape issues are also included within the Landscape Appraisal of County Mayo (hereafter referred to as the LAC).

In assessing the landscape character of the subject site, the map in Figure 11.3 illustrates the location of the 'host' LCU 'G' and LCU 'D'.

11.3.2.4 Area G: Northern Mayo Drumlins

The 'host' landscape typology, LCA G: North Mayo Drumlins within which the subject site is located, is characterised by an area of drumlin topography containing mild low lying lakeland drumlins at the southern end merging into similar coastal topography in the north east surrounding Killala Bay. More severe, steep drumlins occur around the foothills of the mountains to the north-west of the Ox Mountains to the east. The floodplain of the River Moy is also incorporated within this area. In terms of the relative descriptions for each of these LCAs, it is clear that the site and its surrounding landscape context is much more affiliated with 'LCA G: North Mayo Drumlins'. The northern boundary, shared with Area 'D,' marks the upper limits of direct coastal watersheds.

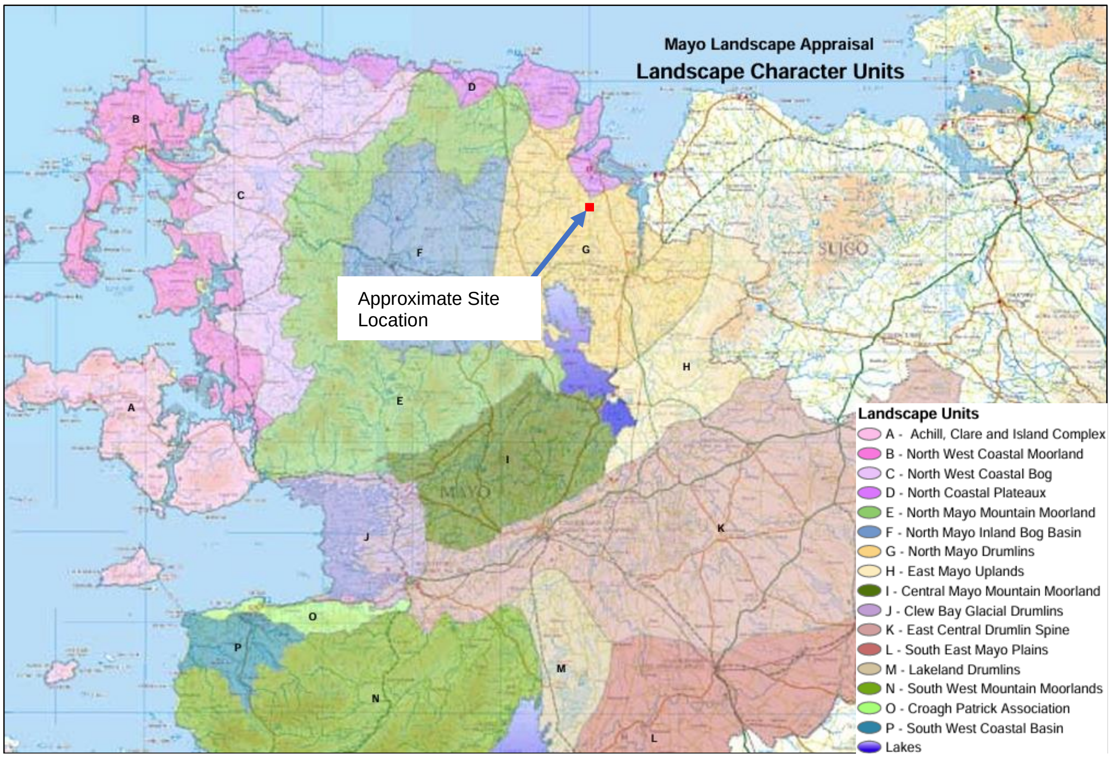

Figure 11.3 *Landscape Character Units Map – Mayo Landscape Appraisal (courtesy Mayo County Council)*

Critical Landscape Factors described by the LAC that may be relevant to the subject site include:

- Undulating topography: mildly undulating topography as represented in this character unit by glacial drumlins has the ability to both shelter and absorbs the visual impact of development. Firstly, the physical shielding of a built form within the lee of hill where it does not break the skyline renders it visually unobtrusive and reflective of landscape scale. Secondly, the dynamic and complex nature of undulating country provides fore, middle, and distant ground to a vista that helps to provide a realistic scale and visual containment not available in open country.
- Shelter vegetation: natural visual barriers that add to the complexity of a vista, breaking it up to provide scale and containment for built forms.

- Prominent ridgelines: these occur as either primary ridgelines (visible only against the sky from any prospect) or secondary ridgelines (visible at least from some prospects below a distant primary ridge line). In this area both primary and significant secondary ridgelines are located to the east as part of the Ox Mountains.

The subject site is typical the host landscape typology, with the presence of mature woodland and hedgerow trees, arable fields introduce enclosures into the landscape that absorb large features, and industrial/commercial development that reduce the sensitivity locally of the LCU.

11.3.2.5 Area D: North Coast Plateaux

A narrow strip of often steeply sloping terrain, characterized by a combination of pasture and moorland, runs along the planar seaward slopes above sea cliffs and abrupt gullies, extending in an east-west direction. This area offers expansive vistas of the sea to the north. Peat bogs and small patches of natural grassland dominate the landscape. The inland boundary is determined by the upper limits of direct coastal watersheds, which, in this type of terrain, closely correspond to the visual fields.

Critical Landscape Factors describes by the LAC that may be relevant to the subject site include:

- The R314 (Wild Atlantic Way): following gentle, upper seaward slopes in an east-west direction, the linear nature of this coastline and the elevated position of the road, long-distance vistas along the coast are available. The primary concern for natural linear features such as coastlines and ridgelines is to prevent development that could disrupt and diminish the integrity of these elements.
- Smooth terrain: long distance vistas over a planar surface without breaking up the fore and middle-ground, foreshortening distance; developments may seem closer or larger than they actually are.
- Low-lying bogland vegetation: sharing similar typical characteristics to that of Area G.

The subject site study area displays some of the typical landscape typology of LCU 'D', including the presence of the A314.

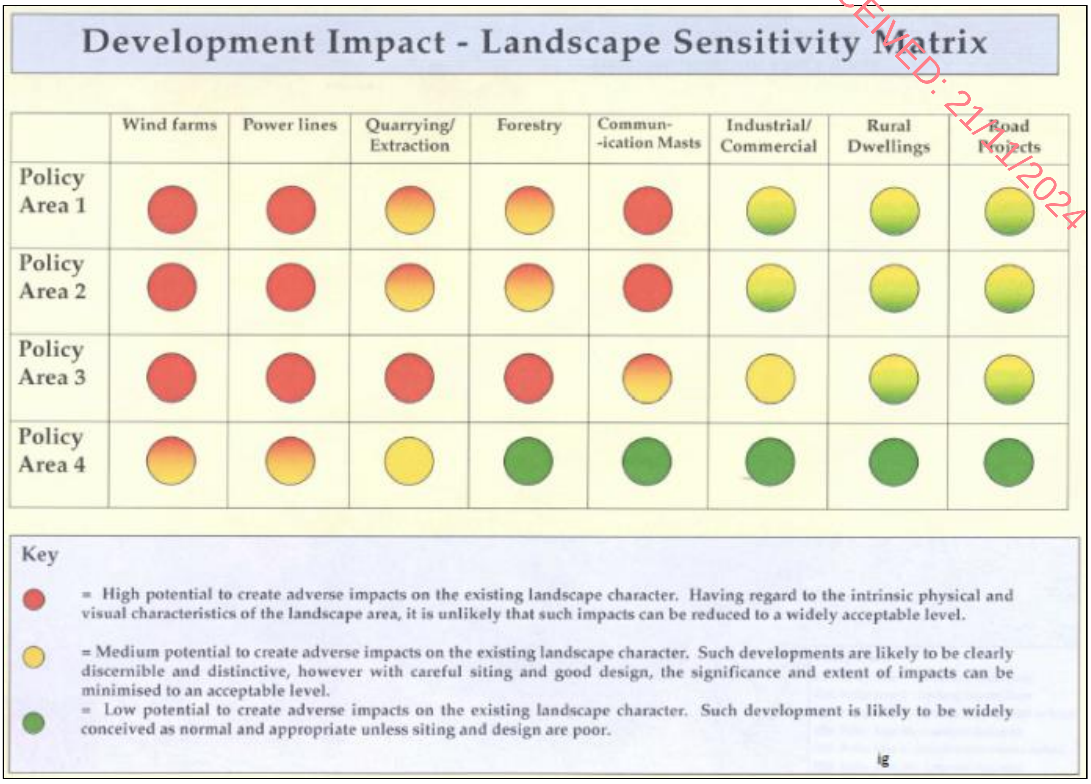

Figure 11.4 *Landscape Sensitivity Matrix – Mayo Landscape Appraisal (courtesy Mayo County Council)*

11.3.2.6 Regional Landscape Sensitivity

Chapter 11 of the CDP provides general guidance regarding landscape sensitivity based on the detailed inventory of locations and features included in the LAC. Sensitivity is assessed therein against the CORINE Land Cover Project, which while not being a widely used method of evaluation for landscape character, provides a structure for grading relative value with a range of values as follows, (the equivalent values used by the LVIA methodology are stated in parentheses):

Mayo County Council)

- Vulnerable (Very High);
- Sensitive (High);
- Normal (Medium);
- Robust(Low); and
- Degraded (Negligible).

The CPD Chapter 11 also identifies areas designated as:

- Scenic routes;
- Highly scenic routes; and
- Highly scenic vistas

The landcover types that the LAC identifies as sensitive are:

- Natural Grassland
- Peat Bogs Moors and Heathland
- Transitional Woodland Scrub
- Beaches, dunes and sands

- Estuaries
- Broad Leaved Forest
- Mixed Forest
- Inland and Salt Marshes
- Intertidal flats
- Water courses/bodies
- Agricultural lands with significant areas of natural vegetation

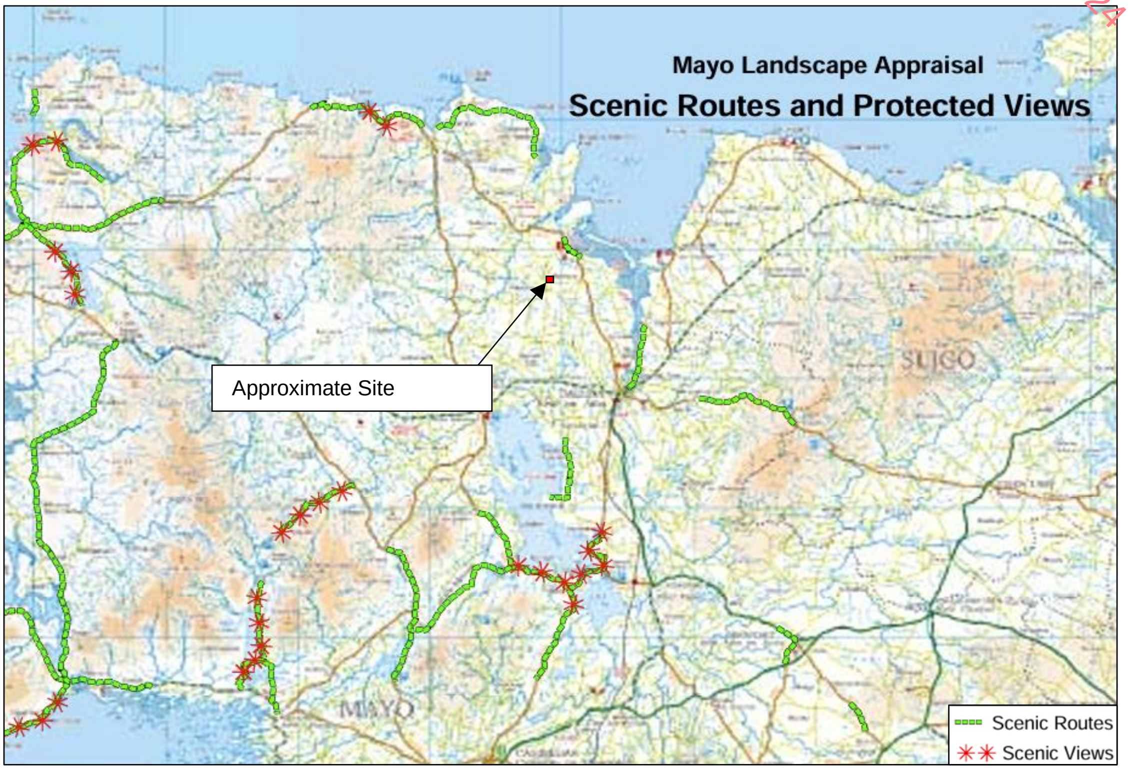

Figure 11.5 *Scenic Routes and Protected Views Map –Mayo Landscape Appraisal (courtesy Mayo County Council)*

For each LCU, it provides specific examples and an inventory of named locations. None of the listed items are located within or immediately adjacent to the subject site. However, as the R314 is designated a part of the Wild Atlantic Way touring route, as a precautionary approach, for the purposes of this study it is considered to be a Scenic Route and a High sensitivity receptor. As all of these features are present within the wider landscape character units it is more pragmatic to focus the evaluation of landscape character sensitivity on the local environment. Regionally, landscape character sensitivity is considered Medium.

11.3.2.7 Local Landscape Character and Sensitivity

The surrounding area is primarily defined by agricultural uses to the west and south, industrial uses to the north and east (Killala Business Park) and dispersed residential development to the southwest. The following describes the receiving landscape character of the receiving environment.

Land to the North

The northern boundary of the site is characterised by its proximity to significant industrial, commercial, and natural landmarks, with a predominantly open landscape and minimal residential development:

Killala Community Windfarm Site:
- Juxtaposed with the northern boundary.
- Features 5 wind turbine generators operational since 2019.
- Located on open grazing land.

Figure 11.6 *Killala Community Wind Farm*

Tawnaghmore Power Station:
- Visible from the site.
- Includes various buildings and structures associated with power generation
- A commercial shed (170m x 70m) is situated to the east.

Killala Business Park (see Figure 11.7):
- Located beyond the power station.
- Predominantly occupied by a semi-derelict industrial building.
- Features 4 slender towers, each approximately 40m in height.

Figure 11.7 *Killala Business Park*

Figure 11.8 *Killala Village*

Killala Village (see Figure 11.8):

- Situated 1.6km north of Killala Business Park.
- Ross Beach and Killala Bay are immediately north of the village.

Meelick Lough: A small lake located approximately 0.8km north of the Business Park

Surrounding Area:

- Relatively open with no residential properties in the immediate vicinity.
- The land is level between the site and the southwestern extent of Killala Village.
- Few trees or other screening vegetation present.
- The River Moy
- Killala estuary (see Figure 11.9)
- Western Way National walking trail passes through Killala

Figure 11.9 *Killala Estuary*

Land to the West

The western boundary, marked by an overgrown hedgerow with mature trees, borders three arable fields, also enclosed by hedgerows with mature trees on all sides with he following key features:

Ballysakeery Manse:

- A NIAH listed property approximately 180m to the west, fully screened from direct views of the site by mature broadleaf trees enclosing two disused garden areas.

Killala Rock Co. Quarry:

- Approximately 750m to the west, along with the Mullafarry Graveyard and adjacent ruins of Ballysakeery Church, all screened from direct views by intervening vegetation

Mullafarry Presbyterian Church:

- Located further southwest, surrounded by mature trees and hedgerows, screening it from view of the site.

Ballysakeery Church and Graveyard (see Figure 11.10)

- Located further southwest, screened by mature trees and hedgerows.

Figure 11.10 *Ballysakeery Church and graveyard*

Residential Properties:

- Three properties set in extensive gardens to the west, screened from view by mature vegetation.

Figure 11.11 *Residential Property on Mullafarry Road*

Land to the South

The southern boundary of the site is characterized by its proximity to significant roads, historical structures, and natural vegetation, with a predominantly agricultural landscape and minimal residential development:

Mullafarry Road:
- Defines the southern boundary.

Ballysakeery Glebe House (the Old Rectory) and Grounds:
- Derelict condition.
- Surrounded by mature broadleaf woodland trees and hedgerow vegetation.
- Fully screened from view of Mullafarry Road and the subject site.
- Existing driveway access from the minor road is largely concealed.

Surrounding Area:
- Primarily agricultural land with a few scattered houses.
- Dunleavy Meats Limited is approximately 2.2 km south of Killala Business Park.
- The town of Ballina is approximately 9 km to the south.
- Rolling pastoral farming context
- Drumlin hills and hedgerows

Land to the East

The eastern boundary of the site is characterized by its proximity to significant infrastructure, residential clusters, and natural landmarks, with a predominantly agricultural landscape and minimal residential development:

EirGrid/ESB's Tawnaghmore 110kV Substation:
- Located immediately adjacent to the subject site.

Unnamed Country Road and R314 Killala-Ballina Road:
- Section of the Wild Atlantic Way tourist route.
- Junction with a cluster of about 9 residential houses.

Surrounding Area:
- Extending 2.5 km beyond the junction is mainly agricultural land with a few scattered houses along small local roads.
- Further on lies the River Moy estuary, forming part of the border between counties Mayo and Sligo.

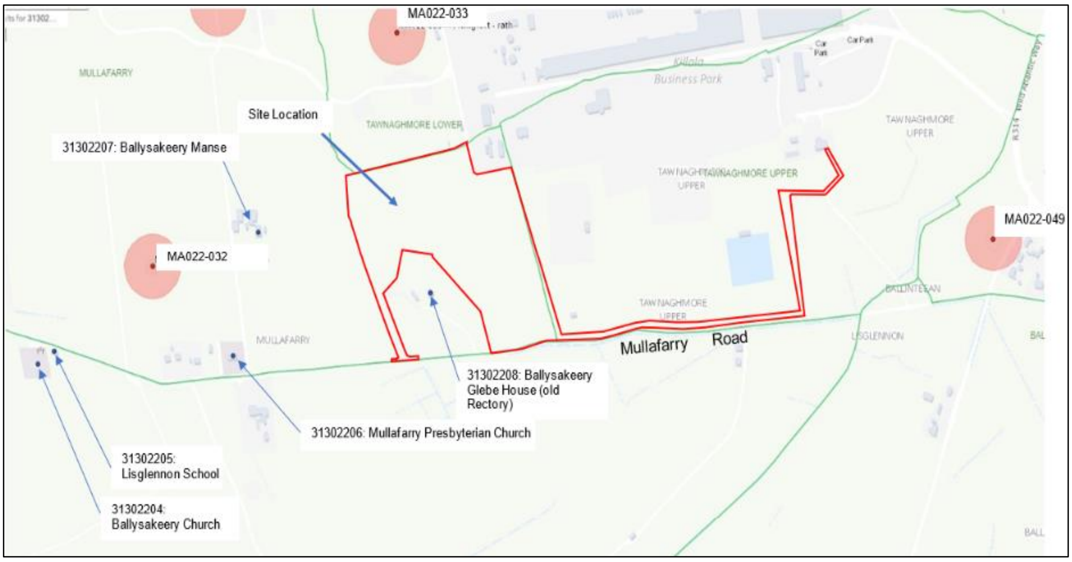

Figure 11.12 *Heritage sites (Source National Monuments Service) (Annotated).*

11.3.2.8 Local Historic and Archaeological Heritage

A number of properties listed with regional importance on the National Inventory of Architectural Heritage (NIAH) are located near the site. None fall within the site boundary, although an old Rectory is partially enclosed by it, as shown on Figure11.12. The properties in question include:

- 31302204: Ballysakeery Church:
  - Dates from c.1805 – 1815;
  - Ruined church/chapel surrounded by a graveyard;
  - NBHS appraisal: "an important component of the early nineteenth-century ecclesiastical heritage of the rural environs of Killala with the architectural value of the composition".
- 31302205: Lisglennon National School:
  - Dates from c.1800 – 1838;
  - Disused since 1911;
  - NBHS appraisal: "…a neat self-contained group alongside the ruined Ballysakeery Church with the resulting ensemble making a pleasing visual statement in a sylvan street scene".
- 31302206: Mullafarry Presbyterian Church:
  - Dates from 1820 – 1830;
  - NBHS appraisal: "well maintained, the elementary form and massing survive intact…An adjacent graveyard contributing positively to the group and setting".

- 31302207: Ballysakeery Manse (former Presbytery Rectory)
    - Located 200m west of the subject site;
    - Built in the early nineteenth century;
    - Formerly a rectory, now in disrepair;
    - Ongoing repairs with the Council aiming to bring it into community use.
- 1302208: Ballysakeery Glebe House (the old Rectory) - see Figure 11.13:
    - Located immediately south of the subject site;
    - Built in the early nineteenth century;
    - Formerly a rectory, now in disrepair;
    - Ongoing repairs with the Council aiming to bring it into community use.

Figure 11.13 *1302208: Ballysakeery Glebe House (the old Rectory)*

Additionally, there are a number of monuments and archaeological remains within the area registered within the Archaeological Survey of Ireland by the National Monuments Service (NMS). There are none within the subject site red line boundary. The closest are to the north and west:

- MA022-032: Ringfort: Mullafarry, at ITM Coordinates 519629,827588. It survives as "a broad, very shallow depression, most clearly traced at W, and marked by a growth of rushes." The subject site does not physically impinge on the fort.
- MA022-033: Ringfort: Tawnaghmore Lower at ITM Coordinates: 519769, 828074. There is little evidence of the remains. The subject site does not physically impinge on the fort.
- MA022-049: Ringfort: Carrowreagh (Callahoof Fort) consists of a raised oval area (c. 25m NW–SE; c. 27.7mm NE–SW) defined by a scarp, but elsewhere is low and degraded, with a broadly slumped external slope. The subject site does not physically impinge on the fort.

11.3.2.9 Summary of Potentially Sensitive Landscape Receptors

- Properties to east end of Mullafarry Road at the junction of the R134
- Properties to Mullafarry Road to the west of the subject site
- Heritage Properties including:
- 31302204: Ballysakeery Church
- 31302205: Lisglennon National School
- 31302206: Mullafarry Presbyterian Church
- 31302207: Ballysakeery Manse
- 31302208: Ballysakeery Glebe House, (the old Rectory)
- MA022-032: Ringfort: Mullafarry, at ITM Coordinates 519629,827588.
- R134 Wild Atlantic Way
- Killala residential properties on the south of Courthouse Road

11.3.2.10 Local Landscape Sensitivity

The landscape sensitivity of the site has been assessed using the LAC and CPD methodology, with receptor landscape sensitivities identified as follows:

Vulnerable (Very High Landscape Sensitivity):

- No features identified using the LUC assessment methodology fall into this category within the study area of the subject site.
- Historic architectural and archaeological features are likely to fall into this category unless there are qualifying issues.

Sensitive (High Landscape Sensitivity):

- Broad-leaved Forest:
- adjacent to a small area of woodland located within the Glebe House (old Rectory) grounds.
- Agricultural Land with Significant Areas of Natural Vegetation, adjacent to fields with mature hedgerow trees, particularly to the west and south.

Normal (Medium Landscape Sensitivity):

- Complex Cultivation Patterns and Pasture Lands:
- Adjacent fields to the west are already accounted for in the preceding category.
- Fields in the lands south of the subject site are less enclosed by hedgerows and fall into the Medium category.

Robust (Low Landscape Sensitivity):

- Continuous Urban Fabric:
- North of the subject site (Killala).
- Discontinuous Urban Fabric:
- Properties on the R314 and to the southwest of the subject site.
- Industrial or Commercial Units:
- Townaghmore Power Station, Killala Business Park, and Community Wind Farm to the north.
- Processing facility to the south.
- EirGrid/ESB's Townaghmore 110kV substation to the east.

Degraded (Negligible Landscape Sensitivity):

- Killala Rock Co. Quarry:

Scenic Routes:

- R314 Ballina-Killala Road:

- Designated as a section of the Wild Atlantic Way.
- Carries tourists as well as normal traffic and should be considered a High landscape sensitivity.

Highly Scenic Routes:

- Coastal Road to the Northeast of Killala:
- Designated a Highly Scenic Route.
- Views from this road may potentially have a High landscape sensitivity.
- The main focus of views from this road is towards the open ocean; this is tempered to Moderate sensitivity where views are inland towards industrial development such as near the subject site.

Protected Views:

- No protected views have been identified within the study area that directly intervisible with the subject site.

The preponderance of existing features directly impacting the site character of Normal (Medium, Robust (Low) and Degraded (Negligible) sensitivity off-set those with Vulnerable (Very High) and Sensitive (High) sensitivity, with the exception of the Old Rectory.

Overall, the local receiving environment to the proposed development can be considered to have ***Medium*** landscape sensitivity.

11.3.3 Receiving Environment - Visual Assessment

Visual receptors are “the different groups of people who may experience views of the development” (GLVIA, 3rd edition, para 6.3). In order to identify those groups who may be significantly affected the ZTV study, baseline desk study and site visits have been used. The different types of groups assessed within this report encompass local residents; people using key routes such as roads; cycle ways, people within accessible or recreational landscapes; people using public footpaths; or people visiting key viewpoints. In dealing with areas of settlement, public footpaths and local roads, receptors are grouped into areas where effects might be expected to be broadly similar, or areas which share particular factors in common.

A series of viewpoints have been chosen to convey the main potential visual impacts. These are not the only places where someone may see the Proposed Development but have been chosen to be sufficiently representative that an accurate overall assessment of impact can be made. The selection includes close views, medium distance views and long distant views and views covering all directions of the compass around the Subject Site.

Photographs were taken in July and September 2024, when the trees were in full leaf. For each view, a panoramic view is presented to show the full context, with labels to identify key features and text to assess the predicted changes to the view. A single frame image is presented on the following page, which if printed at A3, replicates the view of the naked eye, if printed at A3 and held 400-500 mm from the eye. Photomontages have also been prepared for key views and these are presented in Appendix 11.1.

11.3.4 Viewpoints for Visual Sensitivity Assessment

The eleven viewpoints representative of the receiving environment were selected for visual impact assessment informed by verified photomontages. The photographs taken from each public viewpoint are presented in Appendix 11.1 Photomontage Report. It has not been possible to take photographs from private properties and so the visual impacts from these receptors are estimated as relevant.

The viewpoints are described in the following section together with an assessment of the receptor sensitivity. Based on these, predicted changes and assessment of significance of visual effects at construction and operation phases are described in section 11.6, and illustrated by the montages, with reference to the Photomontage Report in Appendix 11.1. The viewpoint locations are as shown on the Figure11.14.

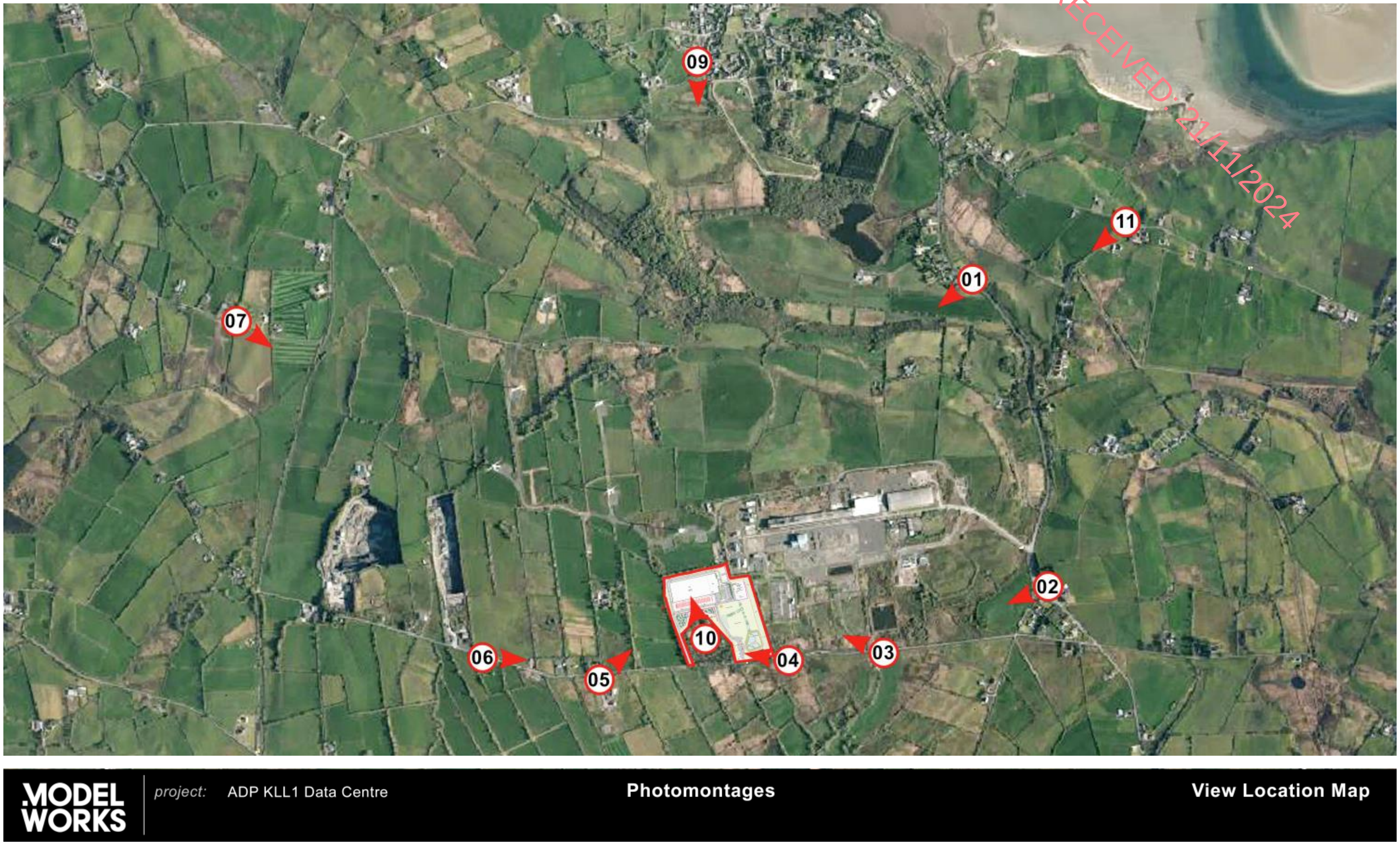

Figure 11.14 *Viewpoint Locations Map*

11.3.4.1 **Viewpoint 01:** R314 at the outskirts of Killala

Existing View

From: 1411m to subject site from the hard shoulder of the R314 (Wild Atlantic Way) southeast of Killala.

To: 215º SW, baseline view overlooking the R314 road in the foreground and a 5-bar metal gate between hedgerows bordering a pastoral field. Residential single storey properties with gardens are situated to the right (out of frame). A shallow wooded ridgeline, characteristic of Landscape Character Unit (LCU) G - North Mayo Drumlins, lies between the viewpoint and the subject site, which is beyond and not visible.

Landform: gently undulating, at approximately 15m AMS.

Enclosure and skyline: open curvilinear road and fields bordered with mature hedgerows and hedgerow trees and dispersed built environment, with a mid-distant low profile skyline. Wind turbine generators from the Killala Community Wind Farm are clearly visible in the centre of the horizon.

Scale and complexity: intricate, medium scale peri-rural agricultural and residential built environment.

Vegetation type: grassland pasture, mature 2m ht. field hedgerows; trees/woodland in full leaf, and ornamental planting enclosing gardens.

Built environment: contemporary pitched roof residential single storey properties (out of frame); wind turbines; towers within Killala Business Park.

Historic/cultural environment: R314 is a national tourist route (Wild Atlantic Way) promoting conservation of the natural environment of Ireland.

Development trends: replacement of unviable commercial and industrial built development and renewal with sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: the site is fully screened by landform and vegetation from users of the public highway and residents.

Sensitivity: although this a designated tourist route (Wild Atlantic Way) and there are residential properties (both High susceptibility receptors) with views towards the subject site, it does not fall within a protected view or sensitive LCU; the low aesthetic quality of the view reduces receptor expectation from this location; there is a ***Medium*** sensitivity at this location.

11.3.4.2 **Viewpoint 02:** junction of R314 / Unnamed Road (leading to Mullafarry Road)

Existing View

From: 1084m to subject site at a junction with an unnamed road (leading to Mullafarry Road) from the hard shoulder of the R314 (Wild Atlantic Way) south of Killala.

To: 267° W, baseline view overlooking the R314 road in the foreground and an un-named road leading to Mullafarry Road. A residential property is visible to the left of view, representative of a cluster. An unfenced, open field lies beyond a clump of scrub and young broadleaf trees in the central foreground. A shallow wooded ridgeline, characteristic of Landscape Character Unit (LCU) G - North Mayo Drumlins, lies between the viewpoint and the subject site, which is beyond and not visible.

Landform: level, at approximately 39m AMS.

Enclosure and skyline: open fields with low scrub and grassland; dispersed built environment, with a mid-distant low profile skyline. Wind turbine generators from the Killala Community Wind Farm and commercial/industrial sheds in Killala Business Park are visible to the right of view on the horizon.

Scale and complexity: simple, medium scale peri-rural agricultural and residential built environment.

Vegetation type: low scrub and grassland and ornamental planting enclosing gardens; some distant trees/woodland in full leaf.

Built environment: contemporary pitched roof residential single storey properties (left of frame) with garden room/garage; wind turbines; commercial/industrial sheds and towers within Killala Business Park.

Historic/cultural environment: R314 is a national tourist route (Wild Atlantic Way) promoting conservation of the natural environment of Ireland.

Development trends: replacement of unviable commercial and industrial built development and renewal with sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: no designated LCU's or features; the site is mostly screened by landform and vegetation from users of the public highway and residents.

Sensitivity: although this a designated tourist route (Wild Atlantic Way) and there are residential properties (both High susceptibility receptors) with views towards the subject site, it does not fall within a protected view or sensitive LCU; the low aesthetic quality of the view reduces receptor expectation from this location; there is a ***Medium*** sensitivity at this location.

11.3.4.3 **Viewpoint 03:** Mullafarry Road to the east

Existing View

From: 403m to subject site from a public road to the east.

To: 288º WNW, baseline view along the Mullafarry Road and a front garden wall to left in the foreground and a mature hedgerow bordering pastoral fields to the right. A residential single storey property with gardens are situated to the left (out of frame). The subject site is screened from view.

Landform: level, at approximately 41m AMS.

Enclosure and skyline: enclosed linear road and fields bordered with mature hedgerows and hedgerow trees and widely dispersed built environment. Wind turbine generators the Killala Community Wind Farm may be visible to the right on the horizon when vegetation is leafless.

Scale and complexity: intricate, small scale rural agricultural and residential built environment.

Vegetation type: grassland pasture, mature 2m ht. field hedgerows; trees/woodland in full leaf, and ornamental planting enclosing gardens.

Built environment: contemporary pitched roof residential single storey farm property (out of frame) with barn; wind turbines; towers within Killala Business Park.

Historic/cultural environment: None visible within this view.

Development trends: replacement of unviable commercial and industrial built development and renewal with sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: no designated LCU's or features; the site is mostly screened by landform and vegetation from users of the public highway and residents.

Sensitivity: the viewpoint location does not fall within a protected view or LCU sensitivity categories; the road is used as access to businesses; the residence is a sensitive receptor; medium aesthetic quality of the view tempers receptor expectation and there is a ***Medium*** sensitivity at this viewpoint.

11.3.4.4 **Viewpoint 04:** Mullafarry Road at proposed site entrance

Existing View

From: 10m to subject site from a public road to the east.

To: 310º N, baseline view along the Mullafarry Road with mature hedgerows bordering the site and a 5-bar metal agricultural gate to the right and pastoral fields to the left of view. Although adjacent to the red-line boundary, the subject site is screened from view.

Landform: gently rising south east to north west, at approximately 45m AMS.

Enclosure and skyline: enclosed gently curvilinear road and subject site bordered with mature hedgerows and hedgerow trees, truncating skyline.

Scale and complexity: intricate, medium scale peri-rural agricultural and residential built environment.

Vegetation type: mature, overgrown 2m ht. hedgerows; trees/woodland in full leaf.

Built environment: roadway, farm gate and multiple overhead transmission cables.

Historic/cultural environment: None visible within this view, although the mid-distance is the property boundary of listed NIAH 31302208: Ballysakeery Glebe House, an old Rectory is immediately to the south of the site.

Development trends: 5-bar gate leading to adjacent EirGrid/ESB's Tawnaghmore 110kV substation, a part of the regional infrastructural renewal including sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: no designated LCU's or features; the site is mostly screened by landform and vegetation from users of the public highway.

Sensitivity: the viewpoint location does not fall within a protected view or LCU sensitivity categories; the road is used as access to businesses; the residence is occupied for farming purposes; medium aesthetic quality of the view tempers receptor expectation and there is a ***Low*** sensitivity at this viewpoint.

11.3.4.5 **Viewpoint 05:** Mullafarry Road, representing houses/graveyard

Existing View

From: 324m to subject site from a public road to the east.

To: 42º NNE, baseline diagonally across the Mullafarry Road towards the subject site; mature 2m ht. hedgerows to the left/centre of view and glimpsed pastoral fields and clear views of wind turbine generators beyond.

Landform: gently rising south east to north west, at approximately 66m AMS.

Enclosure and skyline: open linear road and agricultural fields bordered with mature hedgerows and hedgerow trees and dispersed built environment, with a skyline truncated by the enclosing hedgerows. Wind turbine generators from the Killala Community Wind Farm are visible in the centre and out of frame to the left of the horizon.

Scale and complexity: simple, medium scale peri-rural agricultural and built heritage environment.

Vegetation type: grassland pasture, mature 2m ht. field hedgerows; trees/woodland in full leaf, and some ornamental planting escaped from cemetery. Some mature hedgerow trees to the middle distant right of view showing severe ash dieback.

Built environment: several heritage properties fall within cone of view and vicinity of the viewpoint; a wind turbine generator from the Killala Community Wind Farm is visible to the left of the horizon; the other turbines are also visible from the viewpoint to the left, out of frame. An industrial / infrastructure processing facility lies to the right of view (out of frame).

Historic/cultural environment: heritage properties within the cone of view but screened by vegetation, or visible from the viewpoint out of view include the

Ballysakeery Glebe House (the old Rectory); Mullafarry Presbyterian Church (to the left rear of view, out of frame); and the Ballysakeery Manse (to the left of viewpoint, out of frame).

Development trends: sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: The site is fully screened by vegetation from users of the public highway, reducing likely visibility of Proposed Development superstructure.

Sensitivity: the viewpoint location does not fall within a protected view or LCU sensitivity categories; the road is used as primarily to access Killala Rock Co. quarry and farm businesses. While heritage properties are highly susceptible receptors, the low quality of the view—though representative of them, it is within the public realm—lowers the expectation for receptor sensitivity. Therefore there is a ***Medium*** sensitivity at this viewpoint.

11.3.4.6 **Viewpoint 06:** Mullafarry Road, representing houses/graveyard

Existing View

From: 689m to subject site from a public road to the east.

To: 72º NE, baseline diagonally across the Mullafarry Road towards the subject site, with mature 2m ht. hedgerows to the left/centre of view and glimpsed pastoral fields and clear views of wind turbine generators beyond.

Landform: gently rising south east to north west, at approximately 61m AMS.

Enclosure and skyline: open linear road and agricultural fields bordered with mature hedgerows and hedgerow trees and dispersed built environment, with a skyline truncated by the enclosing hedgerows. Wind turbine generators from the Killala Community Wind Farm are visible in the centre and out of frame to the left of the horizon.

Scale and complexity: simple, medium scale peri-rural agricultural and built heritage environment.

Vegetation type: grassland pasture, mature 2m ht. field hedgerows; trees/woodland in full leaf, and some ornamental planting escaped from cemetery. Some mature hedgerow trees to the middle distant right of view showing severe ash dieback.

Built environment: several heritage properties fall within cone of view and vicinity of the viewpoint; a wind turbine generator from the Killala Community Wind Farm is visible to the left of the horizon; the other turbines are also visible from the viewpoint to the left, out of frame.

Historic/cultural environment: heritage properties within the cone of view or visible from the viewpoint out of view include Ballysakeery Glebe House (the old Rectory); Mullafarry Presbyterian Church (both the right mid-distance, out of frame) and the Ballysakeery Manse (to the centre of viewpoint, screened); the ruin of Ballysakeery Church and graveyard (behind the viewpoint); the derelict Lisglennon National School (to the immediate right of view); and Mullafarry Presbyterian Church (screened by vegetation to the right middle distance).

Development trends: sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: the viewpoint location does not fall within a protected view or LCU sensitivity categories; the road is used as access to residences and farms; medium aesthetic quality of the view tempers receptor expectation, and with the elevated vantage point, there is a Medium sensitivity at this viewpoint.

Sensitivity: the viewpoint location does not fall within a protected view or LCU sensitivity categories; the road is used as primarily to access Killala Rock Co. quarry and farm businesses . While heritage properties are highly susceptible receptors, the low quality of the view—though representative of them, it is within the public realm—lowers the expectation for receptor sensitivity. Therefore there is a ***Medium*** sensitivity at this viewpoint.

11.3.4.7 **Viewpoint 07:** Distant view from north west (Rathowen East)

Existing View

From: 1767m to subject site from the unnamed public highway at Rathowen East, located East-Northeast of the subject site.

To: 121º ESE, baseline view towards the subject site, along the unnamed road in the foreground, a garden wall tot the right, and a double 5-bar metal field gate between hedgerows bordering a pastoral field to the right of centre, looking over pastoral fields enclosed by a network of mature hedgerows. The view traverses a shallow wooded ridgeline, characteristic of Landscape Character Unit (LCU) G- North Mayo Drumlins, Residential single storey properties with gardens are situated to the left (out of frame). A utility pole with an insulator arm sits centrally carrying power lines overhead. The 5 turbines of Killala Community Wind Farm are fully visible in the left distance.

Landform: gently undulating, at approximately 41m AMS.

Enclosure and skyline: enclosed linear road with fields bordered with mature hedgerows and hedgerow trees and dispersed built environment, with a distant, open skyline. Wind turbine generators from the Killala Community Wind Farm are clearly visible to the left on the horizon.

Scale and complexity: intricate, medium scale peri-rural agricultural and residential built environment.

Vegetation type: grassland pasture, mature 2m ht. field hedgerows; trees/woodland in full leaf, and ornamental planting enclosing gardens.

Built environment: contemporary pitched roof residential single storey properties (out of frame); wind turbines; towers within Killala Business Park.

Historic/cultural environment: none clearly visible within this view.

Development trends: replacement of unviable commercial and industrial built development and renewal with sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: the viewpoint location does not fall within a protected view or LCU sensitivity categories; the road is used as access to farms (low susceptibility) but also residences (highly susceptible receptors), of which the view is representative; the medium quality of the view tempers receptor expectation, but with the elevated vantage point, there is a ***Medium*** sensitivity at this viewpoint.

11.3.4.8 **Viewpoint 08:** Distant view from south (towards Coonealmore)

Existing View

From: 1085m to subject site from the public highway between Coonealmore and Ballinteean.

To: 324ºNNW, baseline view towards the subject site over a 5-bar metal field gate between hedgerows bordering livestock fields. A shallow wooded ridgeline, characteristic of Landscape Character Unit (LCU) G - North Mayo Drumlins, lies between the viewpoint and the subject site, which is beyond and not visible; however, the low laying topography; clear views of wind turbine generators beyond. Farm buildings and a single residential storey property are situated to the behind the viewpoint and further along the road to the right (out of frame).

Landform: gently undulating, at approximately 49m AMS.

Enclosure and skyline: open linear road and fields bordered with mature hedgerows and hedgerow trees and dispersed built environment, with a mid-distant low profile skyline. Wind turbine generators from the Killala Community Wind Farm are clearly visible in the centre of the horizon.

Scale and complexity: intricate, medium scale peri-rural agricultural and residential built environment.

Vegetation type: grassland pasture, mature 2m ht. field hedgerows; trees/woodland in full leaf, and ornamental planting enclosing gardens.

Built environment: contemporary pitched roof residential single storey properties (out of frame); wind turbines; towers within Killala Business Park.

Historic/cultural environment: none clearly visible within this view.

Development trends: replacement of commercial and industrial built development and renewal with sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: the viewpoint location does not fall within a protected view or LCU sensitivity categories; the road is used as access to residences and farms; low aesthetic quality of the view tempers receptor expectation, and with the elevated vantage point, there is a ***Medium*** sensitivity at this viewpoint.

11.3.4.9 **Viewpoint 09:** Courthouse Road (R314), Killala

Existing View

From: 1922m to subject site from the hard shoulder of R314 Courthouse Road west of Killala village centre, where it joins Crossmolina Road.

To: 195ºS, baseline view overlooking Courthouse Road in the foreground to a two storey residential apartment and carpark (left of view) and a 5-bar metal gate between dry stone walling, fencing and scrubby hedgerows, accessing a pastoral field. Streetlighting and utility poles with insulator bar and multiple overhead powerlines, together with an ivy-clad dead tree, dominate the foreground. A shallow wooded ridgeline, characteristic of Landscape Character Unit (LCU) D - North Coastal Plateaux, lies between the viewpoint and the subject site, which lies is beyond; existing wind turbines and tower structures of Killala Business Park are visible on the horizon.

Landform: gently undulating, at approximately 15m AMS, with shallow ridgelines.

Enclosure and skyline: gently curving road and fields bordered with dry stone walling, mature hedgerows and hedgerow trees and urban edge environment, with a mid-distant low profile skyline. Wind turbine generators from the Killala Community Wind Farm are clearly visible in the centre of the horizon.

Scale and complexity: intricate, medium scale peri-rural agricultural and urban edge residential built environment, cluttered with vertical infrastructure.

Vegetation type: grassland pasture, mature 2m ht. field hedgerows; trees/woodland in full leaf, and ornamental planting enclosing gardens.

Built environment: contemporary pitched roof residential single storey properties (out of frame) with garden room/garage; wind turbines; towers within Killala Business Park.

Historic/cultural environment: where it joins Crossmolina Road west of Killala village centre, Courthouse Road is not part of the designated Wild Atlantic Way.

Development trends: renewal of unviable commercial and industrial built development and with sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: no designated LCU's or features; the site is partly screened by landform and vegetation from users of the public highway and residents.

Sensitivity: there are residential properties with views towards the subject site, but the viewpoint does not fall within a protected view or sensitive LCU; the low aesthetic quality of the view reduces receptor expectation from this location; there is a ***Low*** sensitivity at this location.

11.3.4.10 **Viewpoint 10:** Ballysakeery Glebe House (the old Rectory)

Existing View

From: 200m to subject site from the immediate curtilage of the property.

To: 90ºE, baseline view towards the subject site is from within a former domestic garden (derelict) looking over a grassed yard, dominated by enveloping mature trees, overgrown hedgerows and high masonry walling and other structures in the foreground; no direct views of the subject site are possible.

Landform: rising, at approximately 60m AMS, towards a shallow ridgeline.

Enclosure and skyline: the viewpoint is tightly enclosed by the intervening vegetation and garden walling.

Scale and complexity: intricate, small scale residential built environment, cluttered with vertical trees and garden structures.

Vegetation type: garden lawn (derelict), mature 3m ht. field hedgerows; trees/woodland in full leaf, planting enclosing gardens.

Built environment: stone built pitched roof residential three storey property with out buildings/garage.

Historic/cultural environment: NIAH listed property 31302208: Ballysakeery Glebe House (the old Rectory)

Development trends: restoration of heritage properties in peri-rural location adjacent to renewal of unviable commercial and industrial built development and with sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: heritage status property; the site is partly screened by landform and vegetation from users of the public highway and residents.

Sensitivity: there is a ***High*** receptor sensitivity at this location.

11.3.4.11 **Viewpoint 11:** Moyne Abbey/Wild Atlantic Way

Existing View

From: 2270m to subject site from the hard shoulder of R314(Wild Atlantic Way) east of Killala, at the junction of an unnamed road leading to Crosspatrick Graveyard.

To: 265ºWSW, baseline view looking along the Crosspatrick road, dry stone wall field boundaries, a stone structure, a utility pole and fields in the foreground, to a single storey residence (left of view) and low mixed woodland and scrubby hedgerows, in the mid-distance, characteristic of Landscape Character Unit (LCU) D - North Coastal Plateaux, lies between the viewpoint and the subject site; existing wind turbines and tower structures of Killala Business Park are visible on the horizon.

Landform: level, at approximately 23m AMS.

Enclosure and skyline: open linear road and fields bordered with dry stone walling, and grass verges trees, with a distant low profile skyline. Wind turbine generators from the Killala Community Wind Farm are clearly visible to the right of the horizon.

Scale and complexity: simple, medium scale farmland, some vertical infrastructure.

Vegetation type: grassland pasture, some low mixed woodland.

Built environment: contemporary pitched roof residential single storey properties (more to rear, out of frame) with gardens; wind turbines; towers within Killala Business Park (distant).

Historic/cultural environment: The R134 (designated Wild Atlantic Way).

Development trends: renewal of unviable commercial and industrial built development and with sustainable energy initiatives in Killala Business Park.

Receptors visual amenities: no designated LCU's or features; the site is partly screened by landform and vegetation from users of the public highway and residents.

Sensitivity: the views from this section of the Wild Atlantic Way, but are directed away from the coastal panoramas and as residential receptors are partially screened from views towards the subject site, views are of ***Medium*** receptor sensitivity.

11.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

11.4.1 Buildings

The proposed development comprises a single data centre building located towards the north of the site. It will comprise a footprint of c. 185m x 77m. The building will accommodate data halls, associated electrical and mechanical plant rooms, maintenance and storage space, ancillary office administration areas, with plant at roof level. To the north of and adjacent to the main data centre building it is proposed to provide for 25 no. backup generators and associated flues within a fenced compound. To the east of the site is an area which is reserved for a 110kV substation subject to a separate pre-application. A sprinkler tank and pumphouse compound is located to the northeast of the site.

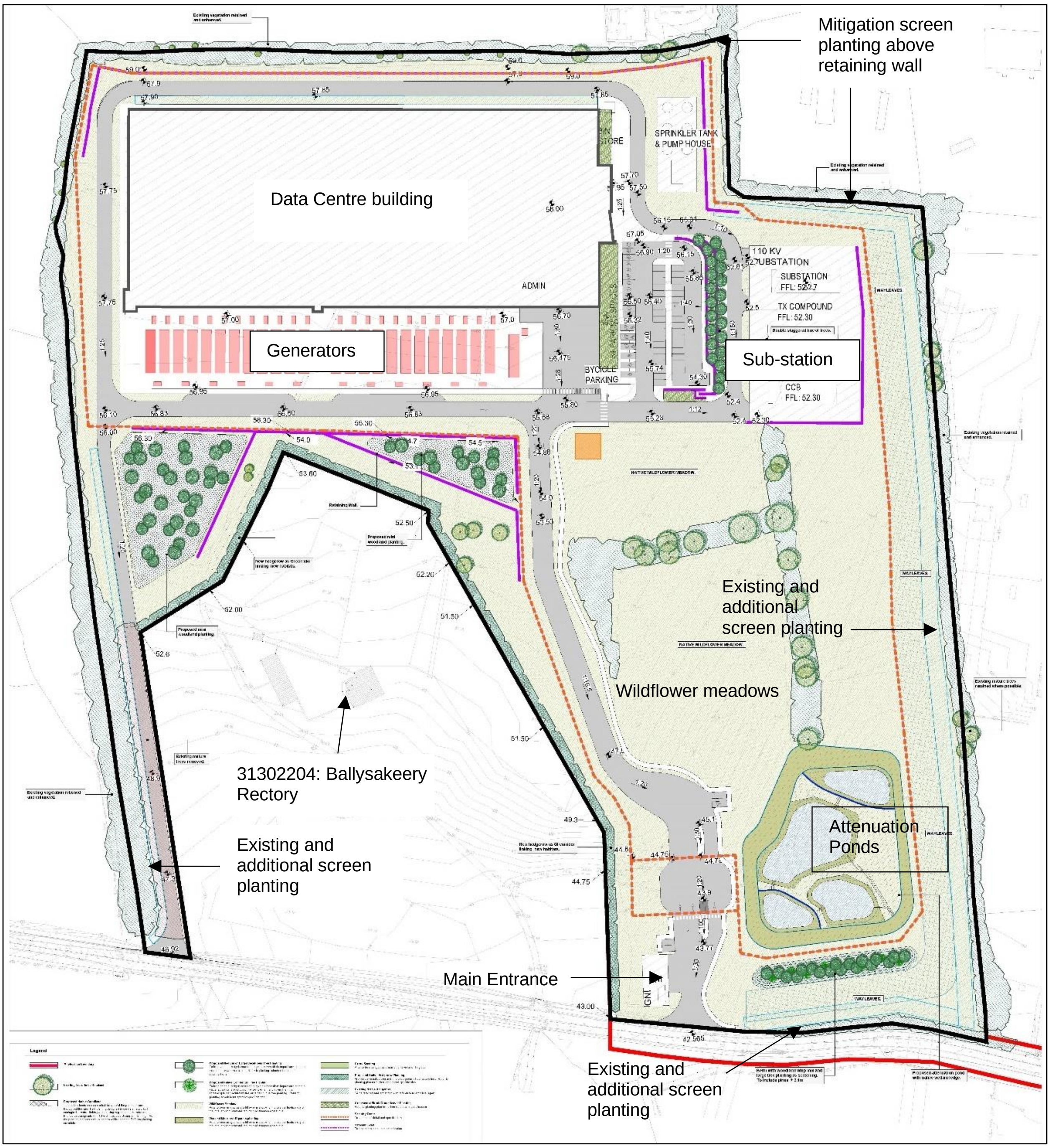

***Figure 11.15** Landscape Masterplan (Source: KFLA)*

11.4.2 Landscape Design

The layout of the Proposed Development is set back from locations where sensitive landscape and visual receptors may otherwise experience an adverse effect (e.g., Mullafarry Road, the R134 Wild Atlantic Way, the Presbyterian Church, Ballysakeery Glebe House (the old Rectory) and Ballysakeery Manse (former Presbytery Rectory). The subject site is relatively contained in both a visual and physical sense. The proposal will have a similar mass to that of nearby existing development in Killala Business Park and will be dominated by the height of nearby existing wind turbine generators.

The Proposed Development includes embedded landscape and visual impact mitigation strategies, including retention and enhancement of existing site vegetation, earthwork bunding, additional woodland areas, belts and wildflower meadows, to enhance visual screening and biodiversity. These measures ensure that the development integrates with the surrounding environment while providing opportunities for future growth.

The key characteristics of the proposal are as follows:

Access: The main entrance to the site is proposed from the south with a gatehouse located on the easternmost of the two entrances along with a turning area to allow vehicles to return to the road safely. Access will be provided around the site for delivery and emergency vehicle access. Car parking is proposed to the east of the building. 56 spaces are proposed which is in line with the future users' requirements. Safe and secure cycle parking is also proposed to the east, close to the building entrance. All main vehicular routes and hard standing will be paved with permeable surfacing.

Drainage: an attenuation pond is proposed to the south of the site to facilitate sustainable drainage within which a range of native marginal and macro-aquatic planting will be incorporated.

Planting: a range of native rapid growth 'nurse' species and slow-growth high-canopy broadleaf trees will be planted to quickly reinforce hedgerows and mature tree belts that currently provide screening and to increase biodiversity across the site.

Unused Spaces: The irregular shape of the site and orthogonal arrangement of buildings create unused areas around the infrastructure. These spaces offer opportunities for future development and landscaping, serving dual purposes of visual screening and biodiversity enhancement.

Woodland Vegetation: Strategic placement of woodland belts, based on the LVIA, aims to:

- Enhance screening for sensitive visual receptors, including heritage properties to the south and southwest, residential properties to the southwest and west, and the R314 to the west.
- Increase biodiversity by connecting with the surrounding network of hedgerows.

Northern Boundary Screening: While screening is planned along the northern boundary where feasible, views from sensitive receptors in the north are already compromised by the intervisibility with the Killala Wind Farm.

Meadow Maintenance: The remaining unused areas will be maintained as meadows, providing additional habitat with minimal maintenance requirements.

11.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

General

Landscape impacts are assessed on the basis landscape sensitivity combined with the magnitude of physical landscape effects within the site and effects on landscape character within the wider landscape setting. This wider setting is considered in respect of the immediately surrounding landscape (<5 km).

Additionally, visual impacts are assessed on the basis of visual receptor sensitivity combined with the magnitude of change that would be perceptible within a given view. Ten viewpoints representative of the receiving environment were selected for visual impact assessment informed by verified photomontages. The viewpoints were selected to represent the range of potential visual receptors in terms of sensitivity, as well as views from various angles and distances from the site. With reference to Table 11.3, the stand-alone Proposed Development is predicted to have the following visual effects during Construction Phase (see Table 11.6 for summary).

11.5.1 Landscape Impacts – Construction Phase

11.5.1.1 Magnitude of Landscape Change

Regional Magnitude of Change

Construction Stage landscape character effects will be impacted by an increase in construction traffic, the moving presence of construction riggs and cranes that will be visible from a number of locations within LCUs D and G. Overall, the Regional magnitude of effects will be ***Low***, short term, but adverse.

Local Magnitude of Change

The landscape character of the subject site would be changed temporarily (for the duration of the works programme of the new development) by amongst others, the following key activities:

- Earthworks, including reprofiling of the site topography to accommodate the building platform, footings, attenuation pond and excavation of services on the Mullafarry Road
- On-site cut and fill operations to the north and south of the site respectively
- Spoil stockpiles
- Trenching operations
- Construction of environmental bunds
- Construction of retaining walls to accommodate the main buildings
- Dust and fumes
- Floodlighting for shift work and winter periods
- Movement and noise of heavy construction traffic within the site and on the Mullafarry Road and R134.
- Disturbance of the tranquillity of religious sites (graveyards) and heritage properties to the west of the Subject Site
- Site hoarding and security fencing

The Proposed Development landscape proposals respect all existing trees and hedgerows where no earthworks impinge, and screening will remain as existing. All areas within recommended distances form existing trees hedgerows and shrubs to be retained will be subject to Root Protection Areas (RPA) and will be fenced off to prevent damage during construction according to the Arboriculture Impact Statement recommendations.

Construction Phase magnitude of landscape effects will accordingly be ***Medium*** (refer to Table 11.2).

11.5.1.2 Significance of Landscape Effects – Construction Phase

Considering the Medium magnitude of change and the Low over all sensitivity of the receiving environment, the significance of the potential landscape effects can be classified ***Slight*** and adverse but temporary (refer to Table 11.5), as would be anticipated during construction phases of a major development of this nature.

11.5.2 Landscape Impacts - Operation

11.5.2.1 Magnitude of Landscape Change

Regional Magnitude of Change

Landscape character will be impacted in a regional context during Operation Stage by minor increase in service and maintenance traffic within the road network in LCUs D and G, as would be anticipated due to expanding commercial infrastructure. Overall, the Regional magnitude of effects will be Negligible, long term, and neutral, at operational stage.

Local Magnitude of Change

In a local context he landscape character of the subject site would be permanently changed as a result of the new development by amongst others, the following:

Topography would be altered and the grassland fields and mature hedgerows removed (erasing the long-standing field pattern) and replaced by industrial scale buildings and ancillary infrastructure. While the impact would be of high magnitude on the site itself, at the wider scale (landscape scale) the development would be in keeping with the plan-driven trend of change towards an urban area dominated by employment uses.

Relative to the existing and other proposed commercial and industrial uses within the study area, the proposed development would comprise a proportionate and commensurate volume and mass of the total built environment. It is diminutive in height and perceived presence of the adjacent wind turbine generators (due to movement and noise). It is comparable in height compared to the existing structures within the Kallia Business Park and of mass of the proposed Power Station adjacent, although of greater horizontal mass than the existing power station, In terms of the quality of design, the proposed development contrasts strongly with the existing degraded Kalila Business Park derelict structures.

The change in landscape character due to its juxtaposition to the proposed development to existing heritage properties to the west will potentially effect their setting, but to a lesser extent than does the presence of the existing wind turbine generators. The new buildings will be nearer than the existing Townaghmore Power Station and Killala Business Park, but they will not introduce an unprecedented change to the landscape character of the location. The heritage properties are currently separated from the proposed development by mature trees and hedgerows enclosing both the properties themselves and the intervening fields, insulating them from perception of change. The physical separation and vegetation will remain unchanged.

Overall, the magnitude of change during Operation Stage to the landscape would be ***Medium*** (refer to Table 11.2 above).

11.5.2.2 Significance of Landscape Effects

Considering the Medium magnitude of change and the Low over all sensitivity of the receiving environment, the significance of the potential landscape effects can be classified ***Moderate*** and neutral. (refer to Table 11.5)

The development would reinforce the trend of change in landscape character, from the current peri-urban condition towards employment-dominated urban. It would contribute to the realisation of the development strategy for the area and can therefore be considered a neutral change.

11.5.3 Visual Impacts - Construction

With reference to Table 11.3, the stand-alone Proposed Development is predicted to have the following visual effects during Construction Phase (see Table 11.6 for summary).

11.5.3.1 **Viewpoint 01:** R314 at the outskirts of Killala

Receptor Sensitivity: Medium

Proposed Change at Construction
Effects of Magnitude on Sensitive Receptors: As illustrated by the profile outlined in red on Viewpoint 01 – Proposed, Appendix 11.1, the intervening landform and vegetation act to fully screen the Proposed Development from Viewpoint 01.
Magnitude of change: Negligible.

Significance of Visual Effect – stand alone development
With reference to Table 11.3, with a Medium Sensitivity and Negligible magnitude of change, the significance of the visual effects for the stand-alone Proposed Development during construction would be ***Not Significant*** and neutral from Viewpoint 01.

11.5.3.2 **Viewpoint 02:** junction of R314 / Unnamed Road (leading to Mullafarry Road)

Receptor Sensitivity: Medium

Proposed Change at Construction
Effects of Magnitude on Sensitive Receptors As shown in the red-outlined profile in Viewpoint 02 – Proposed, Appendix 11.1, the intervening landform and vegetation screen the Proposed Development from Viewpoint 02.
Magnitude of change: Low.

Significance of Visual Effect – stand alone development
With a Medium Sensitivity and Low magnitude of change, the significance of the visual effects for the stand-alone Proposed Development during construction would be ***Slight*** and adverse from Viewpoint 02.

11.5.3.3 **Viewpoint 03:** Mullafarry Road to the east

Receptor Sensitivity: Medium

Proposed Change at Construction
Effects of Magnitude on Sensitive Receptors: as shown in the massing profile outlined in red in Viewpoint 03 – Proposed, Appendix 11.1, intervening vegetation will be partially removed during construction, exposing views of site construction activities from Viewpoint 03.
Magnitude of change: Low.

Significance of Visual Effect – stand alone development
With reference to Table 11.3, with a Medium sensitivity and Negligible magnitude of change, the significance of the visual effects for the stand-alone Proposed Development during construction would be ***Slight*** and adverse from Viewpoint 03.

11.5.3.4 **Viewpoint 04:** Mullafarry Road at proposed site entrance

Receptor Sensitivity: Low

Proposed Change at Construction
Effects of Magnitude on Sensitive Receptors: as illustrated by the massing profile outlined in red on Viewpoint 04 – Proposed, Appendix 11.1, the intervening vegetation acts to fully screen the Proposed Development from Viewpoint 04; there will be no perceived changes to the view resulting from the proposed development.
Magnitude of change: High

Significance of Visual Effect – stand alone development
With a Low Sensitivity and High magnitude of change, the significance of the visual effects for the stand-alone Proposed Development during construction would be ***Moderate*** and adverse from Viewpoint 04.

11.5.3.5 **Viewpoint 05:** Mullafarry Road, representing houses/graveyard

Receptor Sensitivity: Medium

Proposed Change at Construction
Effects of Magnitude on Sensitive Receptors: as illustrated by the photomontage of the Proposed Development on Viewpoint 05 – Proposed, Appendix 11.1, intervening hedgerows, woodland and landscape planting will be partially removed during construction.
Magnitude of change: High.

Significance of Visual Effect – stand alone development
With a Medium Sensitivity and Medium magnitude of change, the significance of the visual effects for the stand-alone Proposed Development during construction would be ***Moderate*** and adverse from Viewpoint 05.

11.5.3.6 **Viewpoint 06:** Mullafarry Road, representing houses/graveyard

Receptor Sensitivity: Medium

Proposed Change at Construction

Effects of Magnitude on Sensitive Receptors: as illustrated by the profile outlined in red on Viewpoint 06 – Proposed, Appendix 11.1, the intervening landform and vegetation act to mostly screen the Proposed Development from Viewpoint 06. Only a small element of the upper structure and roof will be visible when vegetation is in full leaf; a slightly greater extent of visibility will be likely at other times.

Magnitude of change: Medium.

Significance of Visual Effect – stand alone development

With a Medium Sensitivity and Low magnitude of change, the significance of the visual effects for the stand-alone Proposed Development during construction would be ***Moderate*** and adverse from Viewpoint 06.

11.5.3.7 **Viewpoint 07:** Distant view from north west (Rathowen East)

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:

Receptor Sensitivity: Medium

Proposed Change at Construction

Effects of Magnitude on Sensitive Receptors: as no proposed development will be visible from this viewpoint, there will be none.

Magnitude of change: Negligible

Significance of Cumulative Visual Effect

With reference to Table 11.3, with a Medium sensitivity and Negligible magnitude of change, the significance of the visual effects for the Proposed Development in context with the Proposed Power Station and Hydrogen Plant would be ***Not Significant*** from Viewpoint 07.

11.5.3.8 **Viewpoint 08:** Distant view from south (towards Coonealmore)

Receptor Sensitivity: Medium

Proposed Change at Construction

Effects of Magnitude on Sensitive Receptors: as illustrated by the profile outlined in red on Viewpoint 08 – Proposed, Appendix 11.1, the intervening landform and vegetation act to fully screen the Proposed Development from Viewpoint 08; there will be no perceived changes to the view from this viewpoint resulting from the proposed development.

Magnitude of change: Medium.

Significance of Visual Effect – stand alone development
With a Medium Sensitivity and Negligible magnitude of change, the significance of the visual effects for the stand-alone Proposed Development during construction would be ***Moderate*** and negative from Viewpoint 08.

11.5.3.9 **Viewpoint 09:** Courthouse Road (R314), Killala

Receptor Sensitivity: Low

Proposed Change at Construction
Effects of Magnitude on Sensitive Receptors: illustrated by the profile outlined in red on Viewpoint 09 – Proposed, Appendix 11.1, intervening hedgerows and woodland partially screen the Proposed Development from Viewpoint 09, limiting the level of change to the view despite its relatively close proximity. Proportionately, approximately 10% of the viewpoint will be exposed to visibility of a minor section of the upper structure and roof both when vegetation is in full leaf or not, albeit backclothed against open sky.
Magnitude of change: Medium.

Significance of Visual Effect – stand alone development
With a Low Sensitivity and Low magnitude of change, the significance of the visual effects for the stand-alone Proposed Development during construction would be ***Not Significant*** and neutral from Viewpoint 09.

11.5.3.10 **Viewpoint 10:** Ballysakeery Glebe House (the old Rectory)

Receptor Sensitivity: High

Proposed Change at Construction
Effects of Magnitude on Sensitive Receptors: illustrated by the montage on Viewpoint 10 – Proposed, Appendix 11.1, intervening hedgerows and woodland fully screen the Proposed Development from Viewpoint 10; due to proximity there will be noise and during construction and a perception of change.
Magnitude of change: Low.

Significance of Visual Effect – stand alone development
With a High Sensitivity and Low magnitude of change, the significance of the visual effects for the stand-alone Proposed Development during construction would be ***Moderate*** and adverse from Viewpoint 10.

11.5.3.11 **Viewpoint 11:** Wild Atlantic Way (R314), east of Killala

Receptor Sensitivity: Medium

Proposed Change at Construction
Effects of Magnitude on Sensitive Receptors: illustrated by the montage on Viewpoint 11 – Proposed, Appendix 11.1, intervening hedgerows, woodland, landform and structures mostly screen the construction works of the Proposed Development from Viewpoint 11, limiting the level of change to the view in addition to its distant proximity.
Magnitude of change: Low.

Significance of Visual Effect – stand alone development
With a Medium Sensitivity and Low magnitude of change, the significance of the visual

effects for the stand-alone Proposed Development during construction would be ***Slight*** and adverse from Viewpoint 11.

11.5.4 Visual Impacts – Operational Phase

With reference to Table 11.3, the stand-alone Proposed Development is predicted to have the following visual effects during Operation Phase (see Table 11.6 for summary).

11.5.4.1 **Viewpoint 01:** R314 at the outskirts of Killala

Receptor Sensitivity: Medium

Proposed Change
Effects of Magnitude on Sensitive Receptors: As illustrated by the profile outlined in red on Viewpoint 01 – Proposed, Appendix 11.1, the intervening landform and vegetation act to fully screen the Proposed Development from Viewpoint 01; there will be no perceived changes to the view from this viewpoint resulting from the proposed development.
Magnitude of change: Negligible.

Significance of Visual Effect – stand alone development
With reference to Table 11.3, with a Medium Sensitivity and Negligible magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Not Significant*** and neutral from Viewpoint 01.

11.5.4.2 **Viewpoint 02:** junction of R314 / Unnamed Road (leading to Mullafarry Road)

Receptor Sensitivity: Medium

Proposed Change
Effects of Magnitude on Sensitive Receptors As shown in the red-outlined profile in Viewpoint 02 – Proposed, Appendix 11.1, the intervening landform and vegetation screen the Proposed Development from Viewpoint 02. Although the vegetation, when in leaf, provides significant screening, road users and nearby residents may be able to see the roof and upper structure of the new building during periods when the trees are leafless.
Magnitude of change: Low.

Significance of Visual Effect – stand alone development
With a Medium Sensitivity and Low magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Slight*** and adverse from Viewpoint 02.

11.5.4.3 **Viewpoint 03:** Mullafarry Road to the east

Receptor Sensitivity: Medium

Proposed Change
Effects of Magnitude on Sensitive Receptors: as shown in the massing profile outlined in red in Viewpoint 03 – Proposed, Appendix 11.1, intervening vegetation screens the Proposed Development from Viewpoint 03.
Magnitude of change: Negligible.

Significance of Visual Effect – stand alone development
With reference to Table 11.3, with a Medium sensitivity and Negligible magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Not Significant*** and neutral from Viewpoint 03.

11.5.4.4 **Viewpoint 04:** Mullafarry Road at proposed site entrance

Receptor Sensitivity: Low

Proposed Change
Effects of Magnitude on Sensitive Receptors: as illustrated by the massing profile outlined in red on Viewpoint 04 – Proposed, Appendix 11.1, the intervening vegetation acts to screen the Proposed Development from Viewpoint 04, although due to the clearance of foreground vegetation for visibility splays at the entrance and installation of a new entrance gateway, there will be perceived changes to the view resulting from the proposed development.
Magnitude of change: Medium

Significance of Visual Effect – stand alone development
With a Low Sensitivity and Negligible magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Slight*** and Adverse from Viewpoint 04.

11.5.4.5 **Viewpoint 05:** Mullafarry Road, representing houses/graveyard

Receptor Sensitivity: Medium

Proposed Change
Effects of Magnitude on Sensitive Receptors: as illustrated by the photomontage of the Proposed Development on Viewpoint 05 – Proposed, Appendix 11.1, intervening hedgerows, woodland and landscape planting partially screen the Proposed Development from Viewpoint 05, limiting the level of change to the view despite its relatively close proximity. Proportionately, approximately 10% of the upper structure and roof will be visible when vegetation is in full leaf; a slightly greater extent of visibility will be likely at other times, albeit backclothed against open sky.
Magnitude of change: Medium.

Significance of Visual Effect – stand alone development
With a Medium Sensitivity and Medium magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Moderate*** and adverse from Viewpoint 05.

11.5.4.6 **Viewpoint 06:** Mullafarry Road, representing houses/graveyard

Receptor Sensitivity: Medium

Proposed Change
Effects of Magnitude on Sensitive Receptors: as illustrated by the profile outlined in red on Viewpoint 06 – Proposed, Appendix 11.1, the intervening landform and vegetation act to mostly screen the Proposed Development from Viewpoint 06. Only a small element of the upper structure and roof will be visible when vegetation is in full leaf; a slightly greater extent of visibility will be likely at other times.
Magnitude of change: Low.

Significance of Visual Effect – stand alone development
With a Medium Sensitivity and Low magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Slight*** and neutral from Viewpoint 06.

11.5.4.7 **Viewpoint 07:** Distant view from north west (Rathowen East)

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:

Receptor Sensitivity: Medium

Proposed Cumulative Change
Effects of Magnitude on Sensitive Receptors: as no proposed development will be visible from this viewpoint, there will be none.
Magnitude of change: Negligible

Significance of Cumulative Visual Effect
With reference to Table 11.3, with a Medium sensitivity and Negligible magnitude of change, the significance of the visual effects for the Proposed Development in context with the Proposed Power Station and Hydrogen Plant would be ***Not Significant*** from Viewpoint 07.

11.5.4.8 **Viewpoint 08:** Distant view from south (towards Coonealmore)
Receptor Sensitivity: Medium

Proposed Change
Effects of Magnitude on Sensitive Receptors: as illustrated by the profile outlined in red on Viewpoint 08 – Proposed, Appendix 11.1, the intervening landform and vegetation act to partially screen the Proposed Development from Viewpoint 08; there will be minor perceived changes to the view from this viewpoint resulting from the proposed development.
Magnitude of change: Low.

Significance of Visual Effect – stand alone development
With a Medium Sensitivity and Negligible magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Slight*** and Adverse from Viewpoint 08.

11.5.4.9 **Viewpoint 09:** Courthouse Road (R314), Killala

Receptor Sensitivity: Low

Proposed Change
Effects of Magnitude on Sensitive Receptors: illustrated by the profile outlined in red on Viewpoint 09 – Proposed, Appendix 11.1, intervening hedgerows and woodland partially screen the Proposed Development from Viewpoint 09, limiting the level of change to the view despite its relatively close proximity. Proportionately, approximately 10% of the viewpoint will be exposed to visibility of a minor section of the upper structure and roof both when vegetation is in full leaf or not, albeit back-clothed against open sky.
Magnitude of change: Low.

Significance of Visual Effect – stand alone development
With a Low Sensitivity and Low magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Not Significant*** and neutral from Viewpoint 09.

<u>11.5.4.10 **Viewpoint 10:** Ballysakeery Glebe House (the old Rectory)</u>

Receptor Sensitivity: High

Proposed Change
Effects of Magnitude on Sensitive Receptors: illustrated by the montage on Viewpoint 10– Proposed, Appendix 11.1, intervening hedgerows and woodland fully screen the Proposed Development from Viewpoint 10; due to proximity there will be noise of day to day operations and a perception of change.
Magnitude of change: Low.

Significance of Visual Effect – stand alone development
With a High Sensitivity and Low magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Moderate*** and adverse from Viewpoint 10.

<u>11.5.4.11 **Viewpoint 11:** Wild Atlantic Way (R314), east of Killala</u>

Receptor Sensitivity: Medium

Proposed Change
Effects of Magnitude on Sensitive Receptors: illustrated by the montage on Viewpoint 11 – Proposed, Appendix 11.1, intervening hedgerows, woodland, landform and structures screen the Proposed Development from Viewpoint 11, limiting the level of change to the view in addition to its distant proximity.
Magnitude of change: Negligible.

Significance of Visual Effect – stand alone development
With a Low Sensitivity and Low magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Not Significant*** and neutral from Viewpoint 11.

11.6 MITIGATION MEASURES

11.6.1 Construction Phase

No mitigation measures are required other than standard best practice construction site management (e.g., erection and maintenance of site hoarding, orderly storage of materials and vehicles, etc.).

11.6.2 Operational Phase

As noted in Section 11.4.2, mitigation measures have been embedded into the layout and landscape design of the Proposed Development. The proposal will have a similar mass to that of nearby existing development in Killala Business Park and will be dominated by the height of nearby existing wind turbine generators.

11.6.2.1 Landscape Mitigation

Proposed embedded mitigation measures include planting hedgerows to existing gaps, fully screening views of the Proposed Development from these viewpoints with rapid growth species (e.g., *Populus* and *Salix* spp.). Existing hedgerows and vegetation will be managed to attain a height that will screen the Proposed Development from public views beyond the boundary. The layout of the Proposed Development is set back from locations where sensitive receptors may otherwise experience an adverse effect (e.g., Mullafarry Road, the R134 Wild Atlantic Way, the Presbyterian Church, Ballysakeery Manse, Ballysakeery Glebe House (the old Rectory)). There will also be additional tree planting within the site to screen views from the old Rectory that sites adjacent and partially encompassed by the subject site. These measures are embedded into the design and therefore should not be assessed as post-assessment mitigation, even though they act to reduce adverse effects. These mitigation measures are embedded into the design and should not be assessed as post-assessment mitigation, even though they act to reduce adverse effects identified through iterative LVIA and design collaboration.

Proposed embedded mitigation measures include:

- Setting back the layout of the development from locations where sensitive receptors may experience adverse effects (e.g., Mullafarry Road, the R134 Wild Atlantic Way, the Presbyterian Church, Ballysakeery Manse, Ballysakeery Glebe House (the old Rectory).
- Designing the buildings to have a similar horizontal mass to those in nearby Killala Business Park
- Planting hedgerows in existing gaps to fully screen views of the development from these viewpoints with rapid growth species (e.g., *Populus* and *Salix* spp).
- Managing existing hedgerows and vegetation to attain a height that will screen the development from public views beyond the boundary.
- Additional tree planting within the site to screen views from the old Rectory adjacent to and partially encompassed by the site.

The magnitude of change will remain Medium, permanent and neutral.

The Operational Phase significance of landscape effects after mitigation will also remain a combination of Medium sensitivity and Medium magnitude of effects, resulting in a ***Moderate*** significance. This is below the level of significance considered to be unacceptable for a development of this type.

11.6.2.2 Visual Mitigation

The assessment has found that the landscape and visual effects on all receptors are predicted to not be significant; visual effects on Viewpoints 05 and 06 are considered to be ***Moderate*** significance, but this is considered to be not significant. Mitigation measures additional to those incorporated into the proposal are not required to reduce effects to an acceptable level. The proposed development is compliant with the relevant County Moyo guidance for development of this type. Additional mitigation measures beyond those incorporated into the proposal are not required to reduce effects to an acceptable level.

In summary, the proposed development is designed to minimise visual impact and complies with local guidelines, ensuring that additional mitigation measures are unnecessary.

11.7 MONITORING OR REINSTATEMENT MEASURES

As an integral element of landscape maintenance, all trees, both existing and proposed, would be checked for health.

11.7.1 Construction Phase

11.7.1.1 Protection of existing Vegetation to be Retained

- Measures as recommended by an Arboriculturally Impact Assessment will be put in place, particularly the tree root protect zone exclusion fencing to any existing trees that are to be retained.
- Avoidance of damage to tree roots, by excluding any works within the root protection area (RPA).

11.7.2 Operational Phase

11.7.2.1 Tree and Shrub Monitoring and Management:

- Monitor the progression of Ash Dieback Disease (*Hymenoscyphus fraxineus*), which may affect existing mature trees within the site over a short period (1-5 years).
- Fell any affected trees and remove all arising from the site for burning.
- Treat diseased trees appropriately.
- Replace removed trees with saplings of similar ultimate size and foliage.

11.7.2.2 Wild Flower Meadows Management:

- Monitor wild flower meadows for appropriate species diversity.
- Treat noxious or notifiable weeds (particularly non-native) with appropriate bio-safe herbicides.
- Implement an appropriate mowing regime to ensure the wild flower meadows retain a full range of annual and perennial flowering species:
    - Two cuts per annum.
    - Removal of arisings to prevent soil enrichment

11.8 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

It will not always be possible or practical to mitigate all adverse effects. The effects that remain after all assessment and mitigation are referred to as ‘Residual Effects’. These are the remaining environmental ‘costs’ of a project that could not be reasonably avoided. These are a key consideration in deciding whether the project should be permitted or not.

11.8.1 Construction Phase

11.8.1.1 Landscape Effects

- Landscape impacts during construction would range in significance over the course of the construction process.
- No unacceptable significant effects have been identified resulting from landscape impacts during the Construction Phase that can be mitigated effectively.
- Potential effects are either unavoidable and therefore accepted or have been managed within the normal regulatory frameworks in place for undertaking construction projects.
- All such effects are temporary regardless of frequency and quality, and therefore can be considered to have no residual effect.
- No mitigation measures have been recommended for visual impacts during the Construction Phase.
- Overall, Residual landscape effects remain ***Moderate*** at Construction Phase.

11.8.1.2 Visual Effects

- Visual impacts during construction would also range in significance over the course of the construction process.
- No unacceptable significant effects have been identified resulting from visual impacts during the Construction Phase that can be mitigated effectively.
- Potential effects are either unavoidable and therefore accepted or have been managed within the normal regulatory frameworks in place for undertaking construction projects.
- For those effects that are unavoidable, such as noise, movement, dust, movement of construction plant and machinery, and increased road usage, the significance of the effects would reduce with increasing distance from the site.
- All such effects are temporary regardless of frequency and quality, and therefore can be considered to have no residual effect.
- No mitigation measures have been recommended for visual impacts during the Construction Phase.
- Overall, Residual visual effects remain ***Moderate*** at Construction Phase.

11.8.2 Operational Phase

Landscape Effects

- Landscape impacts during operation phase would vary over time as the landscape scheme matures. This would alter the character of the subject site and Proposed Development, from an open, organised and functional Data Centre facility campus and utility compound with young trees, shrubs and fairly 'weedy' looking wild flower planting to a 'bedded-in' composition of buildings knitted together by mature crowns of trees and entwined foliage of shrubs and the developed, densely vegetated and colourful wild flower meadows.

Local Landscape Character

The immediate surroundings of the subject site would be effected to varying levels:

Land to the North

The Proposed Development will introduce a prominent new structure to the existing buildings and energy infrastructure at Killala Business Park. Initially, the north elevation will be fully visible, but as the northern section of the development platform has been cut 2.5m into the upper slope, the new building's full height will be obscured by a retaining wall, When mature, the hedgerow and tree belt planted above the retaining wall will fully screen the Data Centre, integrating it into LCU D. The landscape effects will be ***Slight.***

Land to the West

The west elevation will be partially screened by the existing mature tree belt and hedgerow from the start of Operation Phase. A belt of mature trees will be removed to accommodate the secondary access route. The remaining hedgerow will be supplemented with additional tree planting, which will reinstate full screening as the belt trees mature, integrating it into LCU D. The landscape effects will be ***Moderate***.

Land to the East

The Proposed Development will introduce a prominent new structure to the existing buildings and energy infrastructure at Killala Business Park. The east elevation will be partially screened by the existing mature tree belt and hedgerow from the start of Operation Phase, and fully screened when enhanced screen belt trees mature, integrating it into LCU D. The landscape effects will be ***Slight to Not Significant***.

Land to the South

The new gatehouse will be visible to the main site entrance in the middle of the boundary with Mullafarry Road. The main buildings of the Proposed Development be set back from the Mullafarry Road, screened form the start of Operation Phase by the existing mature/overgrown hedgerow to the site boundary to the east. The main entrance will be open to view due to requirement of visibility splay setbacks, but the landscape design planting will mature behind the security fencing, returning its appearance to a fully mature hedgerow with hedgerow trees, screening the site.

The Ballysakeery Glebe House and Grounds will retain the current full planting screen to the boundary interface with the subject site, which will be enhanced as additional screen planting becomes mature. will introduce a prominent new structure for a part the existing buildings and energy infrastructure at Killala Business Park. The east elevation will be partially screened by the existing mature tree belt and hedgerow from the start of Operation Phase, and fully screened when enhanced screen belt trees mature, integrating it into LCU D. The landscape effects will be ***Moderate to Slight***.

Summary of Landscape Effects

- No unacceptable significant effects have been identified resulting from landscape impacts during the Operational Phase that can be mitigated effectively.
- Potential effects are either unavoidable and therefore accepted or have been managed within the normal regulatory frameworks in place for undertaking construction projects.
- No mitigation measures have been recommended for visual impacts during the Operational Phase.

Summary of Residual Visual Effects

- Visual impacts during construction would also range in significance over the course of the construction process.
- No unacceptable significant effects have been identified resulting from visual impacts during the Operational Phase that can be mitigated effectively.
- No mitigation measures have been recommended for visual impacts during the operation phase, and any remaining residual effects are considered to be, overall, ***Slight***.

11.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

The development context is provided in Chapter 2; the appraisal of cumulative impacts is based on the cumulative proposal plan contained in Chapter 2 of this EIAR which is prepared in respect of all other extant or proposed developments within the border of the study area, there are no areas of the LCU D which are subject to effects that are proportionately greater than the baseline due to Proposed Development in isolation.

In terms of relevant planning history within the vicinity of the subject site, the cumulative proposal plan located in Appendix 2.1 of the EIAR. The Proposed Developments that may be intervisible with the Proposed ADP KLL1 Data Centre are as follows:

1. Planning ref 2360117 Constant Energy Limited Hydrogen Plant (CEHP);
2. Planning ref 2360134 Tawnaghmore Power Station (TPS);
3. Planning ref 19351 Westlands Networks Ltd telecommunications facility (WNTC).

Other schemes that have been considered but not addressed due to their relative remote location and therefore scoped out for landscape and visual impacts cumulative assessment include:

4. Planning ref 2193 Anaerobic Digestion biogas facility with gas pipeline to national grid.

Two further schemes have been assessed as an existing elements within the receiving environment:

5. Planning ref 17619 Killala Community Windfarm, as a constructed scheme;
6. Planning ref 21708 Continued use and operation of the existing limestone quarry.

11.9.1 Construction Phase Cumulative Effects

Cumulative effects at construction with the Proposed Development predicted to result from scheme 1) the CEHP complex, scheme 2), TPS power station, and scheme 3), WNTC telecoms building are assessed as follows.

11.9.1.1 Landscape Effects

Regional Magnitude of Change

Construction Stage landscape cumulative effects of the Proposed Development with schemes 1, 2 and 3 on regional landscape character will result in an increase in construction traffic within the wider road network, the moving presence of construction riggs and cranes that will be visible from a number of locations within LCUs D and G Overall, the Regional magnitude of effects that the Proposed Scheme adds to the Cumulative schemes will be ***Low***, short term, but adverse.

Local Magnitude of Change

Construction Stage landscape cumulative effects of the Proposed Development with schemes 1, 2 and 3 on local landscape character will result in an increase in construction traffic, the moving presence of construction riggs and cranes that will be visible from a number of locations within the study area. The landscape character would be changed temporarily (for the duration of the works programme of the new developments) by amongst others, the following key activities:

- Earthworks, including reprofiling of the site topography to accommodate the building platform, footings, attenuation ponds and excavation of services on the Mullafarry Road, R134, and within Killala Business Park.
- On-site cut and fill operations
- Spoil stockpiles
- Trenching operations
- Construction of environmental bunds
- Construction of structural platforms to accommodate the main buildings
- Dust and fumes
- Floodlighting for shift work and winter periods
- Movement and noise of heavy construction traffic within the site and on the Mullafarry Road and R134.
- Disturbance of the tranquillity of religious sites (graveyards) and heritage properties to the west and east of the Subject Site
- Site hoarding and security fencing

As the Proposed Development landscape proposals respect all existing trees and hedgerows and screening will remain as existing in respect to the cumulative schemes, no additional magnitude of effects will be anticipated, i.e., they will remain High during construction.

11.9.1.2 Significance of Cumulative Construction Phase Landscape Effects

Considering the High magnitude of change and the Low over all sensitivity of the receiving environment, the significance of the potential landscape effects can be classified ***Moderate*** and adverse but temporary (refer to Table 11.5), as would be anticipated during construction phases of a major development of this nature.

11.9.1.3 Visual Effects

For visual effects, while there will be differences resulting for the cumulative works and developing mass of structures collectively, the overall additional contribution to this by the Proposed Development will be either no greater than as a standalone scheme, of in some views, to be less so. This is due to the other schemes acting to screen views of the on-going construction associated with the Proposed Development. As this is largely a speculative perception, however, it is appropriate to take a cautious approach and conclude that the cumulative visual effects of the Proposed Scheme will be the same as those of the stand alone assessment at construction.

11.9.2 Operational Phase Cumulative Effects

Cumulative effects at Operational Phase with the proposed Development predicted to result from scheme 1) the CEHP complex, scheme 2), TPS power station, and scheme 3), WNTC telecoms building are assessed as follows.

11.9.2.1 Cumulative Magnitude of Landscape Change

Regional Magnitude of Change

Landscape character will be cumulatively impacted in a regional context during Operational Stage by minor increase in service and maintenance traffic within the road network in LCUs D and G, as would be anticipated due to expanding commercial infrastructure. Overall, the Regional magnitude of effects will be ***Negligible***, long term, and neutral.

Local Magnitude of Change

In a local context the cumulative landscape character of the subject site in conjunction with that of schemes 1, 2 and 3 would be permanently changed as a result of the new development by amongst others, the following:

- Topography would be altered and the grassland fields and mature hedgerows removed (erasing the long-standing field pattern).
- Existing industrial scale buildings and ancillary infrastructure will be removed and replaced with new structures of multiple times greater in area and mass. The impact would be of high magnitude, although at the wider scale (landscape scale) the development would be in keeping with the plan-driven trend of change towards an urban area dominated by sustainable productivity and employment.
- The Proposed Development will cumulatively represent a fractional part of the combined proposed commercial and industrial uses within the study area. All the proposed developments would be diminutive in height and perceived presence adjacent to the wind turbine generators. All structures will be of a comparable mass.
- The change in landscape character due to its juxtaposition to the proposed development to existing heritage properties in the area will be of no greater effect than does the presence of the existing wind turbine generators. As the Proposed Development is closest to the heritage properties, the effect on them will not change cumulatively. will be nearer than the existing Tawnaghmore Power Station and Killala Business Park, but they will not introduce an unprecedented change to the landscape character of the location. The physical separation and vegetation will remain unchanged.

Overall, the cumulative magnitude of change during Operation Stage to the landscape would be ***Medium*** (refer to Table 11.2 above).

11.9.2.2 Significance of Cumulative Landscape Effects

Considering the Medium magnitude of change and the Low overall sensitivity of the receiving environment, the significance of the potential landscape effects can be classified ***Moderate*** and neutral. (refer to Table 11.5)

The development would reinforce the trend of change in landscape character, from the current peri-urban condition towards employment-dominated urban. It would contribute to the realisation of the development strategy for the area and can therefore be considered a neutral change.

11.9.2.3 Cumulative Visual Effects – Operation Phase

Station and Hydrogen Plant schemes, cumulative effects are predicted to have the following cumulative visual effects (see Table 11.6 for summary).

Viewpoint 01: *R314 at the outskirts of Killala*

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:

Receptor Sensitivity: Medium

Proposed Cumulative Change

Effects of Magnitude on Sensitive Receptors: as no proposed development will be visible from Viewpoint 01 there will be none.

Magnitude of change: Negligible

Significance of Cumulative Visual Effect

With a Medium sensitivity and Negligible magnitude of change, the cumulative significance of the visual effects for the Proposed Development would be ***Not Significant*** from Viewpoint 01.

Viewpoint 02: *junction of R314 / Unnamed Road (leading to Mullafarry Road)*

Receptor Sensitivity: Medium

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen P lant:

Proposed Cumulative Change

Effects of Magnitude on Sensitive Receptors: as indicated in the red-outlined profile in Viewpoint 02– Proposed, Appendix 11.1, the Proposed Power Station and Hydrogen Plant, together with intervening landform and vegetation, screen the Proposed Development from Viewpoint 02, reducing its magnitude of effect compared to the Stand Alone assessment.

Magnitude of change: Negligible

Significance of Cumulative Visual Effect

With a Medium sensitivity and Negligible magnitude of change, the cumulative significance of the visual effects for the Proposed Development would be ***Not Significant*** from Viewpoint 02.

***Viewpoint 03:** Mullafarry Road to the east*

Receptor Sensitivity: Medium

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:

Proposed Cumulative Change

Effects of Magnitude on Sensitive Receptors: Effects of Magnitude on Sensitive Receptors: the Proposed Development will not add to the mass or magnitude of effects that would result from the Proposed Power Station and Hydrogen Plant from this viewpoint; the effects will remain consistent with the stand—alone assessment from Viewpoint 03 with no additional effects.

Magnitude of change: Negligible

Significance of Cumulative Visual Effect

With a Medium sensitivity and Negligible magnitude of change , the cumulative significance of the visual effects for the Proposed Development would be ***Not Significant*** and neutral from Viewpoint 03.

***Viewpoint 04:** Mullafarry Road at proposed site entrance*

Receptor Sensitivity: Low

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:

Proposed Cumulative Change

Effects of Magnitude on Sensitive Receptors: the Proposed Development will not add to the mass or magnitude of effects that would result from the Proposed Power Station and Hydrogen Plant from this viewpoint; ; the effects will remain consistent with the stand—alone assessment from Viewpoint 04, with no additional effects.

Magnitude of change: Medium

Significance of Cumulative Visual Effect

With a Low sensitivity and Negligible magnitude of change, the cumulative significance of the visual effects for the Proposed Development would be ***Slight and Adverse*** from Viewpoint 04.

***Viewpoint 05:** Mullafarry Road, representing houses/graveyard*

Receptor Sensitivity: Medium

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:

Proposed Cumulative Change

Effects of Magnitude on Sensitive Receptors: the Proposed Development will not add to the mass or magnitude of effects that would result from the Proposed Power Station and Hydrogen Plant from this viewpoint; ; the effects will remain consistent with the stand—alone assessment from Viewpoint 05, with no additional effects.

Magnitude of change: Medium

Significance of Cumulative Visual Effect

With a Medium Sensitivity and Medium magnitude of change, the cumulative significance of the visual effects for the Proposed Development would be ***Moderate*** and adverse from Viewpoint 05.

***Viewpoint 06:** Mullafarry Road, representing houses/graveyard*

Receptor Sensitivity: Medium

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:

Significance of Cumulative Visual Effect

Proposed Cumulative Change

Effects of Magnitude on Sensitive Receptors: the Proposed Development will not add to the mass or magnitude of effects that would result from the Proposed Power Station and Hydrogen Plant from this viewpoint; the effects will remain consistent with the stand—alone assessment from Viewpoint 06, with no additional effects.

Magnitude of change: Low

Significance of Cumulative Visual Effect

With a Low sensitivity and Medium magnitude of change, the cumulative significance of the visual effects for the Proposed Development would be ***Slight*** from Viewpoint 06.

***Viewpoint 07:** Distant view from north west (Rathowen East)*

Receptor Sensitivity: Medium

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:

Proposed Cumulative Change

Effects of Magnitude on Sensitive Receptors: the Proposed Power Station and Hydrogen Plant will not add to the mass or magnitude of effects that would result from the from Proposed Development this viewpoint; the effects will remain consistent with the stand—alone assessment from Viewpoint 07, with no additional effects.

Magnitude of change: Negligible

Significance of Cumulative Visual Effect

With a Low sensitivity and Negligible magnitude of change, the cumulative significance of the visual effects for the Proposed Development would be ***Not Significant*** from Viewpoint 07.

***Viewpoint 08:** Distant view from south (towards Coonealmore)*

Receptor Sensitivity: Medium

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:

Proposed Cumulative Change

Effects of Magnitude on Sensitive Receptors: the Proposed Development will not add to the mass or magnitude of effects that would result from the Proposed Power Station and Hydrogen Plant from this viewpoint; the effects will remain consistent with the stand—alone assessment from Viewpoint 08, with no additional effects.

Magnitude of change: Low

Significance of Cumulative Visual Effect
With a Low sensitivity and Negligible magnitude of change, the cumulative significance of the visual effects for the Proposed Development would be ***Slight*** and adverse from Viewpoint 08.

<u>Viewpoint 09:</u> *<u>Courthouse Road (R314), Killala</u>*

Receptor Sensitivity: Low

Visual Effect – With and Hydrogen Plant:
Proposed Cumulative Change
Effects of Magnitude on Sensitive Receptors: the Proposed Development will add to the mass and magnitude of effects that would result from the Proposed Power Station and Hydrogen Plant from Viewpoint 09, as they will be adjacent, both schemes will be visible, cumulatively increasing the visual effects.
Magnitude of change: Medium

Significance of Cumulative Visual Effect
With a Low sensitivity and Negligible magnitude of change, the cumulative significance of the visual effects for the Proposed Development would be ***Slight*** from Viewpoint 09.

<u>Viewpoint 10:</u> *<u>Ballysakeery Glebe House (the old Rectory)</u>*

Receptor Sensitivity: High

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:
Proposed Cumulative Change
Effects of Magnitude on Sensitive Receptors: illustrated by the montage on Viewpoint 10 – Proposed, Appendix 11.1, intervening hedgerows and woodland fully screen the Proposed Development from Viewpoint 10 with no additional effects.
Magnitude of change: Low.

Significance of Cumulative Visual Effect
With a High Sensitivity and Low magnitude of change, the significance of the visual effects for the stand-alone Proposed Development would be ***Moderate*** and adverse from Viewpoint 10.

<u>Viewpoint 11:</u> *<u>Wild Atlantic Way (R314), east of Killala</u>*

Receptor Sensitivity: Medium

Visual Effect – With Proposed Tawnaghmore Power Station and Hydrogen Plant:
Proposed Cumulative Change
Effects of Magnitude on Sensitive Receptors: the Proposed Development will be mostly screened by the mass of the Proposed Power Station and Hydrogen Plant from Viewpoint 11 with no additional effects.
Magnitude of change: Low

Significance of Cumulative Visual Effect
With a Low sensitivity and Negligible magnitude of change, the cumulative significance of the visual effects for the Proposed Development would be ***Slight*** and adverse from Viewpoint 11.

11.9.2.4 Conclusion

The assessment predicts that the cumulative visual effects resulting from the adjacent proposed developments during Construction Phase, would remain similar to the stand-alone scheme, due in part to the similar levels of intrusion that the Proposed Scheme would cause within local landscape. Of the schemes assessed for cumulative effects there are none which are subject to effects that are proportionately greater than those of the Proposed Development in isolation. There would be no significant cumulative visual effects during Operational Phase.

Please see Table 11.6 below for summary.

Table 11.6 *Potential visual effects assessment*

Ref	Viewpoint Location	Sensitivity	Construction Phase (all effects temporary)		Operation Phase (all effects Permanent)		Cumulative (all effects Permanent)	
			Magnitude of Change	Significance of Visual Effects	Magnitude of Change	Significance of Visual Effects	Magnitude of Change	Significance of Visual Effects
1	R314 at the outskirts of Killala.	Medium	Negligible	Not Significant	Negligible	Not Significant	Negligible	Not Significant
2	R314 Mullafarry Road junction	Medium	Low	Slight, Adverse	Low	Slight	Negligible	Not Significant
3	Mullafarry Road to the east	Medium	Low	Slight, Adverse	Negligible	Not Significant	Negligible	Not Significant
4	Mullafarry Road at proposed site entrance	Low	High	Moderate, Adverse	Medium	Slight, Adverse	Medium	Slight, Adverse
5	Mullafarry Road to south west, rep road users/church	Medium	High	Significant, Adverse	Medium	Moderate, Adverse	Medium	Moderate, Adverse
6	Mullafarry Road further west, rep houses/graveyard	Medium	Medium	Moderate, Adverse	Low	Slight, Adverse	Low	Slight, Adverse
7	Distant view from north west (Rathowen East)	Medium	Negligible	Not Significant	Negligible	Not Significant	Negligible	Not Significant
8	Distant view from south (towards Coonealmore)	Medium	Medium	Moderate, Adverse	Low	Slight, Adverse	Low	Slight, Adverse
9	Killala	Low	Medium	Slight, Adverse	Low	Not Significant	Medium	Slight, Adverse
10	Ballysakeery Glebe House (the old Rectory)	High	Low	Moderate, Adverse	Low	Moderate, Adverse	Low	Moderate, Adverse
11	Moyne Abbey/Wild Atlantic Way	Medium	Low	Slight, Adverse	Negligible	Not Significant	Low	Slight, Adverse

11.10 REFERENCES

- Landscape and Visual Assessment Guidelines - Consultation Draft of guidelines for Planning Authorities 2000.
- Landscape Character Assessment in Ireland: Baseline Audit and Evaluation prepared by Julie Martin Assoc in association with Alison Farmer Assoc for An Chomhairle Oidhreachta Sept 2006.
- Environmental Protection Agency (EPA) publication "Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EIAR)" (May 2022) and the accompanying Advice Notes on current practice in the Preparation of Environmental Impact Statements (2015).
- Landscape Institute and Institute of Environmental Management and Assessment, 2013, Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3);
- The Landscape Institute (2013), GLVIA3 Statement of Clarification 1/13[1];
- Landscape Institute Technical Guidance Note 06/19: Visual Representation of Development Proposals," published in September 2019[2];
- SNH and The Countryside Agency (2002) Landscape Character Assessment Guidance for Scotland and England[3]; and
- Natural England, 2014, An Approach to Landscape Character Assessment; and
- SNH and the Countryside Agency (2002) Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity.

[1] The Landscape Institute (2015) GLVIA3 – Statements of Clarification [Online] Available at: https://www.landscapeinstitute.org/technical-resource/glvia3-clarifications/ (Accessed September 2023)

[2] Landscape Institute (2019) Photography and photomontage in LVIA [Online] Available at: https://www.landscapeinstitute.org/PDF/Contribute/LIPhotographyAdviceNote01-11.pdf (Accessed September 2023)

[3] SNH and The Countryside Agency (2002). Landscape Character Assessment Guidance for Scotland and England. (Accessed September 2023)

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CHAPTER 12:

ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE

12

CONTENTS

12.0 ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE

12.1 INTRODUCTION

The following chapter assesses the predicted impacts of the Proposed Development on archaeological, architectural and cultural heritage. The Proposed Development is located in the townlands of Mullafarry and Tawnaghmore Upper, Killala, Co. Mayo (ITM E. 520213m, N. 827691m; see Figure 12.1).

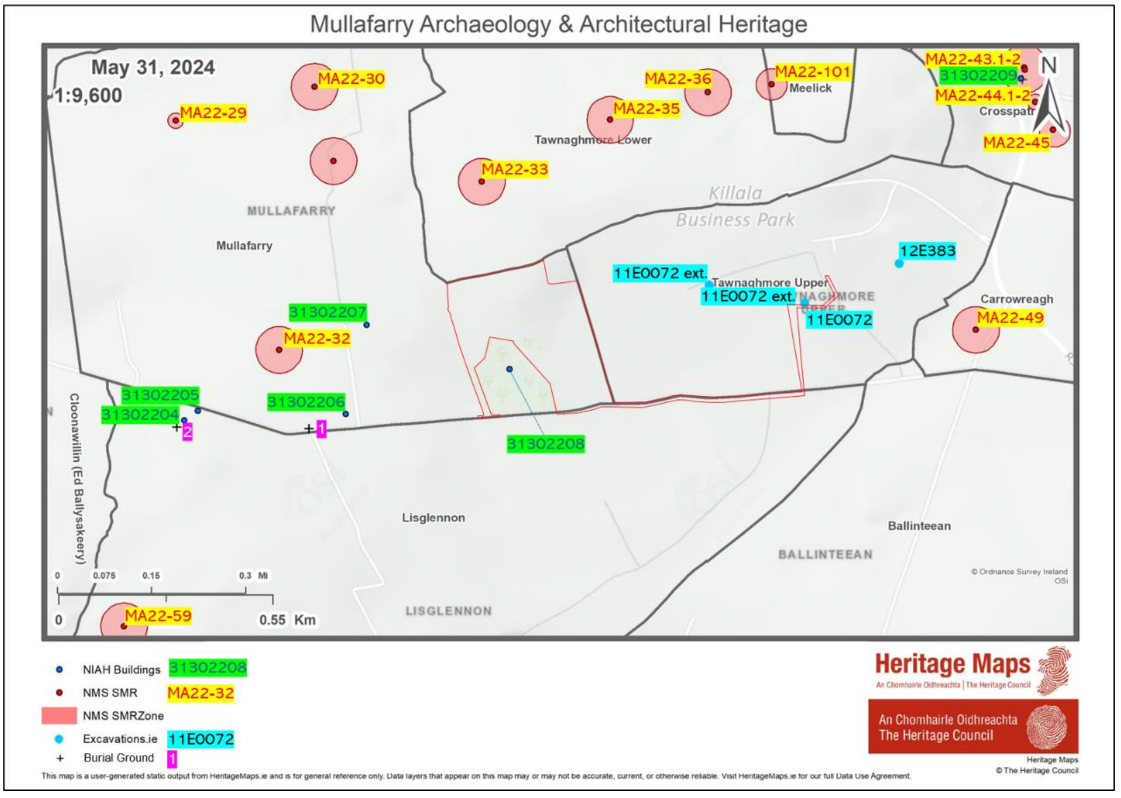

Figure 12.1 *Site location map showing recorded archaeological and architectural heritage sites in the vicinity of the Proposed Development (source: https://heritagemaps.ie; https://archaeology.ie; https://excavations.ie; https://buildingsofireland.ie).*

12.2 METHODOLOGY

12.2.1 Forecasting Methods and Difficulties Encountered

Archaeological, architectural and cultural heritage have been assessed in line with best practice at a National and EU level, in line with the following:

12.2.1.1 Guidelines and Legislation

The following legislation, standards and guidelines were consulted as part of the assessment:

- National Monuments Acts, 1930 to 2014;
- The Planning and Development Act, 2000 (as amended);
- Heritage Act, 1995 (as amended);
- Draft Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), 2015, EPA;
- Guidelines on the Information to be contained in Environmental Impact Assessment Report 2022, EPA;
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht, and Islands; and
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 2000 and the Local Government (Planning and Development) Act 2000.

12.2.1.2 The Valletta Convention

The Valletta Convention was adopted on 16 January 1992 in Valletta (Malta) and came into force on 25 May 1995 (Council of Europe Treaty Series no. 143). It is open for signature by member states of the Council of Europe and other states party to the European Cultural Convention and for accession by non-member states and the European Community.

The Valletta Convention (The European Convention for the Protection of the Archaeological Heritage (revised)) replaced and updated the original London Convention of 1969. It reflected the change in the nature of threats to the archaeological heritage, which now came less from unauthorised excavations, as in the 1960s, and more from the major construction projects carried out all over Europe from 1980 onwards. The revised Convention drew on twenty-two years of experience in implementing the original Convention. It established a body of new basic legal standards for Europe, to be met by national policies for the protection of archaeological assets as sources of scientific and documentary evidence, in line with the principles of integrated conservation.

No difficulties were encountered during the study.

12.2.2 Assessment Methodology

To set the Proposed Development within its wider archaeological, architectural and cultural heritage landscape, and to assess the potential of encountering such features on the site, a paper survey of archaeological, architectural heritage, historical and cartographic sources was undertaken. A study area of approximately 500m from the Proposed Development was assessed, with reference to important relevant findings farther afield.

12.2.2.1 Record of Monuments and Places

The Record of Monuments and Places (RMP), comprising the results of the Archaeological Survey of Ireland, is a statutory list of all recorded archaeological monuments known to the National Monuments Service (https://archaeology.ie). The relevant files for these sites contain details of documentary sources and aerial photographs, early maps, OS memoirs, the field notes of the Archaeological Survey of Ireland and other relevant publications. Sites recorded on the Record of Monuments and Places all receive statutory protection under the National Monuments Act 1994. The information contained within the RMP is derived from the earlier non-statutory Sites and Monuments Record (SMR); some entries, however, were not transferred to the statutory record as they refer to features that on inspection by the Archaeological Survey were found not to merit inclusion in that record or could not be located with sufficient accuracy to be included. Such sites however remain part of the SMR. The record is a dynamic one and is updated so as to take account of on-going research. The Record of Monuments and Places was consulted in the Archives of the Department of Arts, Heritage and the Gaeltacht. There are no recorded archaeological monuments located within the site boundary. There are fifteen recorded within the study area (see Appendix 12.1, Figure 12.1 and Table 12.1).

12.2.2.2 Recorded Archaeological Objects

The National Museum of Ireland's topographical files are a national archive of all known archaeological finds from Ireland. They relate primarily to artefacts but also include references to monuments and contain a unique archive of records of previous excavations. The topographical files were consulted to determine if any archaeological artefacts had been recorded from the area. Other published catalogues of prehistoric material were also studied: Raftery (1983 - Iron Age antiquities), Eogan (1965; 1993; 1994 - bronze swords, Bronze Age hoards and goldwork), Harbison (1968; 1969a; 1969b - bronze axes, halberds and daggers). There are fifteen stray finds recorded from the study area (see Table 12.2 and Appendix 12.2).

12.2.2.3 Recorded Archaeological Excavations

The excavation bulletin website (https://excavations.ie) was consulted to identify previous excavations that have been carried out within the study area. This database contains summary accounts of excavations carried out in Ireland from 1970 to 2023. There have been no previous licenced archaeological investigations within the study area as recorded on the excavations website. There have been four within the study area. Summaries of these are listed in Appendix 12.3 (see also Table 12.3 and Figure 12.1).

12.2.2.4 Cartographic Sources

Down Survey - Taken in the years 1656-1658, the Down Survey of Ireland is the first ever detailed land survey on a national scale anywhere in the world. The survey, led by William Petty, sought to measure all the land to be forfeited by the Catholic Irish in order to facilitate its redistribution to Merchant Adventurers and English soldiers (https://downsurvey.tchpc.tcd.ie/). Killala is depicted on the Ireland, Mayo county and the Tirawley Barony maps as shown in Figure 12.2.

Taylor and Skinner - In 1777 George Taylor and Andrew Skinner surveyed and mapped the roads of Ireland and published their results the following year. A second edition of the Maps was printed in 1783. The maps were engraved by Garnet Terry. The strip maps were welcomed for their accuracy and for showing details of roads and crossroads, naming landlords and their houses and outlining topographical features. The *Road from Dublin to Killala to Roscommon by Lanesboro to Boyle by Strokestown* is shown as Figure 12.3 (https://www.swilson.info/tandsdets.php?pg=70&rt=470).

Ordnance Survey Early Editions - Reference to cartographic sources provides information on the development of the area. Manuscript maps consulted included the Ordnance Survey first edition 6" (1829-41) and second edition 25" (1897-1913) maps were also assessed (https://heritagemaps.ie; see Figures 12.4 and 12.5).

12.2.2.5 Griffith's Valuation

Griffith's Valuation was the first full-scale valuation of property in Ireland, overseen by Richard Griffith and published between 1847 and 1864. It is one of the most important surviving 19th century genealogical sources (http://www.askaboutireland.ie/griffith-valuation/). The Griffiths Valuation for the townland of Mullafarry is given in Figure 12.6.

12.2.2.6 National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) is a systematic programme of identification, classification and evaluation of the architectural heritage of the State (https://archaeology.ie; https://buildingsofireland.ie). The Minister for Housing, Local Government and Heritage is currently using the Inventory as the basis for making recommendations for the inclusion of structures in the Record of Protected Structures (RPS). No structures included in the NIAH are located within the footprint of the Proposed Development. There are no recorded sites listed in the NIAH within the Proposed Development site boundary. However, the curtilage of Mullafarry Rectory is within the site boundary. There are six sites recorded within the study area (see Appendices 12.4 and 12.5 and Figure 12.1).

12.2.2.7 Aerial Photography

Available online sources for aerial photography were consulted, including the Ordnance Survey and National Monuments Service collections, and Google Maps (see Figures 12.7 – 12.10).

12.2.2.8 Historical Research

The baseline historical research utilised sources including Lewis' Topographical Dictionary of Ireland (1837) and local journals.

12.2.2.9 County Development Plan

The Mayo Development Plan 2022 – 2028 was consulted (https://www.mayo.ie/planning/county-development-plans/2022-2028). The plan includes policy objectives for the protection of the county's architectural heritage through their inclusion in the Record of Protected Structures (RPS) or in Architectural Conservation Areas (ACA) (see Appendix 12.7). The RPS is a list of every structure which is of special architectural, archaeological, artistic, cultural, scientific, social or technical interest within the council's functional area. No structures included in the RPS are located within the study area.

12.2.2.10 Site walkover survey

A site walkover survey was undertaken on 28 June 2024 in sunny dry weather.

Table 12.1: *Recorded archaeological sites and monuments within the study area (source: https://heritagemaps.ie; https://archaeology.ie).*

SMR No	Townland	Monument Class	ITM
MA022-029----	Mullafarry	Ritual site - holy well	519363, 828178
MA022-030----	Mullafarry	Enclosure	519720, 828265
MA022-031----	Mullafarry	Enclosure	519769, 828074
MA022-032----	Mullafarry	Ringfort - rath	519629, 827588
MA022-033----	Tawnaghmore Lower	Ringfort - rath	520150, 828021
MA022-035----	Tawnaghmore Lower	Enclosure	520480, 828180
MA022-036----	Tawnaghmore Lower	Earthwork	520731, 828251
MA022-043001-	Crosspatrick	Church	521544, 828314
MA022-043002-	Crosspatrick	Graveyard	521546, 828309
MA022-044001-	Crosspatrick	Cross-inscribed stone	521573, 828226
MA022-044002-	Crosspatrick	Inscribed stone	521573, 828226
MA022-045----	Crosspatrick	Barrow - ring-barrow	521618, 828154
MA022-049----	Carrowreagh (Tirawley By.)	Ringfort - rath	521420, 827640
MA022-059----	Lisglennon	Ringfort - rath	519230, 826877
MA022-101----	Tawnaghmore Lower,Meelick (Tirawley By.)	Ringfort - rath	520895, 828271

Table 12.2: *Recorded archaeological excavations within the study area (source: https://heritagemaps.ie; https://excavations.ie).*

Register Number	Townland	Description	Notes
NMI 1997:25	Tawnaghmore	Wooden vessel containing bog butter	Found on surface after peat milling
NMI 1997:26	Tawnaghmore	Vessel	Found on surface after peat milling
NMI 1997:27	Tawnaghmore	Rope	Found on surface after peat milling
NMI 1971:1042	Tawnaghmore	Human remains	Found on floor of cist burial
NMI 1965:68	Tawnaghmore	Stone axehead	Found 3-4 ft deep in bed of stream
NMI 1960:610	Tawnaghmore	Wooden lid, churn-type	Found in Sheskin bog
NMI 1960:620	Tawnaghmore	Decorated wooden mether	Found in Sheskin bog
NMI 1930:131.1	Tawnaghmore	Wooden animal trap frame	Found in bog
NMI 1930:131.2	Tawnaghmore	Sample	Found in bog
NMI 1933:1232	Killala	Skeletal remains	Found on seashore
NMI 1886:42	N/A	Flat bronze axehead	Found near Killala
NMI 2013:96	Townplots West	Carved sandstone font	The Cathedral Church of St Patrick, Killala
NMI 2013:97	Townplots West	Upper stone of beehive quern	The Cathedral Church of St Patrick, Killala
NMI 2013:605	Killala	Skeletal remains: two adults and one juvenile	Digging to repair water mains in the Cathedral
NMI 2021:100	N/A	Human skull portion	member of the public walking in Killala Bay

Table 12.3: *Recorded archaeological excavations within the study area (source: https://heritagemaps.ie; https://excavations.ie).*

Exc. #	Licence #	Site Name	Site type	ITM
2011:450	11E0072 and ext.	Tawnaghmore, Killala	Testing, shell deposit	496004, 839493
2012:448	12E383	Tawnaghmore Upper	No archaeological significance	521223, 827810
2013:418	11E0072 ext.	Tawnaghmore	No archaeological significance	520979, 827707
2013:418	11E0072 ext.	Tawnaghmore	No archaeological significance	520979, 827707
2014:159	11E0072 Ext.	Tawnaghmore	Monitoring	520735, 827755

Figure 12.2 *Extract of Down Survey map of the County of Mayo and the Barony of Tirawley (https://downsurvey.tchpc.tcd.ie/).*

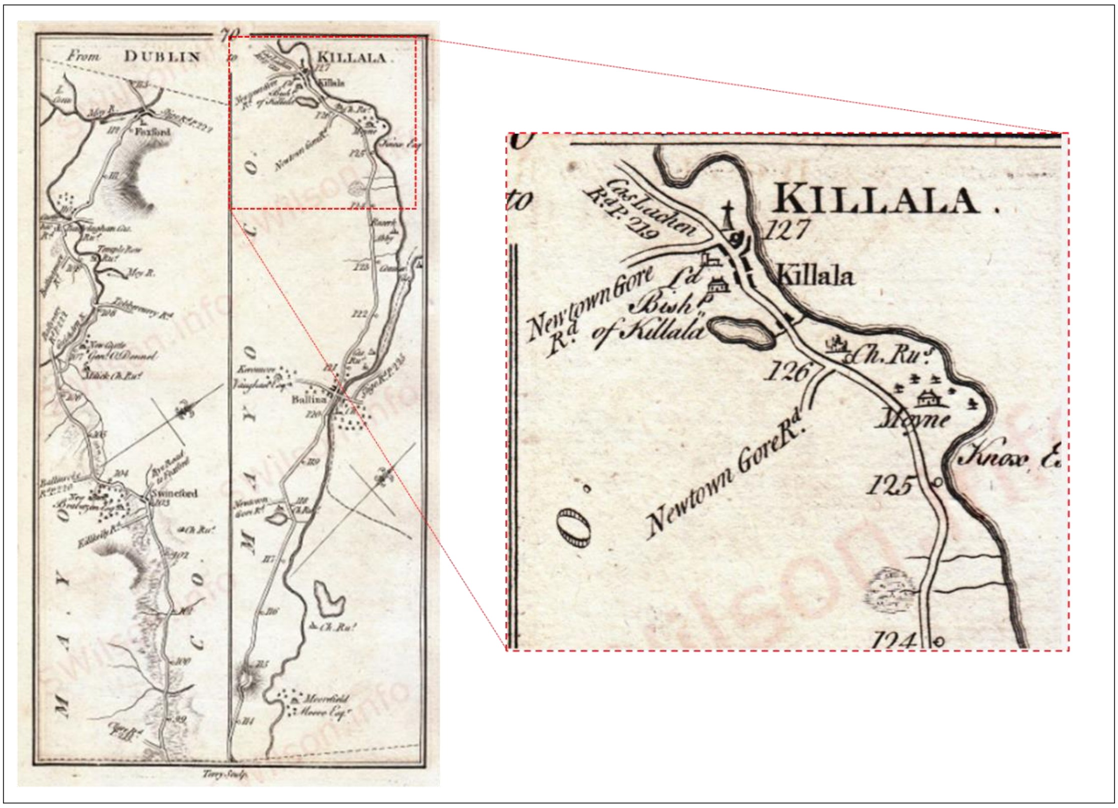

Figure 12.3 *Extract of Taylor & Skinner map of the Road from Dublin to Killala to Roscommon by Lanesboro to Boyle by Strokestown (1777) (https://www.swilson.info/tands1777.php)*

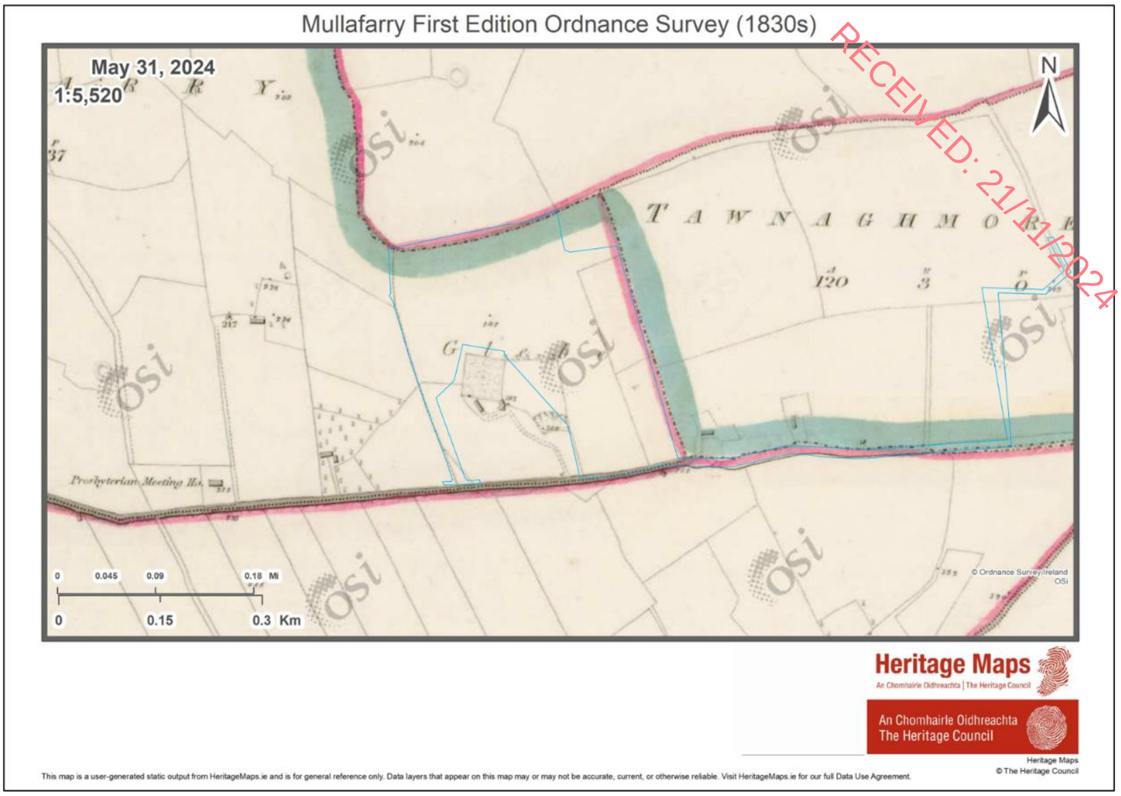

Figure 12.4 *Extract from the Ordnance Survey c. 1830s First Edition map of Mullafarry (https://heritagemaps.ie).*

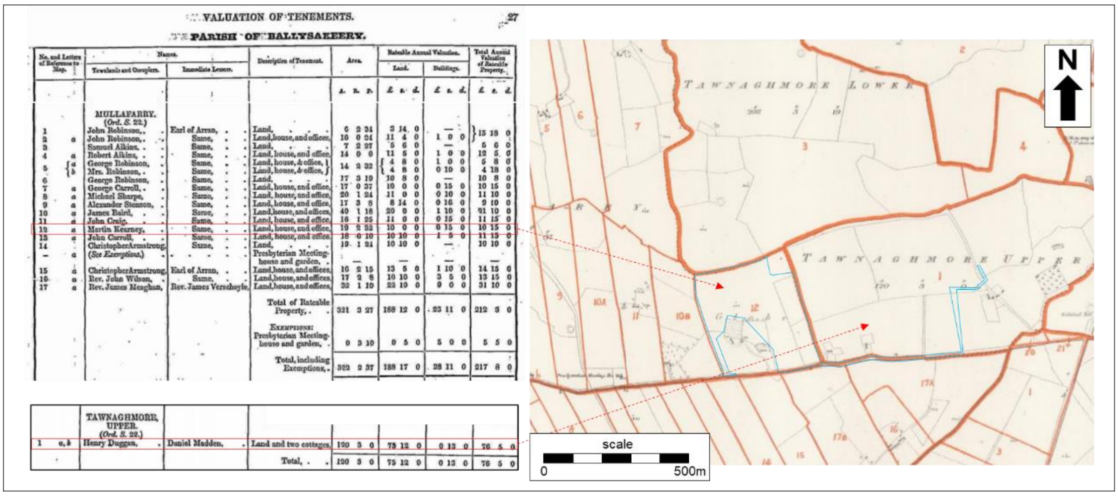

Figure 12.5 *Extract from the Griffith's Valuation of Mullafarry ((http://www.askaboutireland.ie/griffith-valuation/).*

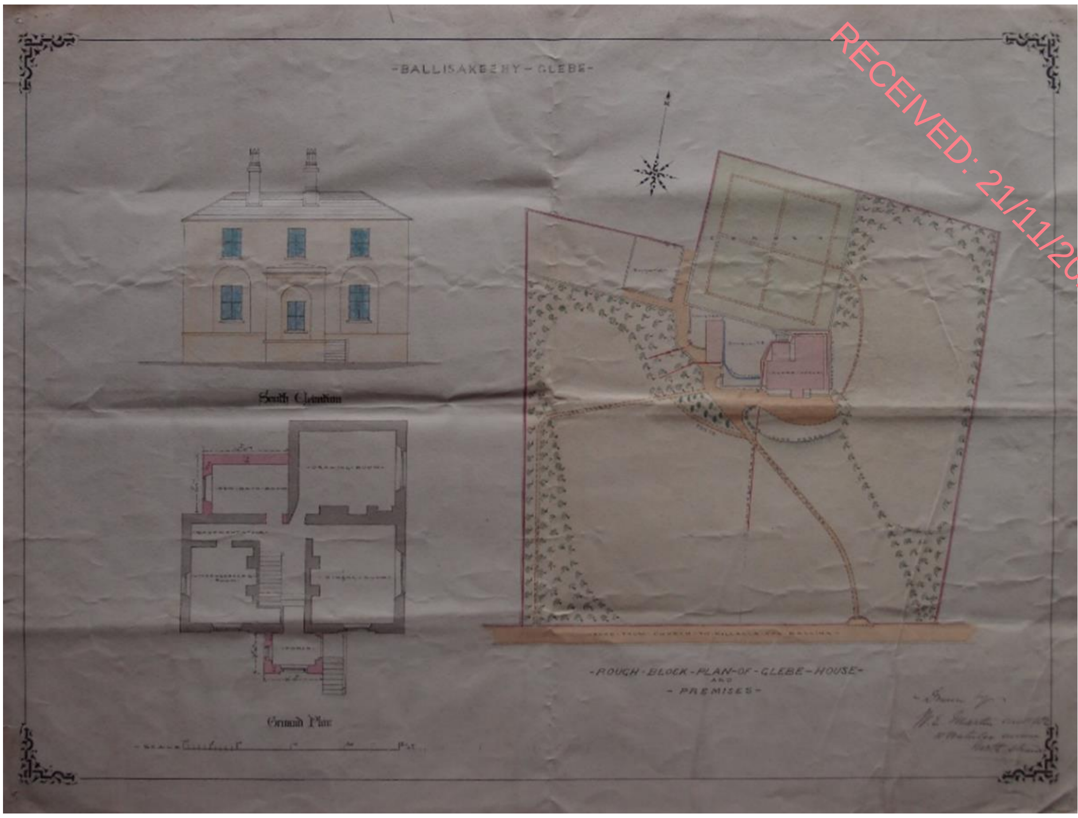

Figure 12.6 *A drawing signed by William Edward Martin (1843-1915) of 10 Waterloo Avenue, North Strand, Dublin, showing a ROUGH BLOCK PLAN OF GLEBE HOUSE and PREMISES and the South Elevation and Ground Plan with proposals for the addition of a porch and new bathroom. Courtesy of the Representative Church Body Library (i_gh01800101)*

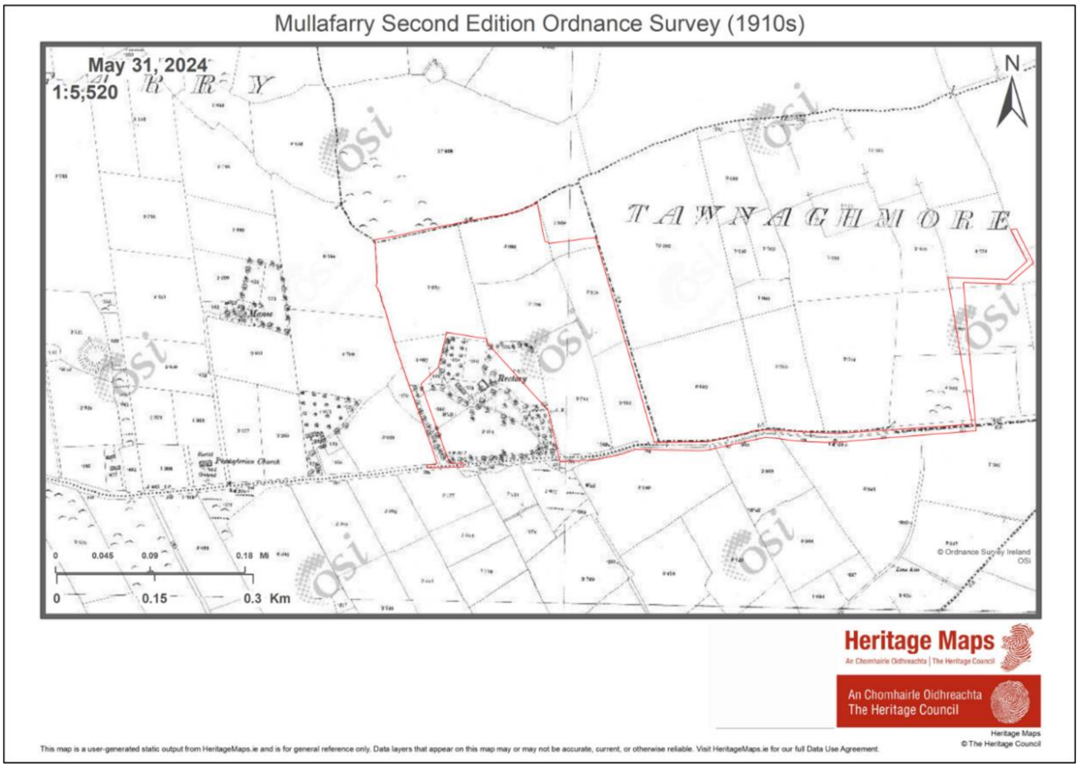

Figure 12.7 *Extract from the Ordnance Survey c. 1910s Second Edition map of Mullafarry (https://heritagemaps.ie).*

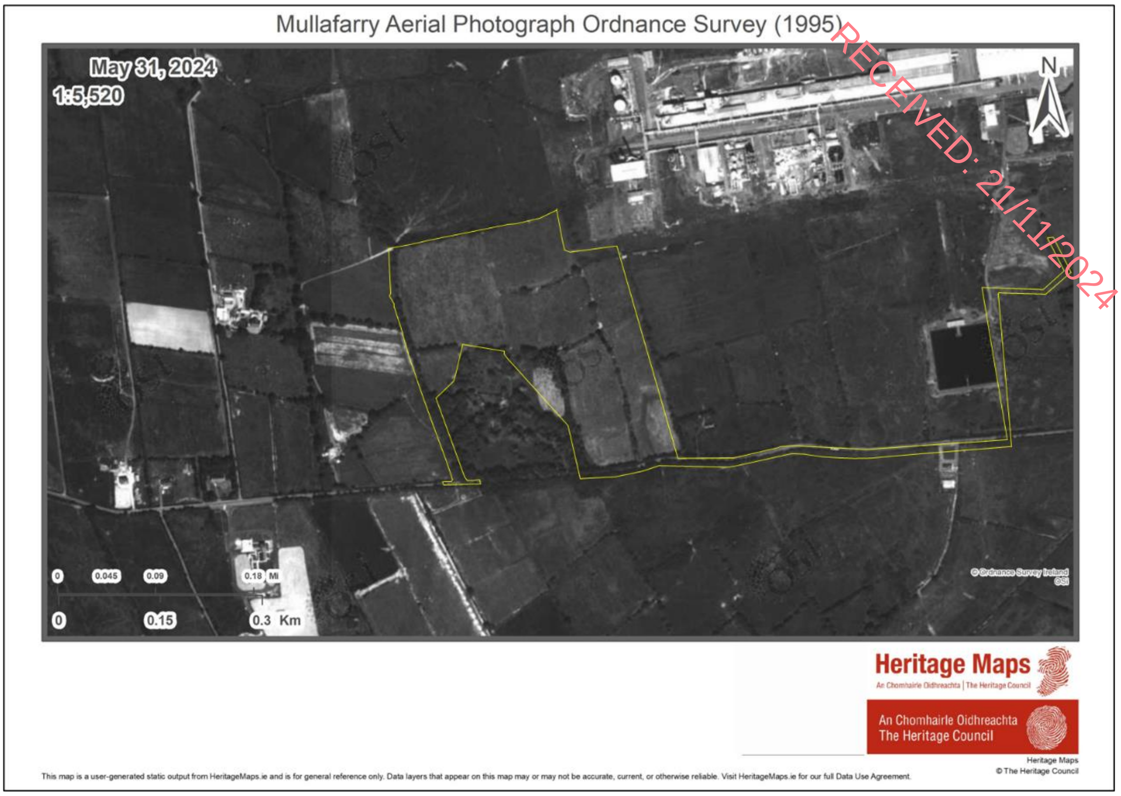

Figure 12.8 *Extract from the Ordnance Survey 1995 Aerial Photograph of Mullafarry (https://heritagemaps.ie).*

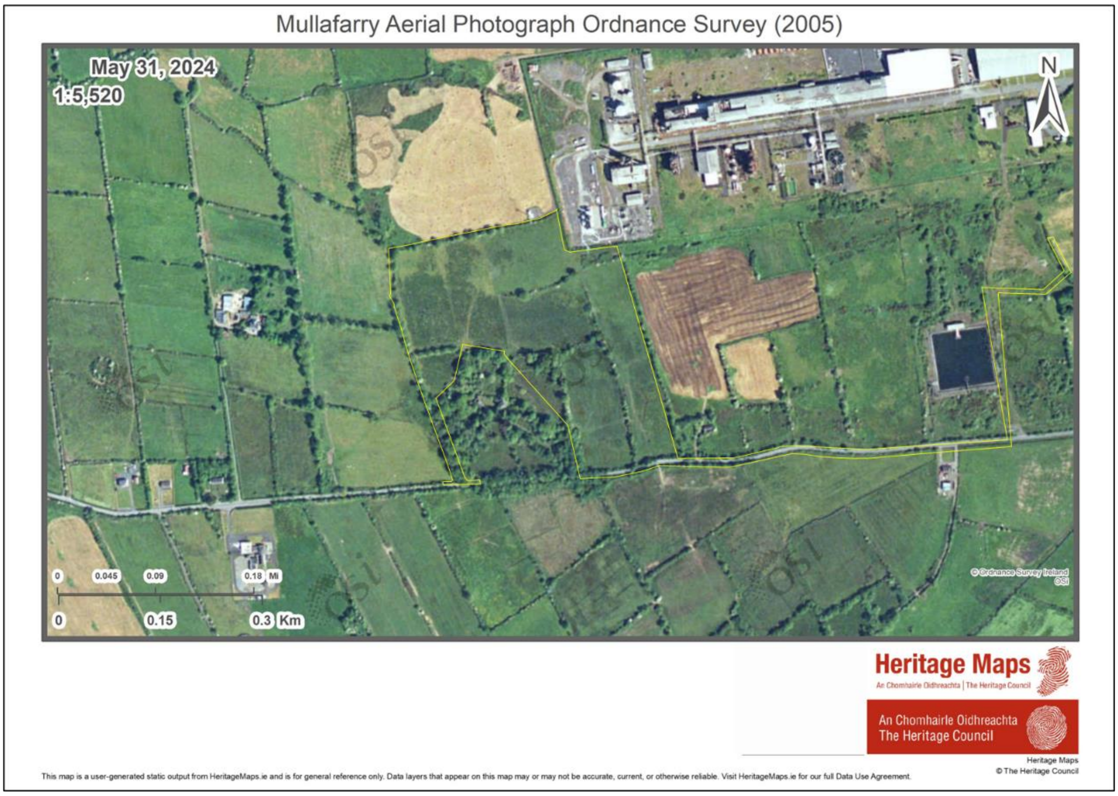

Figure 12.9 *Extract from the Ordnance Survey 2005 Aerial Photograph of Mullafarry (https://heritagemaps.ie).*

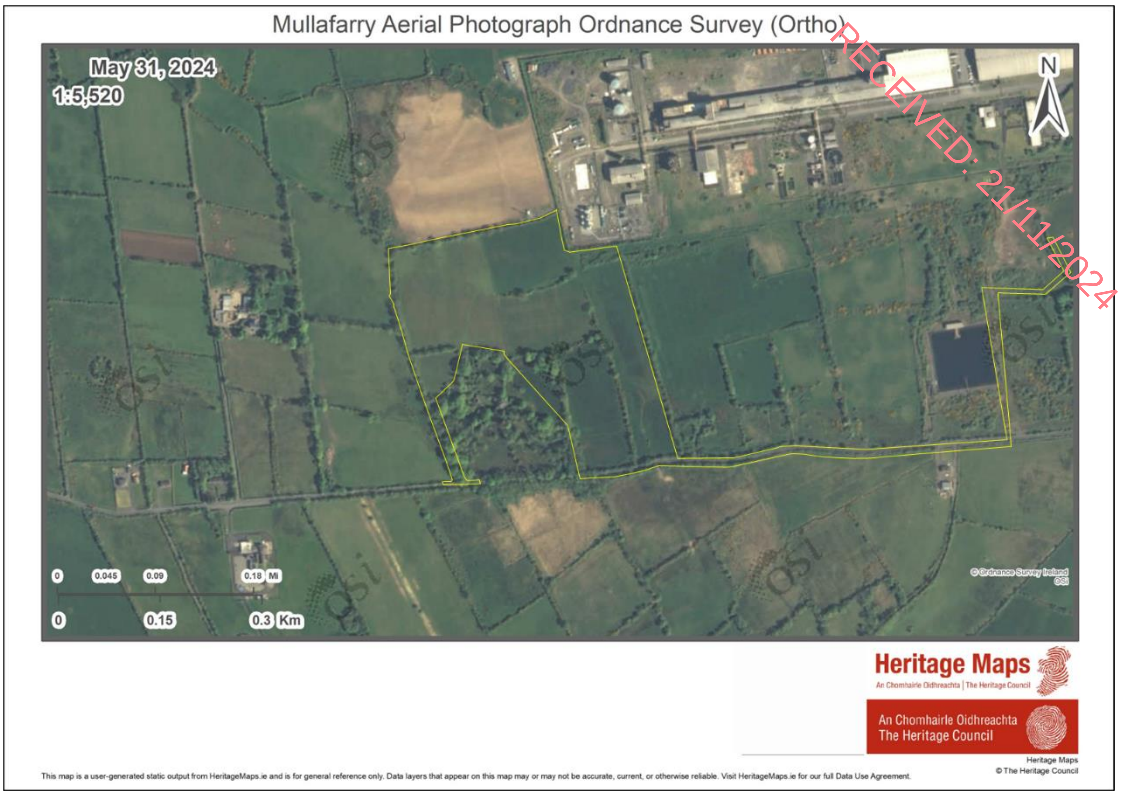

Figure 12.10 *Extract from the Ordnance Survey Ortho Edition Aerial Photograph of Mullafarry (https://heritagemaps.ie).*

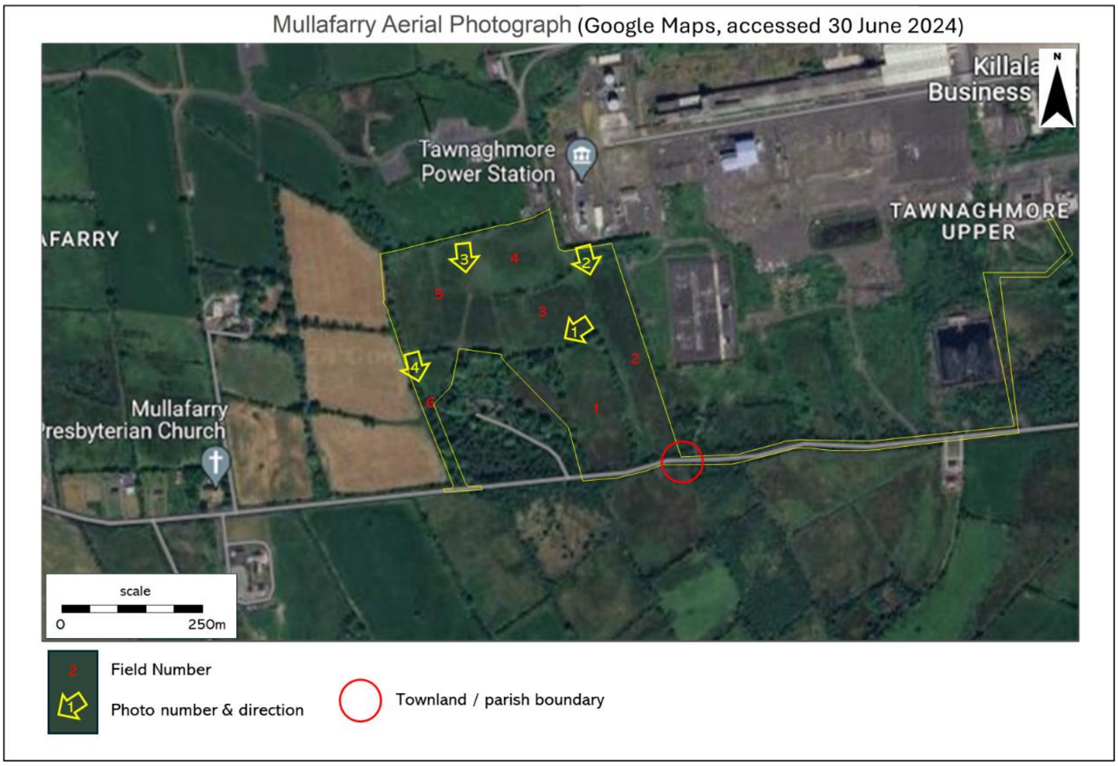

Figure 12.11 *Extract from the Google Maps Aerial Photograph of Mullafarry, showing filed notes and photo locations (https://www.google.com/maps, accessed 31 May 2024).*

12.3 RECEIVING ENVIRONMENT

The Proposed Development area is principally located within the townland of Mullafarry, in the Electoral Division of Ballysakeery, in the Civil Parish of Ballysakeery, in the Barony of Tirawley, in the County of Mayo (ITM E. 520213m, N. 827691m; see Figure 12.1).

The Irish name for Mullafarry is Mullach Farraidh (https://www.logainm.ie/en/34256)

Mullafarry borders the following other townlands:

- Cloonawillin to the west
- Lisglennon to the south
- Magherabrack to the west
- Tawnaghmore Lower to the east
- Tawnaghmore Upper to the east

The eastern portion of the development extends into the townland of Tawnaghmore Upper in the Electoral Division of Kilalla, in the Civil Parish of Killala, in the Barony of Tirawley, in the County of Mayo. The Irish name for Tawnaghmore Upper is Tamhnach Mhór Uachtarach (the great / big arable place / field: https://www.logainm.ie/en/34542).

The archaeological and architectural heritage of the study area, which comprises an area of approximately 500m radius from the site (incorporating the above townlands), is summarised in Tables 12.1 – 12.3 and Appendices 12.1 – 12. 7 (see also Figure 12.1).

12.3.1 Pre-history (c. 8000 BCE – 400 AD)

There is tentative evidence that the area of the Proposed Development was inhabited as far back as the Mesolithic Period (middle stone age; c. 8,000 BCE – 4,000 BCE), in the form a shell midden found during archaeological test excavations in advance of a development in the adjacent Killala Business Park (Excavation No. 2011:450; see Appendix 12.3 and Figure 12.1). It should however be noted that shell middens date from the Mesolithic to modern times and no dateable artefacts were recovered, and not radiocarbon dates ascribed.

The earliest dateable evidence of human habitation in the study area dates to the Neolithic (new stone age; c. 4,000 BCE – 2,500 BCE) in the form of a 12.1cm long sandstone stone axehead recorded from Tawnaghmore (NMI 1965:68). Over 21,000 stone axeheads are known from Ireland (Sheridan et al. 1992, 391; Cooney and Mandal 1998, 4). They represent the ‘single most numerous artefact type surviving from prehistory in Ireland’ (Mandal 1997, 289; Mandal et al 2004, 116; Woodman 1978; 1987; Cooney and Grogan 1994), with their production and usage noted as commencing in the early Mesolithic and continuing well into the Bronze Age (c. 2,500 BCE – 500 BCE) (Cooney & Mandal 1998, 1; Sheridan et al 1992, 400; Cooney et al 2011, 432; Cooney 2000, 210). Since 1991 stone axeheads have been the focus of detailed research by the Irish Stone Axehead Project (ISAP). Stone axeheads were both a symbol of prestige and an ordinary working tool for people for thousands of years. They served a wide range of functions in early prehistoric Irish society, including use in woodworking, in burial and ceremonial contexts and as symbols of power.

There is also artefactual evidence of human habitation in the area in the Bronze Age (c. 2,500 BCE – 500 BCE), in the form of a flat bronze axehead, found ‘near Killala’ in the nineteenth century (NMI 1886:42). The earliest recorded archaeological site from the study area is a ring-barrow located in Crosspatrick (SMR No. MA022-045). Ring barrows typically consist of a circular or oval raised area (generally up to 1m above the external ground level or level with it) enclosed by fosse(s) and outer bank(s), with or without an entrance. These are part of the Bronze/Iron Age burial tradition (c. 2400 BC - AD 400) (*Archaeology Ireland 2005*). Human remains associated with a cist burial at Tawnaghmore (NMI 1971:1042) may also date to this period.

Evidence of Iron Age (500 BC – 400 AD) activity in the area, as with much of Ireland, is relatively sparse, although it should be noted that the practice of barrow burials continued into this time period. The wooden vessel containing bog butter (found in Tawnaghmore; NMI 1997:25) and beehive quern (found in Townplots West; NMI 2013:96) may date to this period (e.g. see Caulfield 1977).

12.3.2 Early Medieval Period (c. 400 AD – 1100 AD)

The spread of Christianity from the early fifth century AD marks the transition from the prehistoric to the medieval period. Ireland at this time was predominantly a rural society, with dispersed settlement (Charles-Edwards 2000). Killala has strong associations with St Patrick; it is suggested as the port from which Patrick escaped from Ireland in his youth (Collins 2023). The cluster of archaeological sites in Crosspatrick (SMR Nos. MA022-043001-2 and MA022-044001-2), coupled with the placename, are a strong indicator of Early Christian monastic settlement in the area. The Holy well at Mullafarry (SMR No. MA022-029----) also relates to this period.

Secular life during this period is attested to by defensive enclosures known as ringforts were constructed to protect farmsteads. These are one of the most frequently recorded archaeological site types and c. 50,000 examples are recorded in the Irish landscape. Ringforts are regarded as defended family homesteads and the dating evidence to date suggests they were primarily built between the seventh and ninth centuries AD (Stout 1997, 22–31). Five raths (earthen ringforts) area recorded in the study area, one in Mullafarry (SMR No. MA022-032----), two in Tawnaghmore Lower (SMR Nos. MA022-033---- and MA022-101----), and one in Carrowwreagh (SMR No. MA022-049----).

Many ringforts have been partially or completely destroyed since the 1960s and often the only indication of the former presence of a ringfort is preserved in townland name elements such as Dún, Rath, Cashel or Lios. However, monuments which have experienced above-ground disturbance continue to be of archaeological interest due to the potential for subsurface remains to exist at their locations. The term ‘enclosure’ is applied to monuments that cannot be classified more accurately without archaeological assessment but were identified as enclosures during fieldwork or through the study of aerial photography or other sources. Three enclosures have been recorded in the study area, two in Mullafarry (SMR Nos. MA022-030---- and MA022-030----), and one in Tawnaghmore Lower (SMR No. MA022-035----).

The decorated mether found in Tawnaghmore (NMI 1960:61) provides evidence of secular settlement in the area. A mether is a two or four handled medieval wooden drinking or storage vessel that typically features a quadrangular mouth tapering to a narrower rounded base. The body and handles were hand-carved from a single piece of wood such as yew, alder or willow. Feasting was an integral part of medieval Irish society. Wine, ale, mead, broth and milk were consumed with the food. Under the king’s or chieftain’s direction the four handled mether was passed in a 'full circuit' of the banqueting hall and guests were expected to drink moderately so that the mether could complete the circuit before the contents were drained (O'Sullivan, 2004, 88).

12.3.3 Later Medieval Period (c. 1100 AD – 1650 AD)

The Anglo-Norman's arrived in Ireland in 1169, to support the deposed king of Leinster, Diarmuid MacMurchadha. By the end of the twelfth century the Anglo-Normans had succeeded in gaining control over much of the country (Stout & Stout 1997, 53). The Anglo- Norman tenurial system more or less appropriated the older established land units known as túath in the early medieval period but described the territories as manors (MacCotter 2008).

County Mayo fell under Norman control in AD 1235, leading to the decline of numerous Gaelic lords and chieftains, particularly the O'Connors of Connacht. During the 1230s, the Anglo-Normans and Welsh, led by Richard Mór de Burgh (c. 1194–1242), invaded and established settlements in the county. Norman surnames remain prevalent in County Mayo today. After the collapse of the lordship in the 1330s, these families became increasingly disconnected from the Anglo-Irish administration in Dublin and assimilated into Gaelic-Irish society. They adopted the local language, religion, dress, laws, customs, and culture, and intermarried with Irish families, ultimately becoming "*more Irish than the Irish themselves*."

The closest direct evidence of the arrival of the Anglo-Normans in the area is c. 4km to the northwest of the Proposed Development, the form of a motte castle at Rathcash (SMR No. MA021-020----).

12.3.4 Post-Medieval Period (c. 1650 AD –)

In the mid-seventeenth century, the armies of the English Commonwealth, commanded by Oliver Cromwell, emerged victorious over the royalists, and immediately undertook an ambitious project of social engineering, underpinned by a massive transfer in landownership from Irish Catholics to English Protestants. For this to happen, the land had to be accurately surveyed and mapped, a task overseen by the surgeon-general of the English army, William Petty.

Taken in the years 1656-1658, the Down Survey of Ireland is the first ever detailed land survey on a national scale anywhere in the world. The survey sought to measure all the land to be forfeited by the Catholic Irish in order to facilitate its redistribution to Merchant Adventurers and English soldiers. Copies of these maps have survived in dozens of libraries and archives throughout Ireland and Britain, as well as in the National Library of France (see http://downsurvey.tcd.ie/). Killala and the Barony of Tirwaley is depicted on the Down Survey Maps for the county (see Figure 12.2) and the depositions are given in Appendix 12.4. In keeping with the patter seen throughout the country, the survey saw the transfer of vast quantities of land from Catholic to Protestant ownership – the townlands of Mullafarry, Lisglennon, TawnaghmorE Lower and Tawnaghmore Upper were all in Catholic ownership in 1641, and in Protestant ownership in 1670. The remaining townlands were in Protestant ownership in 1641 and remained so in 1670.

Taylor and Skinner's map (1777) of the Road from Dublin to Killala to Roscommon by Lanesboro to Boyle by Strokestown shows the significance of the town of Killala at the time (https://www.swilson.info/tands1777.php) (see Figure 12.3).

There are two burial grounds in the study are that have their origins and the start of the nineteenth century (see Figure 12.2). Mullaferry Presbyterian Burial Ground, with 50+ graves commenced burials in 1824 (plaque on church wall), and Mullaferry Church of Ireland Burial Ground, in which burials commenced in the 1800s. Both have associated churches.

The first edition Ordnance Survey map of the townland of Mullafarry and surrounding townlands, dating to the 1830s, depicts the lands on which the Proposed Development is planned as a large field surrounding Ballysakeery Glebe House, which is depicted as a series of buildings and landscaped gardens, including a walled garden, but is not labelled (see Figure 12.4).

Lewis's topographical dictionary entry for the Parish of Ballisakeery (1837) states

> *BALLISAKEERY, a parish, in the barony of TYRAWLEY, county of MAYO, and province of CONNAUGHT 2- miles (S. E.) from Killala; containing 5730 inhabitants. This parish, which is situated on the river Moy, and on the mail coach road from Ballina to Killala, comprises 11,281 statute acres, as applotted under the tithe act, and valued at £4705 per annum. The lands are principally under tillage; the system of agriculture is very much improved, and there is little waste land but what is very deep and irreclaimable bog, of which there are very large tracts. Limestone is found in some parts of the parish. There are several gentlemen's seats, of which the principal are Reserk, the residence of Cowen Green, Esq.; Broadlands Park, of P. C. Howley, Esq.; Netley Park, of H. W. Knox, Esq.; Ballybrooney, of J. Perkins, Esq.; and Farrow, of T. Waldron, Esq. The river Moy, which is celebrated for the abundance and quality of its salmon, is navigable on the border of the parish, and forms the pool of Ballisakeery, which is accessible to vessels of small burden. The living is a vicarage, in the diocese of Killala, to which the vicarage of Rathrea was united by act of council in 1807, and in the patronage of the Bishop; the rectory is appropriate to the deanery and archdeaconry of Killala. The tithes amount to £368. 11. 8-., of which £175. 7. 8-. is paid to the impropriators, and the remainder to the vicar the entire tithes of the benefice amount to £273. 4. The church is a neat plain edifice, erected by a loan of £1025 from the late Board of First Fruits, in 1810; the Ecclesiastical Commissioners have lately granted £131 for its repair. The glebe-house, a handsome residence, was built by aid of a gift of 400 and a loan of £400 from the same Board, in 1820: the glebe comprises 29 acres. The R. C. parish is co-extensive with that of the Established Church ; a chapel is now in process of erection in the village of Cooncal, and will be completed in a short time. There are places of worship toy Presbyterians, Wesleyan Methodists, and Baptists. There are five public schools, of which a female school is supported by the Misses Knox, of Rappa, and in which about 200 boys and 200 girls are taught; also two hedge schools, in which are about 100 boys and 30 girls. There are some remains of the ancient abbey of Rosserick or Reserk, near the river Moy, founded by one of the sept of Joyce, for friars of the Franciscan order; they consist of the ruins of the church and a burial-ground; in the centre of the gable end is a square tower, and in the monastery is a closet of hewn stone for two confessors.*

The Griffith's Valuation of 1847 to 1864 depicts the townland of Mullafarry as being in the ownership of the Earl of Arran, divided by tenancy into a series of linear strips, with the eastern portion, including the land in which the Proposed Development is planned, in the tenancy of Martin Kearney, valued at £10 in land and 15 shillings in buildings. The portion of the proposed development located in the townland of Tawnaghmore Upper is listed as being dwelled in by Henry Duggan, lessee of Daniel Madden, comprising of land and two cottages. The buildings are valued at 13 shillings, whilst the land is valued at £75 and 12 shillings (see Figure 12.5).

Ballysakeery Glebe House, originating from the early nineteenth century, is linked to the construction of a new Church of Ireland church in Lisglennon townland. This church was one of nearly 700 built or rebuilt between 1808 and 1823 with support from the Board of First Fruits, an institution funded by tithes and established by Queen Anne to build churches and glebe houses. For Ballysakeery parish, the Board provided £400 as a gift and an equal amount as a loan for the construction of a glebe house in Mullafarry townland. While the architect of the glebe house remains unknown, drawings preserved in the Representative Church Body Library depict the elevation, basement, and ground floor plans for the project. These plans were associated with Reverend Joseph Verschoyle, Vicar of the united parishes of Ballysakeery and Rathrea, and son of the Right Reverend James Verschoyle, Bishop of Killala. The bishop's note approving the plans and authorizing the commencement of construction on August 1, 1815, underscores the familial and ecclesiastical connections involved in the project (NIAH No. 31302208; see Appendix 12.5 and 12.6; see also Figure 12.6).

By the time of the second edition Ordnance Survey, dating to the 1910s, Ballysakeery Glebe House is labelled ‘Rectory’ and the managed demesne surrounding the house is shown as mature woodland and a managed landscape (see Figure 12.7). The land in which the Proposed Development is planned has been subdivided into a series of smaller fields.

Aerial photography images from 1995 (Figure 12.8) suggests there were no changes to the landscape in the twentieth century, with the land remaining in agricultural use in open pasture. However, it is clear that the ground of Ballyaskeery Glebe House is sited has become overgrown, in accordance with the description given in Appendix 12.6). More recent aerial photography (Figures 12.9 – 12.11) show little change in the landscape, other than the gradual removal of the field boundaries put in place between the first (1830s) and second (1910s) editions of the Ordnance Survey maps.

12.3.5 Site walkover survey

A site walkover survey was undertaken on 28 June 2024 in overcast dry weather. The site was accessed through the entrance lane of Ballyaskeery Glebe House and walked in an anti-clockwise direction from the eastern side of the Proposed Development lands. The walked fields are numbers in Figure 12.11, and the photograph numbers and orientations are also shown (see Figures 12.12 – 12.15).

The land on which the Proposed Development is sited is marshy and uneven, with reeds growing throughout. Fields are bounded by mature hedgerow, including substantial hedgerows in the eastern and northern boundaries (of fields 2 and 4 respectively), which are townland boundaries. Ballysakeery Glebe House is visible from the northeast through the substantial tree cover (Figure 12.12). The ground rises to the north, with a clear escarpment between fields 3 and 4 (see Figure 12.13 and 12.14). The formerly managed grounds of Ballysakeery Glebe House are extensively overgrown.

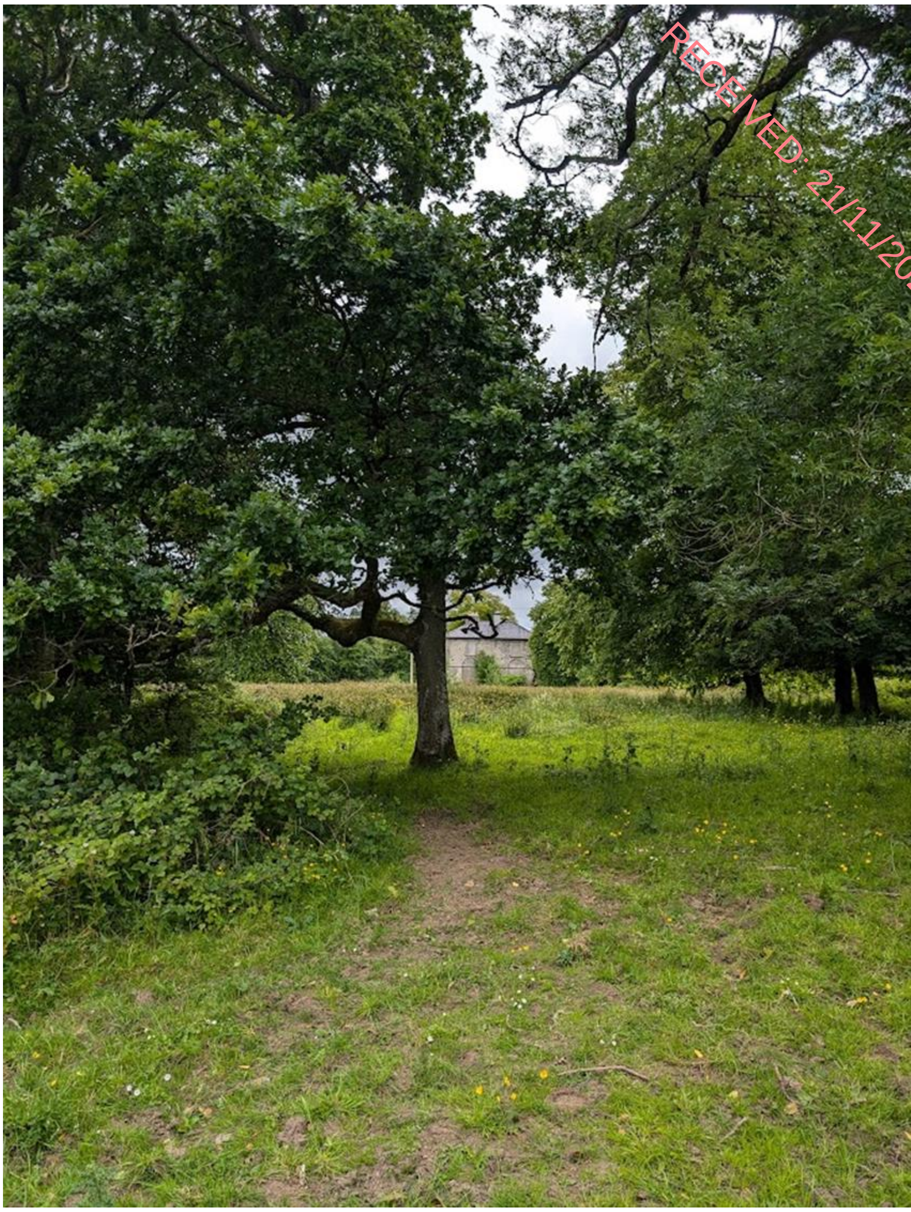

Figure 12.12 *View of Ballysakeery Glebe House from the Proposed Development lands (see Figure 12.11).*

Figure 12.13 *View of sloping topography the Proposed Development lands (see Figure 12.11).*

Figure 12.14 *View of elevated northern portion of the Proposed Development lands, facing towards Ballysakeery Glebe House and gardens (see Figure 12.11).*

Figure 12.15 *View of western portion of the Proposed Development lands, through towards Ballysakeery Glebe House gardens (see Figure 12.11).*

12.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the Proposed Development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the Proposed Development.

12.4.1 Construction Phase

In relation to archaeology, architectural and cultural heritage, the Proposed Development will comprise substantial ground disturbance in the construction of buildings, services and access. There will be further ground disturbance during the construction phase to facilitate the construction programme and methodology.

12.4.2 Operational Phase

There will be no ground disturbance during the operational phase of the Proposed Development.

12.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

12.5.1 Construction Phase

The potential impacts of the Proposed Development on archaeological and architectural heritage can be summarised as follows:

There are no recorded archaeological sites or monuments within the Proposed Development lands, as listed in the Record of Monuments and Places.

There are fifteen recorded archaeological sites within c. 500m of the Proposed Development lands. None of these sites will be impacted, either directly or indirectly, by the Proposed Development works.

There have been five licenced archaeological excavations in the study area in advance of development works (none of which are within the Proposed Development footprint). Only one of these uncovered archaeological remains, a shell midden of unknown date (but possibly Mesolithic).

The archaeological sites in the study area, coupled with the results of archaeological excavation, and with stray archaeological finds in the vicinity are indicative of the landscape having been populated since early prehistory and throughout the Medieval and Post-Medieval periods.

The eastern extent of the main proposed development boundary (see Figure 12.11) forms part of the boundary between the townlands of Mullafarry and Tawnaghmore Upper, which is also the civil parish boundary between Ballysakeery and Killala. The proposed development crossed this boundary on previously developed land (the roadway). However, boundaries of this nature can be in the form of wide and deep ditches, traces of which can survive sub-surface. Should they exist, they could potentially be impacted by construction works.

A desk-top survey of the lands proposed for development, did not highlight any additional, previously unrecorded, archaeological features.

However, there is the potential for previously unrecorded archaeological material to be uncovered during the course of development works.

There are no recorded architectural heritage sites within the Proposed Development lands, as listed in the National Inventory of Architectural Heritage. There are six recorded NIAH sites within c. 500m of the Proposed Development lands. The most significant of these is Ballysakeery Glebe House (NIAH 31302208), which the Proposed Development lands surround. The house or related structures, including the former square garden landscape, will not be directly impacted. However, as outlined in Chapter 11 Landscape, “the significance of the visual effects for the stand alone Proposed Development would be moderate and adverse” for this location (illustrated in Photomontage Viewpoint 10) based on the views during construction without full landscape mitigation in place. It should be noted though that the existing Killala Business Park is currently visible from Ballysakeery Glebe House (NIAH 31302208) and gardens.

None of the remaining five NIAH sites will be impacted, either directly or indirectly, by the Proposed Development works.

Therefore, the potential impact of the Proposed Development on the archaeology architectural and cultural heritage within the area is considered to be ***negative, slight*** and ***short term***.

12.5.2 Operational Phase

No direct impacts on archaeological, architectural and cultural heritage are expected as a result of the operational phase of the Proposed Development.

However, as noted above, the site will still be visible from Ballysakeery Glebe House (NIAH 31302208), albeit reduced by landscaping as it matures.

There will be no disturbance to ground during operation and as such the potential impact on archaeology during the operational phase of the Proposed Development i.e ***neutral, imperceptible*** and ***long term***

The visual impact will remain to Ballysakeery Glebe House alone during the operational phase of the Proposed Development if not adequately mitigated and as such the potential effect on Cultural heritage within the area is **negative*, slight*** and ***long term.***

12.6 MITIGATION MEASURES

12.6.1 Construction Phase

In order to mitigate against the potential impacts of the Proposed Development on archaeological heritage, the following will be required:

A suitably qualified archaeological consultant should be retained to oversee the archaeological and architectural mitigation strategy for project from design through to planning and construction phase.

At pre-construction phase, should ground conditions permit, a geophysical survey should be undertaken under license to the National Monuments Service, of areas that will be subject to development or construction-related impacts. Archaeological geophysics is a non-invasive survey, using a variety of techniques (typically high-resolution magnetometry and advanced multichannel fluxgate gradiometery), to investigate sub-surface archaeological features.

Also at pre-construction phase, licensed archaeological testing should be undertaken of anomalies identified by the geophysical survey. Further test excavation of areas where no features were positively identified should also be undertaken, to alleviate the risk of them being uncovered during the construction phase(s).

Any archaeological features identified positively by testing in areas where they will be impacted on, directly or indirectly, by the development, will require permission from National Monuments for the excavation (preservation by record) of these remains.

Sufficient time will be required for the archaeological team to complete their site investigations, and if required, excavations. If archaeological excavations are required, it may be possible to undertake the works in phases to allow construction works to be phased, i.e. it may be possible to commence construction is areas of the site where archaeological features have been excavated and the areas stripped of topsoil and assessed. However, this will require specific permission from National Monuments.

Given the scale of the Proposed Development, it is not possible to fully mitigate against the indirect, visual impact of the Proposed Development on Ballysakeery Glebe House (NIAH 31302208) and gardens. However, through the landscaping as presented with planning and presented in Chapter 11 Landscape, the impact can be minimised.

Please note that the recommendations given here are subject to the approval of the National Monuments Service, Department of Housing, Local Government and Heritage.

12.6.2 Operational Phase

No mitigation measures are required for archaeological, architectural and cultural heritage during the operational phase of the Proposed Development. As noted above, landscaping will be undertaken and will continue to improve screening with growth over time.

12.7 MONITORING OR REINSTATEMENT MEASURES

12.7.1 Construction Phase

Dependent on the results of the geophysical survey and archaeological testing undertaken at pre-construction, in consultation with the National Monuments Service, a programme of archaeological monitoring may be required during the construction phase.

12.7.2 Operational Phase

There are no ongoing monitoring or reinstatement requirements during the operational phase relating to archaeological, architectural and cultural heritage.

12.8 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

12.8.1 Construction Phase

The residual effects during the construction phase relating to archaeological is ***positive, imperceptible*** and ***short term.***

With mitigation in place, the residual effect on cultural heritage is deemed to be ***negative, not significant*** and ***short term.***

12.8.2 Operational Phase

There are no identified residual effects during the construction phase relating to archaeology. With mitigation in place, the residual effect on architectural and cultural heritage is deemed to be ***negative, not significant*** and ***longterm.***

12.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

12.9.1 Construction Phase

Of the five archaeological investigations undertaken in advance of or during previous development works in the surrounding area, only one has yielded archaeological features. Should archaeological features be uncovered during testing or monitoring of the Proposed Development, these will be archaeologically excavated, and the knowledge added to the academic record.

The academic knowledge gained from the excavation of these features, would result in a net cumulative ***permanent***, ***significant***, ***positive*** impact in relation to archaeology.

The cumulative effect on architectural and cultural heritage is unchanged as surrounding developments will not have greater impact on local NIAH sites than already assessed for the datacentre development i.e ***negative, not significant*** and ***short term.***

12.9.2 Operational Phase

During operation there is no potential for cumulative impact as there will be no disturbance to ground. The cumulative effect on archaeology is therefore ***permanent***, ***imperceptible and long term.***

As noted above, the existing Killala Business Park is currently visible from Ballysakeery Glebe House (NIAH 31302208) and gardens. No works are proposed which could impact the curtilage of the site. Landscape screening work undertaken in relation to the Proposed Development will reduce the visibility of the existing business park over time from the house and gardens. There is no significant change noted for any other protected structure.

The cumulative effect on architectural and cultural heritage is unchanged as surrounding developments will not have greater impact on local NIAH sites than already assessed for the datacentre development i.e ***negative, not significant*** and ***longterm.***

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CHAPTER 13:

TRAFFIC AND TRANSPORT

13

CONTENTS

13.0 TRAFFIC AND TRANSPORT

13.1 INTRODUCTION

This Chapter has been prepared by Clifton Scannell Emerson Associates (CSEA) to assess the likely effects of the subject development in terms of access to the site during both the construction and operational phases.

This Chapter describes: the methodology adopted, the receiving environment at the area surrounding the application site, the characteristics of the scheme relevant to this Chapter, the potential traffic impacts associated with the construction and operational phases, and the mitigation and measures required to prevent, reduce, or offset any significant adverse effects.

13.2 METHODOLOGY

The following methodology has been adopted for this assessment:

Establishing the Receiving Environment (Baseline Conditions): the receiving environment has been described, including information on the existing site location, description of relevant local roads and junctions and baseline traffic volumes, description of local public transport services and facilities and existing local pedestrian and cycle facilities.

Describing the Development: the proposed development has been described, including information on the proposed access to the site, staff shift arrangements and car and bicycle parking proposal.

Assessing the Development's Impacts: the impacts of the proposed development on the local road network have been assessed, including information on estimated traffic during both the construction and the operational phases. The assessed years are Construction Year (2026), Operational Opening Year (2026), Operational Opening Year +5 Years (2031) and Operational Opening Year +15 Years (2041). Junctions 10 (PICADY) software has been used to model the junctions for their critical morning and evening peak hours.

Mitigation Measures: mitigation measures and plans set to help minimise any potential traffic impact that may arise from both the construction and operational phases of the proposed development have been outlined.

13.2.1 Forecasting Methods and Difficulties Encountered

No difficulties were encountered when preparing this Chapter.

13.3 RECEIVING ENVIRONMENT

13.3.1 Introduction

This section describes the receiving environment in the vicinity of the site. Details of the local road network infrastructure as well as the local public transport and active facilities are provided.

13.3.2 Local Road Network

13.3.2.1 Local Roads

Figure 13.1 below illustrates the location of the subject site in the local and expanded road network.

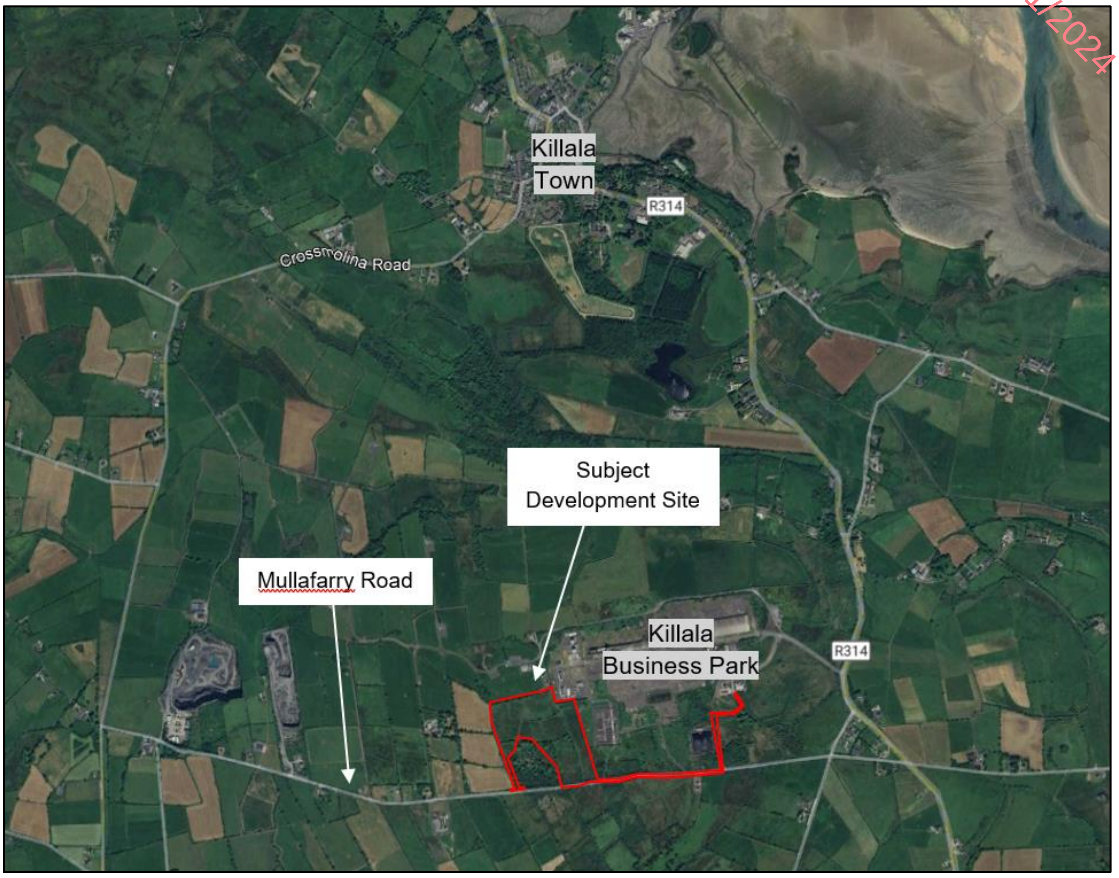

Figure 13-1 *Location of Proposed Development Site in the Local and Expanded Road Network.*

The subject site is located to the south of Killala town, north of Mullafarry Road, west of the R314 and southwest of the Killala Business Park.

The R314 is a regional road running north-south to the west of the site and serves as a key vehicular route linking Killala to the north to Ballina to the south and comprises the access to the Killala Business Park.

Mullafarry Road is a rural road running east-west along the southern boundary of the site which provides the access to some non-residential properties such as the Mullafarry Quarry, the Mullafarry Graveyeard, the Mullafarry Presbyterian Church, and is proposed to directly provide the access to the subject development.

13.3.2.2 Local Relevant Junctions

The local junctions considered relevant to the subject assessment are the following:

- Junction 1: priority-controlled T-junction between R314 an Unnamed Local Road.
- Junction 2: priority-controlled crossroads between the access roads to the R314, the access road to Ballintean and the Mullafarry Road.
- Junction 3: priority-controlled crossroads between R314, the access road to Newtownwhite School and the access road to the R314.

The location of the subject site in relation to these junctions is illustrated in Figure 13.2.

Figure 13-2 *Location Map for Proposed Development and Local Relevant Junctions.*

13.3.2.3 Existing Traffic Flows (October 2024)

In order to determine the volume of traffic movements at the local relevant junctions and surrounding road network, a set of classified traffic surveys was commissioned.

Traffic surveys were carried out by 'IDASO' on Tuesday 1st October 2024 during the period of 12 hours (from 07h00 to 19h00) at the three junctions illustrated in Figure 13.2 above.

The identified peak hours for each surveyed junction are shown in Table 13.1.

Table 13.1 *Traffic Survey Results – Recorded Peak Hours by Junction.*

Surveyed Junction	Surveyed Peak Hours	
	AM	PM
Junction 1	08h15 to 09h15	15h45 to 16h45
Junction 2	08h00 to 09h00	15h30 to 16h30
Junction 3	08h15 to 09h15	15h45 to 16h45

It can be noted that the peak traffic hours are the same for Junction 1 and Junction 3, while Junction 2 experiences peak traffic 15 minutes earlier in both the AM and PM periods.

Full IDASO Traffic Survey Report is provided in Appendix 13.1. A summary of the 2024 two-way peak hour traffic volumes through each junction is provided in Table 13.2. Traffic flow diagrams are included in Appendix 13.2.

Table 13.2 *Traffic Survey Results – Recorded Peak Hours by Junction.*

Surveyed Junction	Surveyed Two-way Flows (PCU)	
	AM Peak Hour	PM Peak Hour
Junction 1	338	346
Junction 2	62	78
Junction 3	379	366

The two-way traffic figures presented above are in Passenger Car Units (PCU) and were converted based on the following PCU conversion factors: Motorcycle – 0.4, Passenger Car/LGV – 1.0, Medium Goods Vehicle (MGV/OGV1) – 1.5, Buses and Coaches – 2.0 and Heavy Goods Vehicle (HGV/OGV2) – 2.3. (Source: TII, Project Appraisal Guidelines for National Roads Unit 5.2 – Data Collection, October 2016 – PE-PAG-02016).

13.3.3 Public Transport

13.3.3.1 Bus Services

The closest bus stops to the site are located on the access road to Newtownwhite School, east of the R314 at Mullafarry Cross (Stops ID: 589151 and 544831), approximately 1,400 metres away or a 19-minute walk. Refer to Figure 13.3. These stops are part of the only bus route serving the area, Bus Eireann Route No. 443 (Ballina to Farragh Cross via Cooneal). This route operates only one service on Fridays, with buses arriving at Mullagarry Cross at 09h37 eastbound and at 14h04 westbound.

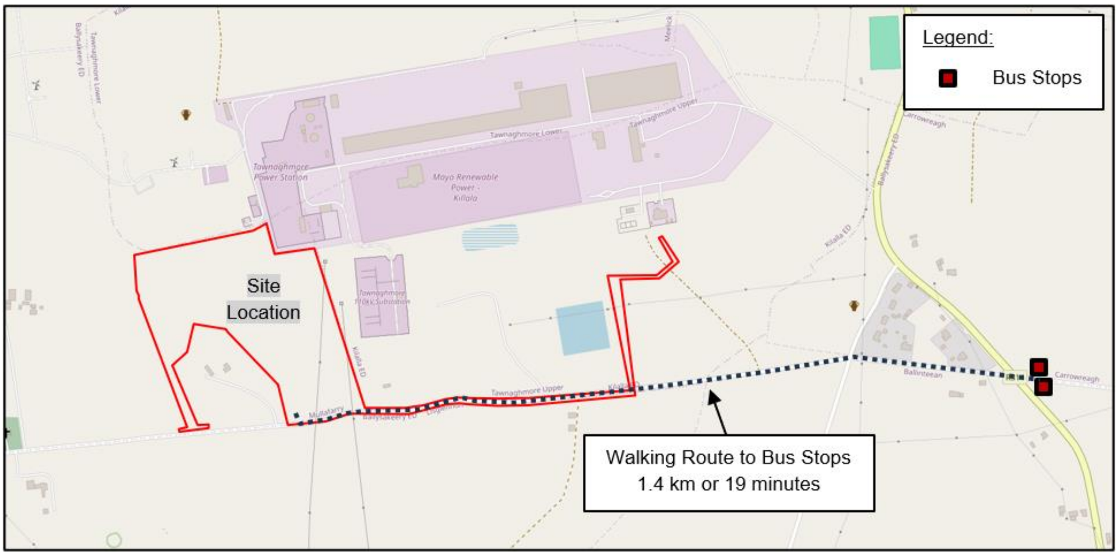

Figure 13-3 *Location of Nearest Bus Stops and Walking Route to/from the Site.*

Given the operational limitations of this route – only running on Fridays one service westbound in the afternoon and one service eastbound in the morning, it is recognised that taking public bus will not be a feasible option for staff to commute to and from work.

13.3.3.2 Rail Services

There are no rail routes directly serving the site. The nearest station, Ballina, is approximately 11 km (14-minute drive) to the south. Ballina Station is on the Dublin Hueston – Westport and Ballina route, with operating hours from 04h30 to 23h00 Monday to Friday, 06h30 to 21h45 on Saturdays, and 07h00 to 22h15 on Sundays.

Although Ballina Station offers a good frequency of train services, it is not located closed enough to the site for easy access. Staff commuting by rail would need to use other forms of transportation, such as walking, cycling, or taking a bus, to reach the site. However, as previously mentioned, public bus services are currently very limited, and infrastructure for pedestrians and cyclists in the locality are non-existent. Refer to following section.

13.3.4 Active Travel Infrastructure

The local area currently lacks pedestrian infrastructure and cycle tracks/cycle lanes.

The National Transport Authority (NTA) released preliminary cycling proposals in 2022 for the County of Mayo under the 'Cycle Connects: Ireland's Cycle Network' scheme. This scheme integrates both existing and planned cycle routes, presenting draft suggestions for cycling connections in key cities, towns, and villages within each county, as well as connections between larger towns, villages and settlements.

The draft proposals for the county envision an extensive cycling network covering all 22 counties, complementing existing cycling plans for the Greater Dublin Area. Together, these plans aim to establish a comprehensive cycle network for Ireland.

Figure 13.4 is an extract of the 'Proposed County Cycle Network Plan – Mayo County Area' as extracted from the 'Cycle Connects: Ireland's Cycle Network' scheme. As shown below, the proposal for County Mayo includes a Greenway and an Inter-Urban route, running to the west and east of the site, respectively, connecting Ballina to Killala.

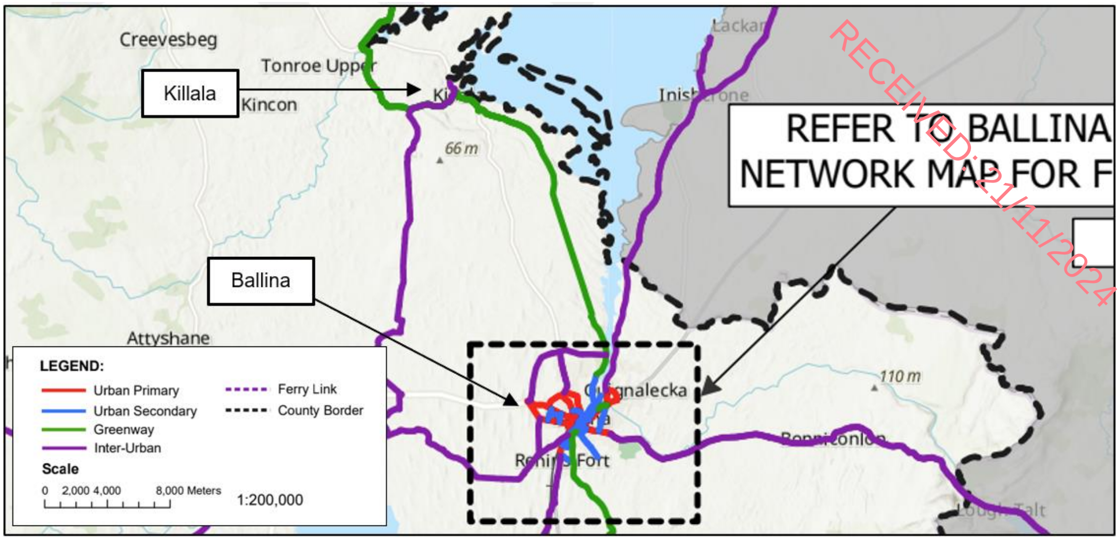

Figure 13-4 *Location of Nearest Bus Stops and Walking Route to/from the Site.*

13.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

13.4.1 Development Description

A full description of the proposed development can be found in Chapter 2 of this EIAR. The following is a general outline of the development with relevant information for the subject Chapter:

- Construction of a two-storey 40 MW data centre building with a gross floor area of (GFA) of approximately 31,00 sqm, located in the northern part of the site.
- Construction of access roads, international circulating areas, footpaths, car, and bicycle parking, as well as soft and hard landscaping.
- Access to the site is propose via the main entrance on Mullafarry Road, with an additional emergency access road proposed on the western side of the site.

13.4.2 Site Access Arrangements

Access to the proposed development site will be provided from the southern boundary via Mullafarry Road. The entrance has been designed as a priority-controlled T-junction, with sufficient visibility splays to accommodate the safe movement of all vehicles, including large articulated trucks.

Visibility splays for the main access junction are in line with Table 4 within Section 7.6 (Volume 2) of the Mayo County Development Plan (2022 – 2028) which sets out that a Local Road subject to a speed limit of 80kph shall have a visibility splay of 3.0m (minimum set back – ‘x’) x 10m (minimum distance – ‘y’). For visibility splays extent please refer to CSEA Drawing 24_078-CSE-V1-XX-DR-C-0011 accompanying the documentation package.

Within the site, the main entrance road is an 8.0-metre-wide two-way road. A security hut and gate will be positioned at the entrance road and will be set back to allow vehicles to pull off the road when entering the site and avoid blocking the public road.

Around the building, a one-way loop road, running in an anticlockwise direction, will be constructed and will allow easy circulation for both articulated trucks and service vehicles. To support site operations, three lay-by bays will be constructed along this loop road, to provide designated spaces for service vehicles to stop and operate as needed.

An emergency entrance off Mullafarry Road and associated emergency 5.0-metre-wide access road running along the western side of the site is also proposed. This access is anticipated to be gated and closed at all times, and only used when necessary. The visibility splays for the emergency access junction are also in line with the requirements set out in the Development Plan and are also shown on CSEA Drawing 24_078-CSE-V1-XX-DR-C-0011 accompanying the documentation package.

The location of each access point to the site and the internal road layout are illustrated in Figure 13.5.

For auto tracking drawings, please refer to CSEA Drawings 24_078-CSE-V1-XX-DR-C-0030, 24_078-CSE-V1-XX-DR-C-0031 and 24_078-CSE-V1-XX-DR-C-0032 accompanying the documentation package.

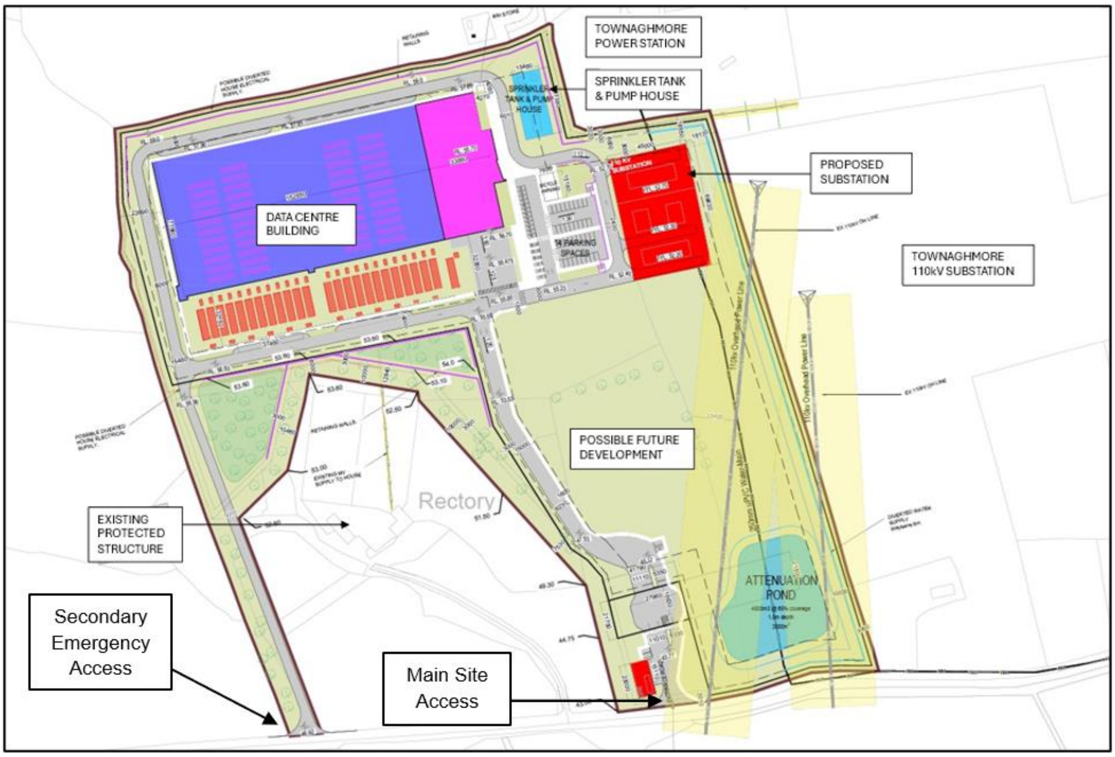

Figure 13-5 *Proposed Development Plan Layout and Access Points.*

13.4.3 Estimated Staff Numbers and Shifts

It is anticipated that the proposed development will have a total of 32 employees on site per day, divided between three shifts.

Table 13.3 *Proposed Development Staff Numbers.*

Job Title	Estimated Staff Count
Property Managers	3
Technical Facilities Managers	2
Facility Technicians	24
Security Staff	3
Total	**32**

At this stage, the shift arrangements are currently uncertain and will be defined once the development is operational. However, for the purposes of this assessment and to carry out a conservative appraisal of the local assessed junctions, the following has been assumed:

- There will always be staff on site for routine checks and maintenance.
- The shift changeover will occur during the road network peak hours.
- The 3 Property Managers will be on site during Shift 1.
- The 2 Technical Facilities Managers will split between Shift 1 and Shift 2.
- The 24 Facility Technicians will be equally split between Shift 1, Shift 2 and Shift 3.
- The Security Staff will be equality split between Shift 1, Shift 2 and Shift 3.

Table 13.4 *Proposed Development Staff Numbers.*

Shift Arrangements	Total No. Employees	Comment
Shift 1 (08h00 to 16h00)	12	Shift 1 will arrive whilst Shift 3 will be leaving the site.
Shift 2 (16h00 to 00h00)	9	Shift 2 will arrive whilst Shift 1 will be leaving the site.
Shift 3 (00h00 to 08h00)	8	Shift 3 will arrive whilst Shift 2 will be leaving the site.
Security Staff	3	Equally split between the three Shifts.
Total – 24 hrs	32	-

13.4.4 Internal Pedestrian Circulation

The proposed pedestrian infrastructure will extend from the main site entrance and continue northward towards the building entrance. The footpath infrastructure will loop around the building, providing continuous access around the structure and will also connect the proposed carpark to the building entrance. Zebra crossings will be provided at key locations along the pedestrian route to ensure easy and safe movement for all users.

13.4.5 Car Parking

13.4.5.1 Mayo County Development Plan (2022 – 2028) Standards

The Mayo County Development Plan (MCDP) does not specifically set out parking standards for data centres. While parking guidelines for light industry developments, listed in Table 7 of Section 7.0 of the MCDP, may seem like the closest comparison, they are not entirely representative. Data centres generally have lower employment densities and fewer operational demands compared to light industry facilities, which typically involve production lines and more frequent use of delivery vehicles. As a result, applying the same parking standards based on GFA may overestimate the requirements for data centres, whilst based on employee numbers may underestimate. See below:

Car Parking Requirement for Light Industry Based on GFA (31,000 sqm):

1 space per 65 sqm of GFA = 477 car parking spaces.

Car Parking Requirement for Light Industry based on Number of Staff (32 staff in total, Max 13 per shift):

1 space/employee/shift = 13 car parking spaces.

For a more realistic provision, which we understand would be more appropriate for the proposed type of development, the car parking spaces for the proposed data centre has been calculated based on Applicant's previous experiences with similar data centre developments. See Subheading 13.4.5.2.

With regards to Electric Vehicles (EV) and Disabled Parking space standards, the Development Plan states the following:

"A minimum of 10% of the proposed car parking spaces required for the category listed in car parking standards below shall be provided with electrical connection points, to allow for functional electric vehicle charging. The remaining car parking spaces shall be fitted with ducting for electrical connection points to allow for the future fit out of charging points at up to 20% of car parking spaces."

"A number of the spaces shall be dedicated for Disabled Parking as set out below."

Disabled Parking Standards	
No. of Total Parking Spaces Required for the Development	No. of spaces to be dedicated to Disabled Parking
5-25 spaces	1 space
26-50 spaces	3 spaces
51-75 spaces	4 spaces
76-100 spaces	5 spaces
Per 100 thereafter	3 spaces

Figure 13-6 *Disabled Parking Standards*

13.4.5.2 Proposed Car Parking

It has been observed from the Applicant's experience that the car parking requirement for data centres is typically around 1.2 times the facility's Megawatt (MW) capacity. Applying this ratio to the proposed 40 MW data centre (IT Load), a minimum of 48 parking spaces would be seen as sufficient to accommodate staff and visitors, ensuring sufficient capacity without over or underestimating the demand. The total car parking spaces proposed is set out below:

Table 13.5 *Car Parking Spaces Proposed.*

Type of Parking	Car Parking Spaces Proposal
Standard	36 spaces at the carpark + 1 at the security
Electric Vehicle (EV)	12 EV spaces at the carpark
Disabled	3 disabled spaces at the carpark + 1 at the security
Disabled EV	3 disabled electric vehicle spaces at the carpark
Overall	**54 spaces at the carpark + 2 at the security**

The proposed development will include a total of 56 car parking spaces. Of these, 54 will be located din the main parking area, while 2 will be positioned near the security gate. Out of the total spaces, 15 will be designated for Electric Vehicles (EV), representing 26% of the overall parking allocation – in compliance with the requirements specified in the Development Plan, and 7 spaces will be reserved for disabled parking, also meeting the standards outlined in the Development Plan for accessible parking.

13.4.6 Bicycle Parking

13.4.6.1 Mayo County Development Plan (2022 – 2028) Standards

Table 9 in Volume 2 of the Mayo Country Development Plan (2022 – 2028) outlines bicycle parking standards for various land uses. However, similar to car parking, the Development Plan does not provide specific bicycle parking standards for data centres. As a result, the standard for "Other Developments" has been applied to calculate the required bicycle parking for the subject development, which as are as follows:

> *"Other Developments: 1 bike space per car space, or 10% of employee numbers in general"*

13.4.6.2 Proposed Bicycle Parking

Based on the standards above, the development would require either 56 bike parking spaces (1 space per car spaces) or 3 spaces (10% of the expected 32 employees).

We acknowledge that 56 spaces would exceed the actual needs of the development, given that only 32 staff will be employed, while 3 spaces may be insufficient. Therefore, it is proposed to provide 25 bicycle parking spaces all located at a bicycle parking area near the carpark and the entrance to the building. These spaces are likely to be more than sufficient to serve the subject proposed development, However, they will be regularly monitored, and if demand increases, additional spaces can be provided. The proposed development will also include 2 showers (one male and one female) and 10 lockers in each of the designated changing rooms.

13.4.7 Trip Generation and Distribution

13.4.7.1 Construction Phase

Trip Generation

During the construction phase, some construction traffic movements will be undertaken by heavy goods vehicles, though there will also be vehicles associated with the appointed contractors and their staff.

Based on experience with similar scale developments, the daily construction traffic has been estimated as follows:

- Peak cars per day = 240.
- Peak Heavy Goods Vehicles (HGV) per day = 100 – 120.
- Peak Light Goods Vehicles (LGV) per day = 30

It should be noted that the majority of the construction traffic will occur outside the local network peak hours (if not all, as drivers will be instructed to do so), however, for the purpose of the subject assessment, it has been conservatively assumed that 10% of the total trips listed above will occur during the network peak hours, of which 75% will arrive and 25% will depart ion the AM and 25% will arrive and 75% will depart in the PM. See Table 13.6.

Table 13.6 *Construction Phase – Proposed Development Peak Hour Trips – [Veh] (PCU).*

Trip Type	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
Car Trips	[18] (18)	[6] (6)	[6] (6)	[18] (18)
LGV Trips	[2] (2)	[1] (1)	[1] (1)	[2] (2)
HGV Trips	[9] (20.7)	[3] (6.9)	[3] (6.9)	[9] (20.7)
Total Trips	[29] (40.7)	[10] (13.9)	[10] (13.9)	[29] (40.7)

HGV trips above were converted based on the following PCU conversion factor: Heavy Goods Vehicle (HGV/OGV2) – 2.3 (Source: TII, Project Appraisal Guidelines for National Roads Unit 5.2 – Data Collection, October 2016 – PE-PAG-02016).

Trip Distribution and Assignment

The trip distribution and assignment on each assessed junction has been estimated based on the traffic survey carried out by IDASO and associated turning movement percentages. The trip distribution characteristics are assumed as follows:

100% of trips to/from east along Mullafarry Road, of which:

- 48% to/from north along R314.
- 48% to/from south along R314.
- 4% to/from south along the access road to Ballintean.

The trip distribution and assignment figures are provided in Appendix 13.2.

13.4.7.2 Operational Phase

Trip Generation

Staff Trips

Although it is likely that some staff of the proposed development will choose sustainable transportation options like walking, cycling, public transport, or using a van, this assessment assumed a conservative, worst-case scenario. For the purpose of evaluating the junctions, it has been assumed that all 32 predicted staff members will drive to and from work daily, with no carpooling taken into account. Based on that and on the shift changeover arrangements as outlined in Table 13.4, the relevant peak trips are shown in Table 13.7.

Table 13.7 *Staff Two-way Trips Shift Changeover.*

Shift	08h00		16h00		00h00	
	IN	OUT	IN	OUT	IN	OUT
Shift 1	12			12		
Shift 2			9			9
Shift 3		8			8	
Security	1	1	1	1	1	1
Total	13	9	10	13	9	10
	22		23		19	

It is estimated that the subject proposed development will generate 22 car trips during the AM peak, 13 arrivals and 9 departures, and 23 car trips during the PM peak, 10 arrivals and 13 departures. The midnight shift changeover was not assessed in this study.

Service Vehicle Trips

It is anticipated that truck trips to the site will be infrequent and are likely to be associated with refuse collection and other sporadic service/delivery trip. Where possible, servicing and delivery trips will be managed to arrive/depart outside the network peak times. However, for robustness, an allowance of 4 truck trips (2 inbound and 2 outbound) during the peak periods has been assumed.

Overall Development Trips

The overall peak hour trips estimated to be generated by the proposed development, including staff trips and truck trips, is provided below.

Table 13.8 *Operational Phase – Proposed Development Peak Hour Trips – [Veh] (PCU).*

Trip type	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
Staff Trip (Car)	[13] (13)	[9] (9)	[10] (10)	[13] (13)
Service Trips (Truck)	[2] (4.6)	[2] (4.6)	[2] (4.6)	[2] (4.6)
Total Trips	[15] (17.6)	[11] (13.6)	[12] (14.6)	[15] (17.6)

The trips presented above are in Passenger Car Units (PCU) and were converted based on the following PCU conversion factor: Heavy Goods Vehicle (HGV/OGV2) – 2.3 (Source: TII, Project Appraisal Guidelines for National Roads Unit 5.2 – Data Collection, October 2016 – PE-PAG-02016).

Trip Distribution and Assignment

Vehicular access to the development is proposed from the southern boundary via Mullafarry Road. The likely catchments for the proposed development are currently unknown and will be established once the development is in operation. However, for the purpose of this assessment, is has been conservatively assumed that all trips will arrive from and depart to east along Mullafarry Road via R314. The trip assignment on each assessed junction has been estimated based on the traffic survey carried out by IDASO and associated turning movement percentages. The trip distribution characteristics are assumed as follows:

100% of trips to/from east along Mullafarry Road, of which:

- 48% to/from north along R314.
- 48% to/from south along R314.
- 4% to/from south along the access road to Ballintean.

The trip distribution and assignment figures are provided in Appendix 13.2.

13.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

13.5.1 Construction Phase

13.5.1.1 Assessed Junctions

The junctions assessed as part the Construction Phase are the following:

- Junction 1: priority-controlled T-junction between R314 an Unnamed Local Road.
- Junction 2: priority-controlled crossroads between the access roads to the R314, the access road to Ballintean and the Mullafarry Road.
- Junction 3: priority-controlled crossroads between R314, the access road to Newtownwhite School and the access road to the R314.
- Main Site Access Junction: proposed priority-controlled T-junction between Mullafarry Road and the site access road.

The location of Junctions 1, 2 and 3 in relation to the subject site was illustrated om Figure 13.2.

13.5.1.2 Assessed Scenarios – Base Year and Construction Phase

The performance of the junctions has been analysed for their critical AM & PM peak hours for the following scenarios. It is important to reinforce that while the trips generated by the proposed development during the construction phase may not occur during the junction's peak hours, 10% of them are assumed to do so for the purpose of this assessment:

- 2024 Base Year: with 2024 surveyed traffic flows.
- 2026 Do Nothing: with 2024 surveyed flows factored up to 2026.

- 2026 Do Something – Construction Phase: with 2024 surveyed flows factored up to 2026 + traffic generated by the proposed development during the construction phase.

2024 surveyed flows were factored up into 2026 flows based on '*Table 6.2: Link-Based Growth Rates: Country Annual Growth Rates (excluding Metropolitan Areas)*' within the TII Publications – Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections, October 2021 (PE-PAG-02017). These are outlined below.

- Light Vehicles (LV) – 2024 to 2026: 1.0256
- Heavy Vehicles (HV) – 2024 to 2026: 1.0671

13.5.1.3 Analysis Results – Base Year and Construction Phase

The Traffic and Transport Assessment (TTA) prepared by Clifton Scannell Emerson Associates (CSEA) for the subject application (accompanying the documentation package under a separate cover – *ref. RPT-24_078-004*) includes detailed traffic modelling to assess impact and determine whether the local assessed junctions would have sufficient capacity to accommodate the trips arising from the construction phase. A summary of the Junctions 10 (PICADY) analysis results for the Base Year and Construction Phase is provided below.

Junction 1

Junction 1 is a priority-controlled T-junction located to the east of the site. This junction has been modelled based on its current layout and the results for 2024 Base Year, 2026 Do Nothing and 2026 Do Something – Construction Phase are summarised in Table 13.9 below. For further details on the model carried out, please refer to PICADY output report provided in Appendix 13.3. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: R314 (SE)
- Arm B: Access to R314 (SW)
- Arm C: R314 (NW)

Table 13.9 *Junction 1 – PICADY Analysis Results – Construction Phase.*

Stream	AM Peak Hour			PM Peak Hour		
	Queue (pcu)	Delay (s)	RFC (LOS)	Queue (pcu)	Delay (s)	RFC (LOS)
2024 Base Year						
B-C	0.0	5.72	0.01 (A)	0.0	6.11	0.02 (A)
B-A	0.1	14.58	0.04 (B)	0.0	10.34	0.02 (B)
C-AB	0.0	5.70	0.02 (A)	0.0	6.31	0.02 (A)
2026 Do Nothing						
B-C	0.0	5.77	0.01 (A)	0.0	6.15	0.02 (A)
B-A	0.1	14.67	0.04 (B)	0.0	10.41	0.02 (B)
C-AB	0.0	5.70	0.02 (A)	0.0	6.33	0.02 (A)
2026 Do Something Construction Phase						
B-C	0.0	6.05	0.02 (A)	0.1	7.44	0.05 (A)
B-A	0.1	15.04	0.04 (C)	0.0	10.93	0.02 (B)
C-AB	0.1	7.01	0.04 (A)	0.0	6.53	0.03 (A)

The modelling results as summarised above indicate that Junction 1 is currently operating well within capacity during both peak hours and would continue to do so for the 2026 Do Something – Construction Phase scenario. The differences between the 2026 Do Nothing and 2026 Do Something – Construction Phase scenarios are minimum, with no significant queues, delays or RFC values increase recorded. Therefore, it can be determined that the traffic effects on Junction 1 during the construction phase of the proposed development will be ***negative***, ***not significant*** and ***short-term***.

Junction 2

Junction 2 is a priority-controlled crossroads also located to the east of the site. This junction has been modelled based on its current layout and the results for the 2024 Base Year, 2026 Do Nothing and 2026 Do Something – Construction Phase are summarised in Table 13.10. For further details on the model carried out, please refer to PICADY output report provided in Appendix 13.3. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: Access to R314 (E)
- Arm B: Access to Ballintean (S)
- Arm C: Mullafarry Road (W)
- Arm D: Access to R314 (N)

Table 13.10 *Junction 2 – PICADY Analysis Results – Construction Phase.*

Stream	AM Peak Hour			PM Peak Hour		
	Queue (pcu)	Delay (s)	RFC (LOS)	Queue (pcu)	Delay (s)	RFC (LOS)
2024 Base Year						
B-ACD	0.0	7.78	0.01 (A)	0.0	8.11	0.04 (A)
A-BCD	0.0	5.09	0.00 (A)	0.0	6.76	0.00 (A)
D-ABC	0.0	7.57	0.02 (A)	0.0	7.21	0.02 (A)
C-ABD	0.0	5.51	0.00 (A)	0.0	5.57	0.01 (A)
2026 Do Nothing						
B-ACD	0.0	7.81	0.01 (A)	0.0	8.11	0.04 (A)
A-BCD	0.0	5.09	0.00 (A)	0.0	6.81	0.00 (A)
D-ABC	0.0	7.58	0.02 (A)	0.0	7.21	0.02 (A)
C-ABD	0.0	5.52	0.01 (A)	0.0	5.58	0.01 (A)
2026 Do Something Construction Phase						
B-ACD	0.0	7.78	0.02 (A)	0.0	7.95	0.04 (A)
A-BCD	0.0	6.80	0.00 (A)	0.0	6.18	0.00 (A)
D-ABC	0.0	7.61	0.05 (A)	0.0	8.11	0.03 (A)
C-ABD	0.0	5.56	0.01 (A)	0.0	5.59	0.01 (A)

The modelling results as summarised above indicate that Junction 2 is currently operating well within capacity during both peak hours and would continue to do so for the 2026 Do Something – Construction Phase scenario. The differences between the 2026 Do Nothing and 2026 Do Something – Construction Phase scenarios are minimum, with no significant queues, delays or RFC values increase recorded. Therefore, it can be determined that the traffic effects on Junction 2 during the construction phase of the proposed development will be ***negative***, ***not significant*** and ***short-term***.

Junction 3

Junction 3 is also a priority-controlled crossroads located to the east of the site. This junction has been modelled based on its current layout and the results for 2024 Base Year, 2026 Do Nothing and 2026 Do Something – Construction Phase are summarised in Table 13.11. For further details on the model carried out, please refer to PICADY output report provided in Appendix 13.3. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: R314 (SE)
- Arm B: Access to R314 (SW)
- Arm C: R314 (NW)
- Arm D: Access to Newtownwhite School

Table 13.11 Junction 3 – PICADY Analysis Results – Construction Phase.

Stream	AM Peak Hour			PM Peak Hour		
	Queue (pcu)	Delay (s)	RFC (LOS)	Queue (pcu)	Delay (s)	RFC (LOS)
2024 Base Year						
B-CD	0.0	8.09	0.00 (A)	0.0	7.24	0.01 (A)
B-AD	0.0	9.00	0.02 (A)	0.0	7.93	0.02 (A)
A-BCD	0.0	6.44	0.03 (A)	0.0	5.76	0.02 (A)
D-AB	0.0	6.41	0.03 (A)	0.0	5.57	0.01 (A)
D-BC	0.0	7.42	0.02 (A)	0.0	8.27	0.02 (A)
C-ABD	0.0	10.71	0.00 (B)	0.0	0.00	0.00 (A)
2026 Do Nothing						
B-CD	0.0	8.21	0.00 (A)	0.0	7.27	0.01 (A)
B-AD	0.0	9.14	0.02 (A)	0.0	7.97	0.02 (A)
A-BCD	0.0	6.47	0.03 (A)	0.0	5.78	0.02 (A)
D-AB	0.0	6.44	0.03 (A)	0.0	5.59	0.01 (A)
D-BC	0.0	7.47	0.02 (A)	0.0	8.32	0.02 (A)
C-ABD	0.0	10.72	0.00 (B)	0.0	0.00	0.00 (A)
2026 Do Something Construction Phase						
B-CD	0.0	8.47	0.00 (A)	0.0	7.80	0.01 (A)
B-AD	0.0	9.02	0.03 (A)	0.1	10.16	0.05 (B)
A-BCD	0.0	6.47	0.03 (A)	0.0	5.78	0.02 (A)
D-AB	0.0	6.44	0.03 (A)	0.0	5.60	0.01 (A)
D-BC	0.0	7.49	0.02 (A)	0.0	8.35	0.02 (A)
C-ABD	0.0	10.78	0.00 (B)	0.0	0.00	0.00 (A)

The modelling results as summarised above indicate that Junction 3 is currently operating well within capacity during both peak hours and would continue to do so for the 2026 Do Something – Construction Phase scenario. The differences between the 2026 Do Nothing and 2026 Do Something – Construction Phase scenarios are minimum, with no significant queues, delays or RFC values increase recorded. Therefore, it can be determined that the traffic effects on Junction 3 during the construction phase of the proposed development will be ***negative***, ***not significant*** and ***short-term***.

Main Site Access Junction

The main site access junction has been modelled based on its proposed layout as described in Section 13.4.2. As this is a junction proposed under the subject application, for the construction phase it has only been modelled for the 2026 Do Something – Construction Phase scenario, which the results are summarised in Table 13.12 below. For further details on the model carried out, please refer to PICADY output report provided in Appendix 13.3. The arms of the junction were labelled as follows within the model:

- Arm A: Mullafarry Road (W)
- Arm B: Site Access Road (N)
- Arm C: Mullafarry Road (E)

Table 13.12 *Main Site Access Junction – PICADY Analysis Results – Construction Phase.*

Stream	AM Peak Hour			PM Peak Hour		
	Queue (pcu)	Delay (s)	RFC (LOS)	Queue (pcu)	Delay (s)	RFC (LOS)
2026 Do Something Construction Phase						
B-C	0.0	5.94	0.01 (A)	0.1	6.11	0.04 (A)
B-A	0.0	0.00	0.00 (A)	0.0	0.00	0.00 (A)
C-AB	0.1	7.64	0.05 (A)	0.0	7.37	0.02 (A)

The modelling results as summarised above indicate that, for the 2026 Do Something – Construction Phase scenario, the proposed main site access junction would operate well within capacity during both peak hours. The effects of the construction traffic in terms of traffic load on Mullafarry Road during the peak hours will be ***negative***, ***not significant*** and ***short-term***.

13.5.1.4 Additional Construction Traffic Impacts

In addition to the traffic impacts on each local junction during the peak hours as discussed above, there is also potential for construction traffic to impact from a noise, vibration and dust perspective in relation to the local road network. Deliveries to/from the site by HGV will impact on noise and vibration levels, whilst dust may result from vehicles travelling along gravel roads and from general earthworks activities. The potential for inappropriate parking, particularly along the Mullafarry Road whilst waiting for access to the site may also impact local users. There is also potential for conflicts with pedestrian/cyclists' movements during the construction phase.

It can be determined that the additional construction traffic effects as outlined above will be ***short-term*** in terms of duration and ***slight negative*** in terms of magnitude.

13.5.2 Operational Phase

13.5.2.1 Assessed Junctions

The same junctions as outlined in Subsection 13.5.1.1 have been assessed as part the Operational Phase.

13.5.2.2 Assessed Scenarios – Operational Phase

It has been assumed that the proposed development will be fully operational by 2026. In line with the 'Traffic and Transport Assessment Guidelines' published by the National

Transport Authority (NTA) / Transport Infrastructure Ireland (TII) the following years have been assessed in the Operational Phase:

- 2026 Do Nothing: with 2024 surveyed flows factored up to 2026.
- 2026 Do Something – Operational Phase: with 2024 surveyed flows factored up to 2026 + traffic generated by the proposed development during the operational phase.
- 2031 Do Nothing: with 2024 surveyed flows factored up to 2031.
- 2031 Do Something – Operational Phase: with 2024 surveyed flows factored up to 2031 + traffic generated by the proposed development during the operational phase.
- 2041 Do Nothing: with 2024 surveyed flows factored up to 2041.
- 2041 Do Something – Operational Phase: with 2024 surveyed flows factored up to 2041 + traffic generated by the proposed development during the operational phase.

2024 surveyed flows were factored up into future baseline traffic flows based on '*Table 6.2: Link-Based Growth Rates: Country Annual Growth Rates (excluding Metropolitan Areas)*' within the TII Publications – Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections, October 2021 (PE-PAG-02017). These are outlined below.

- Light Vehicles (LV) – 2024 to 2026: 1.0256
- Heavy Vehicles (HV) – 2024 to 2026: 1.0671
- Light Vehicles (LV) – 2024 to 2031: 1.0817
- Heavy Vehicles (HV) – 2024 to 2031: 1.2331
- Light Vehicles (LV) – 2024 to 2041: 1.1121
- Heavy Vehicles (HV) – 2024 to 2041: 1.4344

13.5.2.3 Analysis Results – Operational Phase

The Traffic and Transport Assessment (TTA) prepared by Clifton Scannell Emerson Associates (CSEA) for the subject application (accompanying the documentation package under a separate cover – *ref. RPT-24_078-004*) includes detailed traffic modelling to assess impact and determine whether the local assessed junctions would have sufficient capacity to accommodate the trips arising from the operational phase. A summary of the Junctions 10 (PICADY) analysis results for the worst-case Operational Phase scenario (2041 Do Nothing and 2041 Do Something – Operational Phase) is provided below.

Junction 1

The operational phase results for Junction 1 modelling are summarised in Table 13.13 below. For further details please refer to PICADY output report provided in Appendix 13.3. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: R314 (SE)
- Arm B: Access to R314 (SW)
- Arm C: R314 (NW)

Table 13.13 *Junction 1 – PICADY Analysis Results – Operational Phase.*

Stream	AM Peak Hour			PM Peak Hour		
	Queue (pcu)	Delay (s)	RFC (LOS)	Queue (pcu)	Delay (s)	RFC (LOS)
2041 Do Nothing						
B-C	0.0	5.87	0.01 (A)	0.0	6.23	0.02 (A)
B-A	0.1	15.27	0.06 (C)	0.0	10.96	0.02 (B)
C-AB	0.0	5.73	0.02 (A)	0.0	6.49	0.03 (A)
2041 Do Something Operational Phase						
B-C	0.0	6.17	0.02 (A)	0.0	6.57	0.04 (A)
B-A	0.1	15.57	0.06 (C)	0.0	11.38	0.03 (B)
C-AB	0.0	6.11	0.03 (A)	0.0	6.66	0.04 (A)

The modelling results as summarised above indicate that Junction 1 would operate well within capacity for the 2041 Do Nothing scenario should the proposed development not take place but would also do so with the proposed development in place. The differences between the 2041 Do Nothing and 2041 Do Something – Operational Phase scenarios are minimum, with no significant queues, delays or RFC values increase recorded. Therefore, it can be determined that the traffic effects on Junction 1 during the operational phase of the proposed development will be ***neutral***, ***imperceptible*** and ***brief***.

Junction 2

The operational phase results for Junction 2 modelling are summarised in Table 13.14 below. For further details please refer to PICADY output report provided in Appendix 13.3. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: Access to R314 (E)
- Arm B: Access to Ballintean (S)
- Arm C: Mullafarry Road (W)
- Arm D: Access to R314 (N)

Table 13.14 *Junction 2 – PICADY Analysis Results – Operational Phase.*

Stream	AM Peak Hour			PM Peak Hour		
	Queue (pcu)	Delay (s)	RFC (LOS)	Queue (pcu)	Delay (s)	RFC (LOS)
2041 Do Nothing						
B-ACD	0.0	7.63	0.02 (A)	0.0	8.41	0.04 (A)
A-BCD	0.0	5.11	0.00 (A)	0.0	7.08	0.00 (A)
D-ABC	0.0	7.70	0.02 (A)	0.0	7.28	0.03 (A)
C-ABD	0.0	5.53	0.00 (A)	0.0	5.60	0.02 (A)
2041 Do Something Operational Phase						
B-ACD	0.0	7.56	0.02 (A)	0.0	8.19	0.04 (A)
A-BCD	0.0	5.56	0.00 (A)	0.0	6.32	0.00 (A)
D-ABC	0.0	7.62	0.04 (A)	0.0	7.65	0.04 (A)
C-ABD	0.0	5.56	0.01 (A)	0.0	5.62	0.02 (A)

The modelling results as summarised above indicate that Junction 2 would operate well within capacity for the 2041 Do Nothing scenario should the proposed development not take place but would also do so with the proposed development in place. The differences between the 2041 Do Nothing and 2041 Do Something – Operational Phase scenarios are minimum, with no significant queues, delays or RFC values increase recorded. Therefore, it can be determined that the traffic effects on Junction 2 during the operational phase of the proposed development will be ***neutral***, ***imperceptible*** and ***brief***.

Junction 3

The operational phase results for Junction 3 modelling are summarised in Table 13.15 below. For further details please refer to PICADY output report provided in Appendix 13.3. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: R314 (SE)
- Arm B: Access to R314 (SW)
- Arm C: R314 (NW)
- Arm D: Access to Newtownwhite School

Table 13.15 *Junction 3 – PICADY Analysis Results – Operational Phase.*

Stream	AM Peak Hour			PM Peak Hour		
	Queue (pcu)	Delay (s)	RFC (LOS)	Queue (pcu)	Delay (s)	RFC (LOS)
2041 Do Nothing						
B-CD	0.0	8.46	0.00 (A)	0.0	7.51	0.01 (A)
B-AD	0.0	9.57	0.02 (A)	0.0	8.13	0.03 (A)
A-BCD	0.0	6.65	0.03 (A)	0.0	5.84	0.02 (A)
D-AB	0.0	6.55	0.03 (A)	0.0	5.62	0.01 (A)
D-BC	0.0	7.69	0.02 (A)	0.0	8.52	0.02 (A)
C-ABD	0.0	10.68	0.01 (B)	0.0	0.00	0.00 (A)
2041 Do Something Operational Phase						
B-CD	0.0	8.75	0.00 (A)	0.0	7.84	0.01 (A)
B-AD	0.0	9.42	0.04 (A)	0.0	8.73	0.04 (A)
A-BCD	0.0	6.64	0.03 (A)	0.0	5.84	0.02 (A)
D-AB	0.0	6.55	0.03 (A)	0.0	5.62	0.01 (A)
D-BC	0.0	7.71	0.02 (A)	0.0	8.54	0.02 (A)
C-ABD	0.0	10.71	0.01 (B)	0.0	0.00	0.00 (A)

The modelling results as summarised above indicate that Junction 3 would operate well within capacity for the 2041 Do Nothing scenario should the proposed development not take place but would also do so with the proposed development in place. The differences between the 2041 Do Nothing and 2041 Do Something – Operational Phase scenarios are minimum, with no significant queues, delays or RFC values increase recorded. Therefore, it can be determined that the traffic effects on Junction 3 during the operational phase of the proposed development will be ***neutral***, ***imperceptible*** and ***brief***.

Main Site Access Junction

The modelling results for main site access junction during the 2041 Do Something – Operational Phase scenario is summarised in Table 13.16 below. Note that, as the main site access junction will only be constructed if the proposed development receives grant permission, this junction was not modelled for the Do Nothing scenarios. For further details please refer to PICADY output report provided in Appendix 13.3. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: Mullafarry Road (W)
- Arm B: Site Access Road (N)
- Arm C: Mullafarry Road (E)

Table 13.16 *Main Site Access Junction – PICADY Analysis Results – Operational Phase.*

Stream	AM Peak Hour			PM Peak Hour		
	Queue (pcu)	Delay (s)	RFC (LOS)	Queue (pcu)	Delay (s)	RFC (LOS)
2041 Do Something Operational Phase						
B-C	0.0	6.00	0.02 (A)	0.0	6.03	0.03 (A)
B-A	0.0	0.00	0.00 (A)	0.0	0.00	0.00 (A)
C-AB	0.0	7.51	0.03 (A)	0.0	7.45	0.03 (A)

The modelling results as summarised above indicate that, for the 2041 Do Something – Operational Phase scenario, the proposed main site access junction would operate well within capacity during both peak hours. The effects of the construction traffic in terms of traffic load on Mullafarry Road during the peak hours will be ***neutral***, ***imperceptible*** and ***brief***.

13.6 MITIGATION MEASURES

This section discusses the mitigation measures to avoid, prevent, reduce or offset the impacts of the proposed development on the surrounding area during both the construction and operational phases.

13.6.1 Construction Phase

The analysis of the local road network has shown that all junctions would operate within capacity for the construction phase during both peak hours and the changes to the junctions' operational capacities will be minor. It can therefore be determined that the traffic effects during the construction phase of the proposed development will be ***short-term*** in terms of duration and ***negative not significant*** in terms of magnitude.

The project Construction Management Plan (CMP) prepared by Clifton Scannell Emerson Associates (*ref. RPT-24_078-002*) for the subject application provides guidance on how to minimise the potential impact of the construction stage on the safety and amenity of other users of the public road. The CMP considers a number of aspects including, but not limited to, the following:

- Dust and dirt control measures.
- Noise assessment and control measures.
- Working hours of the site.
- Details of construction traffic forecast.
- Facilities for parking cars and other vehicles.

The specific measures will include, but not limited to the following:

- Issue of instructions and maps on getting to the site to each supplier sub-contractor to avoid 'lost' construction traffic travelling on unapproved routes.
- Ongoing assessment of the most appropriate routes for construction traffic to and from the site.
- Use of banksman to control the entry and exit of the construction vehicles.
- Not allowing construction traffic to wait on public roads.
- Schedule the delivery of materials daily.
- Provision of vehicle and wheel washing facilities on site.

Further to the above, a Construction Traffic Management Plan (CTMP) will also be prepared by the main contractor prior to the construction stage which will outline the site logistics and indicate the site aspects such as the site location and boundary lines, diversion of pedestrian and cycling routes, location of loading and unloading areas and material storage, amongst others. Care will be taken to ensure that active travel routes are suitably maintained or appropriately diverted as necessary during the construction period.

Through the implementation of the above detailed Plans prior to the construction phase, it is anticipated that the effect of the traffic on the surrounding environment during the overall construction phase will continue to be ***short-term*** in terms of duration and ***negative not significant*** in terms of magnitude.

13.6.2 Operational Phase

The assessment results have shown that all junctions would operate within capacity for all operational phase scenarios during both peak hours and the changes to the junctions' operational capacities will be minor. Therefore, it can be determined that the traffic effects during the operational phase of the proposed development will be ***neutral***, ***imperceptible*** and ***brief***.

In order to encourage future staff of the proposed development to reduce dependence on private car alone and avail of more sustainable forms of transport, the accompanying Mobility Management Plan (MMP), prepared by Clifton Scannell Emerson Associates (*ref. RPT-24_078-005*) sets out a number of specific actions to be implemented during the operational phase such as:

- Providing information for staff on the available local public transport service, especially the rail service in Ballina.
- Providing information about tax incentives for public transport users such as TaxSaver Commute Ticket Scheme.
- Providing information about Cycle to Work Scheme.
- Providing information about the benefits of carpooling.
- Providing secure cycle parking and shower and locker facilities within the site.

Through the implementation of the above referenced MMP from the early stages of the operational phase of the development, it is anticipated that the effects of the traffic on the surrounding environment during the operational phase will continue to be ***neutral***, ***imperceptible*** and ***brief***.

13.7 MONITORING OR REINSTATEMENT MEASURES

13.7.1 Construction Phase

During the construction phase the following monitoring is advised:

- Construction vehicle routes.
- Construction vehicle parking.
- Staff travel patterns to and from the construction site.
- Internal and external road conditions.
- Construction activities hours of works.

The specific compliance exercises to be undertaken in relation to the range of measures detailed in the Construction Management Plan (CMP) and the Construction Traffic Management Plan (CTMP) will be agreed with the Planning Authority prior to the commencement of construction.

13.7.2 Operational Phase

During the operational phase, the following monitoring is advised in order to further reduce the potential traffic effects associated with the proposed development:

- Car parking and associated occupancy.
- Cycle parking and associated occupancy.
- Public transport in the area, service frequency and routes, and commuting times from key destinations.
- Use of carpooling by staff

The MMP report will be monitored and updated at regular intervals, which will enable tracking in terms off reduction in the dependence on private car journeys, especially alone.

13.8 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

13.8.1 Construction Phase

Provided the mitigation measures and management procedures outlined in the Construction Management Plan (CMP) and the Construction Traffic Management Plan (CTMP) are incorporated prior and during the construction phase, the residual impact upon the local receiving environment will continue to be ***short-term*** in terms of duration and ***neutral imperceptible*** in terms of magnitude.

13.8.2 Operational Phase

Provided the mitigation measures and monitoring outlined in the Mobility Management Plan (MMP) are incorporated in the early stages of the operational phase of the development, the residual impact upon the local receiving environment will continue to be ***neutral***, ***imperceptible*** and ***permanent***.

13.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

The local area surrounding the site has been reviewed with regards to permitted developments that have the potential to generate additional vehicle movements across the assessed local road network during both the construction and operational phases of the proposed development.

As presented in Appendix 2.1, a number of third party permitted developments have been identified in the locality. These developments include a Hydrogen Plant, Tawnaghmore Power Station, an Anaerobic Biogas Facility, continued use and operation of existing quarry, quarry restoration and amendments to existing windfarm.

13.9.1 Construction Phase

Should one or more of the permitted third-party developments listed in Appendix 2.1 be constructed at the same time as the proposed development, there is potential for cumulative impact in terms of traffic in the local area.

Based on the modelling results and the junctions' spare capacities to accommodate additional traffic beyond those being modelled, it is anticipated that the local assessed junctions would be able to handle any cumulative traffic arising from the permitted third-party developments during the construction phase. However, as some construction traffic to and from the local permitted developments are likely to be routed via Mullafarry Road, should one or more of the permitted developments be constructed at the same time as the proposed development, the cumulative impact along this road is predicted to be ***moderate negative*** in terms of magnitude and ***short-term*** in terms of duration.

13.9.2 Operational Phase

During the operational phase of the proposed development, the permitted developments listed in Appendix 2.1 are anticipated to generate some additional traffic to the local road network, such as employee commutes and delivery/collection activities related to each development's operational arrangements.

Similarly to the construction phase, based on the modelling results and the junction's spare capacities, it is anticipated that, during the operational phase of the proposed development, the local assessed junctions would be able to accommodate any cumulative traffic arising from the permitted developments. Traffic growth rates used for the operational phase models (as set out in Section 13.5.2.2) to establish future baseline traffic - both light and heavy vehicles, already account for any additional traffic that may arise from future/permitted developments in the area. However, since some traffic to and from the local permitted developments are likely to be routed via the rural Mullafarry Road and the assessed junctions, the cumulative local impact is predicted to be ***slight negative*** in terms of magnitude and ***long-term*** in terms of duration.

13.10 REFERENCES

- TII Publication PE-PDV-02045, May 2014 - Traffic and Transport Assessment Guidelines.
- TII Publication PE-PAG-02016, October 2016 – Project Appraisal Guidelines for National Roads Unit 5.2 - Data Collection.
- TII Publication PE-PAG-02017, October 2021 – Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections.
- Mayo County Development Plan (2022 – 2028).
- NTA Cycle Connects: Ireland's Cycle Network.

CHAPTER 14:

MATERIAL ASSETS - UTILITIES

14

CHAPTER CONTENTS

14.0 MATERIAL ASSETS - UTILITIES

14.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) evaluates the potential impacts that the Proposed Development may have on a range of Material Assets as defined in the EPA Guidelines 'Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

The EPA Guidance (EPA, 2022, p.21) discuss material assets as follows: " In Directive 2011/92/EU this factor included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils."

The EPA Guidelines (EPA, 2022, pp. 21, & 27) specifically lists and provides sample headings and topics for material assets that include: Roads and Traffic, (Construction Phase, Operational Phase, Unplanned Events [i.e. Accidents]), Built Services (Electricity, Telecommunications, Gas, Water Supply Infrastructure, and Sewerage), Waste Management (Construction Waste, and Operational Waste).

The impact assessment presented in this chapter is designed to identify any potential impacts that have not been previously addressed in other sections of the EIAR. It is essential to thoroughly evaluate the potential impacts of a Proposed Development on material assets to ensure that any negative consequences can be minimised, mitigated, or avoided entirely.

14.2 METHODOLOGY

In this EIAR, the impacts on the material assets described in the above guidance have already been considered in the following chapters and therefore these aspects will not be addressed in specific detail within this chapter.

- Employment and land-use assets and economic resources - Chapter 4 - Human Health and Populations;
- Soils, lands, and mining or quarrying potential - Chapter 5 - Land, Soils, Geology, and Hydrogeology;
- Waterways, rivers, and streams - Chapter 6 – Hydrology;
- Air related effects on land use assets - Chapter 8 - Air Quality;
- Noise related effects on land use assets - Chapter 9 – Noise and Vibration;
- Cultural heritage assets - Chapter 12 - Archaeological, Architectural and Cultural Heritage;
- Visual amenity assets – Chapter 11 - Landscape and Visual
- Roads and traffic - Chapter 13 - Traffic and Transportation; and
- Waste management - Chapter 15 – Material Assets – Waste.

This chapter assesses material assets major infrastructure and utilities which have not already been addressed elsewhere in this EIAR. The potential impacts, if any, are assessed in terms of the following:

- Land Use, Property, and Access.
- Power and Electrical Supply.
- Telecommunications.
- Surface water infrastructure.
- Foul drainage infrastructure.
- Potable Water infrastructure, and
- Natural Gas infrastructure

14.2.1 Determination of Baseline Environment

This assessment has been prepared from a desk top review of existing information and consultation undertaken by the project engineers, Clifton Scannell Emerson Associates (CSEA) and Ethos Engineering, architects Henry J Lyons, with service providers including Uisce Éireann (UÉ), Electricity Supply Board (ESB), Telecommunications providers and Gas Network Ireland (GNI). The existing land use has been determined using interrogation of Google Maps and land use designations with the Mayo County Development Plan 2022-2028.

The sensitivity of the existing environment is determined by describing changes to the environment that could limit access to, or use of, the material assets (EPA, 2003). For the purpose of this assessment, the sensitive receptors are the existing built services in the study area i.e., within the Proposed Development boundary and immediate surrounding area.

<u>Assessment Significance Terminology</u>

As identified in Chapter 2 of this EIAR, a common framework of assessment criteria and terminology has been used based on the EPA's Guidance 2022 to determine the significance of the Proposed Development impact. Table 14.1 below sets out the significance criteria common framework, along with explanatories notes to correlate these terms with effects on material assets (utilities). It is noted that the terms "imperceptible effects", "not significant effects", "slight effects", and "moderate effects" used within this report, while exhibiting varying degrees of impact, are all considered to be without significant consequence.

Table 14.1 *Description of Significance of Effects*

Effect Significance	**Description**
Imperceptible	An impact capable of measurement but without noticeable consequences. *Imperceptible effects on Material Assets occur cases where there is no disruption to utility services or where an increase in demand on a utility results in no noticeable change.*
Not significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences. *Not Significant effects on Material Assets occur in cases of momentary utility interruptions or where there is a measurable increase in utility demand.*
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities. *Slight effects on Material Assets occur in cases where there are brief utility interruptions or where there is only a slight increase in demand on a utility.*
Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging trends.

	Moderate effects on Material Assets occur in cases of intermittent utility outages, occurring for up to seven days or when there is a moderate increase in demand on a utility.
Significant	An effect, which by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment. *Significant effects on Material Assets occur in cases of prolonged utility disruption (temporary effect) or situations involving significant demand on a utility.*
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters the majority of a sensitive aspect of the environment. *Very significant effects on Material Assets occur in cases of prolonged interrupted utility outage (short term effect) or when an increased demand would exhaust remaining capacity.*
Profound	An impact which obliterates sensitive characteristics *Profound effects on Material Assets occur in cases of sustained utility interruption or when the demand on a utility would disrupt the wider network.*
The descriptions of effects characteristics stated as per the EPA Guidelines Table 3.4 (EPA, 2022, p 50-51).	

14.2.2 Difficulties Encountered

Compiling the Material Assets (Utilities) chapter of an EIAR is a complex process, particularly due to the need for ongoing consultations with multiple service providers, such as UÉ, EirGrid, ESB Networks, GNI, telecommunications providers, and other relevant local entities. The finalisation of utility agreements often occurs at the connection agreement stage, after planning permission is granted. This adds an additional layer of complexity, as the specific terms and conditions of these agreements may not be fully determined until later in the project, potentially affecting the accuracy and completeness of the assessment.

14.3 RECEIVING ENVIRONMENT

The existing drainage and wastewater infrastructure has been described in Chapter 2 (Description of the Proposed Development). The associated built services and infrastructure in the vicinity of the site are summarised in detail in the following sections.

14.3.1 Land Use, Property, and Access

The land designated for this development spans approximately 10.58 hectares and is characterised by undeveloped greenfield land that is currently used for agriculture. The main site has a steep gradient from 61m in the north to 42 m in the south

Located in Killala, Co. Mayo, the site lies to the southwest of Killala Business Park. It is bordered to the south by Mullafarry Road, which provides access to the Proposed Development and connects to the nearby village of Killala, a short distance to the north.

The immediate vicinity surrounding the proposed site is predominantly characterised by agricultural land to the west and south, industrial activities to the north and east within Killala Business Park and scattered residential developments to the southwest. To the west of the site is Killala Rock Quarry, while Tawnaghmore Power Station, Killala Business Park, and the Asahi Raw Water Reservoir are situated to the east. The Killala Community Windfarm is located to the north.

The surrounding area includes small residential parcels, with Mullafarry Presbyterian Church located further west along Mullafarry Road. Additionally, disused 19th-century Rectory House and associated buildings are positioned near the site boundary, as seen in Figure 14.1.

Figure 14.1 *Site Location*

14.3.2 Power and Electrical Supply

An existing MV (10KV/20KV) power line runs through the site from the site of the Old Rectory to the North of the site towards Glebe House. Two existing HV (110KV) overhead lines also run over the site from south of the site from Mullafarry Road, as seen in Figure 14.2. A 110 kV ESBN substation is located to the east of the site.

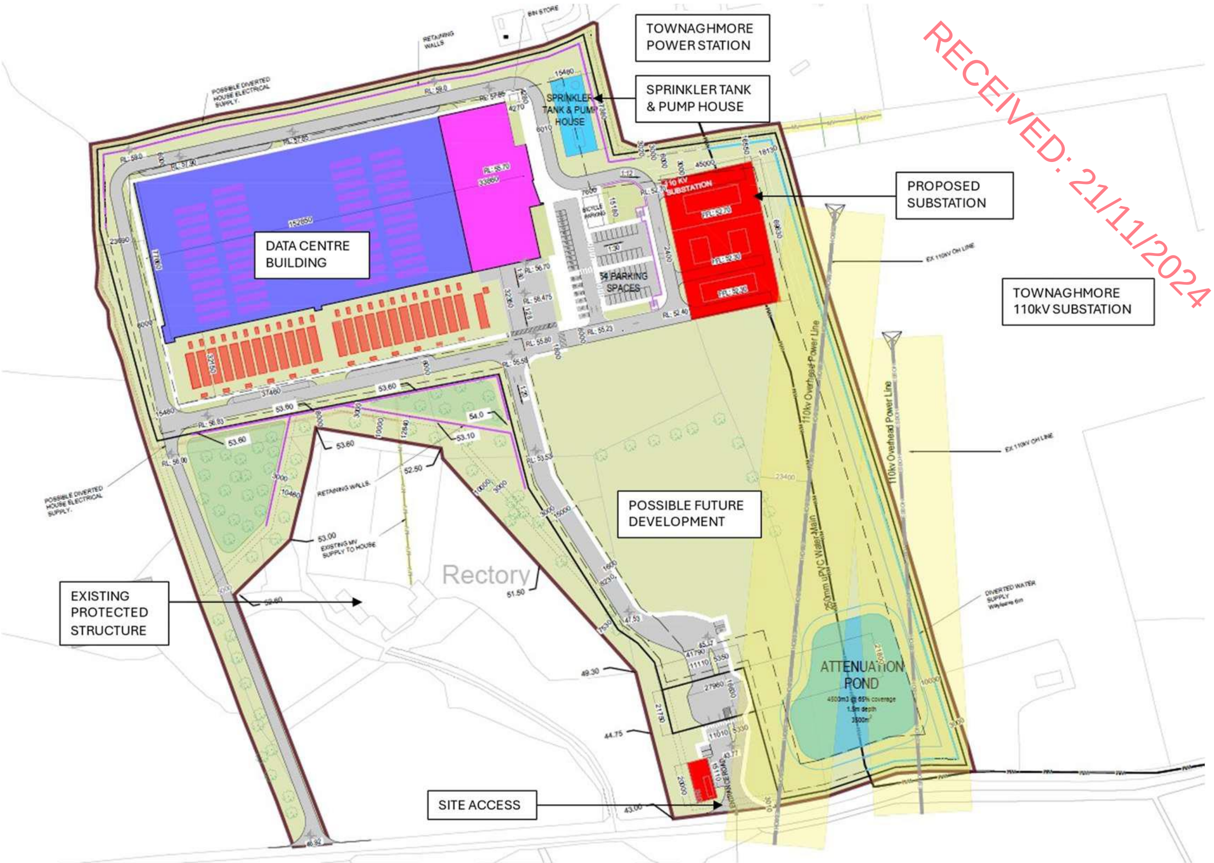

Figure 14.2 *Overhead Power Lines Including Wayleaves for Future Development (Source: CSEA)*

14.3.4 Telecommunications

Records from GNI indicate the presence of existing Aurora and Eir telecommunications cables in close proximity to the site. The site is also adjacent to the future land fall of the AEConnect 1 Transatlantic Data Cable. AEConnect 1 is a transatlantic subsea fibre optic cable extending from Long Island, New York, to Killala, Mayo, positioning the West of Ireland as a potential key telecommunications and data gateway. The cable will have the capacity to handle the entirety of existing European and American information and data traffic, with the potential to double this capacity in the coming years if needed. AEConnect 1 provides high-speed, low-latency connectivity to New York, Dublin, and London and is planned as the landing site for an additional cable connecting to Northern Norway. The landing point is adjacent to the nearby Uiscé Éireann (UÉ) wastewater treatment plant to the east of the Proposed Development. The development of advanced technological infrastructure in the area presents a significant opportunity for the growth of ICT facilities, including data centres, and encourages other businesses to establish their operations locally.

14.3.5 Surface Water Infrastructure

The Proposed Development is located on undeveloped, agricultural land. Several man-made land drains are present on the site and likely discharge to an unnamed stream which runs west to east along the southern boundary of the site.

14.3.6 Foul Drainage Infrastructure

The Proposed Development site currently has no established foul drainage connection.

14.3.7 Potable Water Supply

Records received from UÉ indicate a 225mm uPVC watermain through the eastern portion of the site from the northern to southern boundary, as visible in Figure 14.3.

Figure 14.3 *Proposed and existing watermain (Source: CSEA Extract 24_078-CSE-V1-XX-DR-C-1300)*

14.3.8 Natural Gas Supply

There is currently no existing natural gas infrastructure on site. The nearest connection is c 25.6 km.

14.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

This section describes the built services and infrastructure for the Proposed Development during both construction and operational phases.

Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant documents to define the Proposed Development.

14.4.1 Construction Phase

Land Use, Property, and Access

The Proposed Development site covers an area of c.10.58 hectares.

During the construction phase of the Proposed Development the site will be accessed at the south site boundary via Mullafarry Road with a secondary (rarely used) access further west.

The construction compound will serve as a designated area for contractors, providing office space, portable sanitation facilities, equipment storage, and parking throughout the project duration. For health and safety compliance, the compound will be secured with fencing to restrict access. All construction zones will be enclosed for security and safety purposes, with temporary lighting installed as required. The expected peak construction staff will be c. 300 workers at peak.

The characteristics of traffic and transportation related effects are discussed and described in further detail in Chapter 13 (Traffic and Transportation).

Power and Electrical Supply

During construction, contractors will require power for heating and lighting of the site and their onsite construction compound. The power requirements will be relatively minor. During construction it is expected that temporary power supply will be installed to support works. It is anticipated that during construction power supply will be accessed through a connection to the substation to the east of the site. A future onsite substation will be built, pending the approval from a separate SID application, which is expected to eventually serve as the power source for the site.

Telecommunications

During construction the site will require internet phone connectivity for external communication with clients, contractors, and suppliers. Mobile phones are expected to be used for this purpose. Internet connectivity will be achieved using wireless networks.

Surface Water Infrastructure

During the construction phase, all surface water will be attenuated on site and discharged following settlement (using settlement pond/siltbusters) to existing drainage ditches. The attenuation pond will be installed at an early stage in construction. The run-off will be managed in accordance the measures outlined in the Construction Environmental Management Plan (CEMP), which will include preparation of a surface water plan for approval by MCC.

Foul Drainage Infrastructure

Welfare facilities, including canteens and restrooms, will be provided for the crew throughout construction.

Potable sanitary facilities within the construction compound site will be provided during the construction works. Wastewater generated from these facilities will be removed by road tanker and disposed of off-site to an appropriately licensed facility for disposal.

Potable Water infrastructure

During construction, water will be required for welfare facilities, dust suppression and general construction activities. Initially, water supply will be provided by road tanker and bottled water to the site. During initial enabling works a temporary connection from UÉ will be requested for the duration of the construction phase to the existing 225mm uPVC watermains that run through the full length of the site from the northern to southern boundaries. A proposed diversion and permanent tie into the watermain will be used, subject to agreement from UÉ.

Natural Gas

A connection to the Natural Gas mains is not required for the Construction Phase.

14.4.2 Operational Phase

Land Use, Property, and Access

The Mayo County Development Plan 2022-2028 is used to reference the local planning policy in relation to the lands of the Proposed Development. The site, however, is outside of the boundaries and not zoned at this time. The site has close proximity to industrial zoned lands, at the Killala Business Park, and is adjacent to existing commercial, industrial, energy developments in the surrounding area.

Once the development is complete site access is planned from the southern approach, with a gatehouse positioned at the easternmost entrance. A turning area will be included to ensure vehicles can safely re-enter the road. The site will feature a secondary access point that is reserved for internal routes to accommodate emergency vehicles only. Car parking, consisting of 56 spaces, will be located to the east of the building, meeting the anticipated needs of future users. Additionally, secure cycle parking will be provided near the building entrance to promote safe and convenient access for cyclists. Access is demonstrated below in Figure 14.4

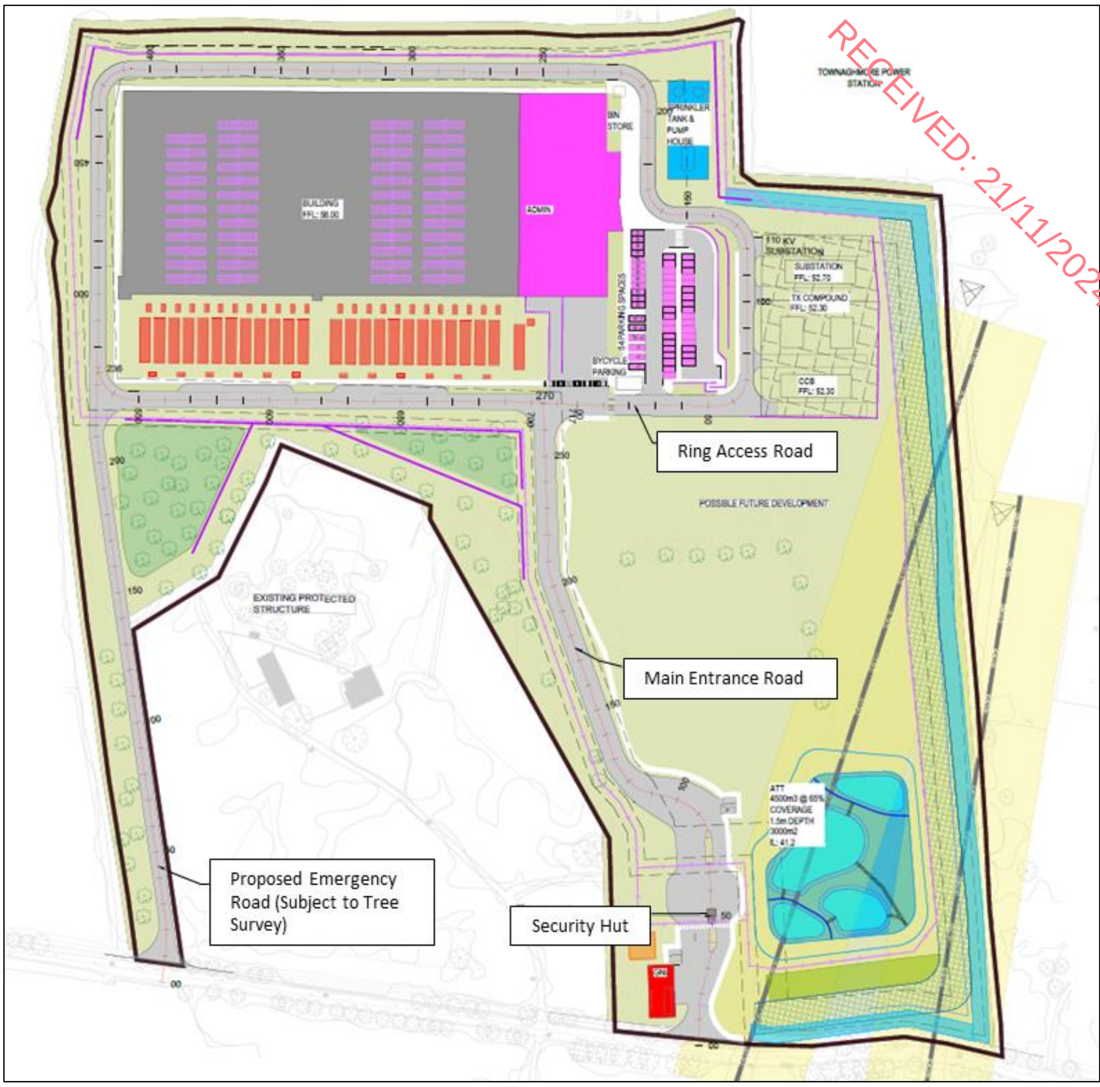

Figure 14.3 *Operational traffic and access (Source: CSEA 24_078-CSE-V1-XX-DR-C-0015).*

Access arrangements and potential traffic safety impacts are considered further in Chapter 13 (Traffic and Transportation). A baseline traffic survey has been completed (October 2024) and the traffic assessment has concluded that there is no significant impact as a result of the operational traffic load.

Power and Electrical Supply

Electricity will be provided to the site via the national grid tying in with existing substation to the east of the site. Future applications (SID application) will be presented for a proposed 110kV substation with an area reserved for its future construction on the eastern boundary of the development. This onsite substation will eventually strengthen the power supply for the Proposed Development as well as potential off site development linking to the adjacent windfarm. A wayleave will be provided through the site for this purpose. A separate pre-application request will be submitted to An Bord Pleanála to determine the substation qualifies for Strategic Infrastructure Development under section 182A of the Planning and Development Act 2000.

The back up generators (powered by HVO) will be capable of operating as a peaking plant providing power to the grid subject to EirGrid requirement up to a maximum of 400 hrs per year.

All connection works will be carried out in accordance with the requirements of EirGrid.

Telecommunications

Connections for this will be made to the existing services locally. This will be carried out in accordance with the requirements of the various service providers / authorities.

Surface Water Infrastructure

All proposed elements of the drainage network and surface water runoff will comply with the Mayo County Council and Sustainable Urban Drainage Systems (SUDs) requirements. A 4,500 m^3 attenuation basin will be installed to support the proposed surface water drainage network. Pollutant traps, hydrocarbon interceptors and full retention hydrocarbon interceptors in fuel delivery area are among the proposed SUD features for the Proposed Development. These are seen in Figure 14.4.

The proposed drainage network and surface water management will adhere to Mayo County Council and SUDs requirements, ensuring that all surface water will be attenuated on-site and discharged into the surrounding natural drainage ditches at controlled greenfield runoff rates. The surface water network will accommodate and manage all surface water runoff associated with a 1-in-100-year event, directing runoff to the attenuation basins without causing overland flooding. The proposed drainage strategy will incorporate a treatment train approach to optimize stormwater management. This approach employs a series of techniques organized into four key elements: pollution prevention, source control, site control, and regional control.

A range of SUDs measures will be in place including the use of a 4,500m^3 attenuation pond at the southeast corner of the site. Pollutant traps and bypass hydrocarbon interceptors will be installed upstream of all attenuation systems, while full retention interceptors will be placed in fuel delivery areas. Surface water runoff from roads will be directed into swales before entering bioretention ponds through flush kerbs, slotted kerbs, or precast gullies.

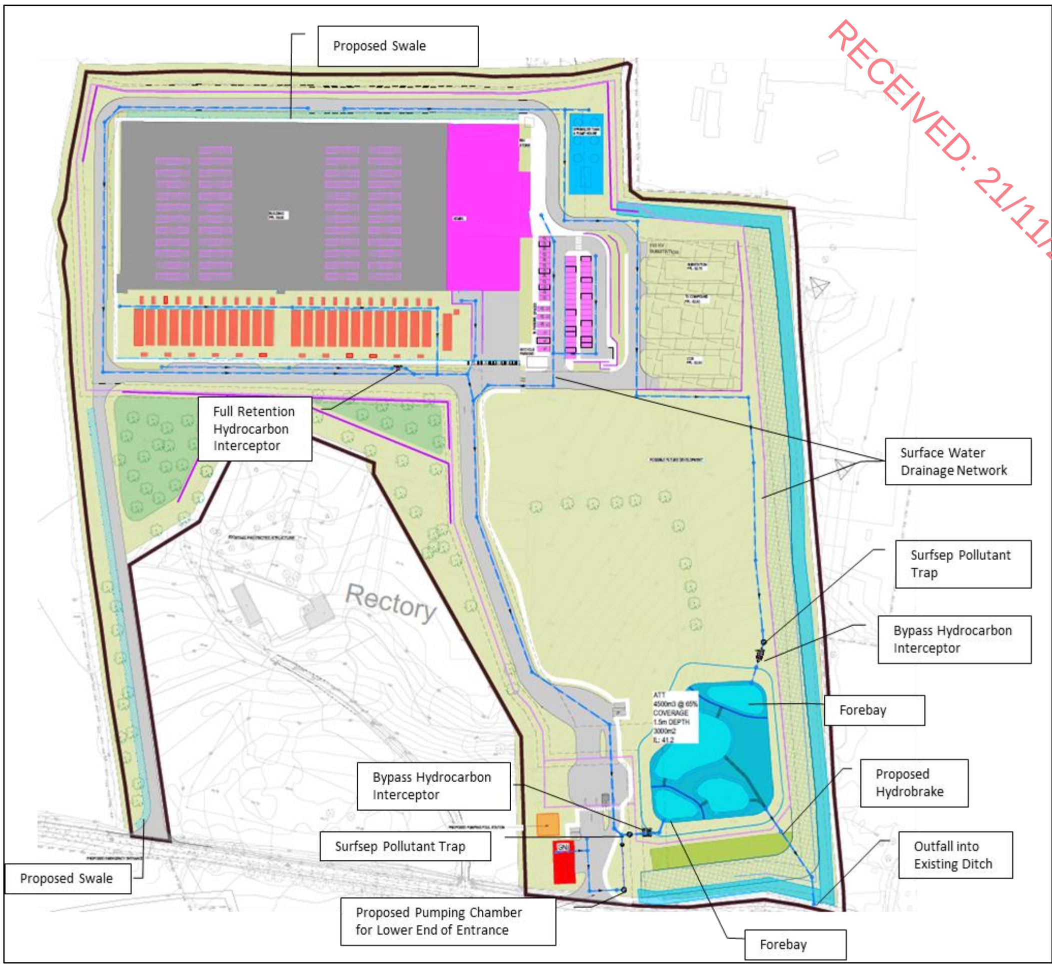

Figure 14.4 *Surface Water and SUDs Features (Source: CSEA)*

Details of the drainage infrastructure is included in the CSEA Infrastructure report.

<u>Foul Drainage Infrastructure</u>

The Proposed Development will primarily generate domestic foul discharge from on-site welfare facilities and staff usage. This discharge will be pumped to the Killala Wastewater Treatment Plant (WWTP), License Number D0067-01, located in the eastern section of Killala Business Park for treatment.

A UÉ Pre-Connection Enquiry (PCE) submitted for the site indicates the peak domestic/business peak demand is estimated at 0.25 litres per second, with no industrial peak demand, as there will be no foul water discharge from industrial sources. The flow from the development will be minimal, primarily servicing administrative areas.

Subject to approval from UÉ, foul water network will drain to a holding tank with a 24-hour storage capacity located on the southern boundary of the site. A pumping station and adjoining rising main are proposed to transfer the flows to the existing wastewater treatment plant, approximately 550 meters east of the site.

Details of the wastewater infrastructure and PCE is included in the CSEA Infrastructure report.

Potable Water Infrastructure

The Proposed Development will require potable water for both domestic use, including on-site welfare facilities and staff needs, and industrial use, such as process water for adiabatic systems, cooling equipment, fire suppression, and other applications.

According to the UÉ Pre-Connection Enquiry, the peak daily demand is estimated at 0.43 litres per second for domestic/business use, with an additional industrial peak demand of 0.04 litres per second.

An existing 225mm uPVC watermain identified on-site runs from the northern boundary across the length of the site, as displayed in Figure 14.5. Pending the necessary approvals, a diversion to this watermain to reroute along the eastern boundary, following the anticipated fence line will be proposed. A 10-meter wayleave has been allocated to accommodate the diverted pipeline, as confirmed through ongoing engagement with UÉ. The diverted pipeline will connect to the existing water main at two locations in both the northeastern and southeastern corners of the site, as visible in Figure 14.5. The water main will generally follow the path of the eastern access road, passing under the main site access point to connect to the existing water main along the southern boundary. A metering system will be present at the tie-in location to the watermains.

Figure 14.5 *Proposed Watermain Diversion with Tie-in locations (Source: CSEA)*

The potable water network will also consist of a closed-loop system around the building footprint to serve the data centre's administrative building, generator yard, substation buildings, and security hut.

Details of the waste infrastructure and PCE is included in the CSEA Infrastructure report.

Natural Gas Infrastructure

A Natural Gas Enquiry has been placed with GNI to secure a connection to the Proposed Development Site. GNI has informed that all Data Centre related gas applications are currently on hold pending an internal review. Once the processing of Data Centre application resumes, a lead time of 3 months will be required for GNI to complete their design and issue a connection offer letter. Once a connection is agreed, the development has the potential to include for an installation of a gas-fired turbine power generators on-site (part of a future panning approval). These turbines are expected to be of the combined cycle dual-fuel type, capable of operating on both natural gas and petroleum distillate as a secondary fuel. An internal gas pipework and gas skid compound / Above Ground Installation (AGI) would be installed along the site boundary to service the natural gas connection to the utility service.

The natural gas connection would have a distribution level 150MWth and be delivered through a c. 400mm diameter connection. The existing distribution network located in Srahyconigaun will serve as the closest connection point approximately 25.6 km from the site of the Proposed development. The future gas pipeline connection would be subject to an application to the Commission for Regulation of Utilities (CRU) under Section 39A of the Gas Act 1976 (as amended).

14.4.3 Decommissioning Phase

Should the site be decommissioned it is likely that the buildings will be redeveloped for an alternative use. Any change to design will have to be undertaken in compliance with planning requirements and an EIA undertaken if required.

14.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

14.5.1 Do Nothing Scenario

In the event that the Proposed Development does not proceed, the specific need for these warehouses would still exist for the intended occupier, and as such the Proposed Development would need to be built elsewhere. The Proposed Development lands would remain greenfield unless developed for an alternative use.

14.5.2 Construction Phase

Land Use, Property, and Access

The Proposed Development will result in the conversion or development of previously undeveloped lands, adjacent to an existing industrial land,

To minimise nuisance for neighbouring properties, the *Construction Environmental Management Plan* (CEMP) (CSEA, 2024) will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager, and Environmental Clerk of Works where relevant.

All mitigation measures outlined within this EIAR, and within the CEMP will be implemented during the construction phase. The construction contractor will update this CEMP to include any additional mitigation required to ensure compliance with any subsequent planning conditions relevant to the Proposed Development

The potential impact associated with land use, property, and access for the construction phase will be***, negative, not significant,*** and ***short term.***

Power Supply and Electrical Supply

Any excavations within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure there is no impact on existing users. The electrical connection should have no disruptions to the national grid during connection works.

All utilities work shall be carried out in accordance with the relevant requirements of the respective service providers. These works will be carried out in a manner that is safe, and which minimises interruptions of service which might affect residents and businesses, and adjacent developments.

The potential impact associated with power and electrical supply for the construction phase in the absence of mitigation measures will be a ***negative, not significant,*** and ***short term.***

Telecommunications

The use of telecom lines will not be required during the construction phase. The locations of existing services (underground and overhead, where applicable) will be confirmed prior to the commencement of on-site works. The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator.

The potential impact on telecommunications infrastructure during the construction phase in the absence of mitigation measures is ***neutral, not significant,*** and ***short term.***

Surface Water Infrastructure

There will be no connection to public surface / storm water networks. Surface water is to be attenuated on site and discharged appropriately.

The potential impact on surface water infrastructure during the construction phase in the absence of mitigation measures is ***neutral, not significant,*** and ***short term.***

Foul Drainage Infrastructure

Welfare facilities will be provided for the construction workers on site during the construction works. It is expected that portable sanitary facilities will be provided through the duration of the construction period. Foul effluent will be appropriately managed and treated off site by a licensed waste sewerage contractor.

Therefore, no potential effects on foul drainage infrastructure.

Potable Water Supply

The water demand during the construction phase will not be significant enough to affect existing pressures. During initial construction, water will be removed by road tanker into the site. Once a connection to the watermains is established, pending agreements, the demand on local potable supplies will increase. The potential impact on potable water supplies and infrastructure during the construction phase is ***negative, not significant,*** and ***short term.***

Natural Gas Infrastructure

There is no requirement for natural gas connection during the construction phase. During the construction works connections will be established for the operational development, these works will be undertaken in consultation with the GNI to ensure minimal disruption to the network. Therefore no potential impact on natural gas infrastructure during the construction phase.

14.5.3 Operational Phase

Land Use, Property and Access

During the operational phase the Proposed Development has been designed to ensure there is no potential to generate significant air (including odour), noise, water emissions or traffic impacts during normal operating conditions; these have been discussed further in the respective EIAR chapters, Chapter 6 (Hydrology), Chapter 8 (Air Quality) Chapter 10 (Noise and Vibration), and Chapter 13 (Traffic and Transportation).

The Proposed Development is on land which is not zoned for development but adjacent to industrial development – industrial park.

The overall potential impact associated with land use, property, and access during the operational phase will be localised ***neutral, not significant****,* and ***long term***.

Power and Electrical Supply

The Proposed Development will increase the demand on existing power and electrical utilities. A separate SID application under section 182A of the Planning and Development Act 2000, as amended, will seek permission to commission a new on-site 110kV GIS substation within the northeast of the site which will eventually connect the Proposed Development to the grid. Excess power generated from on-site generators has the potential to be feed back onto the electrical grid when required up to a maximum of 400 hours/year.

Maintenance of power and electrical utilities infrastructure on the site during the operational phase will be carried out in accordance with the relevant requirements of the utility supplier.

Based on agreement with suppliers, there is a ***neutral, slight,*** and ***long-term*** effect on electrical supply during the operational phase of the Proposed Development.

Telecommunications

There will be an increase in demand on the local telecommunications network during the operation phase. Connections will be made to the existing services locally. This will be carried out in accordance with the requirements of the various service providers / authorities.

The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator. Due to the presence of existing Aurora and Eir telecommunications cables in close proximity to the site, and the future addition of the neighbouring landfall of the AEConnect 1 Transatlantic Data Cable, the potential impact on telecommunications infrastructure for the operational phase is ***neutral, slight,*** and ***long term.***

Surface Water Infrastructure

Stormwater will be discharged to public sewer following attenuation on site. The impact is expected to be ***neutral, not significant,*** and ***long-term.***

Foul Drainage Infrastructure

Foul water will be discharged in accordance with UÉ requirements (PCE submitted). Consultation has confirmed that the WWTP has available capacity. All foul generated on site will be piped to a holding tank (24 hr storage) and pumped to the adjacent WWTP along the public road. The peak flow is 0.25l/s (average 0.25l/s). This is primarily domestic sewage. The impact is expected to be ***neutral, not significant,*** and ***long-term.***

Potable Water Supply

The Proposed Development has considered the sustainable use of water within its design. Water saving devices are included in the design to conserve the use of water, which include a closed loop cooling system servicing the data centre development. As such there is a minimal industrial requirement for water. A water meter is to be provided at the connection to the public watermain, at the development entrance. All metering is to be provided in accordance with UÉ's requirements. The peak flow requirement is 0.43 l/s (avg flow is 0.069l/s).

Based on the approval for connection by UÉ following review of capacity in the network, for the proposed demand, the potential impact on potable water infrastructure for the operational phase is ***neutral, not significant,*** and ***long term.***

Natural Gas Infrastructure

There will be an increase in demand of natural gas on the GNI network to provide the potential future supply of up to 50-150 MWth. Any such connection will be undertaken by GNI and require its own planning and environmental assessment. The Applicant have undertaken consultation with GNI and issues with supply or feasibility of connection have been raised.

Based on the feasibility of connection issued by Gas Networks Ireland, the potential impact on gas infrastructure for the operational phase is ***neutral, not significant,*** and ***long term.***

14.6 MITIGATION MEASURES

14.6.1 Construction Phase

Ongoing consultation with UÉ, EirGrid, ESB Networks, GNI and other relevant service providers within the locality and compliance with any requirements or guidelines they may have will ensure a smooth construction schedule without disruption to local and business community. The works contractor will be obliged to put best practice measures in place to ensure, any planned interruptions are agreed in advance with the utility suppliers.

CSEA have prepared a Construction Environmental Management Plan (CEMP). The CEMP details the construction techniques and methodologies to be employed during the development's construction phase. It incorporates mitigation measures outlined in the EIA Report, specifically as they relate to the construction stage, and includes emergency response procedures for incidents such as spills, leaks, fires, or other environmental events.

This is a dynamic document that will be regularly updated to manage risks throughout the construction program. The Construction Contractor will implement and adhere to the CEMP, with oversight and updates provided by the Project Manager, Environmental Manager, and, where relevant, the Ecological Clerk of Works, should site conditions change. All personnel on-site will receive training on the proper implementation of these procedures.

All mitigation measures identified in this EIAR and the CEMP, along with any additional requirements stemming from planning conditions, will be fully implemented during the construction phase.

14.6.2 Operational Phase

The Proposed Development has been designed in accordance with local requirements. The anticipated power supply, with the addition of the proposed on-site substation, provides sufficient capacity with the potential for excess feed back to the local grid. Back up generators are part of the design in the event of a power outage or stress. No remedial or mitigation measures are required.

The telecommunications requirement is sufficiently satisfied close proximity to the site through Aurora and Eir telecoms. Therefore, no remedial or mitigation measures are required in relation to telecommunications.

A PCE has been submitted to UÉ in relation to a proposed foul pumping station and adjoining rising main to process and send flows from service administration areas to the wastewater treatment plant which is located approx. 550m east of the site and connection will be pending relevant approvals.

A PCE has been submitted to UÉ potable water for both domestic use, including on-site welfare facilities and staff needs, cooling equipment (closed loop), fire suppression, and other applications.

A Natural Gas Enquiry has been placed with GNI to secure a connection at the site. A connection of 150 MWth will be delivered through a 400mm pipe composed of plastic.

All maintenance or upgrades of on-site utilities infrastructure during the operational phase of the Proposed Development will be carried out in accordance with the specifications of the relevant service providers and facilitated by facilities management. No further mitigation measures are required.

14.7 MONITORING OR REINSTATEMENT MEASURES

No additional monitoring or reinstatement is required.

14.8 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

14.8.1 Construction Phase

The works contractor will be obliged to put best practice measures in place and work in accordance with the CEMP. The implementation of mitigation measures within each chapter of this EIA and detailed in Section 14.6.1 will ensure that the residual impacts on the material assets considered in this chapter during the construction phase will be ***neutral, not significant,*** and ***short term***.

14.8.2 Operational Phase

The Proposed Development requires electrical power, gas connection, water supply and connection to the wastewater network. Consultations with UÉ & ESB & GNI take into consideration the environmental impacts of planned developments within the wider network. As such, there will therefore be no significant impact on material assets to the wider economy or environment.

The implementation of mitigation measures within each chapter of this EIA and detailed in Section 14.6.2 will ensure that the residual impacts on the material assets considered in this chapter during the operational phase will be ***neutral, not significant*** and ***long-term***.

14.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

The cumulative impact of the Proposed Development with any relevant other planned or permitted developments are discussed below. For details on the developments considered for cumulative impacts refer to Chapter 2 of this EIAR.

14.9.1 Construction Phase

The Proposed Development entails minimal use of public material assets (utilities) during construction therefore there is limited opportunity for the causation of cumulative impacts during the construction phase of the Proposed Development in combination with other planned or permitted developments (as described in Chapter 2).

This list of developments (Appendix 2.1 of this EIAR) has been reviewed as combining with the Proposed Development and resulting cumulative effects on material assets. Coordination and consultation will be had between the construction contractor and relevant service providers within the locality to facility the Proposed Development. The Proposed Development will be in accordance with the requirements of statutory providers for electrical infrastructure, e, surface water, foul drainage, and water infrastructure.

The implementation of mitigation measures during construction works as well as the compliance of adjacent development with their respective agreement with network providers (GNI, UÉ, and ESB) means that the Proposed Development in combination with other exiting and permitted development is not likely to result in prolonged utility disruption; notable extra demand on a utility; or medium-term disruption to a significant piece of infrastructure. It is unlikely that there will be significant cumulative effects with other planned or permitted developments.

The residual cumulative effects on the material assets during the construction phase for the Proposed Development will be ***negative, slight,*** and ***short-term***.

14.9.2 Operational Phase

The Proposed Development, along with all other permitted developments considered are required to coordinate with Mayo County Council (MCC), Gas Networks Ireland (GNI), UÉ, and ESB to ensure adequate capacity for increased water, wastewater, and electricity demands.

The list of developments (Appendix 2.1) of this EIAR have been reviewed, to assess the cumulative effects on material assets. Notatble develops include:

- An anaerobic digestion biogas facility and associated gas pipeline
- ESB electricity substation
- 25-year permission for a single electricity generating wind turbine
- 10-year planning permission for 5 turbine wind farm
- 20m free-standing telecommunications mast including underground cabling50 megawatt biomass electricity generating station.
- Hydrogen Plant and an Energy Centre

The Proposed Development and surrounding developments will be in accordance with the requirements of statutory providers for electrical infrastructure, gas infrastructure, surface water, foul drainage, and water infrastructure.

The design of the facilities and operation with their respective agreement with network providers (GNI, UÉ, ESB, and Telecoms) means that the Proposed Development in combination with other exiting and permitted development is not likely to result in prolonged utility disruption to a significant piece of infrastructure.

Based on the above, it is predicted that the cumulative effects of the Proposed Development with other permitted, planned, and existing developments is, ***neutral***, ***not significant, and long-term*** during the operational phase.

awn consulting
A Trinity Consultants Company

CHAPTER 15:

MATERIAL ASSETS – WASTE MANAGEMENT

15

CONTENTS

15.0 MATERIAL ASSETS – WASTE MANAGEMENT

15.1 INTRODUCTION

This chapter evaluates the likely impacts, if any, which the Proposed Development may have on Material Assets(related to waste management) as defined in the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU), the Environmental Protection Agency (EPA) Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022).

This chapter has also been prepared to address the issues associated with waste management during the construction and operational phases of the Proposed Development as described in Chapter 2 (Description of Proposed Development).

A site-specific Resource Waste Management Plan (RWMP) has been prepared by AWN Consulting Ltd (ref LB/247501.0366WMR01) to deal with waste generation during the excavation and construction phase of the Proposed Development and has been included as Appendix 15.1. The RWMP was prepared in accordance with the Environmental Protection Agency's (EPA) document Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects (2021).

The Chapter has been prepared in accordance with European Commissions Guidelines, *Guidance on the preparation of the Environmental Impact Assessment Report* (2017), the EPA *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2022).

These documents will ensure the sustainable management of wastes arising at the Development Site in accordance with legislative requirements and best practice standards.

15.2 METHODOLOGY

The assessment of the impacts of the Proposed Development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management; including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

This Chapter is based on the Proposed Development, as described in Chapter 2 of this EIAR (Description of Proposed Development) and considers the following aspects:

- Legislative context;
- Construction phase (including site preparation and excavation works);
- Operational phase; and
- Reinstatement Phase

A desktop study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;

- Description of the typical waste materials that will be generated during the Construction and Operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the Proposed Development have been calculated and are included in section 15.4 of this Chapter. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics and data recorded from similar previous developments.

Mitigation measures are proposed to minimise the effect of the Proposed Development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 15.6

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 5 of this EIAR (Land, Soils, Geology and Hydrogeology). Chapter 5 also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the Proposed Development.

15.2.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) as amended which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 15.1).

Figure 15.1: *Waste Hierarchy (Source: European Commission)*

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products. (Figure 15.2).

Figure 15.2: *Circular Economy (Source: Repak)*

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, Waste Action Plan for a Circular Economy – *Waste Management Policy in Ireland, was published in 2020* and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan*, A Resource Opportunity, in 2012.*

One of the first actions to be taken from the WAPCE was the development of the Whole of Government Circular Economy Strategy 2022-2023 *'Living More, using Less*' (2021) to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The Circular Economy and Miscellaneous Provisions Act 2022 was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's *'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects'* (2021). The guidance documents, *Best Practice Guidelines for the Preparation of*

Waste Management Plans for Construction and Demolition Projects (2006) and Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002), were also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including the National Waste Management Plan for a Circular Economy 2024-2030 (NWMPCE) (2024), BS 5906:2005 Waste Management in Buildings – Code of Practice, the Mayo County Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws (2020), the EPA National Waste Database Reports 1998 – 2020 and the EPA National Waste Statistics Web Resource.

15.2.2 Terminology

Note that the terminology used herein is generally consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows:

Waste - Any substance or object which the holder discards or intends or is required to discard.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

a) the quantity of waste, including through the re-use of products or the extension of the life span of products;
b) the adverse impacts of the generated waste on the environment and human health; or
c) the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I of the Waste Framework Directive sets out a non-exhaustive list of disposal operations.

15.2.3 Forecasting Methods and Difficulties Encountered

Until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

While it is possible to initially select a licensed waste facility for soil disposal, there is potential to encounter contaminated material or material with naturally occurring variations in minerals and chemicals that necessitates sending it to a different suitably licensed facility. The sampling and testing carried out in the Site Investigation (SI) process provides spot samples, and further testing is required during the excavation process, as the true condition of all excavated materials cannot be ascertained with certainty until this is undertaken.

There is a number of licensed, permitted and registered waste facilities in the Mayo region, in the surrounding counties, the Connacht - Ulster region and in Ireland and Northern Ireland. However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which may be more beneficial from an environmental perspective.

Licensed waste facilities have annual limitations on material that they can important as part of their license agreements. Because of this it would not make it possible to commit to a singular specific receiving facility as it is not available throughout the excavation phase. It would not be viable to cease a development and wait until a receiving facilities annual receiving quotas are reset. In a normal development waste facilities would switch between facilities with available capacity.

The ultimate selection of waste contractors, waste facilities and construction materials would be subject to appropriate selection criteria proximity, competency, capacity, serviceability, and cost.

Provided all mitigation measures as set out in this chapter and the attached RWMP, the overall predicted impact of the Proposed Development is **long-term, imperceptible** and **neutral**.

15.3 RECEIVING ENVIRONMENT

In terms of waste management, the receiving environment is largely defined by MCC as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the NWMPCE 2024 – 2030 and the Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland.

The waste management plans set out the following targets for waste management in the region:

- Achieve a recycling rate of 55% of managed municipal waste by 2025; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Regional Waste Management Planning Offices have issued the National Waste Management Plan for a Circular Economy 2024 - 2030 in March 2024, which supersedes the Connacht – Ulster Region (CUR) waste management plan and the two other regional waste management plans. The NWMPCE does not however dissolve the three regional waste areas. The NWCPCE sets the ambition of the plan to have a 0% total waste growth per person over the life of the Plan with an emphasis on non-household wastes including waste from commercial activities and the construction and demolition sector.

The Mayo County Development Plan 2022 – 2028 (2022) sets out the objectives for the MCC area which reflect those sets out in the regional waste management plan and can be found in Appendix 15.1.

In terms of physical waste infrastructure, MCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the Connacht - Ulster Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, municipal waste landfills, material recovery facilities and waste transfer stations.

However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which may be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability.

15.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

A full description of the Proposed Development can be found in Chapter 2 (Description of the Proposed Development). The characteristics of the Proposed Development that are relevant in terms of waste management are summarised below.

15.4.1 Demolition Phase

There is no demolition associated with this Proposed Development. However, soil, stone and vegetation will be removed as a part of the site clearance prior to commencement.

15.4.2 Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be contractually required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

There will be soil and stones excavated to facilitate construction of new foundations and the installation of underground services. The project engineers (Clifton Scannell Emerson Associates Consulting Engineers) have estimated that c. 86,760 m^3 of material will need to be excavated to do so. It is currently envisaged that there will be an opportunity to reuse c. 36,150 m^3 of excavated material for use in landscaping. The remaining c. 50,610 m^3 of material, will need to be removed offsite. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

It is envisaged that bedrock will be encountered during the excavation phase and it is anticipated that it will be crushed on site. When bedrock is to be crushed on-site, the appropriate certificate of registration (COR) or waste facility permit will be obtained from MCC. Any excavated rock is expected to be removed off-site for appropriate reuse, recovery and / or disposal.

If any material that requires removal from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility.

Alternatively, the material may be classed as by-product under Regulation 27 (By-products), as amended, of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2011-2020. For more information in relation to the envisaged management of by-products, refer to the RWMP (Appendix 15.1).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2018). Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. It is anticipated that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific RWMP (Appendix 15.1). The RWMP provides an estimate of the main waste types likely to be generated during the Construction phase of the Proposed Development. These are summarised in Table 15.1.

Table 15.1: *Predicted on and off-site reuse, recycle and disposal rates for construction waste*

Waste Type	**Tonnes**	**Reuse**		**Recycle / Recovery**		**Disposal**	
		%	**Tonnes**	**%**	**Tonnes**	**%**	**Tonnes**
Mixed C&D	152.2	10	15.2	80	121.7	10	15.2
Timber	129.1	40	51.6	55	71.0	5	6.5
Plasterboard	46.1	30	13.8	60	27.7	10	4.6
Metals	36.9	5	1.8	90	33.2	5	1.8
Concrete	27.7	30	8.3	65	18.0	5	1.4
Other	69.2	20	13.8	60	41.5	20	13.8
Total	**461.1**		**104.7**		**313.1**		**43.3**

15.4.3 Operational Phase

Following construction, it is anticipated the operational phase of the development will generate a range of mostly non-hazardous wastes with some hazardous wastes (mostly for maintenance etc.).

An Operational Waste Management Plan (OWMP) will be developed prior to commencement. The plan will seek to ensure the facility contributes to the targets outlined in the NWMPCE 2024 - 2030. Mitigation measures proposed to manage impacts arising from wastes generated during the operation of the Proposed Development are summarised in Section 15.6 below.

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site.

The main hazardous and non-hazardous waste expected to be generated form the operational phase of the Proposed Development are summarised below:

15.4.3.1 Non-Hazardous Waste

Non-hazardous waste which is expected to be produced at the site includes:

- Packaging waste
- General non-hazardous waste
- Non-hazardous WEEE
- Canteen/ Kitchen waste
- Landscaping waste

It should be noted that it will generate no more than any similar industrial facility and the area is well serviced by local waste management contractors. All wastes be managed through the permitted/licenced waste contractors and in accordance with best practice and all EU and Irish waste management legislation.

15.4.3.2 Hazardous Wastes

Hazardous waste which is expected to be produced at the site includes:

- Hazardous WEEE;
- Waste filters, lube oil and other spares;
- Waste diesel (replaced once a year from emergency generators if not used);

- Waste batteries from the battery room; and
- Waste sludge from the petrol interceptors which will be pumped out/removed as required by a suitably permitted/licenced contractor

The above types of hazardous wastes would be expected from any industrial facility. All waste be managed through the permitted/licenced waste contractors and in accordance with best practice and all EU and Irish waste management legislation.

Table 15.3 below summarises the anticipated management strategy to be used for typical wastes to be generated at the site.

Table 15.3: *Proposed Waste Management Strategy*

Waste Name	Hazard Y/N	On-site Storage/Treatment Method (anticipated)	Method of Treatment or disposal	Quantity
Dry Mixed Recyclables	N	Segregated bins/skips	Recycle	1080kg / per month
Mixed Non-Recycling (General)	N	Segregated bins/skips	Recovery/Incineration Disposal of other general waste to landfill	1380kg / per month
Office/Canteen / Kitchen Waste	N	Segregated bins for metal cans, waste plastics, cardboard, general waste	Recycle/Recovery Compost food waste. Recycle dry paper, plastic and aluminium waste. Disposal of other general waste to landfill	300kg/ per month
Cardboard Packaging	N	Segregated bins/skips/bales	Recycle/Recovery	2280kg/ per month
Plastic Packaging	N	Segregated bins/skips/bales	Recycle/Recovery	360kg/ per month
Polystyrene Packaging	N	Segregated bins/skips/bales	Recycle/Recovery	330kg/ per month
Non-Haz and Haz WEEE	Both Non-Haz and Haz	Segregated bins for waste electric and electronic equipment (WEEE)	Off-site recovery	1 no. WEEE Roll Cage (combined) 1 cage per Year
Landscaping waste	N	Compost waste bins	Onsite compost bins	120kg / per month
Lightbulbs	Y	Specialised container in waste storage area	Off-site recovery	1 no. WEEE Roll Cage (combined) 1 cage per year
Waste Oil	Y	Oil drum in external waste storage area	Off-site recovery	1 Drum every 2 months
(Wet) Batteries	Y	Specialised container in waste storage area	Return to supplier	1 no. WEEE Roll Cage (combined) 1 cage per year
(Dry) Batteries	Y	Specialised container in waste storage area	Off-site recovery	1 no. WEEE Roll Cage (combined) 1 cage per year

All waste receptacles stored on site are collected from the within the developments redline boundary by the permitted waste contractor and taken to registered, permitted and/or licensed facilities. No waste collection of operational waste occurs outside of the development's ownership.

15.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

15.5.1 Construction Phase

The Proposed Development will generate a range of non-hazardous and hazardous waste materials during site excavation and construction (see Appendix 15.1 for further detail). General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored in the construction site compound or adjacent to it, on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the Development Site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, short-term, significant** and **negative.**

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, long-term, significant** and **negative.**

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the CUR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the Development Site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, short-term, significant** and **negative**.

There is a quantity of excavated material which will need to be excavated to facilitate the Proposed Development. It is estimated that c. 86,760 m3 of material will be excavated to facilitate the Proposed Development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 5 (Land, Soils, Geology and Hydrogeology). It is anticipated that 50,610 m3 excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, short-term, significant** and **negative**.

15.5.2 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, long-term, significant** and **negative**.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **Indirect, long-term, significant** and **negative**.

It is anticipated that Waste contractors will be required to service the Proposed Development on a scheduled basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, long-term, significant** and **negative**.

15.5.3 Do-Nothing Impact

If the Proposed Development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no excavation or construction at this site. There would continue to be no operational waste generated from the proposed site. There would, therefore, be a **neutral effect** on the environment in terms of waste.

15.6 MITIGATION MEASURES

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

The concept of the ‘circular economy (CE) and ‘waste hierarchy’ are employed when considering all mitigation measures.

The CE is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products. While the waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal.

15.6.1 Construction Phase

The following mitigation measures will be implemented during the construction phase of the Proposed Development:

WM_1:

As previously stated, a project specific RWMP has been prepared in line with the requirements of the requirements of the EPA 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) and is included as Appendix 15.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of the mitigation strategy for the site. The mitigation measures presented in this RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the Proposed Development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 15.1) in agreement with MCC and in compliance with any planning conditions, or submit an addendum to the RWMP to MCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will implement the RWMP throughout the duration of the proposed excavation and construction phases.

WM_2:

A quantity of topsoil and sub soil will need to be excavated to facilitate the Proposed Development. The Development Engineers have estimated that the majority excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

WM_3:

- Building materials will be chosen to 'design out waste';

WM_4:

- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.

WM_5:

- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible; (alternatively, the waste will be sorted for recycling, recovery or disposal);

WM_6:

- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;

WM_7:

- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);

WM_8:

- A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works;

WM_9:

- All construction staff will be provided with training regarding the waste management procedures;

WM_10:

- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;

WM_11:

- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and

WM_12:

- All waste leaving the site will be recorded and copies of relevant documentation maintained.

WM_13:

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 (By-products), as amended, European Union (Waste Directive) Regulations 2011-2020. EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the Proposed Development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the CUR Waste Management Plan 2015 – 2021 and the NWMPCE 2024 - 2030. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

15.6.2 Operational Phase

The following mitigation measures will be implemented during the operational phase of the Proposed Development:

WM_14:

All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins, skips or other suitable receptacles in a designated, easily accessible areas of the site. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the NWMPCE 2024 - 2030 and the MCC waste management bye-laws (2020).

WM_15:

The Operator / Buildings Manager of the Site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – for the implementation of an Operational Waste Management Strategy, ensuring a high level of recycling, reuse and recovery at the Site of the Proposed Development.

WM_16:

The Operator / Buildings Manager will regularly audits the onsite waste storage facilities and infrastructure, and maintain a full paper trail of waste documentation for all waste movements from the site.

All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site.

WM_17:

The following mitigation measures will be implemented:

- The Operator will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
  - Dry Mixed Recyclables
  - Mixed Non-Recycling (General)
  - Office/Canteen / Kitchen Waste
  - Cardboard Packaging
  - Plastic Packaging
  - Polystyrene Packaging
  - Non-Haz and Haz WEEE
  - Landscaping waste
  - UV & Fluorescent Tubes
  - Waste Oil
  - (Wet) Batteries
  - (Dry) Batteries.

WM_18:

- The Operator will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;

WM_19:

- The Operator will ensure that all waste collected from the Site of the Proposed Development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and

WM_20:

- The Operator will ensure that all waste leaving the Site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the proposed Project is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, *the NWMPCE 2024 – 2030* and the MCC waste management bye-laws (2020). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

15.7 MONITORING OR REINSTATEMENT MEASURES

The management of waste during the construction phase will be monitored by the Contactor's appointed Resource Manager to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation.

The management of waste during the operational phase will be monitored by the Operator / Facilities Management to ensure effective implementation of the OWMP internally and by the nominated waste contractor(s).

Table 15.3: *Monitoring Proposals*

Likely Significant Effect	Monitoring Proposals
Litter Pollution	The Contractor will review and maintain waste records and site audits
Unlicensed Waste Collection (Illegal Dumping)	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Insufficient Waste Facilities	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Lack of waste Classification	An appointed Resource Manager will monitor all on-site waste segregation and classification
Unlicensed Waste Collection (Illegal Dumping)	The operator/ facilities management company will maintain waste receipts on-site for a period of 7 years and make available to MCC as requested.
Poor Waste Segregation	Waste generation volumes will be monitored by the operator / facilities management company
Litter Pollution	Waste storage areas will be monitored by the operator / facilities management company

15.7.1 Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the excavation and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting construction schedule targets. The mitigation measures in the RWMP specify the need for a Resource Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the Resource Manager will identify the reasons for this and work to resolve any issues. Recording of waste generation during the construction phase of the Proposed Development will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future developments.

15.7.2 Operational Phase

During the operational phase, waste generation volumes will be monitored by the Operator / Facilities Management against the predicted waste volumes outlined in Table 15.3. There may be opportunities to reduce the number of bins and equipment required in the waste storage areas, where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contractor costs.

15.8 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

The implementation of the mitigation measures outlined in Section 15.6 will ensure that targeted rates of reuse, recovery and recycling are achieved at the site of the Proposed Development during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

15.8.1 Construction Phase

A carefully planned approach to waste management as set out in Section 15.6.1 and adherence to the RWMP (which include mitigation) (Appendix 15.1) during the construction phase will ensure that the predicted effect on the environment will be ***short-term***, ***imperceptible*** **and** ***neutral*****.**

15.8.2 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 15.6.2 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be ***long-term, imperceptible and neutral.***

15.8.3 Conclusion

Assuming the full and proper implementation of the mitigation measures set out herein and, in the RWMP (Appendix 15.1), no likely significant negative effects are predicted to occur as a result of the construction or operational of the Proposed Development.

15.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

As has been identified in the Receiving Environment section, all cumulative developments that are already built and in operation contribute to our characterisation of the baseline environment. As such, any further environmental impacts that the Proposed Development may have in addition to these already constructed and operational cumulative developments has been assessed in the preceding sections of this chapter.

A review of the permitted and proposed developments, as set out in Chapter 2 of this EIAR and in Table 15.4 below, has been undertaken to identify any substantial projects that are concurrent with the construction phase of the Proposed Development that may result in cumulative effects in respect of waste management.

This review identified the permitted developments outlined in Section 15.9.1, below, which are capable of combining with the Proposed Development and have the potential to result in significant cumulative effects due to their scale and close proximity to the Proposed Development site.

Table 15.4: *Cumulative Developments*

Planning App	Title	Decision Date
2360117 Constant Energy Limited Old Ashai Plant, Killala Business Park, Killala	Hydrogen Plant (Awaiting Decision)	Decision due 29/10/2024
2360134 Mayo Renewable Limited Tawnaghmore Upper and Tawnaghmore Lower, Killala, Co. Mayo, F26 X7NP	Tawnaghmore Power Station	20/02/2024 Conditional
2193 Lisglennon Ad Limited Lisglennon, Ballybroony, Coonealmore, Coonealcauraun, Rathrooen, Culleens,, Laghtadawannagh & Farrannoo, Ballina, Co. Mayo	Anerobic Digestion biogas facility with gas pipeline to national grid	07/06/2022 Conditional
21708 BP Mitchell Haulage and Plant Hire Ltd. Mullafarry Townland, Killala, Co. Mayo	Quarry to west of site on Mullafarry road - Continued use and operation of the existing limestone quarry	11/01/2022 Conditional
21342 Mullafarry Quarry LTD. Mullafarry, Killala, Co. Mayo	Quarry to west of site on Mullafarry road - Filling of lands with inert waste for the purpose of quarry restoration	22/11/2021 Conditional

19351 Westland Networks LTD. Tawnaghmore Upper, Killala Business Park	20m free-standing structure carrying telecommunications adjacent to Killala WWTP	08/07/2019 Conditional
17619 Killala Community Windfarm Designated Activity Company. Magherabrack/Mullafarry, Tawnaghmore Lower/Upper, Meelick/Killala	Killala Community Windfarm	11/01/2018 Conditional

15.9.1 Construction Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase.

Developments that have been considered in the cumulative impacts and could potentially overlap during the construction phase of can be can be found in Chapter 2 (Description of the Proposed Development) and in Table 15.4 above.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the effect will be **short-term, not significant and neutral**.

15.9.2 Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area, and the indicative future masterplan development, will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible** and **neutral**.

15.10 REFERENCES

Waste Management Act 1996 - 2021 (No. 10 of 1996) as amended.

Protection of the Environment Act 2003, (No. 27 of 2003) as amended.

Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended

Regional Waste Management Planning Offices, The National Waste Management Plan for a Circular Economy 2024 - 2030 (2024)

Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).

European Commission, Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017).

Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2022)

Forum for the Construction Industry – Recycling of Construction and Demolition Waste.

Department of Communications, Climate Action and Environment (DCCAE), Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025 (Sept 2020).

DCCAE, Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (2021)

Environmental Protection Agency (EPA) 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021)

Department of Environment, Heritage and Local Government, Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (2006).

FÁS and the Construction Industry Federation (CIF), Construction and Demolition Waste Management – a handbook for Contractors and site Managers (2002).

Mayo County Council (MCC) (Segregation, Storage & Presentation of Household & Commercial Waste) Bye-Laws (2020);

Mayo County Council, Mayo County Development Plan 2022 – 2028 (2022)

BS 5906:2005 Waste Management in Buildings – Code of Practice

Planning and Development Act 2000 (No. 30 of 2000) as amended

Environmental Protection Agency (EPA), Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2018)

Local Government Ireland, the Best Practice Guidance for Handling Asbestos (2023).

Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.

EPA, European Waste Catalogue and Hazardous Waste List (2002)

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CHAPTER 16:

INTERACTIONS

16

CHAPTER CONTENTS

16.0 INTERACTIONS

16.1 INTRODUCTION

This chapter of the EIA Report in accordance with the guidance, the potential interactions and inter-relationships between the environmental factors discussed in the preceding chapters. This covers both the construction and operational phase of the Proposed Development.

Directive 2011/92/EU, as amended by Directive 2014/52/EU, and section 171A of the Planning and Development Act, as amended, both provide that an EIA shall identify, describe and assess in an appropriate manner, in the light of each individual case, the interaction between the following factors:

a) human beings, fauna and flora population and human health;
b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
c) land, soil, water, air and climate and landscape;
d) material assets, cultural heritage and the landscape.

This chapter has been produced following the requirements of the EIA Directive and *Planning and Development Act 2000,* as amended. The contents of the chapter have been prepared following *European Commission 'Guidance on Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report'* (2017) and the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022).

The quality, magnitude and duration of potential impacts are defined in accordance with the criteria provided in the EPA 2022 Guidance as outlined in Chapter 1 (Introduction). This section of the assessment presents a summary and assessment of the identified interactions.

16.2 HUMAN HEALTH AND POPULATIONS AND ITS INTERACTION WITH:

16.2.1 Land, Soils, Geology and Hydrogeology:

Construction Phase

Due to the lack of previous development at the site and the historical agricultural use at the site, the risk of contaminated soils being present onsite is low. There is no source pathway linkage to public water supplies or wetlands.

Taking into account the design and mitigation measures set out in Chapter 5 of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Land, Soils, Geology and Hydrogeology during the construction phase. The interaction is considered to be *neutral imperceptible* and *short term*.

Operational Phase

There are no potentially significant interactions identified between Human Health and Populations, and Land, Soils and Hydrogeology during the operational phase as no source pathway linkages exist to public drinking water supplies or recreational bathing waters.

The interaction is considered to be *neutral imperceptible* and *long term*.

16.2.2 Hydrology:

Construction Phase

The construction phase of the Proposed Development has the potential (without mitigation) to impact on the water quality via unmitigated pollutants entering the Moyne Stream. As there is no source pathway linkages to any water supplies or bathing/recreational waters there is no potential for a human health impact.

The interaction is considered to be *neutral imperceptible* and *short-term*.

Operational Phase

As there is no source pathway linkages to any water supplies or bathing/recreational waters there is no potential for a human health impact.

The potential for unmitigated off-site flooding as a result of the increased hardstanding areas, and due to the flood risk at the site the Proposed Development has the potential to impact on human health, populations, and material assets located downstream of the site. However, adequate mitigation and sustainable urban drainage systems to attenuate stormwater is designed into the development and will mitigate this risk.

Taking into account the design and mitigation measures set out in Chapter 6 of this EIA Report, there is no potential for negative interaction Human Health and Populations, and Hydrology during the operational phase. The interaction is considered to be *neutral, imperceptible* and *long term*.

16.2.3 Biodiversity:

Construction Phase

There are no potentially significant interactions identified between Human Health and Populations, and Biodiversity during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Human Health and Populations, and Biodiversity during the operational phase.

16.2.4 Air Quality and Climate:

Construction Phase

There is a low risk of dust-related human health impacts during the construction phase of the Proposed Development. As a result, best practice mitigation measures will be put in place during the construction of the Proposed Development (as outlined in Chapter 8) to ensure that the impact of the Proposed Development complies with all ambient air quality legislative limits.

Taking into account the design and mitigation measures set out in Chapter 8 of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Air Quality and Climate during the construction phase. The interaction is considered to be *short-term, direct, negative, imperceptible*.

<u>Operational Phase</u>

Air dispersion modelling was undertaken as set out in Chapter 8 (Air Quality) to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. The modelling results indicated that the pollutant concentrations during the operational phase of the Proposed Development are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health.

Taking into account the design and mitigation measures set out in Chapter 8 of this EIA Report, there is no potential for significant negative interaction Human Health and Populations, and Air Quality and Climate during the operational phase. The interaction is considered to be *long-term neutral* and *not significant*.

16.2.5 Noise and Vibration:

<u>Construction Phase</u>

As detailed in Chapter 10 (Noise and Vibration), during the construction phase of the project there is the potential for short-term noise impacts on nearby noise sensitive properties due to noise emissions from site activities. The construction noise assessment has shown that in accordance with the ‘significance’ thresholds presented in the BS 5228-1 there is not a significant impact at noise-sensitive locations in terms of ambient noise levels subject to appropriate management of the issues on the site as presented in Section 10.6.1. The application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum as far as practicable.

Taking into account the design and mitigation measures set out in Chapter 10 of this EIA Report, there is potential for negative interaction between Human Health and Populations, and Noise and Vibration during the construction phase. The interaction is considered to be *negative, not significant*, *and short term* at the nearest sensitive receptors.

<u>Operational Phase</u>

As presented in Chapter 10, Table 10.18, the cumulative noise levels with the proposed development added to the prevailing noise environment are 37.5 dB $L_{Aeq,T}$ external to the worst-affected noise-sensitive location. Allowing for a 15 dB reduction across an open window, the expected noise level internal noise level is well within the indoor WHO criterion. The expected health effect due to noise from the proposed development is *neutral, longterm, not significant*.

Landscape and Visual Impacts:

<u>Construction Phase</u>

The physical construction stage works will have an impact on the landscape in the immediate context of the Proposed Development. The number and distribution of potential visual receptors in the receiving environment, and their degree of exposure to the site, is relatively limited. The change from the current undeveloped site to a construction site, with plant equipment and earthworks will have some impact on Human Health and Populations in respect of amenity in the area.

The site is surrounded by agricultural and industrial lands, reflecting a transition from agricultural to industrial and commercial uses. Adjacent to the east is the Killala Business Park.

Taking into account the design and mitigation measures set out in Chapter 11 (Landscape and Visual Impact) of this EIA Report, and the low-medium landscape sensitivity designation of the site lands, there is potential for negative interaction between Population and Human Health, and Landscape and Visuals during the construction phase. The interaction is considered to be *negative, slight,* and *short term*.

Operational Phase

The Proposed Development would cause a shift in landscape character from the current peri-urban condition towards employment-dominated urban, contributing to the realisation of the Regional and Local Authority vision for the site and the wider area.

Taking into account the design and mitigation measures set out in Chapter 11 (Landscape and Visual Impact) of this EIA Report, and the low-medium landscape sensitivity designation of the site lands, there is potential for neutral interaction between Population and Human Health, and Landscape and Visuals during the operational phase. The interaction is considered to be *neutral, not significant,* and *permanent.*

16.2.6 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Human Health and Populations, and Archaeology. With collection of data during research and excavation, the effect relating to archaeology is *positive, imperceptible* and *long term.*

As above the impact of landscape has to be considered for Architectural and Cultural Heritage during the construction phase. The interaction is considered to be *negative, not significant* and *short term*.

Operational Phase

There are no potentially significant interactions identified between Human Health and Populations, and Archaeology during operation. As above the impact of landscape has to be considered for Architectural and Cultural Heritage during the operation phase with landscape mitigation in place. The interaction is considered to be *negative, not significant,* and *permanent*.

Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

Construction phase impacts to human health as a result of waste are primarily associated the indirect effect of litter issues resulting in increase in vermin. Mismanagement of demolition and soil material can potentially lead to air / dust impacts. There are also potential risks to human health associated with accidents when handling and transporting earthworks and wastes.

The Proposed Development will have an impact on material assets such as water supply, power supply and road infrastructure. The individual chapters of this EIA Report Chapters 13, 14, and 15 (Traffic and Transportation; Waste Management; and Material Assets - Utilities) have assessed the capacities of the available infrastructure to accommodate the Proposed Development and the implementation of the mitigation measure proposed in these chapters will ensure there are no residual negative impacts on the local population.

Taking into account the design and mitigation measures set out in Chapters 13, 14, and 15 (Traffic and Transportation; Waste Management; and Material Assets - Utilities) of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Material Assets during the construction phase. The interaction is considered to be *neutral, not significant*, *and short-term*.

Operational Phase

Similar risks to those described above for the construction phase associated with improper waste management during the operational phase could lead to litter and associated vermin. There is the potential risks when untrained staff and waste contractors use waste equipment or move waste receptacles improperly.

The Proposed Development will have a demand on material assets such as surface water drainage, water supply, wastewater drainage, power supply and road infrastructure. Chapters 13, 14, and 15 (Traffic and Transportation; Waste Management; and Material Assets - Utilities) have reviewed the capacities of the available infrastructure to accommodate the Proposed Development and the implementation of the mitigation measure proposed in these chapters will ensure there are no residual negative impacts on the local population.

Taking into account the design and mitigation measures set out in Chapters 13, 14, and 15 (Traffic and Transportation; Waste Management; and Material Assets - Utilities) of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Material Assets during the operational phase. The interaction is considered to be *neutral, not significant and long term*.

16.3 LAND, SOILS, GEOLOGY AND HYDROGEOLOGY AND ITS INTERACTION WITH:

16.3.1 Hydrology:

Construction Phase

Temporary dewatering may require discharge to surface water following treatment on site.

Taking into account the design and mitigation measures set out in Chapter 5 and 6 of this EIA Report, the interaction is considered to be *neutral*, *imperceptible* and *short term*.

<u>*Operational Phase*</u>

During operation there is no abstraction from or discharge to groundwater and therefore the groundwater regime will continue to interact as current with surface water. The interaction is considered to be *neutral*, *imperceptible* and *long term*.

16.3.2 Biodiversity:

<u>*Construction Phase*</u>

The construction phase of the Proposed Development has the potential for contaminated run-off from accidental leakages to contaminate soil and groundwater, enter the watercourses and impact on local biodiversity downstream. Furthermore, dust emissions from exposed earthworks has the potential to settle on plants causing impacts to local ecology.

Taking into account the design and mitigation measures set out in Chapters 5 and 7 of this EIA Report, there remains a residual negative interaction between Land, Soil, and Biodiversity during the construction phase. The interaction is considered to be *neutral*, *imperceptible* and *long term*

<u>*Operational Phase*</u>

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Biodiversity during the operational phase.

16.3.3 Air Quality and Climate:

<u>*Construction Phase*</u>

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. Taking into account the design and mitigation measures set out in Chapter 5 and 8 of this EIAR, there remains a residual negative interaction between Land, Soil, and Biodiversity during the construction phase. The interaction is considered to be *neutral*, *imperceptible* and *long term.*

<u>*Operational Phase*</u>

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Air Quality and Climate during the operational phase.

16.3.4 Noise and Vibration:

<u>*Construction Phase*</u>

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Noise and Vibration during the construction phase.

<u>*Operational Phase*</u>

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Noise and Vibration during the operational phase.

16.3.5 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Landscape and Visual Impacts during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Landscape and Visual Impacts during the operational phase.

16.3.6 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.3.7 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

During the construction phase, excavated soil, stone and clay will be generated from the excavations required to facilitate site levelling, construction of new foundations and the installations of site services. It is envisaged that some of the excavated material will need to be removed off-site. When material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 5 (Land Soils, Geology and Hydrogeology), Chapter 14 (Material Assets – Waste Management), and the requirements of the RWMP (Appendix 14.1), will ensure the effect is *long-term*, *imperceptible* and *neutral.*

Operational Phase

There are no potentially significant interactions identified between Land, Soils, Geology and Hydrogeology, and Material Assets during the operational phase.

16.4 HYDROLOGY AND ITS INTERACTION WITH:

16.4.1 Biodiversity:

Construction Phase

In the absence of mitigation, surface water run-off during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may damage downstream water quality and habitats. The design measures and mitigation measures (outlined in Chapters 6 and 7) will be implemented by the construction contractor to ensure that there is no change in the overall water regime at water dependent habitats on site.

Taking into account the design and mitigation measures set out in Chapters 6 and 7 of this EIA Report, the interaction between Hydrology, and Biodiversity during the construction phase is *neutral imperceptible* and *short term*.

Operational Phase

Surface water will be discharged offsite to the existing culverts under the Dublin-Rosslare railway which discharge to the Moyne Stream via hydrocarbon interceptors, attenuation storage and flow control devices ensuring emissions are controlled. Surface water run-off during operations will be attenuated to the greenfield runoff rate.

Taking into account the design and mitigation measures set out in Chapters 6 and 7 of this EIA Report, there remains a residual interaction between Hydrology, and Biodiversity during the operational phase. The interaction is considered to be *neutral*, *imperceptible* and *long term*.

16.4.2 Air Quality and Climate:

Construction Phase

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions that may deposit in surface waters.

Mitigation measures implemented during the construction phase will ensure that the deposition of dust is minimised. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that the interaction is *neutral imperceptible,* and *short term.*

Operational Phase

Climate change has the potential to increase the risk of flooding in future years due to increased rainfall. The hydrology assessment has concluded that no residual risk is foreseen as the development is located primarily outside any flooding zone designations. The Proposed Development has been assessed as having a low vulnerability to climate change related flooding. The development includes the implementation of SUDS and an attenuation system that has been designed for the 1 in 100 year storm event which an allowance of 20% for climate change.

Therefore it can be determined that there is no significant risk to the Proposed Development or off site as a result of increased rainfall. The interaction is considered to be *neutral, imperceptible,* and *long term.*

16.4.3 Noise and Vibration:

Construction Phase

There are no potentially significant interactions identified between Hydrology, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology, and Noise and Vibration during the operational phase.

16.4.4 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Hydrology, and Landscape and Visual Impacts during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology, and Landscape and Visual Impacts during the construction phase.

16.4.5 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Hydrology, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.4.6 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

In the absence of mitigation, surface water run-off during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may damage downstream surface water infrastructure.

Taking into account the design and mitigation measures set out in Chapter 6 (Hydrology) and Chapter 15 (Material Assets - Utilities) of this EIA Report, there remains a residual neutral interaction between Land, Soils, Geology and Hydrogeology, and Material Assets during the construction phase. The interaction is considered to be *neutral*, *imperceptible*, and *short term*.

Operational Phase

The use of SuDS during operations will mean that the development will result in neutral water impacts in the operational phase with regard to runoff rates and flooding risk. As a part of the SuDS features, it is anticipated that small amounts of hydrocarbon sludge waste and debris may be generated in the hydrocarbon interceptors which will treat the surface water run-off. This waste stream will be managed in accordance with the relevant legislation identified in Chapter 14 (Material Assets – Waste Management). Foul wastewater discharge will be treated on site and discharged to the existing Kish Business Park pumped system, terminating at the Croghan Industrial Estate wastewater pumping station. Therefore wastewater discharge from the site will have no impact on public foul wastewater infrastructure. The interaction is considered to be *negative, not significant,* and *long-term.*

16.5 BIODIVERSITY AND ITS INTERACTION WITH:

16.5.1 Air Quality and Climate:

Construction Phase

Dust generation can occur during extended dry weather periods as a result of construction traffic along haul routes and from construction activities such as excavations and infilling works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability of the plant as well as other effects. Dust mitigation measures will be implemented on site as set out in Chapter 8 of the EIAR. With the implementation of these mitigation measures dust emissions will be minimised and impacts will be *short-term, negative* and *imperceptible* with respect to biodiversity.

Operational Phase

Air dispersion modelling was undertaken as set out in Chapter 8 (Air Quality) and the results from the modelling during the operational phase show that the emissions from the facility will comply with the relevant air quality limits and will not impact on biodiversity.

Modelling has confirmed that the interaction is *long-term, neutral* and *imperceptible* with respect to biodiversity.

16.5.2 Noise and Vibration:

Construction Phase

Construction will result in noise from plant operating on site. Noise mitigation measures will be implemented on site as set out in Chapter 10 of the EIAR. With the implementation of these mitigation measures dust emissions will be minimised and impacts will be *short-term, negative* and *imperceptible* with respect to biodiversity.

Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Noise and Vibration during the operational phase.

16.5.3 Landscape and Visual Impacts:

Construction Phase

The construction phase site clearance works will result in permanent changes to the landscape with some loss of local biodiversity.

Taking into account the design and mitigation measures set out in Chapter 7 and 11 of this EIAR, the interaction is considered to be *negative*, *imperceptible* and *short term*

Operational Phase

Taking into account the design and mitigation measures set out in Chapter 7 and 11 of this EIAR, which included a landscape plan for the site there remains a residual positive interaction between Biodiversity, and Landscape and Visual during the operational phase. The interaction is considered to be *neutral*, *imperceptible* and *long term*.

16.5.4 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.5.5 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Material Assets during the operational phase.

Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Material Assets during the operational phase.

16.6 AIR QUALITY AND CLIMATE AND ITS INTERACTION WITH:

16.6.1 Noise and Vibration:

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Noise and Vibration during the operational phase.

16.6.2 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Landscape and Visual during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Landscape and Visual during the operational phase.

16.6.3 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Archaeological, Architectural and Cultural Heritage, and Landscape and Visual Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Archaeological, Architectural and Cultural Heritage, and Landscape and Visual Heritage during the operational phase.

16.6.4 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

During the Construction and Operational Phase, there is the potential for interactions between Climate and Traffic as vehicles accessing the site will result in emissions of CO_2, a greenhouse gas. However, the change in traffic is not predicted to be significant. There are no potentially significant interactions identified between Climate and Traffic.

Waste management measures will be put in place during the construction phase to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling. The impact to climate as a result of embodied carbon in waste materials is not considered significant.

Interactions between Air Quality and Traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the Proposed Development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality are considered to be *short-term, imperceptible* and *neutral* during the construction phase.

Operational Phase

During operation traffic emissions have the potential to emit GHGs, such as CO_2, which impact climate. However, the change in traffic as a result of the Proposed Development is not predicted to result in significant emissions. The interaction is considered to be *neutral*, *imperceptible*, and *long term*.

16.7 AIR QUALITY AND CLIMATE AND ITS INTERACTION WITH:

16.7.1 Noise and Vibration:

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Noise and Vibration during the operational phase.

16.7.2 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Landscape and Visual during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Landscape and Visual during the operational phase.

16.7.3 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.7.4 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

During the Construction and Operational Phase, there is the potential for interactions between Climate and Traffic as vehicles accessing the site will result in emissions of CO_2, a greenhouse gas. However, the change in traffic is not predicted to be significant. There are no potentially significant interactions identified between Climate and Traffic.

Waste management measures will be put in place during the construction phase to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling. The impact to climate as a result of embodied carbon in waste materials is not considered significant.

With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the Proposed Development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality are considered to be short-term, imperceptible and negative during the construction phase.

Operational Phase

During operation traffic emissions have the potential to emit GHGs, such as CO_2, which impact climate. However, the change in traffic as a result of the Proposed Development is not predicted to result in significant emissions. The interaction is considered to be direct, neutral, imperceptible, and long term.

16.8 NOISE AND VIBRATION AND ITS INTERACTION WITH:

16.8.1 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Noise and Vibration, and Landscape and Visual during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Landscape and Visual during the operational phase.

16.8.2 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Noise and Vibration, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.8.3 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

During the construction phase of the proposed development, construction traffic will use public roads and there will be a corresponding increase in traffic noise levels. The predicted change in noise levels due to an increase in road traffic has been calculated based on information in the Traffic and Transport Assessment prepared for the proposed development.

Predicted increases in traffic noise levels are such that the resultant noise effects are negative, not significant and short-term.

Operational Phase

Similarly, during the operational phase, where the development traffic flows are less than for the construction phase, the resultant noise effects are negative, not significant and long-term.

16.9 LANDSCAPE AND VISUAL IMPACTS AND ITS INTERACTION WITH:

16.9.1 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There is no effect or interaction with archaeology and landscape. There is an interrelationship between archaeology, cultural and architectural heritage and landscape relating to the indirect visual impact of the Proposed Development on Ballysakeery Glebe House (NIAH 31302208) and gardens.

The interaction is considered to be *negative, not significant* and *short term*.

Operational Phase

There are no potentially significant interactions identified between landscape and Archaeology during operation. As above the impact of landscape has to be considered for Architectural and Cultural Heritage during the operation phase with landscape mitigation in place. The interaction is considered to be *negative, not significant,* and *permanent*.

Operational Phase

There is an interrelationship between archaeology, cultural and architectural heritage and landscape relating to the indirect visual impact of the Proposed Development on Ballysakeery Glebe House (NIAH 31302208) and gardens, and the recommended mitigation measures.

16.9.2 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Material Assets during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Material Assets during the operational phase.

16.10 ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE AND ITS INTERACTION WITH:

16.10.1 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

There are no potentially significant interactions identified between Material Assets, and Archaeological, Architectural and Cultural Heritage during the operational phase.

Operational Phase

There are no potentially significant interactions identified between Material Assets, and Archaeological, Architectural and Cultural Heritage during the operational phase

16.11 SUMMARY

In summary, the interactions between the environmental factors and impacts discussed in this EIAR have been assessed and the majority of interactions are neutral with some negative interactions during construction. These will be temporary to short term in nature.

The reasoning behind the conclusion that certain interactions are considered to have a positive, neutral or negative effect is outlined in this Chapter. A summary of the potential interactions is presented in Table 16.1 below.

16.12 TABLE OF INTERACTIONS

Table 16.1 *Summary of interrelationships Between the Aspects*

	Human Health and Populations		Land, Soils and Hydrogeology		Hydrology		Biodiversity		Air Quality and Climate		Noise and Vibration		Landscape and Visual Impact		Archaeological, Architectural and Cultural Heritage		Material Assets, including Transport and Waste	
	Con.	**Op.**	**Con.**	**Op.**	**Con.**	**Op.**	**Con.**	**Op.**	**Con.**	**Op.**	**Con.**	**Op.**	**Con.**	**Op.**	**Con.**	**Op.**	**Con.**	**Op.**
Human Health and Populations			O	O	O	O	0	0	--	0	--	O	--	O	--	O	O	O
Land, Soils and Hydrogeology					O	O	O	X	O	X	X	X	X	X	X	X	O	X
Hydrology							O	O	O	O	--	--	--	--	--	--	O	O
Biodiversity									--	X	--	O	--	O	X	X	X	X
Air Quality and Climate											X	X	X	X	X	X	-	X
Noise and Vibration													X	X	X	X	--	--
Landscape and Visual Impact															--	--	X	X
Cultural Heritage																	X	X
Material Assets, including Transport and Waste																		

Con.	Construction Phase
Op.	Operational Phase
X	No Interaction

+	Positive Interaction
O	Neutral Interaction
--	Negative Interaction