East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Preface, Contents and Glossary

EirGrid

March 2024

Preface

The structure of this Environmental Impact Assessment Report (EIAR) for the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) is summarised as follows:

Volume 1: Non-Technical Summary

Volume 1 provides a non-technical summary of the information contained in Volume 2 of the EIAR.

Volume 2: Main Environmental Impact Assessment Report

Volume 2 provides a general introduction, outlines the environmental impact assessment process, describes the scope of the Proposed Development, presents the consideration of reasonable alternatives and describes the environmental impacts specific to the Proposed Development.

Volume 3: Appendices

Volume 3 provides documentation and data that is supplemental to the information provided in Volume 2 of the EIAR.

Volume 4: Figures

Volume 4 provides drawings and large format images (labelled as 'Figures') that illustrate the information detailed in Volume 2 of the EIAR.

Volume 5: Supporting Documents

Volume 5 provides supporting documentation that were produced during the development of the Proposed Development.

Table of Contents – Volume 2

Glossary of Terminology, Abbreviations and Acronyms

Term, Abbreviation or Acronym	Description
AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
ABP	An Bord Pleanála
AC	Alternating Current
Accident	Something that happens by chance or without expectation
ACA	Architectural Conservation Area
ACM	Asbestos-containing Materials
AD	Anno Domini
AEP	Annual Exceedance Probability
AIS	Air Insulated Switchgear
ALC	Agricultural Land Classification
ALO	Agricultural Liaison Officers
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
Annex I Habitats	Habitat types whose conservation requires the designation of Special Areas of Conservation. Priority habitats, which are in danger of disappearing within the EU territory, are highlighted with an asterisk.
Annex I Species	Annex I of the Birds Directive lists 193 bird species and sub-species which are: i) in danger of extinction, ii) vulnerable to specific changes in their habitat, iii) considered rare because of small populations or restricted local distribution and / or iv) require particular attention for reasons of the specific nature of habitat. Article 4 of the Birds Directive has classified a number of Special Protection Areas (SPAs) for regularly occurring migratory birds and those birds listed on Annex I of the directive.
Annex II Species	Animal and plant species whose conservation requires the designation of Special Areas of Conservation
Annex IV	Animal and plant species in need of strict protection
Annex V	Animal and plant species whose taking in the wild and exploitation may be subject to management measures.
AQGs	Air Quality Guidelines
AR5	Fifth Assessment Report
ASI	Archaeological Survey of Ireland
ATC	Automatic Traffic Count
BAP	Biodiversity Action Plan
BNL	Basic Noise Level
BMV	Best and most versatile
BPO	Best Performing Option
BPTO	Best Performing Technical Option
BS	British Standards
BSI	British Standards Institute
Cable Trench	An approximately 1.5m in width, 1.3m in depth in the public road and 1.8m in depth in private lands in which the underground cable is laid
CAP	Climate Action Plan
CAP	Common Agricultural Policy
Carbon budgets	Ireland's first carbon budget programme, comprising three 5-year economy-wide carbon budgets, was approved by the Government on 22 February 2022. The budgets were laid before the Houses of the Oireachtas on 24 February. The carbon budgets were approved by both Houses of the Oireachtas (the Dáil and Seanad) in April 2022.

Term, Abbreviation or Acronym	Description
Carbon dioxide equivalent (CO_2e)	Carbon dioxide equivalent (abbreviated as CO_2e) is a metric used to compare the emissions of various greenhouse gases, based on their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of CO_2 with the same GWP. For example, the GWP for methane (CH_4) is 25, and for nitrous oxide (N_2O) it is 298. This means that an emission of 1 tonne of CH4 is equivalent to an emission of 25 tonnes of CO_2 and an emission of 1 tonne of N_2O is equivalent to 298 tonnes of CO_2.
Carbon emissions	Shorthand for emissions of any of the seven GHGs that contribute to climate change under the Kyoto Protocol, namely carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF3)
CARO	Climate Action Regional Office
Catchment	The area of land bunded by watersheds draining into a river, basin or reservoir
CEMP	Construction Environmental Management Plan
CGS	County Geological Sites
CH_4	Methane
Ch	Chainage
CHP	Combined heat and power
C&D	Construction and Demolition
CIRIA	Construction Industry Research and Industry Association
Climate	Long-term weather conditions prevailing over a region
CMIP6	Coupled Model Inter-Comparison Projects
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
Construction Phase	The processes and activities on or off site that contribute or are instrumental to the construction of the Proposed Scheme towards, and finally to, the Operational Phase
COMAH	Control of Major Accidents and Hazards
CTMP	Construction Traffic Management Plan
CRTN	Calculation of Road Traffic Noise
CRWMP	Construction Resource and Waste Management Plan
CSO	Central Statistics Office
CSM	Conceptual Site Model
CWSC	Controlled Waters Screening Criteria
DAHG	Departments of Arts Heritage and Gaeltacht
DAHGI	Department of Arts, Heritage, Gaeltacht and Islands
DB	decibel
DBEC	Dublin to Belfast Economic Corridor
DC	Direct Current
DCCAE	Department of the Environment, Climate and Communications
DECLG	Department of the Environmental, Community and Local Government
DEHLG	Department of the Environmental, Heritage and Local Government
DHPLG	Department of Housing, Planning and Local Government
Disaster	A natural hazard (e.g., earthquake) or a man-made / external hazard (e.g., act of terrorism) with the potential to cause an event or situation that meets the definition of major accident.
DLRCC	Dún Laoghaire Rathdown County Council
DMRB	Design Manual for Roads and Bridges
DMP	Dust Mitigation Plan

Term, Abbreviation or Acronym	Description
DoT	Department of Transport
E	East
EA	Environmental Agency
EBPO	Emerging Best Performing Option
EC	European Commission
EGD	European Green Deal
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMFs	Electromagnetic Fields
Embodied Carbon	Carbon (GHG) emissions associated with energy consumption and chemical processes during the extraction, transport and/or manufacture of construction materials or products
EMRA	Eastern and Midlands Regional Assembly
EMWR	Eastern Midlands Waste Region
EnCoW	Environmental Clerk of Works
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
ESR	Effort Sharing Regulation
e.g.	example
EU	European Union
EUPHA	European Public Health Association
FC	Football Club
FCC	Fingal County Council
FDP	Fingal Development Plan
FRA	Flood Risk Assessment
FRM	Flood Risk Management
G=0	Acoustically hard areas (e.g., roads and water bodies)
G=0.5	Mixed areas
G=1	Greenfield areas
GAA	Gaelic Athletic Association
GDA	Greater Dublin Area
GE	Google Earth
GHG	Greenhouse gas emission
GI	Ground Investigation
GIS	Gas Insulated Switchgear
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GM	Google Maps
GNI	Gas Network Ireland
GPR	Ground Penetrating Radar
Greenhouse Gases	A gaseous compound that absorbs infrared radiation and traps heat in the atmosphere. Greenhouse gases are usually expressed in terms of carbon dioxide equivalent (CO_2e)
GTV	Groundwater Threshold Values
GWDTEs	Groundwater Dependent Terrestrial Ecosystems
GWP	Global Warming Potential
GWP	Global warming potential for a 100-year period

Term, Abbreviation or Acronym	Description
HA	Hydrometric Area
ha	hectare
HDD	Horizontal Directional Drilling
HDPE	High Density Polyethylene
HDV	Heavy Duty Vehicle
HEFS	High-End Future Scenario
HGV	Heavy Goods Vehicle
HHAC	Human Health Assessment Criteria
HLC	Historic Landscape Characterisation
HSA	Health and Safety Authority
HSE	Health Service Executive
IAIA	International Association for Impact Assessment
IAQM	Institute of Air Quality Management
IBN	Irish Brownfield Network
ICNIRP	International Council on Non-Ionising Radiation Protection
ICT	Information and Communications Technology
IDA	Irish Development Authority
IEMA	Institute of Environmental Management and Assessment
IFI	Inland Fisheries Ireland
IGI	Institute of Geologists in Ireland
IGV	Groundwater in Ireland
IHD	Ischaemic heart disease
Invasive Species	An invasive species is a plant, fungus, or animal species that is not native to a specific location.
IPC	Integrated Pollution Control
IPCC	International
IPH	Institute of Public Health Ireland
IPPC	Integrated Pollution Prevention Control
JB	Joint Bay
Joint Bay	Joint Bays which are underground chambers located at various points on the route. Joint Bays are used as locations to pull the cables into the pre-installed ducts and to connect ('joint') together the individual cables and create a single, overall continuous circuit.
JTC	Junction Turning Count
km	kilometre
kV	kilovolt
$ktCO_2e$	kilotonnes carbon dioxide equivalent
L_{den}	Day, evening and night
L_{night}	Night
LCA	Life Cycle Assessment
LED	Light-emitting diodes
LGS	Local Geological Site
LGV	Light Goods Vehicle
Life Cycle Stage	PAS 2080:2023 proposes a modular approach for the quantification of infrastructure related GHG emissions over a number of stages over the 'life cycle' of a project, namely 'before use (A)', 'use (B)' and 'end of life (C)'. These stages are further disaggregated into modules (e.g. product stage (A1–A3) and construction process stage (A4–A5)).

Term, Abbreviation or Acronym	Description
LNR	Local Nature Reserve
LoS	Level of Service
LoW	List of Waste
LP	Land Parcels
LVAC	Low Voltage Alternating Current
LVIA	Landscape and Visual Impact Assessment
Major Accident	Events that threaten immediate or delayed serious environmental effects to human health, welfare and / or environment and require the use of resources beyond those accidental, the outcome (e.g., train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events.
MCA	Multi-criteria analysis
MCC	Meath County Council
MCDP	Meath County Development Plan
Mm/s	millimeters per second
MRFS	Mid-Range Future Scenario
Mt CO_2e	megatonnes carbon dioxide equivalent
N	North
N_2O	Nitrogen oxide
Natura Impact Statement	Statement for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own or in combination with other plans or projects, for one or more than one European site, in view of the conservation objectives of the site or sites prepared to enable the carrying out by the competent authority of an Appropriate Assessment as required under the Habitats Directive.
NAP	Noise Action Plan
NBDC	National Biodiversity Data Centre
NCD	Non-communicable diseases
NDC	Nationwide Data Collection
NDP	National Development Plan
NE	North-East
NECP	National Energy and Climate Plan
Net Zero	Net zero means any emissions would be balanced by schemes to offset an equivalent amount of greenhouse gases from the atmosphere, such as planting trees or using technology like carbon capture and storage
NFGWS	National Federation of Group Water Schemes
NHA	Natura Heritage Area
NHBC	National House Building Control
NIAH	National Inventory of Architectural Heritage
NIS	Natura Impact Statement
NMS	National Monument Service
NO_2	Nitrogen dioxide
NPF	National Planning Framework
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
NRMM	Non-Road Mobile Machinery
NSO	National Strategic Outcome
NTA	National Transport Authority

Term, Abbreviation or Acronym	Description
NTpM	National Transport Model
NTS	Non-Technical Summary
NW	North-West
NWCPO	National Waste Collection Permit Office
O_3	Ozone
OBJ	Objective
Operational Phase	This phrase refers to the processes and activities implemented following the Construction Phase to ensure the appropriate environmental management of the Proposed Development over time.
OPW	Office of Public Works
OREDP	Offshore Renewable Energy Development Plan
OS	Ordnance Survey
OSI	Ordnance Survey Ireland
PAB	Planning Application Boundary
PAG	Project Appraisal Guidelines for National Roads
PAH	Polycyclic aromatic hydrocarbons
PAS	PAS 2080:2023 'Carbon Management in Buildings and Infrastructure' specifies requirements for the management of whole-life carbon in buildings and infrastructure.
Passing Bay	A temporary traffic lane to allow traffic flow around Joint Bays while construction works are ongoing.
PB	Passing Bay
PCB	Polychlorinated biphenyls
PRA	Property Registration Authority
PFAS	Polyfluoroalkyl
PL	Pollutant Linkage
PM	Particulate matter
$PM_{2.5}$	Particulate matter of less than 2.5 microns
PM_{10}	Particulate matter of less than 10 microns
POM	Programme of Measures
PPV	Peak Particle Velocity
PSCS	Project Supervisor Construction Stage
PSDP	Project Supervisor Design Process
RAMS	Risk Assessment Method Statements
RBD	River Basin District
RBMP	River Basin Management Plan
RED	Renewable Energy Directive
RC	Reinforced Concrete
RHM	Register of Historic Monuments
Risk	The likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur.
Risk event	An identified, unplanned event, which is considered relevant to the Proposed Scheme and has the potential to result in a major accident and / or disaster, subject to assessment of its potential to result in a significant adverse effect on an environmental receptor.
RMP	Record of Monuments and Places
RPE	Respiratory Protective Equipment
RPII	Radiological Protection Institute of Ireland

Term, Abbreviation or Acronym	Description
RPS	Record of Protected Structures
RRSES	Regional Spatial and Economic Strategy
RSA	Road Safety Authority
RTC	Road Traffic Collision
S	South
SAC	Special Area of Conservation
SAPS	Small Area Population Statistics
SAMs	Scheduled Ancient Monument
SC	Sub-catchment
SDCC	South Dublin County Council
SE	South-East
SEA	Strategic Environmental Assessment
SEO	Strategic Environmental Objective
SF_6	Sulphur hexafluoride
S.I.	Statutory Instrument
SID	Strategic Infrastructure Development
Significant environmental effect	Includes the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration. In addition, a 'Significant' impact resulting from major accidents and / or disasters is identified if it meets the criteria for 'Significant', 'Very Significant' or 'Profound' under the EPA Guidelines.
SMR	Standardised Mortality Ratio
SMR	Site and Monument Records
SNCI	Sites of Nature Conservation Importance
SO_2	Sulphur dioxide
SO	Outer Protection Zone
SPA	Special Protection Area
SSP	Socio-Economic Pathway
SSSI	Sites of special scientific interest
SVOC	Sem-Volatile Organic Compounds
SW	South-West
SWMP	Surface Water Management Plan
TCC	Temporary Construction Compound
TDP	Transmission Development Plan
The Birds Directive	The Birds Directive (formally known as Council Directive 2009/147/EC on the conservation of wild birds) is a European Union directive adopted in 2009. It replaces Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds. It aims to protect all European wild birds and the habitats of listed species, in particular through the designation of Special Protection Areas.
The Habitats Directive	EU Directive on the Conservation of Habitats, Flora and Fauna (92/43/EEC), commonly known as "the Habitats Directive", was adopted in 1992, came into force in 1994 and was transposed into Irish law in 1997.
TII	Transport Infrastructure Ireland
TOC	Total Organic Carbon
TPH	Total petroleum hydrocarbons
TPO	Tree Preservation Order
TTM	Temporary Traffic Management

Term, Abbreviation or Acronym	Description
TSO	Transmission System Owner
TSSPS	Transmission System Security Planning Standards
TTA	Traffic and Transport Assessment
UCD	University College Dublin
UGC	Underground Cable
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UK	United Kingdom
UKHA	United Kingdom Highways Agency
uPVC	Unplasticized polyvinyl chloride
VOC	Volatile Organic Compounds
Vulnerability	Describes the potential for harm as a result of an event, for example due to sensitivity or value of receptors. In the context of the EIA Directive, the term refers to 'exposure and resilience' of the Proposed Development to the risk of a major accident and / or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact
WAC	Waste acceptance criteria
WFD	Water Framework Directive
WHO	World Health Organisation
WHS	World Heritage Sites
WLC	Whole life cycle
WwTP	Wastewater Treatment Plant
ZoI	Zone of Influence

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Chapter 1 – Introduction and the Environmental Impact Assessment Process

EirGrid

March 2024

Contents

1. Introduction and the Environmental Impact Assessment Process

1.1 Introduction

Jacobs has been appointed by EirGrid plc (EirGrid) to prepare this Environmental Impact Assessment Report (EIAR) to accompany an application for statutory approval to An Bord Pleanála (ABP) under Section 182A of Number 30 of 2000 – Planning and Development Act, 2000 (as amended) (hereafter referred to as the Planning and Development Act).

This EIAR has been prepared to facilitate ABP's undertaking of an Environmental Impact Assessment (EIA) for the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). EIA is the process by which the effects on the environment (positive and negative) of a proposed development or project are assessed. Where impacts are significant, relevant design and / or other mitigation measures can be taken to avoid or reduce those impacts. It is ABP that carries out the EIA.

As the Proposed Development meets a threshold specified within Schedule 5, Part 2 of S.I. No. 600/2001 – Planning and Development Regulations, 2001 (as amended) (hereafter referred to as the Planning and Development Regulations), mandatory EIA is required. Refer to Section 1.5.4 for further details.

This Chapter of the EIAR introduces EirGrid, introduces the Proposed Development, summarises the EIA process, describes the methodology used to prepare this EIAR, and outlines the structure of the EIAR.

1.2 Who is EirGrid?

EirGrid is the state-owned Transmission System Operator and is responsible for a safe, secure and reliable supply of electricity, now and in the future.

EirGrid develops, manages and operates Ireland's national high voltage electricity grid (also called the 'Transmission System' (hereafter referred to as the grid)). This brings power from where it is generated to where it is needed throughout Ireland. EirGrid uses the grid to supply power to industry and businesses that use large amounts of electricity. The grid also powers the distribution network owned by the Transmission System Owner (i.e., the Electricity Supply Board (ESB)). This supplies the electricity used every day in homes, businesses, schools, hospitals and farms. EirGrid develops new electricity infrastructure only when it is needed.

S.I. No. 445/2000 - European Communities (Internal Market in Electricity) Regulations, 2000 sets out the role and responsibilities of the Transmission System Operator; in particular, Article 8(1) (a) gives EirGrid, as Transmission System Operator, the exclusive function:

> *"To operate and ensure the maintenance of and, if necessary, develop a safe, secure, reliable, economical and efficient electricity transmission system, and to explore and develop opportunities for interconnection of its system with other systems, in all cases with a view to ensuring that all reasonable demands for electricity are met and having due regard for the environment."*

EirGrid is responsible for the planning and outline design of the Proposed Development and the consent application that this EIAR relates to. The ESB will, as the Developer, be responsible for the development and construction of the Proposed Development, subject to a grant of planning approval by ABP.

1.3 What is the East Meath - North Dublin Grid Upgrade

The Proposed Development will comprise 37.5 kilometres (km) of new 400 kilovolt (kV) underground cable circuit (also referred to as the proposed cable route) between the existing Woodland Substation in the townland of Woodland in County Meath and the existing Belcamp Substation in the townlands of Clonshagh and Belcamp in Fingal, County Dublin. The Proposed Development will also involve works in the substations to facilitate the connection of the underground cable circuit to the electrical grid.

Approximately 20.5km of the proposed underground cable route will be located in County Meath and approximately 17km of the proposed underground cable route will be located in Fingal, County Dublin. Approximately 70% of the proposed underground cable route will be located within public roads and approximately 30% will be located in private lands, to avoid location-specific constraints.

An overview of the Proposed Development is presented in Image 1.1. A full description of the Proposed Development is provided in Chapter 4 (Proposed Development Description) of this EIAR.

1.3.1 Need for the Proposed Development

The Proposed Development is required to reinforce the network between East Meath and North Dublin. Reinforcement of this part of the network is needed to continue to ensure the security of the network feeding the east of County Meath and the north of County Dublin, between Woodland, Clonee, Corduff, Finglas and Belcamp Substations. The Proposed Development will help meet the growing demand for electricity in the east of the country due to the increased economic activity and population growth in recent years in Kildare, Meath and Dublin. It will also enable further development of renewable energy generation in line with Government policy. Renewable energy accounted for 36% of all electricity consumed in Ireland in 2019 and is expected to grow to 70% within 10 years. Ireland's Climate Action Plan 2024 (Government of Ireland 2023) calls for up to 80% of the country's electricity to come from renewable energy sources by 2030 (refer to Chapter 2 (Need for the Proposed Development) of this EIAR for further detail on the Climate Action Plan).

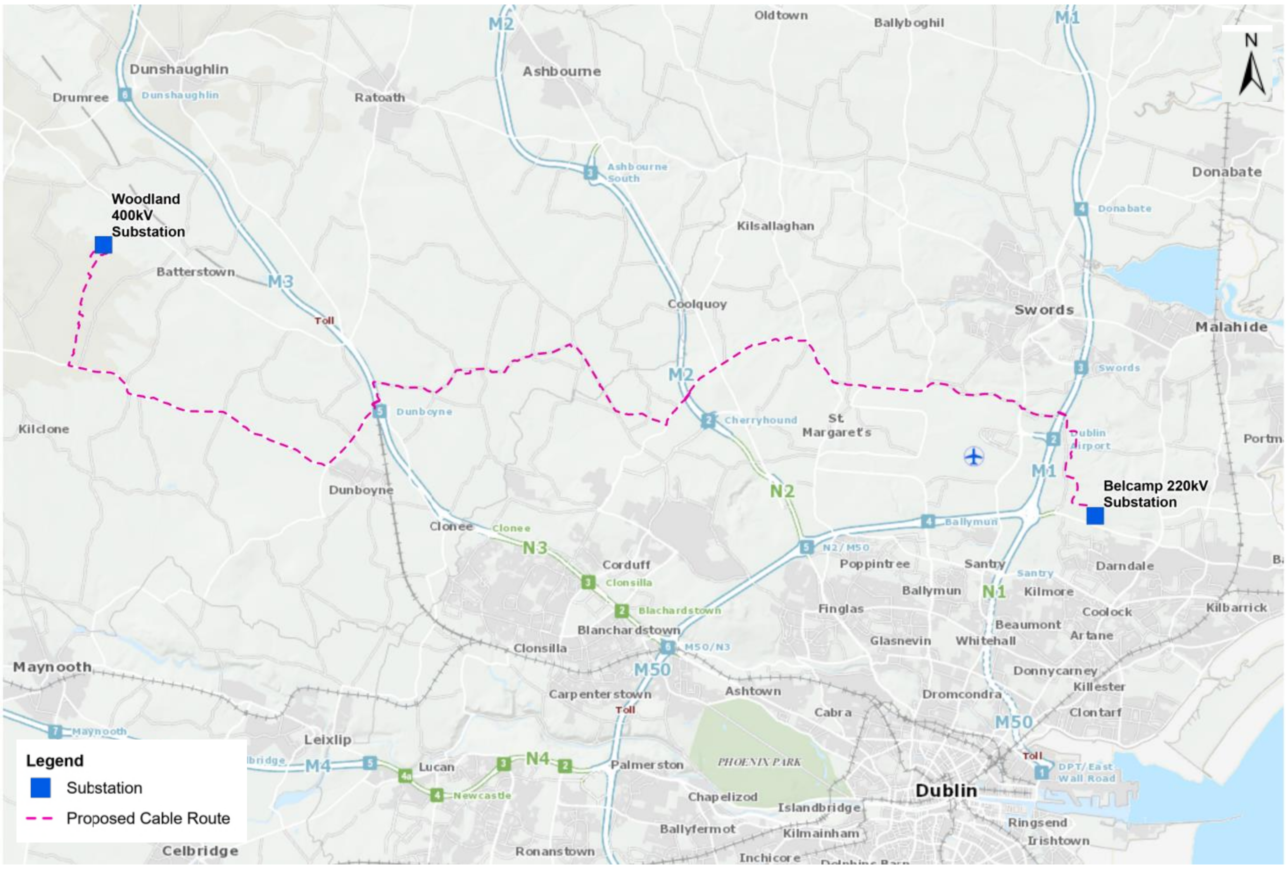

Image 1.1: Location of the Proposed Development

1.4 Planning

A standalone Planning Report has been prepared as part of this planning application. Please refer to the Planning Report which accompanies this planning application for full details in relation to planning history, planning need, and national, regional and local plans and policies related to the Proposed Development.

1.5 Environmental Impact Assessment Process, Screening, Content and Methodology

1.5.1 Introduction

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the EIA Directive) requires that public and private projects that are likely to have significant effects on the environment be made subject to an assessment prior to development consent being given. As set out in the former Department of Housing, Planning and Local Government (DHPLG) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018) (hereinafter referred to as the 2018 Guidelines) (DHPLG 2018), EIA is a process to be undertaken in respect of applications for specified classes of development listed in the EIA Directive and the transposing Irish legislation before a decision in respect of development consent is made. The process involves the preparation of an EIAR by the applicant, consultations with the public, relevant prescribed bodies and any other affected Member States, and an examination and analysis of the EIAR and other relevant information leading to a reasoned conclusion by the competent authority on the likely significant effects of the proposed development on the environment.

The EIA Directive requires that public and private projects that are likely to have significant effects on the environment be made subject to an assessment prior to development consent being given. The requirements of the EIA Directive are transposed into Irish law through the Planning and Development Act and the Planning and Development Regulations.

Article 5 of and Annex IV to the EIA Directive specify the information to be contained in an EIAR in relation to this Proposed Development. Accordingly, this EIAR contains all of the information prescribed by the relevant provisions of Article 5 of and Annex IV to the EIA Directive.

1.5.2 Relevant Legislation, Policy and Guidelines

This EIAR has been prepared in accordance with, but not limited to, the following legislation and guidance:

- The EIA Directive;
- Planning and Development Act;
- Planning and Development Regulations;
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022);
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (hereafter referred to as the European Commission EIAR Guidance) (European Commission 2017);
- Climate Action and Low Carbon Development (Amendment) Act 2021;
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission 1999);

- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013);
- The 2018 Guidelines (DHPLG 2018); and
- Advice Note 17: Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects (The Planning Inspectorate 2019).

Key policy documents that inform the examination of all environmental topic areas include:

- Project Ireland 2040 National Planning Framework (Government of Ireland 2018);
- Project Ireland 2040 National Development Plan 2021 – 2030 (Government of Ireland 2021) (hereafter referred to as the Revised NDP);
- Climate Action Plan 2024 (Government of Ireland 2023);
- Eastern and Midlands Regional Assembly (EMRA) Regional Spatial and Economic Strategy for the Eastern and Midland Region 2019 – 2031 (EMRA 2019);
- National Energy and Climate Plan 2021 – 2030 (Department of Communications, Climate Action and the Environment 2021);
- Fingal County Council (FCC) Fingal Development Plan 2023 - 2029 (FCC 2023);
- Meath County Council (MCC) Meath County Development Plan 2021 – 2027 (MCC 2021); and
- Relevant Local Area Plans; Dublin Airport Local Plan 2020 (FCC 2020).

Where necessary, the EIAR chapters refer to any such topic-specific legislation, guidance and policy documents that are specifically relevant to their assessment.

In addition to the applicable EIA legislation and guidance, all relevant provisions of European Union (EU) Directives and National legislation relating to the specialist areas have also been considered as part of the process and are addressed in the relevant assessment chapters. The Proposed Development is supported by an extensive policy framework of International, European, National, Regional and Local policies, planning strategies and plans. Refer to Chapter 2 (Need for the Proposed Development) of this EIAR for further information.

1.5.3 Environmental Impact Assessment Process

EIA is a systematic and an iterative process that examines the potential environmental impacts of a proposed development or project and establishes appropriate design and mitigation measures to avoid, reduce or offset impacts. The assessment of potential environmental impacts arising from the Proposed Development has been conducted in accordance with best practice as detailed in the chapters and associated appendices prepared in respect of each relevant environmental topic.

The EIA process can generally be summarised as follows:

- **Screening –** Determining whether or not an EIA is required for the Proposed Development. This included a review of the Proposed Development and understanding the legislative requirement for EIA under the EIA Directive;
- **Consideration of the EIAR's Scope –** The EIA team considered the characteristics of the Proposed Development and the likely relevant issues which could arise due to its construction and operation;
- **Baseline Data Collection –** Establishment of a robust baseline of the existing environment in the study area of the Proposed Development, including a review of existing available information and undertaking any surveys identified as required;
- **Impact Assessment –** Assessment of the potential environmental impacts of the Proposed Development with and without mitigation measures, and an iterative process of informing design to avoid impacts;

- **Mitigation –** Formulation of mitigation measures to ameliorate the potential impacts of the Proposed Development which cannot be avoided through design;
- **Consultation –** With statutory authorities, stakeholders, the public and other bodies;
- **Decision –** The competent authority, in this case ABP, will decide if the Proposed Development can be authorised, and if so, may specify conditions that must be adhered to;
- **Announcement –** The public is informed of the decision; and
- **Monitoring –** When required, monitoring of the effectiveness of implemented mitigation measures during construction and operation.

1.5.4 Screening and the Legislative Requirement for Environmental Impact Assessment

Screening is the first stage of the EIA process, whereby a decision is made on whether or not an EIA is required. An EIA Screening Report has been prepared for the Proposed Development and is included as a standalone document in the planning application pack.

The EIA Directive specifies the classes of project for which an EIA is required, and the information which must be furnished within an EIAR. In accordance with Article 4(1) of the EIA Directive, all projects listed in Annex I to the EIA Directive are considered as having likely significant effects on the environment and shall be subject to environmental assessment. For projects listed in Annex II to the EIA Directive, the national authorities may determine whether an EIA is needed, either on the basis of thresholds / criteria or on a case-by-case examination.

The obligations, as set out in the EIA Directive, have been implemented into Irish law by the provisions of the Planning and Development Act and the Planning and Development Regulations.

In order to determine whether an EIA is required for the Proposed Development, it is necessary to determine whether it is a project listed in one of the Annexes to the EIA Directive. These Annexes have been transposed into Irish law by the provisions of the Planning and Development Act and the Planning and Development Regulations.

Under Section 182A(2) of the Planning and Development Act, an application under Section 182A which belongs to a class of development identified for the purposes of Section 176 of the Planning and Development Act must be accompanied by an EIAR. For the purposes of Section 176 of the Planning and Development Act, the relevant classes of development that require EIA are set out in Schedule 5 of the Planning and Development Regulations. Under Section 172(1)(a)(ii)(I) of the Planning and Development Act, an EIA must be carried out by ABP in respect of an application for consent for a proposed development where the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations, and such development would equal or exceed, as the case may be, any relevant quantity, area or other limit specified in that Part. Classes within Schedule 5, Parts 1 and 2, that are most relevant to the Proposed Development were considered and a determination was made against each one.

No classes of development as outlined in Schedule 5, Part 1 of the Planning and Development Regulations were considered applicable or fitting of the Proposed Development.

The relevant class of development in Schedule 5, Part 2 (Paragraph 1) of the Planning and Development Regulations is presented below:

> *'(a) Projects for the restructuring of rural land holdings, undertaken as part of a wider proposed development, and not as an agricultural activity that must comply with the European Communities (Environmental Impact Assessment) (Agriculture) Regulations 2011, where the length of field boundary to be removed is above 4 kilometres, or where re-contouring is above 5 hectares, or where the area of lands to be restructured by removal of field boundaries is above 50 hectares'*.

The Proposed Development is for the purposes of grid infrastructure, and to comply with EirGrid's statutory mandate to ensure a secure and reliable electricity transmission network.

The Proposed Development includes the provision of temporary Passing Bays to facilitate on-road Joint Bay construction, and at locations, off-road alignment of the proposed underground cable and associated infrastructure. These will involve temporary and permanent removal of 4km or more of existing field boundary.

Having regard to the absence of guidelines on how this legislation should be interpreted, and given the fact that the Proposed Development, along its cumulative length (although of very localised extent at any particular location), will result in an exceedance of the 4km length of field boundary to be removed. From a legally cautious perspective, an EIAR has been prepared and EIA is required.

1.5.5 Consideration of the Environmental Impact Assessment Report Scope

As referenced above, the scope of the EIA was developed having regard to the characteristics of the Proposed Development and all likely significant environmental impacts which could arise due to its construction and operation. In addition, during the development of the EIAR, prescribed bodies and relevant non-statutory consultees were consulted to appraise them of the proposed approach to the EIAR and they were afforded the opportunity to provide comment on the approach. Comments received during this pre-application consultation process with prescribed bodies and non-statutory bodies were reviewed and considered in the preparation of this EIAR.

Moreover, as a result of extensive public consultation in respect of the Proposed Development, submissions and observations received from the public and public concerns were considered and, where appropriate, issues raised in those submissions and observations are included in the EIAR. Please refer to Appendix A1.1 in Volume 3 of this EIAR for a summary of the Scoping Consultation responses.

Section 3.3.5 of the EPA Guidelines (EPA 2022) identified the consideration of other assessments (including other projects) as part of the scoping process. Other projects have been considered through the cumulative impact assessment presented in Chapter 20 (Cumulative Impacts and Environmental Interactions) of this EIAR. Other assessments that have been considered as part of this EIAR are:

- Flood Risk Assessment: this is included as Appendix A12.1 in Volume 3 of this EIAR;
- Appropriate Assessment Screening and Natura Impact Statement: these have been produced for the Proposed Development and are included as standalone documents in the planning application pack. A formal conclusion in the matter is the responsibility of ABP as Competent Authority for Appropriate Assessment of this application for statutory consent; and
- Strategic Environmental Assessment (SEA) for EirGrid's Grid Implementation Plan 2023 – 2028. This SEA Scoping Report (EirGrid 2023) outlines information on the Grid Implementation Plan, including the need for the Grid Implementation Plan, its geographical area and overall objectives. The SEA Scoping Report is required to facilitate statutory consultation to ensure that the approach proposed for the SEA is appropriate. The results of consultation of the assessment within the SEA Scoping Report has helped to inform the scope of this EIAR by identifying key issues to be addressed and further grid projects that could be considered through the cumulative impact assessment in this EIAR (refer to Chapter 20 (Cumulative Impacts and Environmental Interactions)).

1.5.6 Contents of the Environmental Impact Assessment Report

As set out in the European Commission EIAR Guidance (European Commission 2017), "*the EIAR is the document prepared by the developer [of a project] that presents the output of the assessment. It contains information regarding:*

- *the Project,*
- *the likely significant effect of the Project,*
- *the Baseline scenario,*
- *the proposed Alternatives,*
- *the features and Measures to mitigate adverse significant effects,*
- *as well as a Non-Technical Summary and,*
- *any additional information specified in Annex IV of the EIA Directive."*

Article 5 of and Annex IV to the EIA Directive specify the information to be contained in an EIAR in relation to this Proposed Development. For clarity on the information to be contained in the EIAR, the relevant section of the legislation is reproduced in Table 1.1.

Table 1.1: Annex IV of the EIA Directive

Annex IV – Information Referred to in Article 5(1) (Information for the EIAR)	Relevant Chapter(s) of this EIAR
1. Description of the project, including in particular: *(a) A description of the location of the project;* *(b) A description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;* *(c) A description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used; and* *(d) An estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases*	Item (a) to Item(d) - Chapter 4 (Description of the Proposed Project). Item (d) – Chapter 7 (Air Quality), Chapter 9 (Noise and Vibration), Chapter 11 (Soils, Geology and Hydrogeology), Chapter 12 (Hydrology) and Chapter 16 (Waste).
2. A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	Chapter 3 (Consideration of Reasonable Alternatives).
3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge	The baseline scenario is outlined in all environmental assessment chapters (Chapter 5 to Chapter 19). Appendix A1.2 in Volume 3 of the EIAR includes a breakdown of the likely evolution of the baseline where this can be determined with reasonable effort on the basis of available environmental information.
4. A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydro morphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.	The following EIAR chapters address the factors listed: • Chapter 5 (Population) contains the population assessment; • Chapter 6 (Human Health) contains the human health assessment; • Chapter 7 (Air Quality) contains the air assessment; • Chapter 8 (Climate) contains the climate assessment; • Chapter 10 (Biodiversity) contains the biodiversity assessment; • Chapter 11 (Soils, Geology and Hydrogeology) contains the land and soil assessment; • Chapter 12 (Hydrology) contains the water assessment; • Chapter 13 (Archaeology, Architectural and Cultural Heritage) contains the cultural

Annex IV – Information Referred to in Article 5(1) (Information for the EIAR)	Relevant Chapter(s) of this EIAR
	heritage (including architectural and archaeological aspects) assessment; • Chapter 17 (Material Assets) contains the material assets assessment; and • Chapter 18 (Landscape and Visual) contains the landscape assessment.
5. A description of the likely significant effects of the project on the environment resulting from, inter alia: *(a) The construction and existence of the project, including, where relevant, demolition works;* *(b) The use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;* *(c) The emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;* *(d) The risks to human health, cultural heritage or the environment (for example due to accidents or disasters);* *(e) The cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;* *(f) The impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;* *(g) The technologies and the substances used.* *The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.*	All environmental assessment chapters of the EIAR (Chapter 5 to Chapter 19) outline the "*likely significant effects of the project on the environment*" and cover any "*indirect, secondary,…… short-term, medium-term and long-term, permanent and temporary, positive and negative effects*" of the project. Chapter 20 (Cumulative Impact and Environmental Interactions) covers the potential "*cumulative*" impacts of the Proposed Development with other projects.
6. A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	All environmental assessment chapters of the EIAR (Chapter 5 to Chapter 19).
7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	All environmental assessment chapters of the EIAR (Chapter 5 to Chapter 19). An overall summary of measures outlined in Chapter 5 to Chapter 19 is contained in Chapter 21 (Summary of Mitigation and Monitoring Measures).
8. A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council (*)6 or Council Directive 2009/71/Euratom (**)7 or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	Chapter 19 (Risk of Major Accidents and / or Disasters) assesses the potential for significant adverse effects of the Proposed Development deriving from its potential vulnerability to the risk of major accidents and / or disasters.
9. A non-technical summary of the information provided under points 1 to 8.	A Non-Technical Summary is included as Volume 1 of the EIAR.

Annex IV – Information Referred to in Article 5(1) (Information for the EIAR)	Relevant Chapter(s) of this EIAR
10 A reference list detailing the sources used for the descriptions and assessments included in the report'.	A list of references used to inform the development of the EIAR is included at the end of each EIAR chapter (Chapter 1 to Chapter 22).

1.5.7 Environmental Impact Assessment Report Structure

The EIAR for the Proposed Development is presented in five volumes, as follows:

- **Volume 1 – Non-Technical Summary**: This summarises the findings of the EIAR in a clear, accessible format that uses non-technical language and supporting graphics. The Non-Technical Summary describes the Proposed Development, summarises the baseline environment, potential impacts and mitigation measures, and relevant topics of the EIAR in a manner that can be easily understood by the general public;
- **Volume 2 – Main Report**: This includes introductory chapters in addition to 'assessment' chapters for each environmental topic in accordance with Annex IV of the EIA Directive. The front-end chapters provide the relevant Proposed Development context while the assessment chapters provide a description of the relevant environmental aspects, and likely significant impacts, with cumulative impacts from other developments in combination with the predicted impacts of the Proposed Development, and summary chapters provided thereafter;
- **Volume 3 – Appendices**: This provides the technical reports and information that support and are cross-referenced within Volume 2;
- **Volume 4 – Figures**: This provides drawings, maps and graphics that support, and are referenced within, Volume 2; and
- **Volume 5 – Supporting Documentation –** This provides published technical reports about the development phases for the Proposed Development, prior to the final route selection assessed in this EIAR.

The overall structure of the EIAR, with a further breakdown of the structure of this Volume (Volume 2) is provided in Table 1.2.

Table 1.2: EIAR Structure

EIAR Chapter	Description
Volume 1: Non-Technical Summary	
NTS	Summary of the EIAR in non-technical language.
Volume 2: Main Text	
Chapter 1	Introduction and the Environmental Impact Assessment Process
Chapter 2	Need for the Proposed Development
Chapter 3	Consideration of Reasonable Alternatives
Chapter 4	Proposed Development Description
Chapter 5	Population
Chapter 6	Human Health
Chapter 7	Air Quality
Chapter 8	Climate
Chapter 9	Noise and Vibration
Chapter 10	Biodiversity
Chapter 11	Soils, Geology and Hydrogeology
Chapter 12	Hydrology
Chapter 13	Archaeology, Architectural Heritage, and Cultural Heritage
Chapter 14	Traffic and Transport
Chapter 15	Agronomy and Equine
Chapter 16	Waste
Chapter 17	Material Assets
Chapter 18	Landscape and Visual
Chapter 19	Risk of Major Accidents and / or Disasters
Chapter 20	Cumulative Impacts and Environmental Interactions
Chapter 21	Summary of Mitigation and Monitoring Measures
Chapter 22	Summary of Significant Residual Impacts
Volume 3: Appendices	
Appendices	Technical reference information supporting the EIAR chapters, such as calculations and detailed background data.
Volume 4: Figures	
Figures	Graphics and plans supporting the EIAR chapters, illustrating the Proposed Development and environmental information.
Volume 5: Supporting Documents	
Supporting Documents	Supporting technical documents for the overall Proposed Development.

While the EIAR has been prepared in compliance with the EIA Directive and the Planning and Development Regulations, it has also been written to make it accessible to a wider, non-specialist audience. Where technical terminology is used, an explanation is provided in the text, and / or in the glossary of terms which is provided at the beginning of Volume 2 of the EIAR.

The structure of the chapters in Volume 2 (Main Report) of this EIAR aligns with both the European Commission EIAR Guidance (European Commission 2017) and the EPA Guidelines (EPA 2022), and includes the following headings:

- **Introduction**: Provides an overview of the aims and objectives of the specific chapter in assessing the Proposed Development and outlines the scope of the assessment;
- **Methodology**: Describes the forecasting methods, evidence and assessment criteria used to identify and assess the significant impacts on the environment. The assessment criteria used

generally follows the European Commission EIAR Guidance and the EPA Guidelines, but any topic-specific divergences from this criteria are explained in the relevant Chapter;

- **Baseline Environment**: The baseline refers to the current state of environmental characteristics. It involves the collection and analysis of information on the condition, sensitivity and significance of relevant environmental topics which are likely to be significantly impacted by the Proposed Development;
- **Potential Impacts**: Reporting in the EIAR is structured to ensure that criteria and standards of significance, sensitivity and magnitude used as part of the assessment are identified and documented and that the level of certainty of data is recorded. An explanation is provided for the assessment criteria that have been applied within each environmental topic area, including reference to the appropriate published guidance;
- **Mitigation and Monitoring Measures**: This section sets out measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse impacts on the environment and, where appropriate, identifies any proposed mitigation and monitoring arrangements; and
- **Residual Impacts**: Any impacts that are predicted to remain after all mitigation measures have been implemented are referred to as 'residual impacts'. These are the remaining environmental impacts of the Proposed Development that could not be reasonably avoided.

1.5.8 Assessment Criteria

The assessments evaluate the Construction and Operational Phases of the Proposed Development, with the likelihood, extent, magnitude, duration and significance of potential impacts described. The interactions in impacts between different environmental aspects and the potential for cumulative impacts to arise are also considered. For all environmental topics, the significance of any residual impacts remaining are assessed and presented.

The assessment criteria used generally follow the European Commission EIAR Guidance (European Commission 2017) and the EPA Guidelines (EPA 2022), as reproduced in Table 1.3, unless otherwise stated and described within the relevant EIAR chapter.

Table 1.3: Description of Effects from the EPA Guidelines (EPA 2022)

Assessment Criteria	
Quality of Effects	
It is important to inform the non-specialist reader whether an effect is positive, negative or neutral.	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative / Adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).
Significance of Effects	
'Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**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 Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
	Very Significant Effects An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics.
Extent and Context of Effects	
Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?).
Probability of Effects	
Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision.	**Likely Effects** The effects that can reasonably be expected to occur because 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.
Describing the Duration and Frequency of Effects	
'Duration' is a concept that can have different meanings for different topics – in the absence of specific	**Momentary Effects** Effects lasting from seconds to minutes.
	Brief Effects Effects lasting less than a day.

Assessment Criteria	
definitions for different topics the following definitions may be useful.	**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.
	Frequency of Effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

1.5.9 Assessment Approach

This assessment is based on the Proposed Development design and construction methodology proposals described in the EIAR. Where, as part of the detailed design process, the design and construction proposals will be further developed post-consent (if granted), such developments will be in accordance with the parameters set out in this EIAR. In those instances, the assessment has adopted a precautionary approach and identified whether the significance of any impact is predicted to change within the prescribed parameters.

This approach is a resilient method that provides conservatism within assessments in this EIAR while also facilitating the progression of the Proposed Development through the detailed design stage, including refinement, following inter alia the appointment of contractors and discharging of planning conditions requiring the agreement of matters of detail (e.g., the final location of Joint Bays, design of crossings etc.).

The detailed design and construction methodology for the Proposed Development will be subject to confirmatory surveys and investigations to ensure that both will not result in any greater environmental impact than that being reported in this EIAR and being assessed by ABP. If the confirmatory assessments identify unanticipated impacts that are greater than those set out in this EIAR, mitigation will be implemented where required to ensure no significance residual impacts arise.

1.5.10 Details of Competent Experts

The Project Team has engaged an environmental team led by Jacobs to undertake the preparation of this EIAR for the Proposed Development, in collaboration with the Jacobs-led Engineering Design Team. The responsible competent expert(s) and details of their expertise are provided in Table 1.4.

Table 1.4: Details of Competent Experts

EIAR Chapter	Responsible Competent Expert – Competency Details
Chapter 1 (Introduction and the Environmental Impact Assessment Process)	**<u>Gregor Simpson, MEng CEng MICE MAPM, Jacobs</u>** Gregor is a Senior Associate Director with Jacobs and an experienced project manager with over 20 years of professional experience in the management and delivery of major infrastructure projects at all stages of the project lifecycle in Ireland, the UK and the Middle East. Gregor holds a master's degree in civil engineering from the University of Glasgow and is a Chartered Engineer and Member of the Institution of Civil Engineers. Gregor has substantial experience in all aspects of project delivery and management of major infrastructure projects including Clyde Metro, A82 Tarbet to Inverarnan, Khor Fakkan Western Bypass D&B, Mafraq to Ghweifat PPP scheme, M3 Clonee to Kells PPP and N8 Cashel to Mitchelstown. Gregor was previously involved in the planning stages for the A82 Tarbet to Inverarnan including route option assessment, option development, preliminary design, Statutory Orders and environmental assessment. He was project manager with overall responsibility for coordinating the services relating to the preparation of the Statutory Orders and Environmental Impact Assessment Report. **<u>Andy Scott, BSc, CSci, MIEnvSc, Jacobs</u>** Andy is a Project Manager and Principal Environmental Consultant working in Ireland and the UK for Jacobs. Andy holds an Honours degree in Geography from University of Sheffield and is a Chartered Scientist. He has over 15 years' professional experience in the delivery and management of multi-disciplinary environmental projects in the infrastructure and commercial sectors. Andy has excellent experience in all aspects of project delivery and management which has captured feasibility, planning, design, procurement and construction phases. Andy has previously been involved in the planning stages of the N2, N21, Foynes to Limerick Road and Cork City Water Supply Scheme as part of the Environmental Team. Andy's Environmental specialism relates to soils, geology and hydrology and this includes management of land contamination. **<u>Katie Randall-Stratton BSc, MSc, MIEMA, CEnv, Jacobs</u>** Katie is a Principal Environmental Impact Assessment (EIA) Consultant with Jacobs and has 18 years' experience in a broad environment field. She holds a Bachelor of Science degree in Environmental Science from the University of Southampton as well as a Master of Science in Environmental Assessment and Management from Oxford Brookes University. Katie has been a Chartered Environmentalist and full member of the Institute of Environmental Management and Assessment (IEMA) for seven years. She has expertise in EIA and environmental consenting and compliance and has worked on a range of sectors including energy, rail, road, river and coastal defences. Linear infrastructure projects have included Bramford to Twinstead Reinforcement, Central Tunnels, and Cross Solent Gas Pipeline. **<u>Stephanie McGlynn BSc MSc C.WEM CEnv MCIWEM, Jacobs</u>** Stephanie is a Principal Environmental Scientist with Jacobs Engineering Ireland and has over 8 years of professional experience in the environmental sector. She holds a BSc degree in Environmental Science and Health from Dublin City University and a MSc degree in Applied Environmental Science from University College Dublin. She is a Chartered Environmentalist (CEnv) with the Society of the Environment and is a Chartered Water and Environmental Manager (C.WEM) with the Chartered Institute of Water and Environmental Management (CIWEM). Stephanie has worked on a range of both public and private sector environmental impact assessments of varying scales. Stephanie has coordinated the delivery of a number of Strategic Infrastructure Development projects including BusConnects Dublin and the Greater Dublin Drainage Project. Stephanie has also completed Risk of Major Accident and / or Disasters assessments for Strategic Infrastructure Development projects including for BusConnects Dublin and the Greater Dublin Drainage Project, and cumulative impact assessment for Strategic Infrastructure Development projects including the Greater Dublin Drainage Project, MetroLink and the Kildare Meath Grid Upgrade Project.

EIAR Chapter	Responsible Competent Expert – Competency Details
Chapter 2 (Need for the Proposed Development)	**Gregor Simpson** See above **Andy Scott** See above **Katie Randall-Stratton** See above **Stephanie McGlynn** See above
Chapter 3 (Consideration of Reasonable Alternatives)	**Gregor Simpson** See above **Andy Scott** See above **Katie Randall-Stratton** See above **Stephanie McGlynn** See above
Chapter 4 (Proposed Development Description)	**Gregor Simpson** See above **Andy Scott** See above **Katie Randall-Stratton** See above **Stephanie McGlynn** See above

EIAR Chapter	Responsible Competent Expert – Competency Details
	Nigel Edwards BSc, MICE, Jacobs Nigel is a chartered civil engineer with the Institution of Civil Engineers (ICE), with over 35 years' experience working on major linear infrastructure projects mainly within the water industry and for the last 14 years in the high voltage transmission and distribution industry. Nigel holds a BSc degree in Civil Engineering. During those 35 years, Nigel has worked as a designer on these projects from inception, through feasibility, outline design and planning and detailed design. He has contributed to numerous planning applications for schemes. For the last 5 years he has been involved in the outline design and planning applications for various transmission and distribution projects in Ireland on behalf of EirGrid.
Chapter 5 (Population)	**Robert Fadden BA MSc MIEnvSc CEnv, Jacobs** Robert is a Principal Environmental Consultant at Jacobs with over 9 years' experience as an Environmental Consultant. He holds a BA in Geography and Politics and a MSc in Environmental Policy and Planning, both from University College Dublin (UCD). Robert is a Member of the Institution of Environmental Sciences and is a Chartered Environmentalist (CEnv). Robert has managed and coordinated the preparation of Environmental Impact Assessment Reports / Statements as well as Population / Social Impact Assessments for a range of different infrastructure projects in a number of different geographies, including Ireland, the UK and Australia, including BusConnects Dublin (Ireland), Kildare-Meath Grid Upgrade (Ireland), Clifden Flood Relief Scheme (Ireland), Water Supply Project (Ireland), Western Harbour Tunnel & Beaches Link Project (Australia), Southampton to London Pipeline (SLP) Project (UK), The Wylfa Newydd Project (UK), and the A9/A82 Longman Junction Improvement Scheme (UK).
Chapter 6 (Human Health)	**Jenny Wade MSc C.Env MIEMA, Jacobs** Jenny Wade is an Associate Director with Jacobs. She holds a Master's degree in Environmental Management from Imperial College, London and is currently completing a Master's in Public Health part-time through Cardiff University. Jenny has over 18 years' relevant experience in environmental impact assessment and strategic environmental assessment. **Dr. Miriam Olivier, CEnv MEnvSci, Jacobs** Dr Miriam Oliver is a full member of the Institute of Environmental Management and Assessment (IEMA) and Chartered Environmentalist (CEnv) with a specialism in health assessment and is holds an MESci Environmental Geoscience, a PhD, and has seven years' experience in EIA practice. Both Jenny Wade and Dr Miriam Oliver have significant experience in preparing population and health assessments for linear infrastructure schemes, including BusConnects Dublin Core Bus Corridors, A12 Chelmsford to A120 Development Consent Order (DCO) scheme and M60 Junction 18 Simister Island Junction DCO scheme.
Chapter 7 (Air Quality)	**Gary Wilson (MSc, BSc Hons, MIAQM), Jacobs** Gary is a Principal Air Quality Consultant at Jacobs, with 18 years' experience and has completed national and international air quality impact assessments. Gary holds a BSc in Meteorology and a MSc in Environmental Technology. Gary has undertaken a considerable number of projects that have included air quality assessment aspects in order to assess the potential air quality impacts, including various rail, pipeline and water infrastructure projects in the UK and Ireland such as Southampton to London pipeline, Strategic Pipeline Alliance, HS2 and Western Rail Link to Heathrow.
Chapter 8 (Climate)	**Kevin Turpin BSc, PhD MIAQM MIEnvSc, Jacobs** Kevin is a Technical Director with over 25 years' environmental consultancy experience. Kevin holds a BSc is in Environmental Management and a PhD in Emissions Modelling for Environmental Impact Assessment. Kevin is an air quality and emissions specialist and project leader with a core expertise in assessing transportation impacts (principally road, rail and shipping). As well as being and air quality specialist with experience including attending planning examination hearings, he is also a specialist in the assessment of climate impacts. He has produced Climate Chapters, Carbon Impact Assessments and Carbon Management Plans for the purpose of EIA. In addition, he was the technical lead for the development of a bespoke carbon tool for Kirklees Council. Kevin has either led or been a specialist reviewer on several carbon related projects including the Clifden Flood Defence

EIAR Chapter	Responsible Competent Expert – Competency Details
	Scheme (EIAR), WYCA Mass Transit Scheme, Halifax Corridor Improvement Scheme. He has also assisted in estimating carbon inventories for international projects such as the Dubai State of the Environment Report.
Chapter 9 (Noise and Vibration)	**Chris Conroy MA (Hons), MSc, MIOA, Jacobs** Chris Conroy is a Principal Acoustician at Jacobs and has over 14 years of professional experience in the environmental sector. He holds an MA in Geography and History from The University of Dundee and an MSc in Geographical Information Systems (GIS) from The University of Ulster. He holds a Diploma in Acoustics and Noise Control and is a Member of the Institute of Acoustics (MIOA). Chris has experience in Environmental Impact Assessments, Appropriate Assessments and planning applications. He has undertaken the noise and vibration assessments on several EirGrid schemes including the Maynooth Substation Upgrade and the Kildare-Meath Upgrade. He has presented evidence as an expert witness at Oral Hearing.
Chapter 10 (Biodiversity)	**Dr. Susie Coyle BSc (Hons) MCIEEM MIFM MRSB CBiol, Jacobs** Dr Susie Coyle is a Senior Associate Director in Jacobs. She holds a Bachelor of Science (Hons) degree in Aquatic Bioscience from the University of Glasgow and a Doctor of Philosophy degree in the inheritance of body armour and risk taking behaviour in a freshwater fish from the University of Glasgow. She is a Chartered Biologist with the Royal Society of Biology, a full member of the Chartered Institute of Ecology and Environmental Management and a full member of the Institute of Fisheries Management. Susie has 17 years' consultancy experience managing ecological survey and assessment contracts as part of Environmental Impact Assessment Directive and Habitats Directive assessment processes. One of her primary roles is checking and reviewing Preliminary Impact Appraisal Reports, Environmental Impact Assessment Reports, Appropriate Assessment Screening Reports and Natura Impact Statements. She also coordinates the delivery of all ecological components of projects in Ireland and the UK. She has undertaken ecological surveys for multiple species to inform impact assessment. She has inputted to biodiversity chapters of Environmental Impact Assessment Reports, Appropriate Assessment Screening Reports and Natura Impact Statements for a range of projects. Susie has extensive field survey skills and technical knowledge and have held several personal licenses for freshwater pearl mussel and great crested newt and is or has have been a named agent on protected species licences for bats, kingfisher, badger, otter and red squirrel. **Tom Moore BA (Hons) MSc MCIEEM, Jacobs** Tom Moore is an Associate Director in Jacobs. He holds a BA (Hons) degree in Development Studies from the University of East Anglia and an MSc in Forest Ecology and Management from Edinburgh University. He has 15+ years' professional experience working within ecological consultancy and is a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). His main areas of expertise include Ecological Impact Assessments (EcIA), Biodiversity Net Gain (BNG) assessments, and undertaking screening and appropriate assessments as part of the Habitat Regulations Assessment (HRA) process. Tom is also experienced in undertaking and coordinating habitat and protected species surveys, habitat creation and mitigation design. He has also previously held survey licences for great crested newt, dormouse, and bats in the UK and has helped author mitigation licences for badger, bat, great crested newt, otter and water vole. **Duncan Smith BSc (Hons) MSc CEnv, Jacobs** Duncan Smith is a Principal Ecologist and Chartered Environmentalist (CEnv). He has a BSc (Hons) in Zoology from the University of Leeds, a MSc in Environmental Technology with Ecological Management from Imperial College, and a MSc in Marine Environmental Protection from Bangor University. He has 29 years professional ecological experience specialising in botanical surveying, habitat management and site evaluation for Ecological Impact Assessment, including EirGrid's CP0966 EIAR and the Ecological Impact Assessment for the Oxford Flood Alleviation Scheme.

EIAR Chapter	Responsible Competent Expert – Competency Details
	During his career he has worked in the private, public, and voluntary sectors, including eighteen years in the private sector, seven years for UK Statutory Nature Conservation Bodies in England and Wales and two years in the voluntary sector.
Chapter 11 (Soils, Geology and Hydrogeology)	**Ewan Pringle BSc MSc FGS CGeol, Jacobs** Ewan is an Associate Director of Land Quality with Jacobs and has 19 years' experience of environmental consultancy experience. He holds an honours degree in Geology from Aberdeen University as well as a Master of Science in Environmental Geochemistry from Leeds University. He is a Chartered Geologist with the Geological Society of London. Ewan has extensive experience of input of Environmental Impact Assessment for linear infrastructure schemes in the Republic of Ireland and the UK, including the Dublin Metrolink, N2 road schemes, A9 road scheme and Longman Junction upgrade. **Vanina Saint-Martin BSc, MSc, FGeolSoc, Jacobs** Vanina is a Director of Hydrogeology with Jacobs and has over 23 years' experience in hydrogeological matters. She holds an honours degree in Geography from Bordeaux University (France) as well as a Master of Hydrogeology from Birmingham University. She is a Fellow of the Geological Society. Vanina worked on a large variety of projects including groundwater resources, hydrogeological-hydrological assessments, mining and quarrying issues, contaminated land and groundwater risk assessment, environmental impact assessments, landfills HRAs, groundwater flooding and groundwater dependent ecological assessments. Vanina has been acting as Technical Lead on a number of projects and environmental studies, with a strong focus on large scale infrastructure projects. Vanina has acted as expert witness at Oral Hearings.
Chapter 12 (Hydrology)	**Rebecca Westlake BSc (hons), MSc, LLM, PhD, CSci, CMarSci, MIMarEST, Jacobs** Rebecca is a Subject Matter Expert (SME) for the Water Science and Hydromorphology Team at Jacobs. She holds an honours degree in physical geography from Plymouth University, an MSc in coastal and marine resource management, an LLM in environmental law and practice, and a PhD in geomorphology. Rebecca is chartered with Institute of Marine Engineering, Science and Technology, and has approximately 25 years' relevant experience in water science and environmental assessment. Rebecca is highly experienced in many aspects of legislation and regulation, in addition to specific technical specialism in Water Framework Directive, and all stages of the EIA process, including Development Consent Orders. Rebecca is a technical lead for water chapters for major infrastructure projects including Development Consent Orders for roads, rail and water sectors, often undertakes peer reviewer roles. **Mark Johnson BSc (hons), MSc - Jacobs** Mark Johnson is a Senior Environmental Scientist within the Water Science and Hydromorphology Team at Jacobs. He holds an honours BSc in Geology from The University of Aberdeen and an MSc in Integrated Petroleum Geoscience from the same institute. Mark is a member of the is Chartered Institution of Water and Environmental Management and is working towards full Chartership. Mark has 10 years of professional experience; five of which are in water science and environmental assessment. Mark is experienced in aspects of Water EIA, regulation and compliance assessment, in addition to specific technical specialism in Water Framework Directive, all stages of the EIA process, geomorphology and surface water quality. Mark has originated and coordinated multiple surface water EIAR chapters for various project types including pipelines, road, rail and utilities.
Chapter 13 (Archaeology, Architectural Heritage, and Cultural Heritage)	**Abby Cooper BA (Hons) MSc, MCIfA, Jacobs** Abby Cooper is a Principal Archaeologist with Jacobs and has over 9 years of professional experience in the historic environment sector. She holds a BA (Hons) in Archaeology and History from the University of Leicester and an MSc in Human Osteoarcheology from the University of Edinburgh. She is a Member of the Chartered Institute for Archaeologists (CIfA). Abby has experience inputting to various stages of Environmental Impact Assessment on a range of projects, including high-profile infrastructure schemes and small commercial sites, across the UK and Ireland.

EIAR Chapter	Responsible Competent Expert – Competency Details
Chapter 14 (Traffic and Transport)	**Colin Wyllie BEng (Hons), MCIHT, MSoRSA, Jacobs** Colin Wyllie is an Associate Director in Jacobs Transport Planning team, based in Glasgow. He has an honours degree in Civil and Transportation Engineering from Napier University, Edinburgh and is an accredited Road Safety Auditor and a member of the Chartered Institution of Highways and Transportation (CIHT) and a member of the Society of Road Safety Auditors (SoRSA). He is a highly experienced transport planner, traffic engineer and road safety auditor with 25 years of experience on a wide range of projects. Colin has led the technical input on several Environmental Impact Assessments for energy and infrastructure developments in the UK and Ireland including the Cork Line Level Crossings where he presented expert witness evidence at the Oral Hearing. Colin is the technical lead for the traffic and transport chapter for the EIAR. **David Marshall BSc (hons), MSc, MTPS, Jacobs** David Marshall is a Senior Transport Planner with Jacobs, based in Glasgow, and has over 10 years' experience. He holds an honours degree in Geography from the University of Glasgow as well as a Master of Science in Geospatial and Mapping Sciences from the University of Glasgow. He is a member of the Transport Planning Society (MTPS). David has been the traffic and transport technical lead and/or lead author on several EIAs for large infrastructure schemes including Anglian Water's Strategic Pipeline Alliance, Musselburgh Flood Prevention Scheme, and Grangemouth Flood Prevention Scheme. David is the lead author for the traffic and transport chapter of the EIAR.
Chapter 15 (Agronomy and Equine)	**Con Curtin, B.AgrSc., Curtin Agricultural Consultants Ltd** Con is a Director of Curtin Agricultural Consultants Ltd and has over 30 years' experience as an Agricultural Consultant. He holds an honours degree in Agricultural Science from University College Dublin as well as a Level 6 Land Drainage Certificate from Teagasc. He is a member of the Agricultural Consultants Association and an approved advisor on the Farm Advisory Service register maintained by the Department of Agriculture, Food and the Marine. Con has carried out agricultural impact assessments for more than 15 major national road projects, for the North South Interconnector (Meath to Tyrone) electricity transmission project and the Kildare to Meath 400 kV grid upgrade project. He has presented expert witness evidence at more than 10 Oral Hearings. Con is the agronomist for the Proposed Development.
Chapter 16 (Waste)	**Hannah Cullen BA MSc C.WEM CEnv MCIWEM, Jacobs** Hannah Cullen is a Principal Environmental Scientist with Jacobs Engineering Ireland and has over 10 years of professional experience in the environmental sector. She holds a BA in Geology from Trinity College Dublin and an MSc in Environmental Science from University College Dublin. She is a Chartered Environmentalist (CEnv) with the Society of the Environment and is a Chartered Water and Environmental Manager (C.WEM) with the Chartered Institute of Water and Environmental Management (CIWEM). Hannah has experience in Environmental Impact Assessment, environmental monitoring, environmental auditing, and environmental site constraints assessment and due diligence work. She has worked on a range of both public and private sector Environmental Impact Assessment Reports of varying scales over the past six years.
Chapter 17 (Material Assets)	**Hannah Cullen** See above
Chapter 18 (Landscape and Visual)	**Rory Curtis BEng BA GDip LA MILI, Macro Works Ltd** Rory is a Landscape Architect at Macro Works Ltd., a specialist Landscape and Visual Impact Assessment (LVIA) company affiliated with the Irish Landscape Institute and has over 9 years of experience in the industry. Rory's experience extends to numerous electrical infrastructure developments including transmission lines and substations as well as the assessment of over 150 wind energy developments and 120 solar energy developments. Rory has been responsible for the for six Strategic Infrastructure Developments.
Chapter 19 (Risk of Major Accidents and / or Disasters)	**Gregor Simpson** See above

EIAR Chapter	Responsible Competent Expert – Competency Details
	Nigel Edwards See above Stephanie McGlynn See above
Chapter 20 (Cumulative Impacts and Environmental Interactions)	Stephanie McGlynn See above
Chapter 21 (Summary of Mitigation and Monitoring Measures)	Katie Randall-Stratton See above Stephanie McGlynn See above
Chapter 22 (Summary of Significant Residual Impacts)	Katie Randall-Stratton See above Stephanie McGlynn See above

1.6 Consultation

Public participation has been an integral part of the iterative development of the Proposed Development from the outset.

A 12 week public consultation from 7 September 2022 to the 30 November 2022 was carried out during Step 4 (Where exactly we should build) of the EirGrid Framework to inform the selection of the Emerging Best Performing Option, and subsequently, the Best Performing Option (refer to Chapter 3 (Consideration of Reasonable Alternatives) in this EIAR for full details of the EirGrid Framework).

These consultations were undertaken to inform the public and stakeholders of the development of the Proposed Development from an early stage and to seek feedback and participation throughout its development. The Step 1 to Step 5 Summary of Engagement Report, which details consultation undertaken as part of the development of the Proposed Development, is included in Volume 5 (Supporting Documents) of this EIAR. The Project Team has undertaken a comprehensive consultation and engagement process with stakeholders, landowners and members of the public throughout the development of the Proposed Development.

The primary objective of the non-statutory public consultation process was and is to provide opportunities for members of the public and interested stakeholders to contribute to the planning and design of the Proposed Development and to inform the development process. Public participation in the planning and design of the Proposed Development was encouraged from an early stage through on-the-ground engagement and information and media campaigns.

The early involvement of the public and stakeholders ensured the views of various groups, individuals and stakeholders were taken into consideration throughout the development of the Proposed Development and in the preparation of this EIAR.

The non-statutory consultation process assisted in:

- The establishment of a robust environmental baseline for the Proposed Development and its surroundings;
- The identification, early in the process, of specific concerns and issues relating to the Proposed Development so that they could be appropriately accounted for in the design and assessment scope; and
- Ensuring the appropriate involvement of the public and stakeholders in the assessment and design process.

More specific information relating to the pre-application phases of consultation, issues which emerged and the manner in which they informed the development of the EIAR for the Proposed Development are outlined in the sections which follow.

1.6.1 Pre-Application Consultation

1.6.1.1 An Bord Pleanála

The planning application for the Proposed Development is being made directly to ABP. Two pre-application consultation meetings took place with ABP on 8 September 2023 and 28 November 2023 and a summary of the items raised in these meetings is provided in Table 1.5.

Table 1.5: Pre-Application Consultation Dates and Summary of Discussion

Consultation Meeting Date	Summary of Consultation
8 September 2023	Key topics discussed included: • Structure of the EIAR and the environmental topics to be considered; • Cumulative impact assessment and the consideration that should be given projects interacting with the Proposed Development; • Watercourse crossing methods; • Construction Environmental Management Plan; • Potential road closures, diversions, work and impact to landowner access; • Planning drawings and details to include.
28 November 2023	Key topics discussed included: • Consultation with Inland Fisheries Ireland (IFI) in relation to watercourse crossings; • Agree methodology with Transport Infrastructure Ireland (TII) and Iarnród Éireann in regards any motorway and rail crossings; • Construction traffic safety; • Cumulative impact assessment; and • Biodiversity and habitat management.

Following the pre-application consultation, a letter was received from ABP on 16 January 2024 confirming that the Proposed Development falls within the scope of Section 182A of the Planning and Development Act, as outlined in Section 1.5.4, and is classified as Strategic Infrastructure Development.

The key items raised in the pre-application consultation meetings with ABP have helped to inform the preferred design for the Proposed Development and have been considered when undertaking the assessments described in this EIAR.

1.6.1.2 Local Authorities

In addition to the pre-application consultation with ABP, meetings were held with officials from Fingal County Council and Meath County Council. The dates of the meetings and the details of the discussions held are summarised in Table 1.6.

Table 1.6: Pre-Application Meetings with Local Authorities

Local Authority	Dates	Departments Consulted	Summary of Consultation
Fingal County Council	10 January 2023, 29 March 2023, 20 June 2023, 20 July 2023, 26 October 2023, 16 November 2023	Planning Department and Roads Department	Key topics discussed included: • Traffic disruptions; • Road network; • Protection of hedgerows; and • Engagement with other stakeholders.
Meath County Council	10 November 2022, 30 March 2023, 19 July 2023, 26 October 2023, 15 November 2023	Planning Department and Roads Department	Key topics discussed included: • Traffic disruptions; • Road network; • Floodplains; • Removal of hedgerows; • M3 Motorway Junction crossing; and • Engagement with other stakeholders.

The various meetings with the local authorities have helped to inform the preferred design for the Proposed Development and the items raised during these meetings have been considered when undertaking the assessments described in this EIAR. Local insight provided by the local authorities has helped to strengthen the environmental assessments in this EIAR.

1.6.2 Consultation on the Environmental Impact Assessment Process

In addition to the extensive non-statutory public consultation on the Proposed Development, as outlined in Section 1.6, the Project Team undertook consultation on the EIAR with certain prescribed bodies and relevant non-statutory stakeholders, upon request. Consultation meetings were also conducted with the National Parks and Wildlife Service (NPWS), Inland Fisheries Ireland (IFI) and the National Monuments Service (NMS), and these consultations informed the development of the relevant impact assessment chapters in Volume 2 of this EIAR.

The dates of the meetings and the details of the discussions held are summarised in Table 1.7. The discussions in each of these meetings helped to inform the development of the Proposed Development and the contents of the EIAR.

Table 1.7: Pre-Application Consultation Meetings with Prescribed Bodies

Prescribed Body	Date	Summary of Consultation
NMS	13 December 2023	Discussion on the inclusion of mitigation measures, potential archaeological remains on / near watercourses, code of best practice, pre-consent non-invasive archaeological investigations and the recently passed Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023.
NPWS	9 January 2024	Discussion on 'habitat restoration' and the use of commercial seeds, sourcing seeds and mitigation measures, dealing with badger setts, Tolka River and the matching of species to re-construction works.
IFI	9 January 2024	Discussion on habitats located downstream, seasonal restrictions, River Tolka, open cut trenching crossing methods of water bodies and IFI presence during construction.

As part of the scoping stage for the EIAR, relevant stakeholders were contacted in November 2023 and were provided with an electronic copy of the EIA Scoping Memo for the Proposed Development. The stakeholders were invited to review the EIA Scoping Memo and make a submission related to its content or additional information or topics which they considered relevant to the development of the EIAR. A non-statutory consultation period of four weeks was provided for comment. However, responses were accepted post this consultation period. A total of seven responses were received during the non-statutory scoping consultation process. A summary of the content of those responses and how the issues raised have been addressed in the EIAR, where applicable, is provided in Appendix A1.1 in Volume 3 of this EIAR.

1.6.3 Consultation with Landowners

The routing principles have sought to avoid agricultural land as far as possible, noting approximately 30% of the total cable length will be off-road (within agricultural land) to avoid location-specific constraints. Extensive discussions have been held between the EirGrid Agricultural Liaison Officers and all of the potentially affected landowners and their feedback has been incorporated in the design. This allowed landowner input into the potential routing and provided more information on ground conditions, environmental constraints, and farming practices that were considered in the routing process. The proposed cable route has tried to maximise the distance from all residential properties in line with the routing principles. The EirGrid Agricultural Liaison Officers will continue to discuss the Proposed Development going forward with the affected landowners.

The Step 4B – Route Options and Evaluation Report was published in September 2023 (included in Volume 5 (Supporting Documents) of this EIAR), and outlines how, at Step 4B, the Best Performing Option (Option A (Red)) was re-examined to refine the route and to provide more certainty on specific locations (refer to Chapter 3 (Consideration of Alternatives) in Volume 2 of this EIAR for further detail on the refinement of the Proposed Development). For example, the section of the proposed cable route between the M1 Motorway and Belcamp Substation was modified to an updated off-road corridor along agricultural land based on consultations with affected landowners. Another example was the route near the M3 Motorway crossing, for which EirGrid worked closely with landowners to minimise the land take and ensure that the Proposed Development did not compromise on their future planned developments.

1.7 Difficulties Encountered During the Preparation of the EIAR

Any limitations and assumptions have been noted within the relevant chapters in Volume 2 of this EIAR. However, the environmental assessment remains robust and is based on a precautionary approach.

1.8 References

Department of Communications, Climate Action and the Environment (2021). National Energy and Climate Plan 2021 – 2030

DHPLG (2018). Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018)

EirGrid (2023). Strategic Environmental Assessment for EirGrid Grid Implementation Plan 2023 – 2028 - Scoping Report

EMRA (2019). Eastern and Midlands Regional Assembly (EMRA) Regional Spatial and Economic Strategy for the Eastern and Midland Region 2019 – 2031

EPA (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

European Commission (2013). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment

European Commission (2017). Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report

FCC (2020). Dublin Airport Local Plan 2020

FCC (2023). Fingal Development Plan 2023 – 2029

Government of Ireland (2018). Project Ireland 2040 National Planning Framework

Government of Ireland (2021). Project Ireland 2040 National Development Plan 2021 – 2030

Government of Ireland (2022). Climate Action Plan 2023

MCC (2021). Meath County Development Plan 2021 – 2027

The Planning Inspectorate (2019). Advice Note 17: Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects

<u>Directives and Legislation</u>

Climate Action and Low Carbon Development (Amendment) Act 2021

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

Directive 2014/52/EU of the Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

Number 30 of 2000 – Planning and Development Act, 2000 (as amended)

S.I. No. 445/2000 - European Communities (Internal Market in Electricity) Regulations, 2000

S.I. No. 600/2001 – Planning and Development Regulations, 2001 (as amended)

S.I. No. 456/2011 - European Communities (Environmental Impact Assessment) (Agriculture) Regulations 2011

S.I. No. 296/2018 – European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 2 – Need for the Proposed Development

EirGrid

March 2024

Contents

2. Need for the Proposed Development

2.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) outlines the need for the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development).

2.2 The Need for the Proposed Development

The Proposed Development is required to strengthen the electricity network in the east of Meath and the north of Dublin to improve the transfer of power across the existing transmission network. There is a need to upgrade and strengthen the network to:

- Address the increased electricity demand in east Meath and north Dublin due to economic development and population growth;
- Reduce the use of and reliance on fossil fuels for electricity generation;
- Facilitate further development of renewable energy generation, onshore and offshore; and
- Assist in achieving climate action targets of having up to 80% of electricity coming from renewable sources by 2030. The Proposed Development is essential to meet the Climate Action Plan 2024 (Government of Ireland 2023) target to increase the proportion of renewable electricity to 80% by 2030, which includes transporting electricity from offshore wind energy. In Ireland, based on existing policies and strategies, total electricity demand over the next 10 years is forecast to grow up to 50%, largely driven by new large energy users (Government of Ireland 2022a). This presents a challenge to Ireland's emissions targets and to Ireland's security of supply. Included in the targets for the electricity sector is to "*expand and reinforce the grid through the addition of lines, substations and new technologies*" (Government of Ireland 2021b).

The need for the Proposed Development has been established through a series of studies completed at Steps 1 to 4 of EirGrid's Framework for Grid Development (see Chapter 3 (Consideration of Reasonable Alternatives) in Volume 2 of this EIAR for full details of the various steps in the Framework for Grid Development). The Proposed Development was also identified as one of the candidate solutions in Shaping Our Electricity Future – a roadmap to achieve our renewable ambition, which was published in November 2021 (EirGrid and the System Operator for Northern Ireland (SONI) 2021). The reports completed as part of Steps 1 to 4 of EirGrid's Framework for Grid Development are available in Volume 5 (Supporting Documents) of this EIAR. These reports outline the assumptions and analysis carried out to forecast how electricity will be used and generated into the future. These reports identified two key drivers of the need to further develop the transmission system:

- **Increased demand in North Dublin**: New industry demand is concentrated around North Dublin. These industries (including data centres) are located at, or near, the existing substations at Corduff, Finglas, and Belcamp. There are a limited number of circuits to supply these zones and constraints are likely as installed demand capacity increases; and
- **Low Generation in Dublin**: There are four generation stations in Dublin connected at Finglas, Corduff, Shellybanks, and Irishtown, respectively. The generators at Finglas, Corduff, and Shellybanks can be used to supply the load in North Dublin and offset flows from Woodland towards Corduff. However, these generators are likely to be overtaken in the merit order by newer, more efficient, conventional generators and increasing levels of renewables. Renewable generation is generally built remote from Dublin and new power stations could be located outside Dublin. This means that the power produced will have to be transported to get to where it is needed around Corduff, Finglas, and Belcamp.

The Step 1 - Needs Report (EirGrid 2016a) identified a number of issues that were in breach of EirGrid's Transmission System Security Planning Standards (TSSPS) and needed to be addressed in the North Dublin 220 kilovolt (kV) corridor that were summarised as:

> "*Network needs were identified in the corridor of transmission network between the Woodland 400 kV station to the north west of Dublin, the key load and generation centres at Finglas and Corduff 220 kV stations, and load and generation in the city centre at Poolbeg and Shellybanks 220 kV stations. The network needs are predominantly on the circuits between Corduff 220 kV and Woodland 400 kV stations. This is because much of the new load is located at Corduff (and between Woodland and Corduff) while Woodland is a strong node with EWIC behind it. Network needs were also identified in the cable circuits between Finglas, and the Poolbeg and Shellybanks 220 kV stations. These needs were more prevalent as availability of generation in the North Dublin network is reduced, or demand in North Dublin increased.*"

The need in this case involves a strengthening of the network in the east of Meath and the north of the Dublin Region to facilitate the transfer of power across the existing 220kV transmission network from the Woodland 400kV Substation to the East Meath and North Dublin areas. This will help to facilitate the increased demand in East Meath and North Dublin and variability in generation output in Dublin.

As this series of studies progressed, the need for a new connection between Woodland and Belcamp Substations was identified, and that an underground cable would be the best technology for this connection. The Proposed Development, for which planning permission is being sought, is a high voltage (400kV) underground cable circuit between Woodland and Belcamp Substations and the need for the project remains robust.

In addition to supporting future renewable generation, the Proposed Development will improve power quality and support growing electricity demand in the North Dublin area. The Proposed Development will strengthen the transmission network between Woodland and Belcamp Substations to continue to ensure the security of the network feeding the east of Meath and the north of Dublin, between Woodland, Clonee, Corduff, Finglas and Belcamp Substations.

Please refer to the Planning Report (included as a standalone document in this planning application pack) for full details in relation to the planning need for the Proposed Development. The Planning Report includes an assessment of how the Proposed Development supports, and is compliant with, relevant policy.

2.3 Policy Context

This Section outlines the European, National, Regional and Local-Level policy and plans that are relevant to the Proposed Development, in addition to sectoral plans which are specific to the electricity transmission sector.

2.3.1 European Policy

There are a range of key international and EU level agreements and policy frameworks that have contributed towards shaping Ireland's approach to energy transmission, distribution and storage. These include:

- European Green Deal 2019 (European Commission 2019), which proposes stricter EU emissions reduction targets for 2030 to at least 50% and towards 55% compared to 1999 levels;
- The Paris Agreement (United Nations 2015), which is an agreement to strengthen climate change resilience efforts via increased financing, while curbing greenhouse gas emissions via an agreed 'Paris Agreement Rulebook' setting out how countries are held accountable for delivering on their climate action promises;
- Europe 2030 Climate and Energy Framework (European Commission 2014a), which established a binding domestic target to reduce GHG emissions by 40% below 1990 levels by 2030;

- Recast Renewable Energy Directive (RED II), which established a binding target of at least 32% of renewable energy for the EU by 2030;
- Recast Renewable Energy Directive (RED III), which established set a binding renewable energy target of a minimum 42.5%, but aiming for 45%, for 2030; and
- Energy Roadmap 2050 (European Commission 2011), which developed scenarios demonstrating that decarbonising the energy system is technically and economically feasible.

2.3.1.1 European Green Deal 2019

In December 2019, the European Commission (the Commission) published a Communication on a European Green Deal (EGD), setting out its increased ambition on climate action. It presents an initial roadmap of key policies and measures needed to achieve the ambition of becoming the first climate neutral bloc in the world by 2050 This will require a transformation of the EU's economy, with sectors such as transport, buildings, agriculture, and energy production all having key roles to play. As well as setting out the policy and legislative programme for all key economic sectors to deliver on the EU's climate ambition, the EGD also addresses the EU's overall ambition on climate targets. It proposes increasing the EU's emissions reduction targets for 2030 from 40% to at least 50% and towards 55% compared with 1990 levels. In December 2020, EU leaders agreed to reduce greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels.

2.3.1.2 The Paris Agreement 2015

Superseding the 2005 Kyoto Protocol, the 2015 Paris Agreement (United Nations 2015) within the United Nations Framework Convention on Climate Change (UNFCCC), addresses greenhouse gas emissions mitigation, adaptation and finance starting in the year 2020, which aims to keep the global average temperature rise this century to below two degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.

One of the key achievements of the Climate Change Conference (COP26) in Glasgow in 2021, was the adoption of the Glasgow Climate Pact (the Pact) which aims to turn the 2020s into a decade of climate action and support. The Pact includes a package of decisions which consist of a range of agreed items, including strengthened efforts to build climate change resilience, curbing greenhouse gas emissions and providing the finance for both of these.

For the first time, nations were also called on to phase down unabated coal power and subsidies for fossil fuels. The package of decisions in the Pact also included the finalisation of the 'Paris Agreement rulebook'. This set of rules lays out how countries are held accountable for delivering on their climate action promises and self-targets under their Nationally Determined Contributions (NDCs).

The most recent Climate Change Conference (COP28) was held in Dubai in 2023. The UNFCCC advised:

> "*COP 28 was particularly momentous as it marked the conclusion of the first 'global stocktake' of the world's efforts to address climate change under the Paris Agreement. Having shown that progress was too slow across all areas of climate action - from reducing greenhouse gas emissions, to strengthening resilience to a changing climate, to getting the financial and technological support to vulnerable nations - countries responded with a decision on how to accelerate action across all areas by 2030. This includes a call on governments to speed up the transition away from fossil fuels to renewables such as wind and solar power in their next round of climate commitments*" (UNFCCC 2023).

2.3.1.3 Europe 2030 Climate and Energy Framework

In October 2014, EU leaders agreed new climate and energy objectives for 2030 following a proposal put forward by the European Commission. The Europe 2030 Climate and Energy Framework aimed to make the

EU's economy and energy system more competitive, secure and sustainable and set out binding targets for the EU. As part of this, member states are required to produce National Energy and Climate Plans from 2021 to 2030, and a Long-Term Strategy to reduce Greenhouse Gases to 2050. In December 2020, the European Council committed to increasing the EU emissions reduction target from 40% below 1990 levels by 2030 to at least 55% by 2030 in the Fit for 55 package. The package aims to update EU legislation and put in place new initiatives to ensure that EU policies are in line with the climate goals agreed by the Council and the European Parliament.

EU leaders also agreed on raising the share of renewable energy to at least 27%. The proposed framework will bring multiple benefits: reduced dependency on imported energy, a lower bill for imported energy, greater innovation, economic growth and job creation, increased competitiveness and better health through reduced air pollution.

2.3.1.4 Recast Renewable Energy Directive (RED II)

In 2014, the European Commission's 'A policy framework for climate and energy in the period from 2020 to 2030' (European Commission 2014b), established a framework for future EU energy and climate policies and promoted a common understanding of how to develop those policies after 2020. The European Commission proposed that the EU 2030 target for the share of renewable energy consumed in its Member States should be at least 27%.

The European Council endorsed this proposal and advised that Member States should be able to set their own, more ambitious, national targets to deliver their planned contributions to the Union 2030 target and exceed them.

Also in 2014, Europe 2030 Climate and Energy Framework (European Commission 2014a), and the 2016 publication, The renewable energy progress report (European Commission 2016), went further than the 'A policy framework for climate and energy in the period from 2020 to 2030' publication, stressing that, in light of the Paris Agreement (United Nations 2015) and the recent renewable technology cost reductions, it was desirable to be significantly more ambitious.

The ambition set out in the Paris Agreement, as well as technological developments including cost reductions for investments in renewable energy, led to new objectives being set in the Recast Renewable Energy Directive (RED II). RED II established a binding target of at least 32% of renewable energy for the EU by 2030. This target will be reviewed upwards in light of:

- Substantial cost reductions in the production of renewable energy; and
- The EU's international commitments for decarbonisation, or where a significant decrease in energy consumption in the EU justifies such an increase.

Member States are required to establish their contribution to the achievement of that target as part of their integrated national energy and climate plans. Also, in RED II, the European Commission encouraged investments in new, flexible and clean technologies. The European Commission also established an adequate strategy to manage the retirement of technologies which do not contribute to the reduction of emissions or deliver sufficient flexibility, based on transparent criteria and reliable market price signals. RED II therefore has directly influenced the national policy context specifically relating to energy in Ireland, as outlined further in the National, Regional and Local Policy subsections of this Chapter (Section 2.3.2, Section 2.3.3 and Section 2.3.4 respectively).

2.3.1.5 Recast Renewable Energy Directive (RED III)

The Fit for 55 package included a proposal for a revision of the Renewable Energy Directive (RED III) increasing the current EU-level target and on 30 March 2023, the European Parliament and the Council reached a provisional agreement and set a binding renewable energy target of a minimum 42.5%, but aiming for 45%, for 2030. In October 2023 the revised Recast RED III was adopted by the European Parliament. The revision of the directive also introduces new measures to complement the already existing building blocks established by the 2009 and 2018 directives to ensure that all potentials for the development of renewable energy are optimally exploited and accelerated, which is a necessary condition to achieve the EU's objective of climate neutrality by 2050.

2.3.1.6 Energy Roadmap 2050

The Energy Roadmap 2050 was published by the European Commission in 2011 (European Commission 2011) and explores the transition of the energy system in ways that would be compatible with the greenhouse gas reductions targets set out in the RED I (to reduce greenhouse gas emissions by at least 20% by 2020 (European Commission 2010)), while also increasing competitiveness and security of supply. To achieve these goals, the Energy Roadmap 2050 states that significant investments need to be made in new low-carbon technologies, renewable energy, energy efficiency, and grid infrastructure. Four main routes are identified to achieve a more sustainable, competitive and secure energy system in 2050:

- Energy efficiency;
- Renewable energy;
- Nuclear energy; and
- Carbon capture and storage.

The Energy Roadmap 2050 combined these routes in different ways to create and analyse seven possible scenarios for 2050. The analysis found that decarbonising the energy system is technically and economically feasible. Each of the scenarios assumes in the analysis that increasing the share of renewable energy and using energy more efficiently are crucial, irrespective of the particular energy mix chosen. An important component of this energy mix is grid infrastructure, with the Energy Roadmap 2050 stating:

> *"With electricity trade and renewables' penetration growing under almost any scenario up to 2050, and particularly in the high renewables scenario, adequate infrastructure at distribution, interconnection and long-distance transmission becomes a matter of urgency. By 2020 interconnection capacity needs to expand at least in line with current development plans. An overall increase of interconnection capacity by 40% up to 2020 will be needed, with further integration after this point."* (European Commission 2011)

As outlined in the Energy Roadmap 2050, the extension of current planning methods to a fully integrated network planning for transmission (onshore and offshore), distribution, storage and electricity highways for a potentially longer timeframe will be needed.

With more decentralised generation, smart grids, new network users (e.g. electric vehicles) and demand response, there is a greater need for a more integrated view on transmission, distribution and storage.

2.3.2 National Policy

This Section outlines the national-level plans, policies and strategies relevant to the Proposed Development.

2.3.2.1 Project Ireland 2040 – National Planning Framework

The National Planning Framework (hereafter referred to as the NPF) (Government of Ireland 2018) is the Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040 and marks the highest tier of Ireland's spatial plans. The National Strategic Outcomes (NSOs), the main policy principles of the NPF, support and strengthen the economy and a transition to a low carbon, climate resilient society (NSO 3, 6 and 8), provide access to quality services (4, 7, and 10) and achieve sustainable growth of settlements and manage environmental resources (NSO 1 and 9). The NPF states that Ireland's National Energy Policy is focused on three pillars:

- Sustainability;
- Security of Supply; and
- Competitiveness.

In line with these principles, NSO 8: 'Transition to a Low Carbon and Climate Resilient Society' notes that in creating Ireland's future energy landscape, new energy systems and transmission grids will be necessary to enable a more distributed energy generation system which connects established and emerging energy sources to the major sources of demand. NSO 8 aims to:

> "*Reinforce the distribution and transmission network to facilitate planned growth and distribution of a more renewables focused source of energy across the major demand centres*". (p.147)

In addition, it contains, in National Policy Objective 42, the following commitment to transmission network reinforcement to:

> "…*support, within the context of the Offshore Renewable Energy Development Plan (OREDP) and its successors, the progressive development of Ireland's offshore renewable energy potential, including domestic and international grid connectivity enhancements*". (p.104)

The NPF promotes the growth of Dublin as Ireland's capital with the following outline strategy:

> "*Supporting the future growth and success of Dublin as Ireland's leading global city of scale, by better managing Dublin's growth to ensure that more of it can be accommodated within and close to the city; Enabling significant population and jobs growth in the Dublin metropolitan area, together with better management of the trend towards overspill into surrounding counties; Addressing infrastructural bottlenecks, improving citizens' quality of life and increasing housing supply in the right locations"*. (p.22)

County Meath is located in the Mid-East Region as set out within the NPF, which states that:

> "*The Mid-East has experienced high levels of population growth in recent decades, at more than twice the national growth rate. Managing the challenges of future growth is critical to this regional area. A more balanced and sustainable pattern of development, with a greater focus on addressing employment creation, local infrastructure needs and addressing the legacy of rapid growth, must be prioritised*". (p.33)

Refer to the Planning Report (included as a standalone document in this planning application pack) for full details in relation to the planning need for the Proposed Development. The Planning Report includes an assessment of how the Proposed Development supports and is compliant with relevant policy.

2.3.2.2 Project Ireland 2040 – National Development Plan 2021-2030

The National Development Plan 2021-2030 (hereafter referred to as the NDP) (Government of Ireland 2021a) is the national capital investment strategy plan that is integrated and aligned with the NPF. It sets out the framework of expenditure commitments to secure the strategic investment priorities to the year 2030 and supports the delivery of the ten NSOs identified in the NPF. One of the core strategic investment priorities identified within the NDP is decarbonising energy, stating:

> "*We need to plan our energy system as a whole to create greater links between different energy carriers (such as electricity and hydrogen); infrastructures; and consumption sectors (such as*

> *transport and heating). The long-term objective is to transition to a net-zero carbon, reliable, secure, flexible and resource-efficient energy services at the least possible cost for society by mid-century*."

The NDP states that doing so requires a coordinated programme of investment in, among other things, "*an expanded and strengthened electricity transmission and distribution network*", in order to support an increase in both renewable and conventional electricity generation.

The NDP identifies the strategic investment priorities for Sectors including energy stating:

> "*Significant expansion and strengthening of the electricity transmission and distribution grid onshore and offshore, including transmission cables and substations, to link renewable electricity generation to electricity consumers and to accommodate higher levels of renewables on the electricity system and reinforcement of the natural gas network by our system operators EirGrid, ESB Networks and Gas Networks Ireland"* (Government of Ireland 2021a).

2.3.2.3 National Energy and Climate Plan 2021-2030

The National Energy and Climate Plan 2021-2030 (hereafter referred to as the NECP) (Department of Communications, Climate Action and Environment 2020) is a 10 year plan mandated by the EU to each of its member states, in order for the EU to meet its overall greenhouse gas emissions targets. The plan establishes key measures to address the five dimensions of the EU Energy Union: decarbonisation, energy efficiency, energy security, internal energy markets and research, innovation and competitiveness. The NECP takes into account energy and climate policies developed to date, the levels of demographic and economic growth identified in the NPF and includes all of the climate and energy measures set out in the NDP.

2.3.2.4 The White Paper: Ireland's Transition to a Low Carbon Energy Future 2015-2030

The White Paper: Ireland's Transition to a Low Carbon Energy Future 2015-2030 (hereafter referred to as The White Paper) (Department of Communications, Energy and Natural Resources 2021) sets out a framework to guide Ireland's energy policy development. The White Paper acknowledges that "*an uninterrupted supply of energy is vital to the functioning of Irish society and economy*" (Section 6.2). It establishes the need for the 'development and renewal' of energy networks to meet economic and social goals. The Proposed Development is considered to be an 'enhanced and extended energy infrastructure' development which includes "*linear facilities – such as gas pipelines, electricity interconnectors and roads – as well as point infrastructure, including power stations, electricity switching stations, ports and oil and gas terminals*" (Section 7.3).

2.3.2.5 Climate Action and Low Carbon Development (Amendment) Act 2021 and Climate Action Plan 2021, 2023 and 2024

The Climate Action and Low Carbon Development (Amendment) Act was published in 2021 and commits to achieving 51% reduction in overall greenhouse gas emissions by 2030 and setting Ireland on a path to reach net-zero by no later than 2050. Climate Action Plan 2021 (Government of Ireland 2021b) aimed to increase the proportion of renewable electricity to up to 80% by 2030. The decarbonisation pathway for the electricity sector is challenging given the rapid growth in demand for power, as well as the need to ensure security of supply through the decarbonisation journey. The Climate Action Plan 2023 (CAP23) (Government of Ireland 2022b) is the second annual update to Ireland's Climate Action Plan 2019 (Government of Ireland 2019). CAP23 was the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction in 2022 of economy-wide carbon budgets and sectoral emissions ceilings. CAP23 was launched on 21 December 2022. The supplementary Annex of Actions was published in March 2023. The plan implements the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government. CAP24 (Government of Ireland 2023) sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development:

> "*Most fundamentally, significant investment is needed in the transmission and distribution systems to maximise the usage of renewable electricity and to reduce constraints and congestion on the system. System Operators and the CRU must ensure the timely investment in, and delivery of, the required electricity network infrastructure, including key priorities such as the North South Interconnector, to meet the targets set out in this, and subsequent, Climate Action Plans*." (Government of Ireland 2023)

Driving climate action through the transformation of the electricity system is at the heart of EirGrid's purpose and is also the most impactful positive contribution EirGrid can make to climate change. Central to this is transforming the electricity grid so that it carries clean, renewable energy. Through innovative work over the past 10 years EirGrid has been able to ensure that 75% of instantaneous electricity requirements are being met by renewable sources. EirGrid plans to further deliver network, operations, markets and engagement initiatives to increase this figure to 95% by 2030. This will help deliver the Government target for annual renewable electricity generation of up to 80% by 2030. EirGrid has committed to publicly report on sustainability performance. EirGrid is the first public body in Ireland to have targets validated by the international Science Based Targets initiative.

EirGrid's verified targets are:

- Reduce absolute scope 1 and 2 greenhouse gas emissions by 50%;
- Reduce scope 3 greenhouse gas emissions related to dispatch of electricity generation by 35% per megawatt hour within the same timeframe; and
- Reduce all other absolute scope 3 greenhouse gas emissions by 30% by 2030, using 2019 as a base year.

CAP23 states that "*Measures to Deliver Sectoral Emissions Ceilings Our 2030 decarbonisation ambition will require all sectors to increase emission mitigation actions if we are to achieve our national and EU targets*". For the electricity sector, the following measures will be critical to success:

- "*EirGrid will carry out further grid, operational, and market studies, through an updated version of Shaping Our Electricity Future, due Q1 2023, and updated regularly thereafter, to assess additional supply and demand side measures, beyond current plans*";
- "*Strengthen the electricity system by upgrading the network and building supporting infrastructure at key strategic locations*"; and
- "*Enable the use of the public road and potentially the rail networks for routing of new public and private electricity circuits*". (Government of Ireland 2022b)

2.3.2.6 Climate Action Plan 2024

Climate Action Plan 2024 (CAP24) (Government of Ireland 2023) was published in December 2023 and explicitly sets out updated emission reductions aligned with carbon budgets and sectoral emissions ceilings.

These include targets for electricity of:

- Carbon Budget 1: 2021-2025: 40 $MtCO_2$ equivalent;
- Carbon Budget 2: 2026-2030: 20 $MtCO_2$ equivalent;
- Reduce electricity sector emissions to 3 $MtCO_2$ equivalent per annum;
- 80% of electricity demand generated from renewable sources;
- 9GW of onshore wind capacity (6GW by 2025);

- 8GW of Solar PV capacity (up to 5GW by 2025);
- At least 5GW of offshore wind capacity;
- At least 2GW new flexible gas plant;
- Ensure that 20-30% of system demand is flexible by 2030 (15-20% by 2025); and
- Delivery of three new transmission grid connections or interconnections to Northern Ireland, Great Britain, and the EU and explore further interconnection.

2.3.3 Regional Policy

This Section outlines the regional policy relevant to the Proposed Development.

2.3.3.1 Regional Spatial and Economic Strategy for the Eastern and Midland Region 2019-2031

The vision of the Eastern and Midlands Regional Assembly (EMRA) Regional Spatial and Economic Strategy for the Eastern and Midland Region 2019-2031 (hereafter referred to as the RSES) (EMRA 2019) is:

> "*To create a sustainable and competitive Region that supports the health and wellbeing of our people and places, from urban to rural, with access to quality housing, travel and employment opportunities for all*."

This vision is underpinned by three key principles, including "*Climate Action – The need to enhance climate resilience and to accelerate a transition to a low carbon society recognizing the role of natural capital and ecosystems services in achieving it*".

The RSES sets out 16 Regional Strategic Outcomes including: *Support the Transition to Low Carbon and Clean Energy*. National Strategic Outcome 8: Transition to a Low Carbon and Climate Resilient Society is referenced in the RSES. The Proposed Development is located within Meath and Fingal County Councils.

There are a number of guiding principles for sustainable development within the Dublin Metropolitan Area, in which the Proposed Development is partially located, these include 'Alignment of growth with enabling infrastructure' which is specified as "*to promote quality infrastructure provision and capacity improvement, in tandem with new development and aligned with national projects and improvements in water and waste water, sustainable energy, waste management and resource efficiency*".

The RSES states, in relation to the Dublin Metropolitan Area, that the "*Development of the energy distribution and transmission network in the region will enable distribution of more renewable sources of energy to facilitate future energy demand in strategic development areas*". Chapter 7: Environment and Climate of the RSES identifies the need for the "*expansion and upgrading of the grid with the aim of increasing the share of variable renewable electricity that the all-island system can accommodate*".

The RSES goes on to state:

> "*The provision of infrastructure should be supported in order to facilitate a more distributed, renewables-focused energy generation system, harnessing both on-shore and off-shore potential from energy sources such as wind, wave and solar and connecting sites of optimal energy production to the major sources of demand*".

Chapter 10 of the RSES addresses provision of services and infrastructure. It states:

> "*High-quality infrastructure is an important element of a modern society and economy, it provides essential functions and services that support societal, economic and environmental systems at local, regional and national levels*".

Section 10.3 states:

> "*A secure and resilient supply of energy is critical to a well-functioning region, being relied upon for heating, cooling, and to fuel transport, power industry, and generate electricity. With projected increases in population and economic growth, the demand for energy is set to increase in the coming years*".

However, the chapter goes on to state that:

> "*the development of onshore and offshore renewable energy is critically dependent on the development of enabling infrastructure including grid facilities to bring the energy ashore and connect to major sources of energy demand*".

Objective RPO 10.23 specifically references the Proposed Development, it provides support for EirGrid's Grid Implementation Plan 2017 – 2022 (EirGrid 2018) and Transmission Development Plan (TDP) 2016 (EirGrid 2016b) and any subsequent plans prepared during the lifetime of the RSES that facilitate the timely delivery of major investment projects, subject to appropriate environmental assessment and the outcome of the planning process.

Developing the grid in the Region through the Proposed Development and other projects, will enable the transmission system to safely accommodate more diverse power flows from renewable generation and also to facilitate future growth in electricity demand. These developments will strengthen the grid for all electricity users, and in doing so will improve the security and quality of supply. This is particularly important if the Region is to attract high technology industries that depend on a reliable, high quality, electricity supply.

2.3.4 Local Policy

This Section outlines the local policy relevant to the Proposed Development.

Please refer to the Planning Report (included as a standalone document in this planning application pack) for an assessment of how the Proposed Development supports, and is compliant with, relevant local planning policy and key policy drivers.

2.3.4.1 Fingal Development Plan 2023-2029

The Fingal County Council (FCC) Fingal Development Plan 2023-2029 (hereafter referred to as the FDP) (FCC 2023a) came into effect in April 2023. The FDP contains two strategic objectives (SO) that are of particular relevance to the Proposed Development:

- SO1 – Transition to an environmentally sustainable carbon neutral economy; and
- SO10 – Protect, enhance and ensure the sustainable use of Fingal's key infrastructure, including water supplies and wastewater treatment facilities, energy supply including renewables, broadband and transportation.

The FDP also contains policies that are of specific relevance to electrical infrastructure such as the Proposed Development:

- **Policy CAP1 – National Climate Action Policy:** Support the implementation of national objectives on climate change including the national Climate Action Plan 2023 (CAP23), the National Adaptation Framework 2018 and the National Energy and Climate Plan for Ireland 2021–2030 and other relevant legislation, policy and agreements in relation to climate action;
- **Policy CAP13 – Energy from Renewable Sources:** Actively support the production of energy from renewable sources and associated electricity grid infrastructure, such as from solar energy, hydro energy, wave/tidal energy, geothermal, wind energy, combined heat and power (CHP),

heat energy distribution such as district heating/cooling systems, and any other renewable energy sources, subject to normal planning and environmental considerations;

- **Policy IUP27 – Energy Networks and ICT Infrastructure:** Facilitate and promote the development of energy networks and ICT infrastructure where necessary to facilitate sustainable growth and economic development and support the provision of critical energy utilities and the transition to alternative, renewable, decarbonised, and decentralised energy sources, technologies, and infrastructure;
- **Policy IUP29 – Enhancement and Upgrading of Existing Infrastructure and Networks:** Work in partnership with existing service providers, businesses and local community groups to facilitate required enhancement and upgrading of existing infrastructure and networks and support the development of new energy systems, local community sustainable energy generation projects and transmission grids, which will be necessary for a more distributed, renewables-focused energy generation system, harnessing both the considerable on-shore and off-shore potential from energy sources such as wind, wave, and solar energy;
- **Policy IUP31 – Enhancement and Upgrading of Existing Infrastructure and Networks:** Support EirGrid's Grid Development Strategy – Your Grid, Your Tomorrow 2017, Implementation Plan 2017–2022, Shaping our Electricity Future-A Roadmap to achieve our Renewable Ambition 2021 and Transmission Development Plan (TDP) 2020-2029, and the Government's Policy Statement on Security of Electricity Supply November 2021 and any subsequent plans prepared during the lifetime of this Plan, to provide for the safe, secure, and reliable supply of electricity; and
- **Policy IUP32 – East Meath – North Dublin Grid Upgrade:** Support the development of the East Meath-North Dublin Grid Upgrade to strengthen the electricity supply network in anticipation of the future development of renewable energy, onshore and offshore.

The Proposed Development will largely be routed along public roads. However, there will be instances where the Proposed Development will pass through the zoned lands illustrated in Table 2.1. Where the Proposed Development passes through zoned lands, it is considered to be relatively minor and mainly consisting of the Planning Application Boundary.

Table 2.1: Fingal Development Plan Zoning Objectives

Zoning Objective	Objective
HT – High Technology	Provide for office, research and development and high technology/high technology manufacturing type employment in a high quality built and landscaped environment.
GB – Green Belt	Protect and provide for a Greenbelt.
GE – General Employment	Provide opportunities for general enterprise and employment.
OS – Open Space	Preserve and provide for open space and recreational amenities.
DA – Dublin Airport	Ensure the efficient and effective operation and development of the Airport in accordance with an approved Local Area Plan.
FP – Food Park	Provide for and facilitate the development of a Food Industry Park.
RS – Residential	Provide for residential development and protect and improve residential amenity.

2.3.4.1.1 Dublin Airport Local Area Plan 2020

The Proposed Development will be routed through an area covered by the Dublin Airport Local Area Plan 2020 (FCC 2020), which was adopted in January 2020. This policy document sets out the following strategic aims for Dublin Airport:

- Support for airport safeguarding;
- Support the continued sustainable growth of Dublin Airport and connectivity as a hub airport whilst ensuring protection of the environment;
- Support the timely delivery of required infrastructure to facilitate airport growth;
- Support the growth of the Airport as a major economic driver for the region; and

- Support the continued communication between the Airport and neighbouring communities to protect community amenity and mitigate potential impact from airport growth in the interests of long-term stability.

The Dublin Airport Local Area Plan 2020 extends beyond the boundary of the airport and contains restrictions on development that may impact on the operation of the airport including safeguarding policies of relevance to the Proposed Development (refer to Appendix D in the Planning Report included as a standalone document in this planning application pack).

2.3.4.2 Fingal County Council Climate Action Plan 2024 - 2029

The Fingal Climate Action Plan 2024-2029 (FCAP) has been prepared in partnership with the other Dublin local authorities and builds on the Dublin Local Authorities Climate Change Action Plan 2019-2024 (CCAP). The primary focus of the FCAP is to deliver and promote best practice in climate action, at a local level and is aligned to the Government's overall National Climate Objective of the pursuit and achievement of a transition to a 'climate resilient, biodiversity rich, environmentally, sustainable and climate neutral economy' no later than 2050.

The FCAP sets the following targets in delivering on the goals set out in the plan:

- 50% improvement in the Council's energy efficiency by 2030;
- 51% reduction in the Council's greenhouse gas emissions by 2030;
- To make Dublin a climate resilient region, by reducing the impacts of future climate change-related events; and
- To actively engage and inform our communities on climate action.

The FCAP sets out the key climate challenges that have been faced at a local level and identifies the mitigation and adaption response to these challenges under the following key headings:

- Energy and Buildings;
- Transport;
- Flood Resilience;
- Nature Based Solutions;
- Circular Economy & Resource; and
- Community Engagement.

2.3.4.3 Meath County Development Plan 2021 - 2027

The current statutory plan for County Meath is the Meath County Development Plan 2021 – 2027 (hereafter referred to as the MCDP) (MCC 2021).

The MCDP emphasises the importance of reliable service provision and infrastructure for sustainable future growth and asserts that the strengthening of the national grid is important to improve security of supply for the domestic, residential and enterprise market as well as attracting high-end enterprise.

The MCDP contains policies that are of specific relevance to electrical infrastructure such as the Proposed Development. These are:

- **INF Pol 46 –** To support and facilitate the development of enhanced electricity and gas supplies, and associated networks, to serve the existing and future needs of the County and to facilitate new transmission infrastructure projects that may be brought forward during the lifetime of the plan including the delivery and integration, including linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner.

- **INF Pol 47 –** To co-operate and liaise with statutory and other energy providers in relation to power generation in order to ensure adequate power capacity for the existing and future business and enterprise needs of the County.
- **INF Pol 48** - To ensure that energy transmission infrastructure follows best practice with regard to siting, design and least environmental impact in the interest of landscape protection.
- **INF Pol 50** - To require that the location of local energy services such as electricity, be undergrounded, where appropriate.

The Proposed Development will be predominantly located on public roads and the off-road sections are mostly zoned for Rural use. The land use zoning objectives of relevance to the Proposed Development are detailed in Table 2.2.

Table 2.2: Meath County Development Plan Land Use Zoning Objectives

Zoning	Objective
RA – Rural Area	To protect and promote in a balanced way, the development of agriculture, forestry and sustainable rural-related enterprise, community facilities, biodiversity, the rural landscape, and the built and cultural heritage.
F1 – Open Space	To protect for and improve open spaces for active and passive recreational amenities.
A1 – Existing Residential	To protect and enhance the amenity and character of existing residential communities.
E2 – General Enterprise and Employment	To provide for the creation of enterprise and facilitate opportunities for employment through industrial manufacturing, distribution, warehousing and other general employment. enterprise uses in a good quality physical environment.
C1 – Mixed Use	To provide for and facilitate mixed residential and employment generating uses.
E2/E3 – General Enterprise and Employment/Warehousing and Distribution	To facilitate logistics, warehousing, distribution and supply chain management inclusive of related industry facilities which require good access to the major road network.
TU – Transport and Utilities	To provide for essential transport and public utilities and infrastructure including rail stations, park and ride facilities, water and wastewater infrastructure, electricity, gas and telecommunications infrastructure.
A2 – New Residential	To provide for new residential communities with ancillary community facilities, neighbourhood

2.3.5 Sectoral Policy

This Section outlines the sectoral plans which are specific to the electricity transmission sector.

2.3.5.1 EirGrid's Shaping our Electricity Future – A Roadmap to Achieving our Renewable Ambition

In 2021, EirGrid and SONI published Shaping Our Electricity Future – a roadmap to achieve our renewable ambition (EirGrid and SONI 2021), which set out to achieve at least 70% of electricity coming from renewable sources by 2030. This aim is seen as an important step on the journey to 80% to get to net-zero carbon emissions by 2050.

The Roadmap is the product of a major public and stakeholder consultation regarding how as a nation and society we can reach these ambitious targets. The consultation focused on four distinct network development approaches to achieving this renewable ambition including:

- Generation-led;
- Developer-led;
- Technology-led; and
- Demand-led.

Based on the modelling undertaken by EirGrid, and its refinement in response to public and stakeholder consultation, EirGrid completed a set of transmission network planning studies. These studies will help determine what potential transmissions network projects will be required by 2030 to deliver their renewable ambition. These studies are illustrated in Figure 5: Map of Ireland and Northern Ireland detailing reinforcements within EirGrid's Shaping our Electricity Future – A Roadmap to Achieve our Renewable Ambition.

Importantly, the Roadmap notes that prior to commencing the transmission needs identification process, a number of transmission projects were included in EirGrid's network model, including grid reinforcements that are scheduled to complete by 2030. Therefore, the base case network model analysed for 2030 consists of the transmission network as it is today plus these critical projects. The Proposed Development is one of those new circuits which are assumed in service and included in the base network model.

2.3.5.2 EirGrid's Transmission Development Plan 2021 – 2030

The Transmission Development Plan 2021-2030 (hereafter referred to as the TDP 2021-2030) (EirGrid 2021) sets out the development of the Irish transmission network over a nine-year period to the year 2030. The TDP 2021-2030 presents projects which are needed for the operation of the transmission network whilst also identifying future needs that may drive future potential projects.

There is an obligation on EirGrid to provide all customers with a 'safe, secure, reliable, economical, and efficient transmission network to meet all reasonable demands for electricity, in accordance with legal obligations' (p. 81) which is essential for enabling economic activity and economic growth. Under this context, drivers of transmission network development are summarised as:

- Ensuring the security of electricity supply;
- Ensuring the competitiveness of the national economy; and
- Ensuring the long-term sustainability of electricity supply in the country.

The TDP 2021-2030 highlights that achieving these strategic objectives, requires investment in the development and maintenance of the electricity transmission network including, but not limited to, securing transmission network supplies and promoting the integration of renewable energy sources and complementary thermal generation. It is also identified that in order to accommodate electricity demand or generation changes to the transmission network due to continuing investment, it will be necessary to modify or strengthen the transmission network to ensure performance and reliability levels are upheld.

2.3.5.3 EirGrid's Grid Implementation Plan 2017-2022 for the Electricity Transmission System in Ireland

EirGrid published its Grid Implementation Plan 2017-2022 for the Electricity Transmission System in Ireland (hereafter referred to as the Grid Implementation Plan) in December 2018 (EirGrid 2018). The Grid Implementation Plan is the latest of the Implementation Plans, however EirGrid is developing a third plan which will sit under EirGrid's Shaping Our Electricity Future Roadmap 2030. The Grid Implementation Plan when adopted will be known as the Grid Implementation Plan 2023-2028. The Grid Implementation Plan sets out the manner in which the Irish transmission system is likely to be developed in its lifetime and was prepared following consultation on EirGrid's, Ireland's Grid Development Strategy – Your Grid, Your Tomorrow (EirGrid 2017a) in 2017, which replaced the 'Grid 25 Strategy' (EirGrid 2008) from 2008. This Grid Implementation Plan identifies those parts of the transmission system that are likely to need development over the five-year period 2017 - 2022, which are primarily as highlighted in the TDP 2021-2030 (EirGrid 2021).

The Grid Implementation Plan is consistent with The White Paper (Department of Communications, Energy and Natural Resources 2021). It is also set in the context of other Government Policy, in particular the Department of Business, Enterprise and Innovations Action Plan for Jobs (Department of Business, Enterprise and Innovations 2017), and the Irish Development Authority's (IDA's) Winning: Foreign Direct Investment 2015- 2019 Strategy (IDA 2015).

The Grid Implementation Plan contains the following key policies and objectives:

- **PDP1**: To have regard to EirGrid's approach to developing the grid, and any associated guidelines, policies and processes, to ensure the structured, consistent development of all its transmission projects;
- **PDP2**: To promote sustainable grid development by balancing complex and/or competing technical, economic, environmental, social and deliverability goals and priorities in decision-making;
- **PDO1**: To undertake a timely and appropriate managed transition of our transmission projects to the new approach to grid development; and
- **PCP3**: To promote sustainable grid development by balancing complex and/or competing technical, economic and environmental goals and priorities in decision-making.

2.3.5.4 Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure

In 2012, the Department of Communication, Energy and Natural Resources published a Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure (hereafter referred to as the Statement) (Department of Communication, Energy and Natural Resources 2012).

The Statement highlights the need and urgency for the new energy infrastructure for the economy, delivery of regional development, creation of jobs and growth and ensure the wellbeing of everyone as well as realising the economic potential of Ireland's own renewable energy resources. It states that significant energy infrastructure is required to deliver a world class electricity transmission system I all regions of the country. The Government endorses, supports and promotes the strategy programmes of the energy infrastructure providers.

The Statement further states that:

> "*energy infrastructure developers are encouraged to work with the forward planning processes at regional and local level to set a clear context for assessment of individual applications for planning consent to facilitate as wide a degree of consensus as possible as to how (and where) to meet grid development needs*". (Department of Communication, Energy and Natural Resources 2012).

The Statement requires energy developers to adhere to international and national standards on health, environment, biodiversity, landscape and safety and address or mitigate any associated impacts in delivering the best engineering solutions. This process is aligned with EirGrid's six-step Framework for Grid Development (refer to Chapter 3 (Consideration of Reasonable Alternatives) in Volume 2 of this EIAR for further details on the Framework for Grid Development).

2.3.5.5 Shaping Our Electricity Future (Version 1.0 November 2021 and Version 1.1 July 2023)

In 2021, EirGrid and SONI published Shaping Our Electricity Future – a roadmap to achieve our renewable ambition (EirGrid and SONI 2021), which provided an outline of the key developments from a networks, engagement, operations and market perspective needed to support a secure transition to at least 70% renewables on the electricity grid by 2030 – an important step on the journey to 80% and to net zero by 2050. It identifies the transmission network reinforcements needed to manage renewable generation and demand growth.

Shaping Our Electricity Future Roadmap - Version 1.1, published in July 2023, builds on the original Roadmap and outlines a pathway towards meeting enhanced 2030 government electricity ambitions in Ireland and Northern Ireland (EirGrid and SONI 2023). The power sector is no longer aiming to achieve an end of decade target but must now also do so within prescribed carbon allowances across five-year blocks. This document states "*additional network infrastructure must be built to achieve the Renewable Ambition*".

It states that public roads remain a key enabler for delivery of network infrastructure where an underground cable has been selected as the preferred option following multi-criteria analysis and decision making.

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<u>Directives and Legislation</u>

Climate Action and Low Carbon Development (Amendment) Act 2021 (Act No. 32 or 2021)

Directive (EU) 2023/2413 of the European Parliament and of the Council of 20 November 2023 amending Directive 2018/2001/EU of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast)

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 3 – Consideration of Reasonable Alternatives

EirGrid

March 2024

Contents

3. Consideration of Reasonable Alternatives

3.1 Introduction

The East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) has been developed in accordance with EirGrid's Framework for Grid Development. The six-step approach in the Framework for Grid Development involves detailed studies and assessments and provides a framework for the comparison of reasonable and relevant options for the Proposed Development.

This Chapter has been written in line with the requirements of Directive 2014/52/EU of the Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the EIA Directive) and the Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) (i.e., "*a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects"*).

Image 3.1 illustrates the sequence of alternative options that exist. The applicant is required to describe the reasonable alternatives examined during the design process with an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

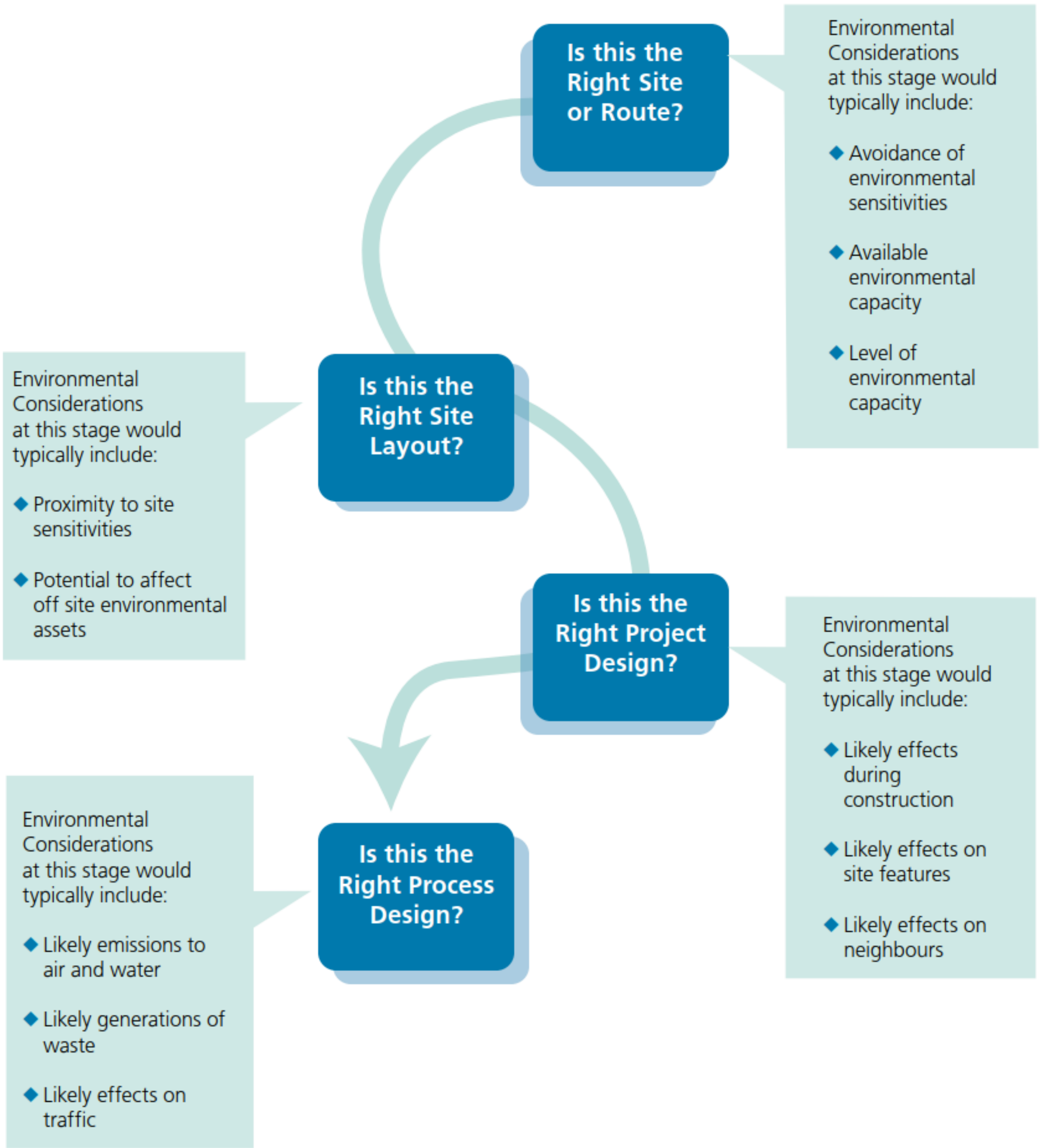


Image 3.1: Consideration of Reasonable Alternatives in an EIAR (adapted from EPA 2022)

The following sections provide a summary of the alternatives considered during the previous steps of this Framework for Grid Development, which consider the elements outlined in Image 3.1 above. Further detail is provided in the individual reports produced for each Step (Steps 1 to 4). These reports are available from the EirGrid website (EirGrid 2024a) and are also included in Volume 5 (Supporting Documents) of this EIAR.

3.2 EirGrid's Framework for Grid Development

EirGrid follows a six-step approach to identify a need to develop the transmission network and determine solutions to any identified transmission network problem (refer to Image 3.2). This six-step approach is described in Have Your Say (EirGrid 2017a) which is published on EirGrid's website.

Each step has a distinct purpose with defined deliverables and together they represent a lifecycle of a development from conception through to implementation and energisation. EirGrid's Framework for Grid Development also provides a framework for the consideration of reasonable alternatives, as required under the EIA Directive, as it includes a comparison of potential environmental impacts, as part of multi-criteria analysis (MCA) process.

The Proposed Development has been in development since 2017 when its need was identified and confirmed at Step 1 of EirGrid's Framework for Grid Development. This Chapter outlines the process of developing the Proposed Development through Step 1 to Step 5 of the Framework for Grid Development, and details the alternatives considered in Step 3 and Step 4.

The Proposed Development is now at Step 5 which includes the preparation and submission of the planning application for approval to An Bord Pleanála (ABP).

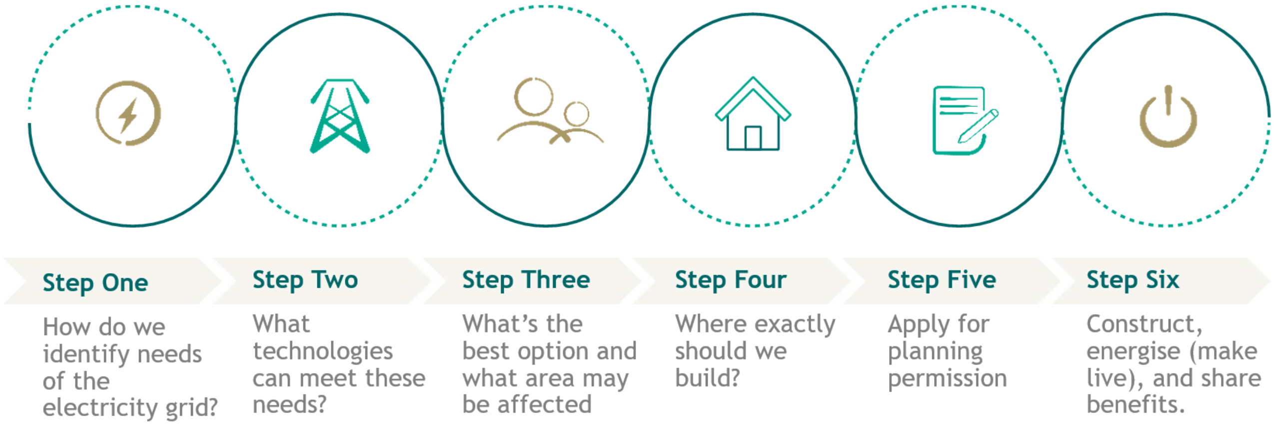


Image 3.2: EirGrid's Six-Step Framework for Grid Development (Proposed Development is at Step 5) (EirGrid 2017a)

EirGrid's Framework for Grid Development ensures that development of the Proposed Development occurs in a consistent and structured manner, with adequate and appropriate opportunities for public and stakeholder participation in decision-making.

The consideration of reasonable alternatives for the Proposed Development, as per the requirements of the EIA Directive, must be understood as occurring in the context of, and from the early stages of, the Framework for Grid Development.

In accordance with the Framework for Grid Development, a comprehensive and consistent MCA was applied (see Image 3.3) to decision making within each of the steps of the development, including in considering a number of technical and routing alternatives. The MCA facilitated a balanced consideration of the following criteria relating to the development of the Proposed Development:

- Environmental;
- Socio-Economic;
- Technical;
- Deliverability; and
- Economic.

Image 3.3: EirGrid's Assessment Criteria

Several key documents providing information about the development of the Proposed Development through this six-step process are available from the EirGrid website (EirGrid 2024a) and are also included in Volume 5 (Supporting Documents) of this EIAR. These documents, organised depending on which stage (step) of the Proposed Development they refer to in EirGrid's Six Step Framework for Grid Development, are as follows:

- Step 1 – How do we identify needs of the electricity grid?:
  - Step 1 - Needs Report (EirGrid 2017b).
- Step 2 – What technology can meet these needs?:
  - Step 2 Part A - Options Report (including the long-list of options) (EirGrid 2019); and
  - Step 2 Part B - Options Report (including the short-list of options) (EirGrid 2021).
- Step 3 – What's the best option and what area may be affected?:
  - Step 3 - Final Report (EirGrid 2022a).
- Step 4 – Where exactly should we build?:
  - Step 4A – Analysis of Route Options Report (EirGrid 2023a); and
  - Step 4B – Route Options and Evaluation Report (EirGrid 2023b).
- Stakeholder Engagement:
  - Step 4 Consultation and Engagement Summary Report (EirGrid 2023c);
  - Engagement Summary Report – Step 4 Emerging Best Performing Option (M-CO 2023); and
  - Step 1 to Step 5 Summary Engagement Report (M-CO 2024).

3.3 'Do-Nothing' Alternative

For the 'Do-Nothing' alternative, the Proposed Development would not be constructed and the existing network would be maintained in line with normal practice. From an environmental perspective, this would mean no change to the existing environment. Existing land management practices in the area would continue and any planning development would occur regardless of the Proposed Development.

In 2019 the Irish Government published its first Climate Action Plan 2019 (Government of Ireland 2019) setting out the Irish State's climate objectives including to achieve at least 70% of electricity from renewables by 2030. This figure has since increased with the publication of the latest Climate Action Plan 2024 (Government of Ireland 2023) and the government are now expecting up to 80% of electricity to come from renewables by 2030. The enactment of the Climate Action and Low Carbon Development (Amendment) Act

2021 has now put Ireland on a legally binding path to net zero emissions no later than 2050. Should the Proposed Development not proceed then it will result in an impact to the achievement of climate action targets through the lack of continued integration of renewable generation into the grid. Technically, the 'Do-Nothing' alternative could result in EirGrid failing to adhere to their legal obligation under S.I. No. 445/2000 – European Communities (Internal Market in Electricity) Regulations, 2000 (as amended) and compliance with the Transmission System Security and Planning Standards (TSSPS) (EirGrid 2016). To ensure transmission system reliability and security, the performance of the network is compared with the requirements of the TSSPS which are available on the EirGrid website (EirGrid 2024b).

The system analysis indicates that the network is experiencing significant violations of compliance with the TSSPS. The violations occur for the unplanned loss of either of the two existing 220kV circuits between Woodland, Corduff and Clonee Substations which will overload the remaining parallel circuit. Reductions in available generation in Dublin, or increases in demand connections in North Dublin, are shown to make the thermal overload violations worse.

Consequently, EirGrid must develop the grid in response to increased demand in North Dublin and low generation in Dublin. Low generation in Dublin would be expected to occur when the existing generators in Dublin are likely to be overtaken in the merit order by newer, more efficient, conventional generators and increasing levels of renewable generation located outside of Dublin.

In line with the above, as part of Step 1 of EirGrid's Framework for Grid Development, EirGrid identified the need for a solution in November 2017, with the publication of the Step 1 - Needs Report (EirGrid 2017b). The conclusion of the Step 1 analysis into the system needs in the North Dublin Corridor highlighted the increasing dependence on generation in the Dublin area and the need to ensure continued security of supply if demand were to continue to grow.

For the reasons set out above, and having regard to the environmental and climate considerations in particular, a 'Do-Nothing' alternative is not considered to be a viable reasonable alternative relative to the outcomes which can be realised by the Proposed Development.

3.4 Route Alternatives

This Section sets out the route alternatives which were considered as part of the process to establish the Proposed Development (as per the 'Is this the Right Site or Route' requirements outlined in Image 3.1).

3.4.1 Initial High-Level Route Alternatives

3.4.1.1 Step 2 of the Framework for Grid Development

As part of Step 2 of EirGrid's Framework for Grid Development, EirGrid compiled a short-list of best performing technical options which were published for public consultation between October and December 2020.

Step 2 was carried out in two parts (Part A and B), and during the initial Step 2 Part A process, a long-list of 21 viable and technically feasible solution options was presented. During this high-level stage of the process, options that make use of the existing assets as well as new circuit options were considered and evaluated, in addition to a number of technological options. The technologies that were evaluated were:

- High voltage Alternating Current (AC) solution options: AC is the standard technology that is used throughout the Irish and International electricity networks and a solution based on this would integrate well into the existing grid. High voltage Direct Current (DC) is an alternative technology that is used to transport electricity over long distances, but was not considered appropriate for the Proposed Development as DC is not easily converted to higher and lower voltages, in comparison to AC;

- Underground cables and overhead lines; and
- 220 kilovolt (kV) and 400kV voltage levels. Another alternative voltage (110kV) was not considered an appropriate alternative for the Proposed Development as this voltage level would not deliver the capacity required to solve the identified system needs.

By combining a number of strong connection points on the electricity grid with the technology options identified above, the long-list of 21 viable and technically feasible solution options was generated, and these solution options were assessed based on two criteria; technical performance and economic performance. The aim of the assessment in Step 2 Part A was to compare the options and reduce the number of solution options that would be brought forward for a more detailed evaluation. Based on this analysis, the long-list was refined to seven solution options and these were carried forward to Step 2 Part B to be assessed under the MCA, as outlined in Section 3.2 (refer to the Step 2 Part A Options Report (long-list of options) (EirGrid 2019) in Volume 5 (Supporting Documents) of this EIAR for full details).

As outlined in Section 3.2, the MCA approach facilitates a balanced consideration of the technical, economic, environmental, socio-economic and deliverability aspects of a project. The overall evaluation using the MCA is based on expert judgement which is informed by various tools such as publicly available datasets and established guidelines, as well as feedback received from consultation and engagement. The seven options included a mix of overhead line and underground cable technological solutions, and the possibility of a new transmission route between Woodland Substation and either, Corduff, Finglas or Belcamp Substations. The seven route options were:

- 400kV overhead line circuit between Woodland and Corduff Substations;
- 400kV underground cable circuit between Woodland and Corduff Substations;
- 220kV overhead line circuit between Woodland and Corduff Substations;
- 220kV overhead line circuit between Woodland and Finglas Substations;
- 400kV underground cable circuit between Woodland and Finglas Substations;
- 400kV overhead line circuit between Woodland and Finglas Substations; and
- 400 kV overhead line circuit between Woodland and Belcamp Substations.

Following on from the MCA process and related consultation held in 2020, EirGrid identified four best-performing options to explore in Step 3 (refer to the Step 2 Part B Options Report (short-list of options) (EirGrid 2021) in Volume 5 of this EIAR for full details). The four options comprised:

- Option 1 - 400kV overhead line between Woodland and Finglas Substations;
- Option 2 - 400kV underground cable between Woodland and Finglas Substations;
- Option 3 - 400kV overhead line between Woodland and Belcamp Substations; and
- Option 4 - 400kV underground cable between Woodland and Belcamp Substations.

3.4.2 Route Option Assessment

3.4.2.1 Step 3 of the Framework for Grid Development

As part of Step 3 of EirGrid's Framework for Grid Development, EirGrid re-confirmed the need for the Proposed Development and assessed the feasibility of, and constraints which may impact upon, the shortlisted technology options from Step 2 Part B to strengthen the electricity network in East Meath and North Dublin.

In order to identify the Emerging Best Performing Option (EBPO), each of the four route options were considered under the MCA, and subsequently updated to incorporate consultation feedback and any new information received during the process. Image 3.4 provides a summary of the performance of each option against the five MCA criteria and the resulting overall combined performance. The effect on each criterion parameter was qualitatively determined using expert judgement and professional experience, which continued to be informed by various tools such as publicly available datasets and established guidelines, as well as feedback received from engagement.

A colour coded scale, along a range from 'more significant' / 'more difficult' / 'more risk' to 'less significant' / 'less difficult' / 'less risk' was applied. The key decision-making tool in the MCA approach is the performance matrix which uses the standard set of criteria to assess all options by means of colour coding from less constrained (yellow) to more constrained (blue). Image 3.5 illustrates the colour coded scale that was applied. Evidence substantiating the colour coded matrix is also documented in the Step 3 Final Report (EirGrid 2022a) (refer to Volume 5 (Supporting Documents) of the EIAR for the full report). This ensures visibility and transparency in the evaluation process.

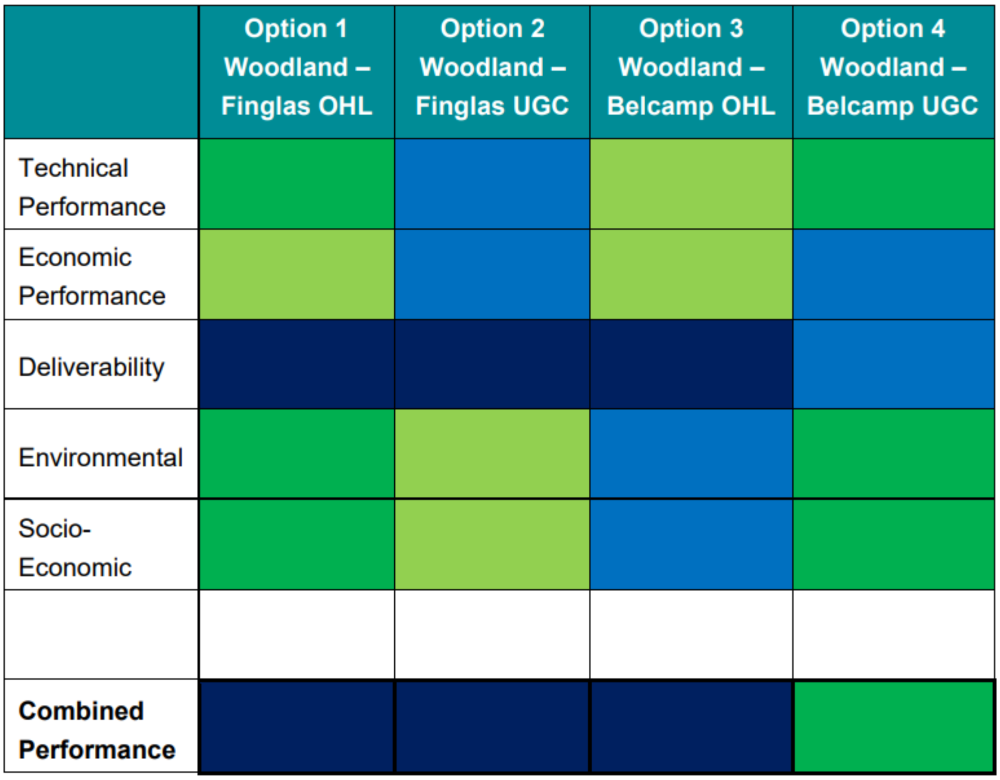


Image 3.4: Overall Comparison of Options Applying the MCA in Step 3

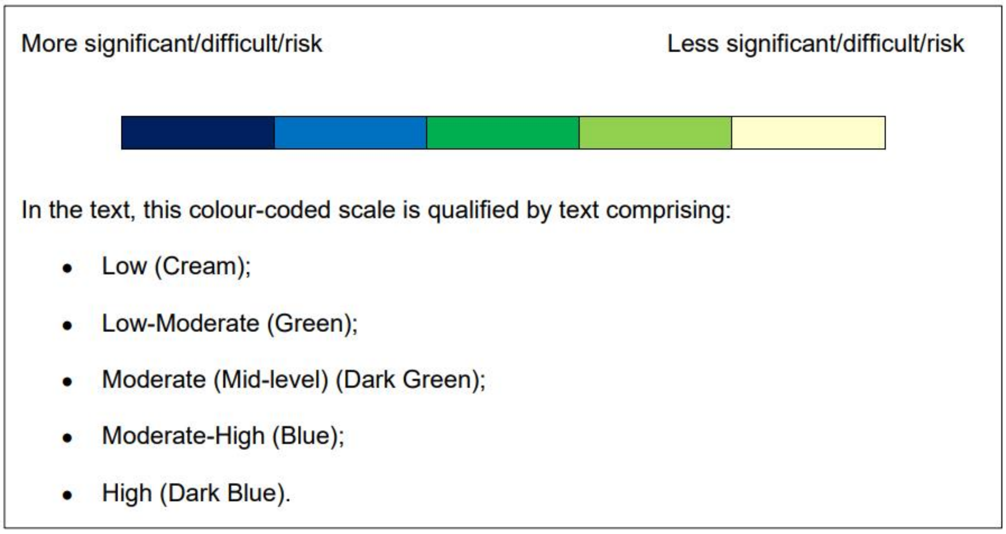


Image 3.5: Colour Coded Scale

3.4.2.1.1 How Environmental Factors Influenced the Choice of the Route

Under each headline criterion, a set of sub-criteria were used to comparatively evaluate the options. For the Environment criterion, the sub-criteria of biodiversity, soil and water, materials assets (land use and planning), landscape and visual, cultural heritage, noise and vibration and climate change were considered in the assessment to inform the Best Performing Technical Option (BPTO) (refer to the CP1021 Environmental Constraints Report (EirGrid 2022b) in Volume 5 (Supporting Documents) of the EIAR). The main environmental constraints determined during this MCA process were identified under the sub-criteria of biodiversity, landscape and visual, cultural heritage and climate change. Option 1 and Option 3 (both overhead line options) had the least favourable ratings based on the identified constraints.

For Option 1, a moderate to high risk of significant impacts on biodiversity was assessed. This was based on the following considerations:

- The potential for impacts on protected sites as all of the water bodies in the study area are hydrologically connected to European designated sites on the east coast;
- The potential for permanent / temporary loss of habitat within the footprint of the pylons and as a result of a loss of some mature trees.; and
- The potential collision risk to birds migrating across the study area.

For Option 3, a high risk of significant impacts on biodiversity was assessed. There would be potential for impacts on protected sites as all of the water bodies in the study area are hydrologically connected to European designated sites on the east coast at relatively close proximity. In particular, a connection approaching Belcamp Substation that would be routed from the north across the estuary at Malahide, which is a designated Special Area of Conservation and Special Protection Area, would have the potential for a significant impact. There would have been a permanent loss of habitat within the footprint of the pylons and as a result of a loss of some mature trees and there is a collision risk to birds migrating across the study area, particularly Brent Geese coming inland to feed. These risks were assessed to be greater than for Option 1 as the route would be longer and would be closer to designated sites and bird migratory routes.

For Option 1, there would be a moderate to high risk of significant impacts on landscape and views due to the presence of pylons and overheads lines. For Option 3, a high risk of significant impacts on landscape and views was assessed due to the increased length of the route requiring an overhead line, and the high number of viewpoints which had the potential to be affected.

The assessment of Option 3 also found that there would be a moderate to high risk of significant impacts on cultural heritage and climate change, which were not deemed to be as high a risk for Option 1. For Option 3, there would be a combined impact of the potential to encounter unknown archaeological assets during construction and the potential to impact the setting of built heritage assets during operation. Of these two potential impacts, however, the more significant impacts would be likely to arise on the setting of heritage features during operation.

3.4.2.1.2 Conclusion of Step 3 Process

Following the consideration of environmental constraints, Option 2 and Option 4 (both underground cables) were deemed to be the preferred options. Therefore, the two options were assessed under the other MCA criterion to determine any other constraints.

Option 4, the new 400kV underground cable (UGC) from Woodland 400kV Substation to Belcamp 220kV Substation, performed well from a technical, environmental and socio-economic perspective, and while some deliverability difficulties were foreseen, the conclusion of the Step 3 assessment was that these difficulties could be effectively mitigated with appropriate design solutions. Option 4 was given an overall performance of moderate significance / difficulty / risk (Dark Green). This was the most preferable option of the four, as Option 1, Option 2, and Option 3 each had a combined overall performance of High significance / difficulty / risk (Dark Blue). The Step 3 assessment identified the following significant challenge for Option 2 (refer to the Step 3 Final Report in Volume 5 (Supporting Documents) of the EIAR for full details):

- In the existing Finglas Substation, there is not enough physical space to support the additional equipment required for either a 400kV overhead line or underground cable. The restricted physical space on this brownfield site impacts both this and future developments at this location. Also, the use of Finglas Substation would require lengthy equipment outages during construction which are difficult to grant while ensuring security of power supply to the Dublin area.

In April 2022, EirGrid brought forward the 400kV underground cable option between Woodland and Belcamp Substations as the BPTO to progress for this Proposed Development into Step 4. This was communicated to stakeholders through a Public Engagement Awareness Campaign from May to June 2022, during which time feedback was encouraged through the project website, webinars and through mobile information units in the study area.

3.4.2.2 Step 4A of the Framework for Grid Development

The Step 4A – Analysis of Route Options Report was published in March 2023 (EirGrid 2023a) (refer to Volume 5 (Supporting Documents) of the EIAR for the full report) and presented an analysis of four proposed route options for the BPTO (Option 4) carried forward from Step 3.

The design of the proposed route options at Step 4 was based on the application, where reasonably practicable, of the following routing principles:

- Avoid motorways;
- Maximise the use of regional and local roads;
- Avoid town centres and industrial estates;
- Avoid going off-road, through private land and through agricultural land where possible;
- Avoid sensitive natural and built heritage locations;
- Minimise impact on communities where possible; and
- Minimise the overall length of the route.

In addition to these routing principles, the following types of routing constraints were considered:

- Width and quality of the road;
- Existing services in the road such as water, gas and drainage;
- Environmental constraints such as European and National protected areas for biodiversity, invasive and protected species and other important biodiversity areas (including undesignated habitats);
- Relevant Development Plans and Local Area Plans; and
- Areas of Amenity.

These routing principles and the consideration of constraints align with EirGrid's five key MCA criteria (i.e. environmental, socio-economic, technical; economic; and deliverability). In addition, through the publication of the Climate Action Plan 2024 (Government of Ireland 2023), the Government has confirmed the use of the road infrastructure for grid projects, like this one, as a measure to deliver the emissions ceilings. This helps to confirm that the routing principles for the Proposed Development were a sound approach.

By following the routing principles, improved route options were designed, with environmental considerations embedded in the process.

The study area for Step 4A was refined by considering a wide variety of factors. These included stakeholder and community feedback as well as technical requirements of the development, road network presence, settlements, presence of existing electrical utilities, physical constraints such as motorway, river or rail crossings and environmental constraints.

The four route options identified following consideration of the routing principles and high level constraints are as follows, and as presented in Image 3.6:

- Option A (Red);
- Option B (Green);
- Option C (Yellow); and
- Option D (Blue).

The common elements for all four route options were the commencement of all route options at Woodland Substation in County Meath, the termination of all route options at Belcamp Substation in North Dublin, all routes crossing the M3, M2 and M1 Motorways, and all routes requiring off-road corridors.

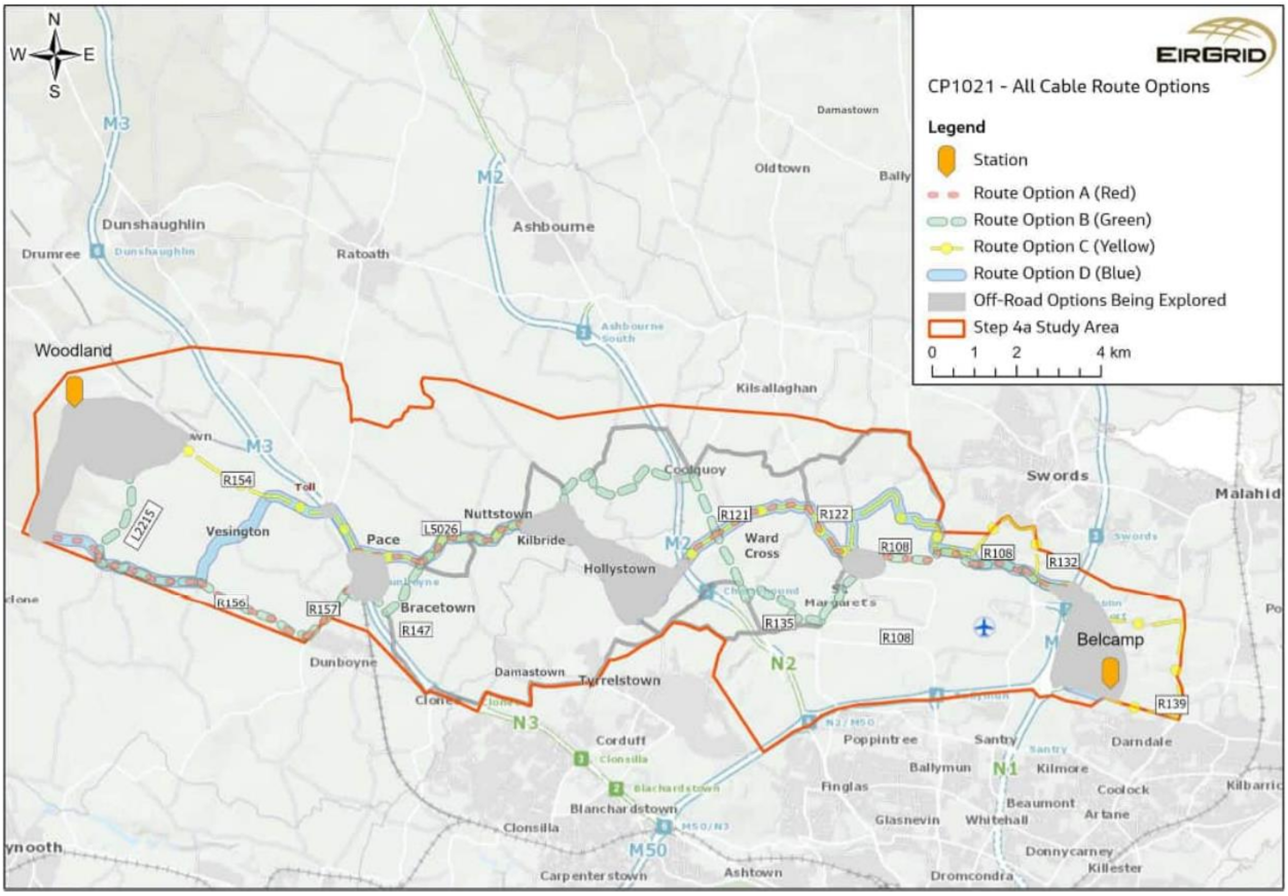


Image 3.6: Step 4A Route Options (A to D)

Each of the four route options were assessed against the five MCA criteria, and the same colour coded scale, along a range from 'more significant' / 'more difficult' / 'more risk' to 'less significant' / 'less difficult' / 'less risk', as outlined under Step 3, was applied.

In addition to the MCA, the four route options were presented for public consultation between 7 September and 30 November 2022. Public consultation was promoted through Community Forum meetings, on-site engagement in the project area, stakeholder engagement, public webinars, multi-channel advertisements, social media and a project website.

A total of 24 responses were received during the public consultation (refer to Volume 5 (Supporting Documents) of this EIAR for consultation summary reports. Public consultation has been an integral part of the Proposed Development, with each response being considered in the routing of the Proposed Development. Stakeholders expressed concerns about disruption, particularly traffic disruption, with one stakeholder questioning whether the construction works would affect the road on which they live, close to Kilbride Village. This feedback was provided to the design team and ultimately informed the design process.

3.4.2.2.1 How Environmental Factors Influenced the Choice of the Route

As with the process described for Step 3, under each headline criterion, a set of sub-criteria were used to comparatively evaluate the options. For the Environment criterion, more detailed sub-criteria were considered in the assessment to inform the BPTO. The sub-criteria were biodiversity, soils and geology, surface water and flood risk, planning policy and land use, landscape, archaeology, architectural and cultural heritage, noise and vibration, and air quality. The main environmental constraints determined during this MCA process were identified under the subheadings of planning policy and land use, and archaeology, architectural and cultural heritage. Option C had the least favourable ratings of the four options, based on the identified environmental constraints.

For Option C, the potential for Malahide Road to become unviable as a route as a result of Metrolink and NISA connections, would have increased the risk to the Proposed Development. Therefore, as an end to end option, Option C (Yellow) was assigned a moderate to high risk in terms of planning policy and land use. In addition, a moderate to high risk was assessed for archaeology, architectural and cultural heritage due to the fact that this route option was the longest of the four and would therefore present the greatest risk of the potential to encounter previously unknown archaeological remains that may be present within the land required for Option C (Yellow).

All other options were assessed to have the same overall environmental rating of low to moderate, and as such, the scores for the other MCA criteria were considered for Option A, B and D, in order to determine the preferred option.

The overall results of this assessment are illustrated in Image 3.7 using the colour coded scale described in Image 3.5.

Option	Environment Score	Socio-economic Score	Technical Score	Deliverability Score	Economic Score
Option A (Red)	Low-Moderate	Low-Moderate	Low	Moderate	Low
Option B (Green)	Low-Moderate	Low-Moderate	Low	Moderate-High	Low
Option C (Yellow)	Moderate	Moderate	Low	Moderate-High	Moderate-High
Option D (Blue)	Low-Moderate	Moderate	Low	Moderate-High	Moderate

Image 3.7: Summary of Step 4A Route Options Assessment

3.4.2.2.2 Emerging Best Performing Option

Route Option A (Red) was selected as the EBPO, following the assessment of each option against the five key MCA criteria. Option A (Red) had a lower environmental impact than Option C (Yellow), a lower socio-economic impact than Option C (Yellow) and Option D (Blue), a lower deliverability impact than all other options and a lower economic impact than Option C (Yellow) and Option D (Blue). The lower deliverability impact means that there would be less disruption to road users and local communities during the delivery of Option A (Red), when compared to other options.

Whilst Option A (Red) was the shortest route option, it has the longest length of off-road sections when compared to the other three options. However, based on feedback from initial landowner engagement, there was a relatively high degree of confidence that the necessary permits and wayleaves could be arranged for these off-road sections, and these sections would primarily be required for technical reasons such as avoiding impacts to existing utilities. Option A (Red) is presented in Image 3.8. The majority of the route (shown as the red dashed line) follows existing roads. A buffer for the off-road areas (orange areas) was included in the EBPO to allow for further investigation, and continued engagement with stakeholders, to be facilitated as part of Step 4B to determine the most preferred off-road route options.

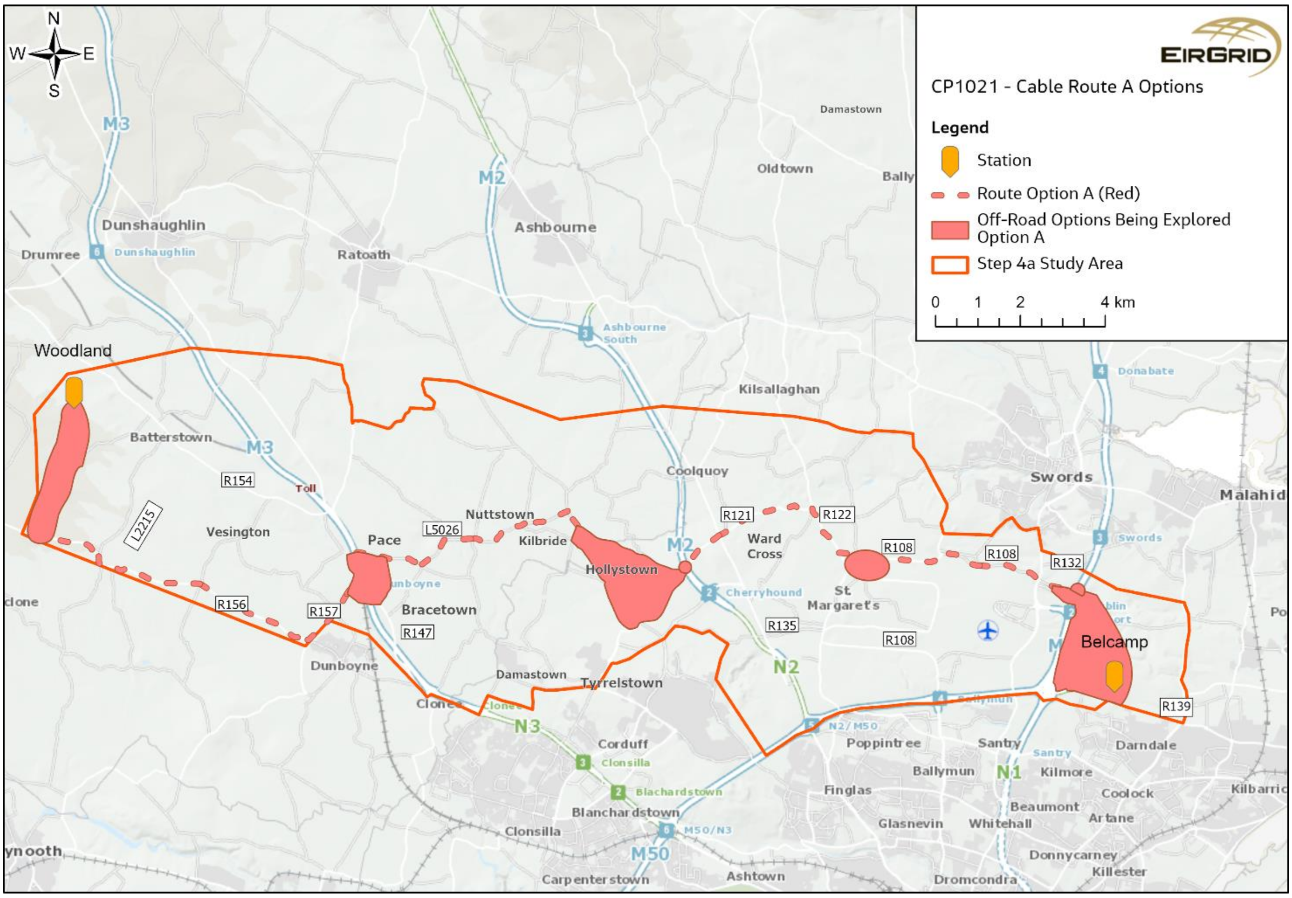


Image 3.8: EBPO - Option A (Red)

Option A (Red) was assessed to have moderate potential for impacts on some environmental sub-criteria (biodiversity, flood risk and cultural heritage), and as a result, it was deemed necessary to complete further surveys, consultation, design and assessment as part of Step 4B and Step 5 to reduce or avoid these potential impacts, and details of how these further influenced the design are outlined in Section 3.5.

Following the announcement of the EBPO and the publication of the Step 4A – Analysis of Route Options Report (EirGrid 2023a), EirGrid held its seventh Community Forum on 19 April 2023. The EBPO was promoted for three weeks, including through local and regional press titles and radio, and on social media sites. EirGrid corresponded with stakeholders throughout this period, including through emails, telephone calls, and information published on the EirGrid website to advise them of the Step 4A – Analysis of Route Options Report and the EBPO.

EirGrid also engaged with a number of stakeholders through in-person open days and door-to-door visits. Members of the EirGrid Project Team discussed the Step 4A – Analysis of Route Options Report and the EBPO during these engagement days.

A Step 4 Engagement and Consultation Summary Report was prepared and published in February 2023 and is available on the project website (EirGrid 2024a). Image 3.9, which is an extract from this report, provides a summary of key issues raised and how the project team have considered the comments.

Feedback Theme	Project Team Response
What is the construction timeline?	The timelines for Step 5 and Step 6 will be confirmed following the completion of Step 4.
What measures will be taken to reduce disruption?	As part of Step 4B of the project development process, traffic survey data has been acquired and a traffic study will assess delays and disruption due to traffic management during the construction phase. We are also working with local communities and landowners to identify suitable site construction compounds and to identify appropriate haul routes and abnormal load routes. Where possible we are seeking to avoid routes through towns, villages and other residential areas while also seeking to minimise disruption to farms and other businesses in the area.
Will road closures be required ?	Wherever possible we seek to avoid road closures however we expect that some narrow roads may require temporary road closures.
What is the decision making process?	We will continue to engage with local communities and stakeholder during Step 4 and Step 5. Following the publication of the planning submission and statutory orders in Step 5 a statutory public consultation process will also be undertaken as part of the statutory approval process.
How will this enable other energy projects?	This upgrade will strengthen the electricity grid in the east of Meath and the north of Dublin to improve the transfer of power across the existing transmission network. This will facilitate further development of renewable energy generation, onshore and offshore.
Will this work with other utilities?	We have undertaken surveys of existing utilities to assess the feasibility of the route. In some locations diversions of existing utilities may be required and in other locations off-road sections are required to avoid excessive disruption to local communities due to the utility diversions that would be required.
Could this impact health (i.e. due to EMF)?	The consensus from health and regulatory authorities is that extremely low frequency EMFs do not present a health risk. Further information is available on the EirGrid website: https://www.eirgridgroup.com/about/health-and-safety/ In addition, EirGrid's design standards require all underground cables to operate within existing public exposure guidelines from the International Commission on Non-Ionising Radiation Protection (ICNIRP) and as such there will be no effect from EMFs in terms of human health or interference to other electrical devices and systems.

Image 3.9: Post Step 4A Engagement Summary

3.5 Design Alternatives

3.5.1 Development of the Best Performing Option

3.5.1.1 Step 4B of the Framework for Grid Development

The Step 4B – Route Options and Evaluation Report (EirGrid 2023b) was published in September 2023. At Step 4B, the EBPO (Option A (Red)) was re-examined to refine the route, as far as possible, to remove the need for any wider areas and to provide more certainty on the specific location, in line with the 'Is this the Right Site Layout' requirements outlined in Image 3.1. There were five wider areas shown at Step 4A (refer to Image 3.8), as these locations included off-road sections which required further discussions with relevant stakeholders and landowners. Further surveys and assessment work were also required to determine the best location for the proposed cable route within these wider areas.

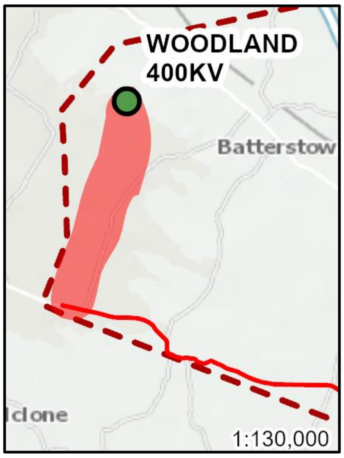
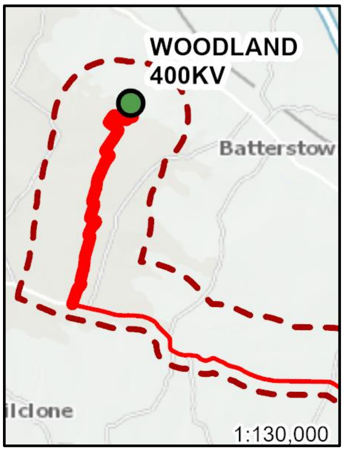
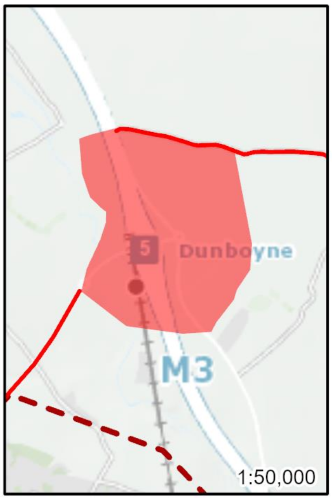
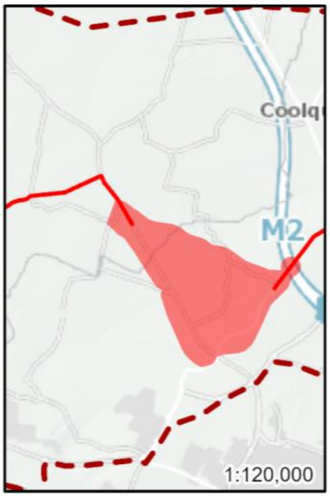
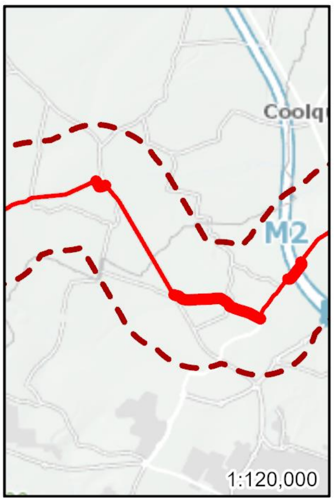
Option A (Red) from Step 4A provided a framework for the routing process at Step 4B. While it was explained in the Step 4A – Analysis of Route Options Report (EirGrid 2023a) that route changes were a possibility because of further surveys and assessment, the Project Team sought to avoid significant changes. However, the Step 4B process identified several areas where changes would result in an improved route. The vast majority of changes are in the off-road wider areas as shown in Image 3.8. The changes were made for a number of reasons, such as reducing potential environmental impacts, or avoiding private lands. As a result, the route located within the wider areas added during Step 4A, could now be determined as part of Step 4B.

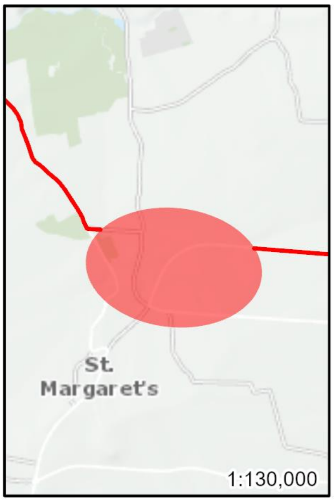
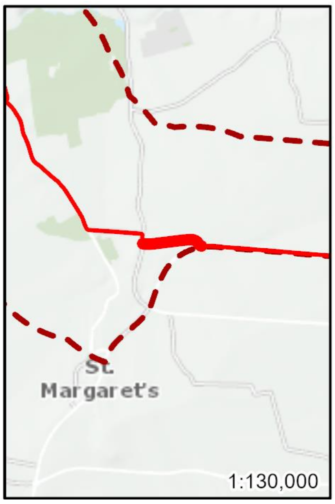
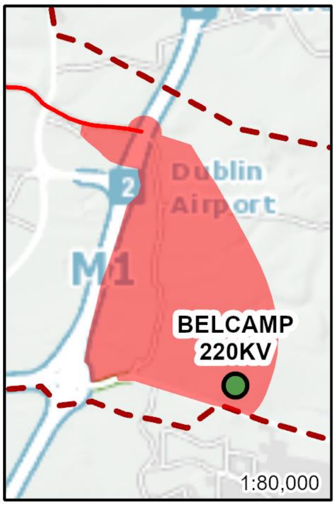
The Step 4B process involved close cooperation between all members of the Project Team (agricultural liaison officers, and specialists in the fields of deliverability, technical, economic, environmental and socio-economic factors). This multi-disciplinary team, along with input from stakeholders, landowners and the community ensured that the Best Performing Option (BPO) would be selected through consideration of all relevant issues.

Extensive engagement was carried out with a number of potentially affected landowners. This allowed landowner input into the potential routing and provided more information on ground conditions, environmental constraints, and farming practices that were considered in the routing process. At this time, further surveys and assessments were undertaken to determine how the route could be refined in order to avoid or reduce the potential environmental and social impacts, and to take account of technical issues. Issues such as the cable rating and the need to maintain the structural integrity of the cable (i.e. the cable must bend and not make 90º (degree) turns) have been factored into the routing. This process also included technical assessment of the roads affected by the cable, for example, masonry arch bridges on existing roads that may not be suitable to accommodate the proposed cable circuit (also referred to as the proposed cable route). This is because the depth of the bridges below the roads are generally quite shallow. In these cases, off-road watercourse crossings adjacent to the bridges have been assessed to be the best solution, subject to the crossing methods, including site-specific environmental mitigation.

Table 3.1 includes a summary of the changes to the wider areas, following the consideration of feedback from stakeholders and landowners, in addition to further surveys and assessment work.

Table 3.1: Summary of Changes to Wider Areas of the Step 4A EBPO (taken from Step 4B – Route Options and Evaluation Report (EirGrid 2023b)

<table>
<tr><th>Emerging Best Performing Option</th><th>Reason for the Change</th><th>BPO</th></tr>
<tr><td>Woodland to R156 Regional Road

</td><td>This is now an off-road section approximately 3km in length through agricultural land. The use of the local road network in this area was technically challenging due to two existing masonry arch road bridges on the Red Road that were unsuitable. An off-road corridor would also minimise the risk of disrupting access to the Woodland Substation and converter station. The BPO also optimises a corridor shared with another EirGrid project, CP966.</td><td>
</td></tr>
<tr><td>M3 Motorway Crossing

</td><td>Feasible route options have been developed at this location. However, the route remains subject to ongoing engagement with key stakeholders and local landowners and will be confirmed during Step 5 (i.e. the Proposed Development now assessed in this EIAR).</td><td>
</td></tr>
<tr><td>Hollystown

</td><td>This is now an off-road section approximately 1.4km in length through agricultural land. The use of the local road through the village of Hollystown was considered challenging from a deliverability perspective due to potential disruption during construction and the presence of numerous existing utilities. An off-road corridor will minimise disruption to the local community, businesses and road users.</td><td>
</td></tr>
</table>

Emerging Best Performing Option	Reason for the Change	BPO
St. Margaret's 	This is now an off-road section approximately 0.5km in length through agricultural land. The use of the local road network in this area was considered to be technically challenging due to potential risk of disruption to strategic infrastructure associated with the airport (i.e. runway landing lights). An off-road corridor will minimise risk.	
M1 Motorway to Belcamp 	This is now an off-road section approximately 3.5km in length through agricultural and industrial land. The use of the local road (Stockhole Lane) was identified to perform less successfully against the other options due to potential disruption during construction and the presence of numerous existing utilities. An off-road corridor will minimise disruption to the local community, businesses and road users. Feasible route options have been developed at this location. However, the route remains subject to ongoing engagement with key stakeholders and local landowners and will be confirmed during Step 5 (i.e. the Proposed Development now assessed in this EIAR). The potential for this off-road section to become a wider 'transmission cable corridor' has been discussed with affected landowners on the approach to Belcamp Substation and continues to be investigated and assessed, for potential development under future EirGrid projects.	

3.5.2 Amendments to the Best Performing Option at Step 5

In the Step 4B – Route Options and Evaluation Report (EirGrid 2023b), it was identified that further design, survey, assessment, and consultation would be undertaken at Step 5 and refinements to the BPO would be possible. These refinements have now been completed for the Proposed Development, in line with the 'Is this the Right Project and Process Design' requirements outlined in Image 3.1. This process is normal practice for infrastructure projects and allowed for further engagement with landowners to be taken into consideration and for the results of additional surveys and design work to be incorporated into the Proposed Development.

The key changes between Step 4B and Step 5 are identified below.

3.5.2.1 M3 Motorway Crossing

In the townlands of Bennetstown and Pace, approximately 12.5km along the proposed cable route east of Woodland Substation, the proposed cable route from the R157 to the R147 Regional Road will intersect the

M3 Motorway at Junction 5 (Dunboyne). The proposed cable route will be required to negotiate several significant constraints including the River Tolka, areas of land subject to planned development, agricultural land, the M3 Parkway rail station, car park and rail line, and the M3 Motorway.

At Step 4A, a wider area, as shown in Table 3.1, was situated around the M3 Motorway crossing. The reason for the wider area was that the surrounding area is subject to planned development and engagement with local landowners and other interested parties was ongoing in order to determine the proposed cable route in this location. Several technically feasible options were developed and assessed against environmental constraints. The options were discussed with relevant landowners and key stakeholders, including Irish Rail and Transport Infrastructure Ireland (TII). The selected option will cross the M3 Motorway to the north of the motorway junction. This option was selected primarily for technical reasons in particular to minimise the potential risk of impact on rail operations.

The route will cross the River Tolka to the west of the motorway junction and will traverse land that is subject to planned development before crossing under the rail line and motorway. To the east of the motorway, the route will cross agricultural land before joining the R147 Regional Road. This section of the route is illustrated in Image 3.10.

Image 3.10: Step 5 Amendment at M3 Motorway Crossing

3.5.2.2 M1 Motorway to Belcamp Substation

In the townlands of Cloghran, Glebe, Baskin, Stockhole, Middletown and Clonshagh, the route will travel approximately 3km north to south from the M1 Motorway to Belcamp Substation. The proposed cable route will be required to negotiate several significant constraints including agricultural land, Baskin Lane, the planned Greater Dublin Drainage Project orbital sewer and the River Mayne watercourse.

At Step 4A, a wider area, as shown in Table 3.1, was situated from the M1 Motorway to Belcamp Substation. As part of Step 4B, several routing options were considered in-line with the routing principles for the

Proposed Development. The option of an in-road section using the L2051 (Stockhole Lane) was considered. However, this was not preferred due to the presence of several existing and planned utilities and the potential need for utility diversion works. This would likely require full road closures that would lead to significant levels of disruption to road users, the local community and local businesses. These issues required the Project Team to identify an alternative off-road route.

Engagement with landowners between the M1 Motorway and Belcamp Substation helped to identify a viable route for the cable which was also technically achievable. Potential impacts to the affected area have been considered and the route has sought to minimise these effects. The potential for this off-road section to become a wider 'transmission cable corridor' has been discussed with affected landowners on the approach to Belcamp Substation, and continues to be investigated and assessed for potential development under future EirGrid projects. This approach is in collaboration with other strategic infrastructure providers and in response to stakeholders who have requested a joined up approach to minimise the impact on communities in the future.

The route will cross Baskin Lane, several field boundaries that include field drains along hedgerows and treelines, agricultural land, the planned Greater Dublin Drainage Project orbital sewer and the River Mayne watercourse before turning to the east and connecting to Belcamp Substation. This section of the route is illustrated in Image 3.11.

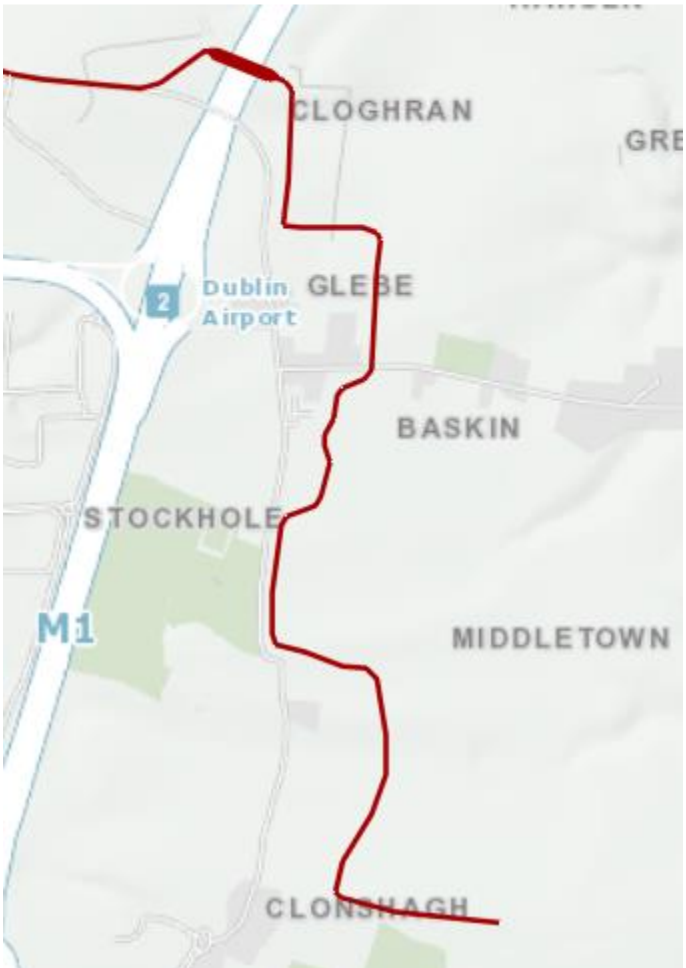


Image 3.11: Step 5 Amendment at M1 Motorway to Belcamp Substation

3.5.2.3 Watercourse Crossings

During Step 4B and Step 5, further technical assessment of the roads affected by the underground cable circuit was undertaken. At numerous locations, the underground cable circuit will cross watercourses via existing bridge structures and culverts. However, at certain watercourse crossings, such as existing masonry arch bridges, the structures have been found to be unsuitable to accommodate the proposed cable circuit due to technical and engineering considerations. This is typically due to insufficient depth below the road surface and it may not be feasible to upgrade the bridge due to adjacent constraints such as existing properties.

In these cases, off-road watercourse crossings were assessed to be the preferred option, considering technical and social considerations based on surveys, assessment, and engagement with statutory bodies and landowners.

These off-road watercourse crossings are described below, and further refinements due to environmental considerations are outlined in Section 3.5.2.4.

3.5.2.3.1 Off-Road Watercourse Crossing in Stokestown

In the townland of Stokestown, the route of the Proposed Development will follow the L1010 Local Road and will be required to cross over two tributaries of the Pinkeen watercourse. The existing bridges have been assessed and found to be unsuitable to accommodate the proposed cable circuit due to engineering and technical considerations.

Engagement with local landowners helped to identify a suitable alternative route for the proposed cable circuit, as illustrated in Image 3.12.

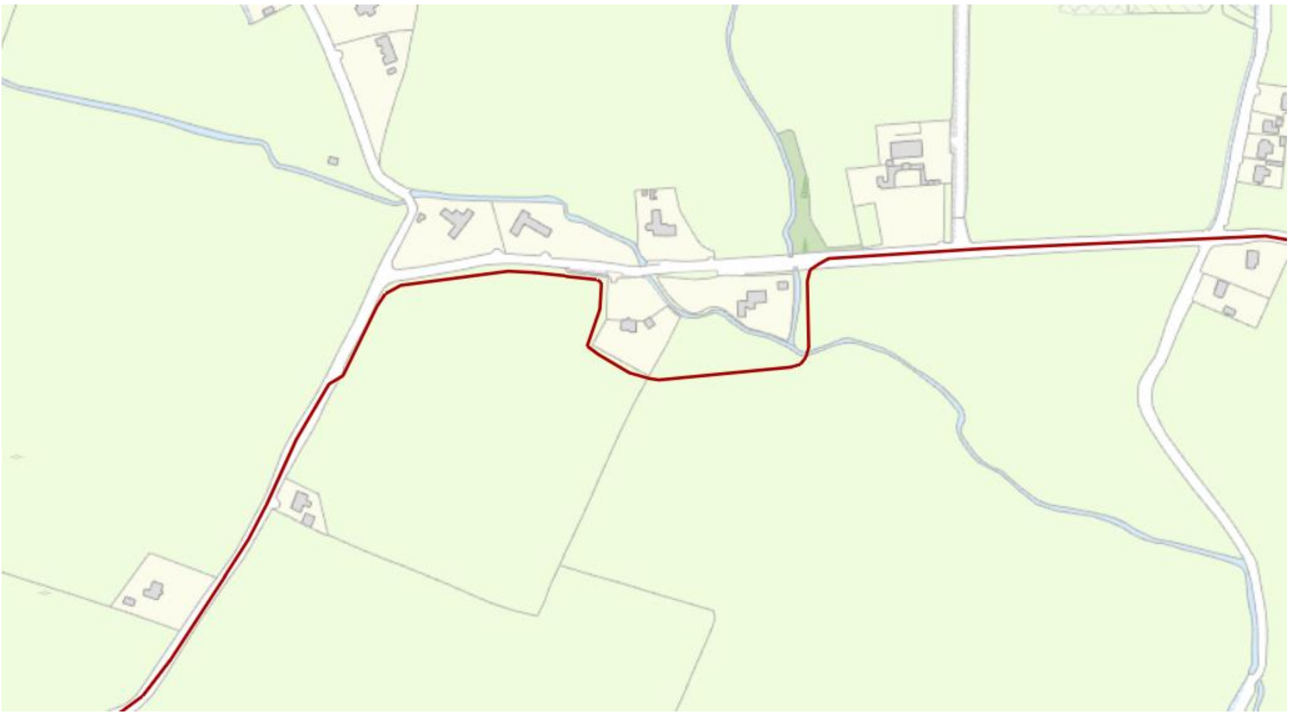


Image 3.12: Step 5 Amendment at a Watercourse Crossing in Stokestown

3.5.2.3.2 Off-Road Watercourse Crossing in Priest Town

In the townland of Priest Town, the route of the Proposed Development will follow the L1010 Local Road and will be required to cross over the Ward watercourse. The existing bridge has been assessed and found to be unsuitable to accommodate the proposed cable circuit due to engineering and technical considerations.

Engagement with local landowners helped to identify a suitable alternative route for the proposed cable circuit as illustrated in Image 3.13.

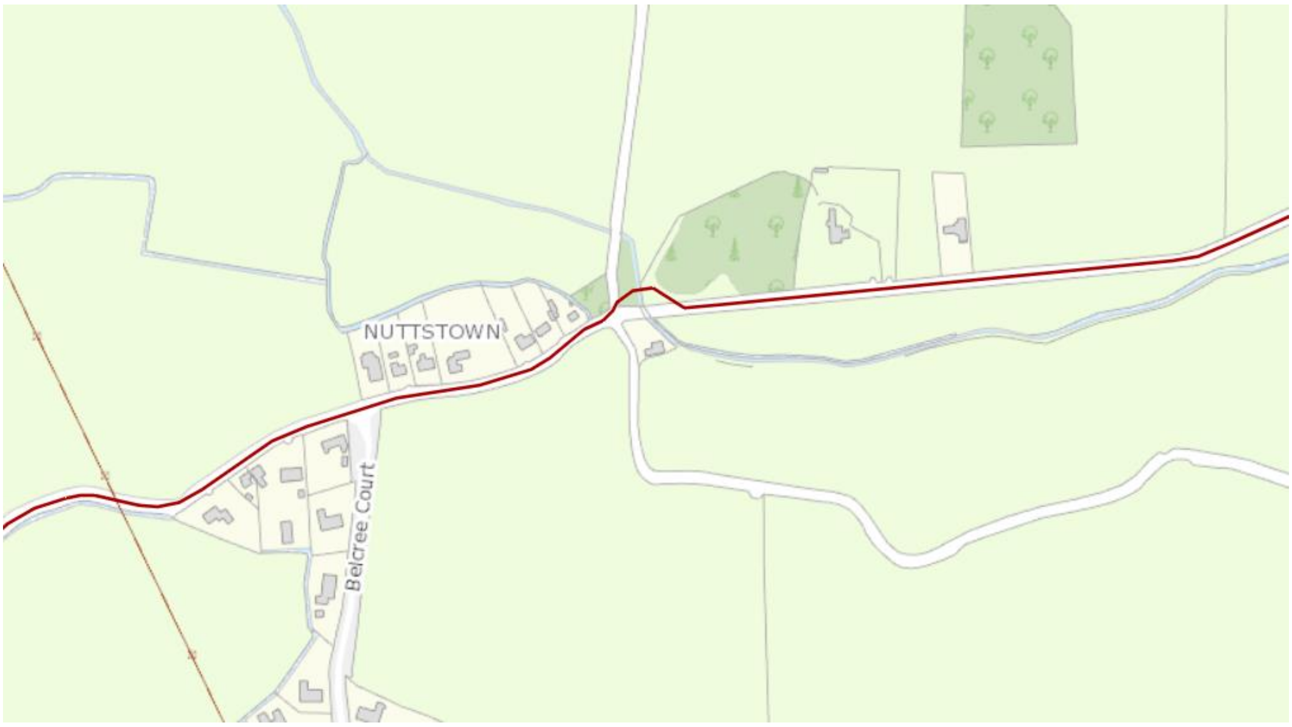


Image 3.13: Step 5 Amendment at a Watercourse Crossing in Priest Town

3.5.2.3.3 Off-Road Watercourse Crossing in Court

In the townland of Court, the route of the Proposed Development will follow the L1007 Local Road and will be required to cross over the Ward watercourse. The existing bridge has been assessed and found to be unsuitable to accommodate the proposed cable circuit due to engineering and technical considerations.

Engagement with local landowners helped to identify a suitable alternative route for the proposed cable circuit as illustrated in Image 3.14.

Image 3.14: Step 5 Amendment at a Watercourse Crossing in Court

3.5.2.3.4 Off-Road Watercourse Crossing in Kilreesk

In the townland of Kilreesk, the route of the Proposed Development will follow the L3030 Local Road and will be required to cross over the Ward watercourse. The existing bridge has been assessed and found to be unsuitable to accommodate the proposed cable circuit due to engineering and technical considerations.

Engagement with local landowners helped to identify a suitable alternative route for the proposed cable circuit as illustrated in Image 3.15.

Image 3.15: Step 5 Amendment at a Watercourse Crossing in Kilreesk

3.5.2.4 Refinements to Off-Road Sections

As part of the refinement process for the off-road sections of the proposed cable route, detailed arboricultural surveys were carried out to inform the final design in order to minimise the loss of hedgerow, vegetation and trees. A desk-based mapping study was undertaken to produce a series of heat maps of trees based on height, canopy size and a combined weighting of both. This gives an indication of the location of the 'important' trees in the Planning Application Boundary. Root protection mapping was also undertaken to consider the relationship between the Proposed Development and the retained trees to identify what precautions are necessary and proportionate. In addition, ground truthing walkover surveys by qualified arboriculturists were also carried out. The purpose of this survey was to check the whole study area for 'significant' trees which may have been missed due to the limitations of the desk-based assessment.

The early desk-based analysis of the existing tree stock, including the generation of indicative Root Protections Areas and subsequent site surveys to identify significant trees has fed into iterations of the proposed cable route design and its various elements at Step 5. There has been a considered effort at Step 5 to design out impact on trees, wherever possible.

With regards to watercourse crossings required in off-road sections, when laying the proposed cable route during the Construction Phase, for a number of design measures were considered including trenchless methodologies such as Horizontal Directional Drilling (HDD) and open cut trench methodologies. Open cut was assessed as the preferred option as there is a greater footprint required for HDD tunnelling compounds on either side of a watercourse, in addition to the requirement to use lubricating substances such as bentonite. This would result in a larger amount of temporary land take during construction, with the potential for a greater impact as a result of habitat loss and severance and potential impacts to the watercourse itself in the event of accidental release of substances or increased sediment from runoff.

In addition, a number of design options for open cut crossings were assessed by the Project Team, and in consultation with Inland Fisheries Ireland (IFI), to-date. The options considered were temporary watercourse diversions, fluming and over pumping. An exercise was undertaken to look at the required space needed to temporarily realign the channels during construction and this concluded that temporary realignment would not be feasible within the footprint of the Proposed Development due to the limited space available within the planning application boundary and / or the presence of nearby infrastructure. Following consultation with IFI to-date, fluming was agreed to be the preferred option to over pumping. Image 3.16 includes an example graphic of a typical flume pipe crossing.

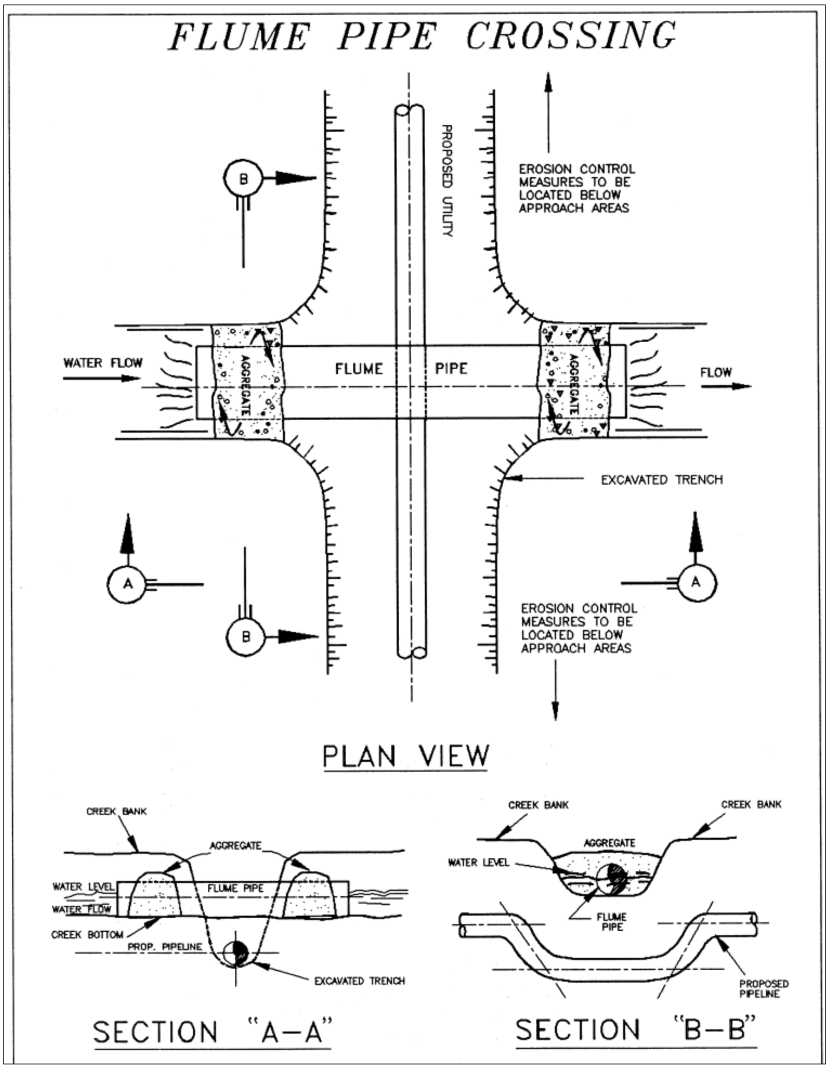


Image 3.16: Example Diagram of a Flume Pipe Crossing (Construction Industry Compliance Assistance Centre 1992)

3.6 Conclusion

The Proposed Development has been the subject of a systematic and comprehensive assessment of reasonable alternatives during the course of its development, informed by extensive engagement with local authorities, landowners and other interested stakeholders, public representatives and the general public.

As described in this Chapter and the supporting documents in Volume 5 of this EIAR, a significant range of alternatives have been considered at three levels:

- Strategic alternatives (Section 3.3);
- Route alternatives (Section 3.4); and
- Design alternatives, incorporating local level design development (Section 3.5).

The assessment of alternatives took account of environmental impacts, alongside other relevant factors including the economy, safety and accessibility, at all stages of the process.

3.7 References

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M-CO (2023). Engagement Summary Report – Step 4 Emerging Best Performing Option

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Directives and Legislation

Climate Action and Low Carbon Development (Amendment) Act 2021

Directive 2014/52/EU of the Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

S.I. No. 455/2000 - European Communities (Internal Market in Electricity) Regulations, 2000

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 4 – Proposed Development Description

EirGrid

March 2024

Contents

4. Proposed Development Description

4.1 Introduction

The East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) includes approximately 37.5 kilometres (km) of new 400 kilovolt (kV) underground cable circuit (also referred to as the proposed cable route) between the existing Woodland Substation in the townland of Woodland in County Meath and the existing Belcamp Substation in the townlands of Clonshagh and Belcamp in Fingal, County Dublin. The Proposed Development will also involve works in the substations to facilitate the connection of the underground cable circuit to the electrical grid. Approximately 20.5km of the proposed underground cable route will be located in County Meath and approximately 17km of the proposed underground cable route will be located in Fingal, County Dublin. Approximately 70% of the proposed underground cable route will be located within public roads and approximately 30% will be located in private lands, to avoid location-specific constraints.

This Chapter has been written in line with the requirements of Directive 2014/52/EU of the Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the EIA Directive) (as outlined in Table 1.1 of Chapter 1 (Introduction and the Environmental Impact Assessment Process) in Volume 2 of this Environmental Impact Assessment Report (EIAR)).

The design of the Proposed Development has evolved through the application of a comprehensive design iteration process with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Development are maintained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and outline design development programme have been incorporated, where appropriate.

4.2 Proposed Development Description

The Proposed Development is illustrated in Figure 4.1 (Sheet 1 to Sheet 48) in Volume 4 of this EIAR. A summary of the Proposed Development, as described in the public notices, is outlined below and described in more detail throughout this Chapter.

The Proposed Development consists of the following principal elements:

A. Installation of an underground cable circuit, approximately 37.5km in length, connecting Woodland Substation (400kV) in the townland of Woodland in County Meath, and Belcamp Substation (220kV) in the townlands of Clonshagh and Belcamp in Fingal. The development of the underground cable circuit will include the following:
   - Construction of a trench of approximately 1.5m in width and approximately 1.3m in depth in the public road (approximately 26km) and approximately 1.8m in depth in private lands (approximately 11.5km) in which the underground cable circuit is laid in flat formation, with associated above ground route marker posts. Route marker posts will be located at field boundaries where the proposed underground cable circuit is laid in private land, at regular intervals in road verges when the proposed underground cable circuit is in-road, in road verges where the proposed underground cable circuit crosses any roads, and at Horizontal Directional Drilling (HDD) crossing locations;
   - Construction of 49 Joint Bays (on average every 750m), primarily in the public roads, each approximately 10m in length, 2.5m in width and 2.5m in depth, with adjacent communication chambers and link boxes, along the full alignment of the underground cable circuit. Where the Joint Bays are located off-road, permanent hardstanding areas will be created around the Joint Bays;

- The laying of communication links and fibre optic cables between both substations, running in the same trench as the underground cable circuit;
- The provision of seven Temporary Construction Compounds located along the route and adjacent to substations – sizes for each of the seven Temporary Construction Compounds ranging from approximately 0.8ha to 1.6ha;
- The provision of a Temporary HDD Compound at both the reception and launch locations for three HDD motorway crossings, (i.e., six temporary HDD Compounds in total), and associated laydown area for each HDD crossing (i.e., three laydown areas in total) - sizes for each of the six HDD Compounds (plus laydown area where applicable) ranging from approximately 0.15ha to 0.45ha;
- The provision of temporary Passing Bays during construction at certain Joint Bay locations, each approximately 95m in length and 5.5m in width;
- The laying of unbound temporary access tracks, 5m wide in private lands (approximately 12km in total length);
- The laying of 12 unbound, permanent access tracks, 4m wide in private land (approximately 4km in total length);
- All associated water, rail, road, and utility underground crossings using either trenchless drilling or open cut techniques as appropriate for the particular crossing; and
- All associated and ancillary above and below-ground site development works, including works comprising or relating to permanent and temporary construction and reinstatement, roadworks, utility diversions and site and vegetation clearance.

B. Upgrades to the existing 400kV Woodland Substation in the townland of Woodland in County Meath. This will include:

- Installation of a 400kV feeder bay and associated electrical shunt reactor (approximately 8m in height);
- Installation of insulators, instrument transformers, overhead conductors, disconnectors, circuit breakers, surge arrestors (up to 12.6m in height) in order to connect the bay to the busbar;
- Installation of two gantries, 25m in height, with one 3m tall lightning rod on top of each gantry; and
- All ancillary site development works including site preparation works, underground cabling, drainage and earthgrid, as required to facilitate the Proposed Development.

C. Upgrades to the existing 220kV Belcamp Substation in the townlands of Clonshagh and Belcamp in Fingal. This will include:

- Construction of a new steel framed and clad building (73m long, 17.8m wide by 16m high) to house a new 400kV Gas Insulated Switchgear (GIS) Hall, plus eight lightning rods on the roof of the GIS Hall (each 3m in height);
- Installation of 400kV switchgear to facilitate the connection of the new underground cable circuit to the existing substation;
- Installation of associated electrical shunt reactor (approximately 8m in height) with insulators, instrument transformers, overhead conductors, disconnectors, circuit breakers, surge arrestors (up to 12.8m in height) in order to connect the reactor to the cable circuit;
- Installation of two lightning masts (each 15m in height);
- Installation of a new 400/220kV transformer adjacent to the new GIS Hall and connections to the existing 220kV substation via cable circuit;
- Internal access road; and

- All ancillary site development works including site preparation works, site clearance and levelling, drainage, access tracks, and use of existing access points off Stockhole Lane and the R139.

4.3 Underground Cable

4.3.1 Overview

There are three key elements of the proposed underground cable:

- **Cable Trench** - approximately 1.5m in width, 1.3m in depth in the public road and 1.8m in depth in private lands in which the underground cable is laid (see Image 4.1);
- **Joint Bay** - the cable will be delivered in lengths and will need to be connected (jointed) together. This will happen at the Joint Bays which are underground chambers located at various points on the route. Joint Bays are used as locations to pull the cables into the pre-installed ducts and to connect ('joint') together the individual cables and create a single, overall continuous circuit; and
- **Passing Bay** – a temporary traffic lane to allow traffic flow around Joint Bays while construction works are ongoing.

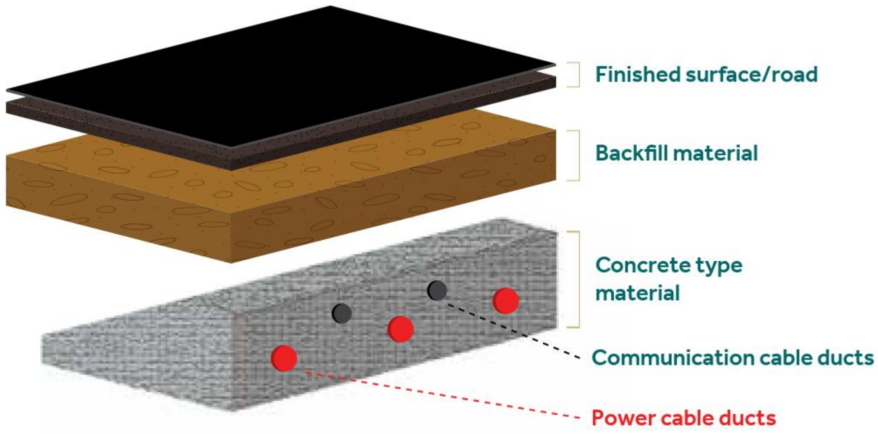

Image 4.1: Proposed Cable Trench

The width and depth of the cable trench can vary for the crossing of watercourses or utilities and for other technical reasons.

The proposed underground cable will be delivered to site in individual lengths on cable drums. These lengths will be installed along the proposed cable route by using 'Joint Bays'.

Smaller buried chambers ('manholes') will be installed alongside Joint Bay locations, of which there are two types:

- C2 chambers, which are used to join the fibre optic communication cables pulled into the pre-installed communications ducts; and
- Link box chambers, which are used to accommodate the link box (a device which earths the outer sheaths of the power cables).

As with any telecommunications facilities, these chambers will be provided with removable covers to facilitate access for ongoing maintenance and commissioning works. While the Joint Bays will not require ongoing maintenance, access from the surface is still required in the unlikely event of a cable failure needing replacement.

A Joint Bay under construction is shown in Image 4.2. An image of a reinstated road after Joint Bay construction is shown in Image 4.3. Passing Bays to facilitate road traffic management will be provided in 14 locations, where the Joint Bays are to be located in the road carriageway. There will be 33 Joint Bays along the public road / verge and 16 Joint Bays in off road sections. A Passing Bay is shown in Image 4.4. Further detail on the construction of Joint Bays and Passing Bays is provided in Section 4.5.1.

Image 4.2: Example of a Joint Bay During Construction

Image 4.3: Example of a Reinstated Road Over a Joint Bay (Darker Asphalt) with the C2 Chamber Cover Visible

Image 4.4: Example of a Passing Bay (Ensuring Road Traffic Continues Around a Working Area)

EirGrid has carefully considered the previous investments made by Meath and Fingal County Councils in maintaining and upgrading their road surfaces. The ESB will establish key principles and agree appropriate methodologies with the County Councils for road reinstatement, where the proposed underground cable and associated infrastructure has been constructed. This could include reinstatement of road surfacing wider than the proposed underground cable trench and Joint Bays, subject to planning approval by the planning authorities. This will be in accordance with the accepted standard for underground cable development; The

Guidelines for Managing Openings in Public Roads (hereafter referred to as The Purple Book) (Department of Transport, Tourism and Sport 2017). This can also be assured by way of an appropriate Condition of planning approval.

It is noted that, the specific location and design of Joint Bays and Passing Bays are subject to refinement at the detailed design stage, within the parameters set out in this planning application.

4.3.2 Underground Cable Route Description

The majority (70%) of the proposed cable route between the existing Woodland Substation and Belcamp Substation will be installed within the existing public road network. Off-road routes are proposed at particular locations to avoid specific constraints.

From Woodland Substation, the proposed cable route will travel south through private lands for around 3.5km until it joins the R156 Regional Road at Barstown Industrial Estate. From there, the proposed cable route will travel east as far as Dunboyne, turning north along the R157 Regional Road until it reaches the north-western outskirts of the town (Image 4.5).

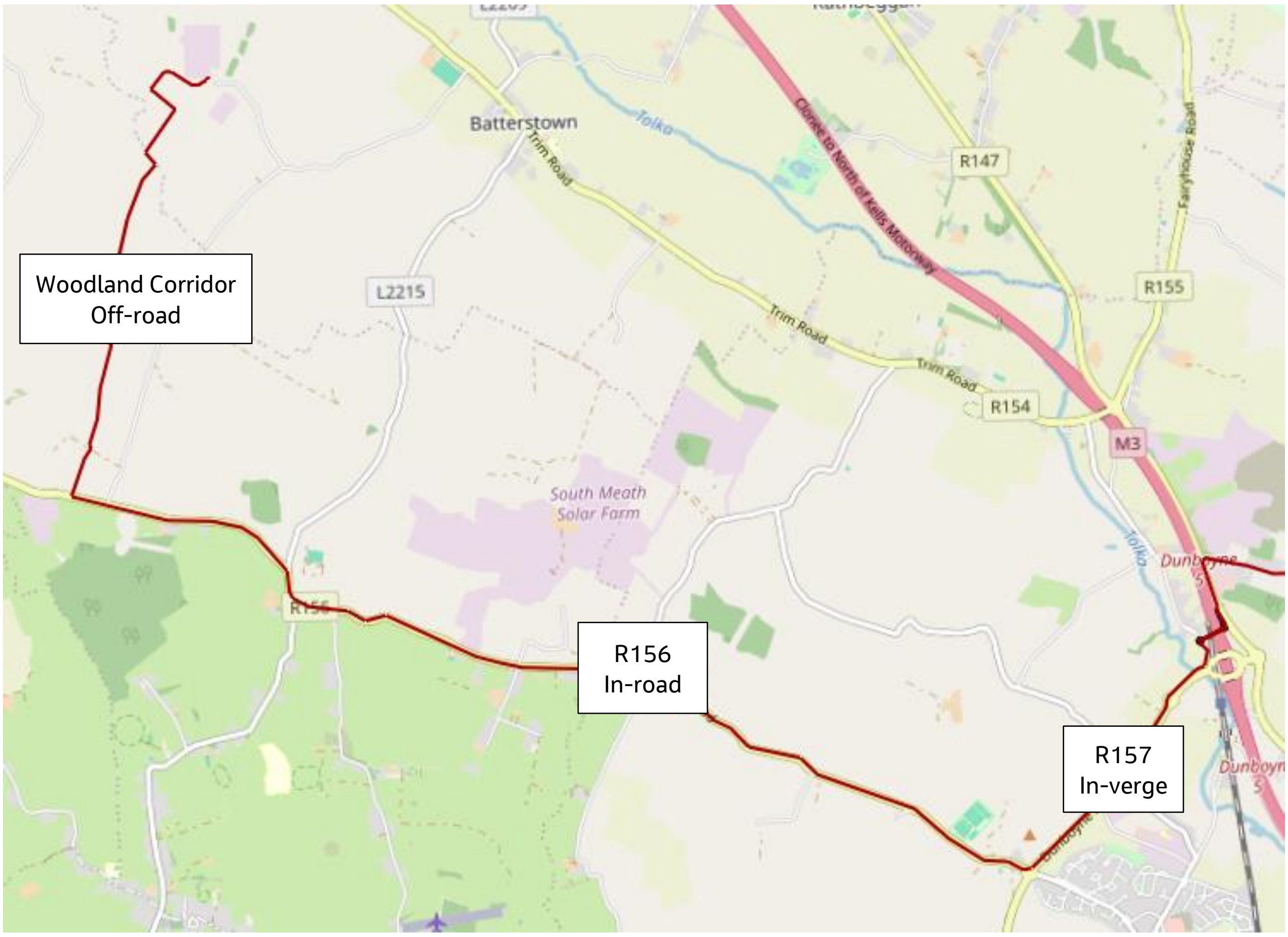

Image 4.5: Proposed Cable Route Woodland Corridor, R156 and R157 Regional Roads

The proposed cable route will follow an off-road corridor, crossing the River Tolka, the railway line at M3 Parkway and the M3 Motorway at Junction 5. The railway and motorway will be crossed via HDD. The proposed cable route will then briefly progress north along the R147 Regional Road before travelling east once more along the L5026 Local Road. At the junction with the L1010 Local Road, the proposed cable route will turn to the north-east, following the L1010 Local Road, before turning east again through Nuttstown, and following an off-road route to facilitate the crossing of a watercourse, which is a tributary of the Pinkeen_010 (Image 4.6).

Image 4.6: Proposed Cable Route M3 Parkway Railway and M3 Motorway Crossing, Along L5026 and L1010 Local Roads

As the proposed cable route continues eastward toward Kilbride, there will be an off-road section required to cross the Ward_010 watercourse. The proposed cable route will pass through Priest Town, and before reaching the junction with the L1007 Local Road, will follow a localised off-road section again crossing the Ward_010 watercourse (Image 4.7).

Image 4.7: Proposed Cable Route Along Local Roads through Nuttstown, Priest Town to the L1007 Local Road

From this location, the proposed cable route will turn south-east following an on-road route along the L1007 Local Road. Approaching Hollystown, the proposed cable route will follow a localised off-road section to facilitate a watercourse crossing. Immediately north of Hollystown, opposite Kilmartin Lane, the proposed cable route will turn off-road to the east / south-east. Following the off-road section at Hollystown, the proposed cable route will turn back on-road at Killamonan, following the R121 Regional Road towards the north-east. At the M2 Motorway, the proposed cable route will follow a localised off-road section, to allow for an HDD crossing to the south of the overbridge (Image 4.8).

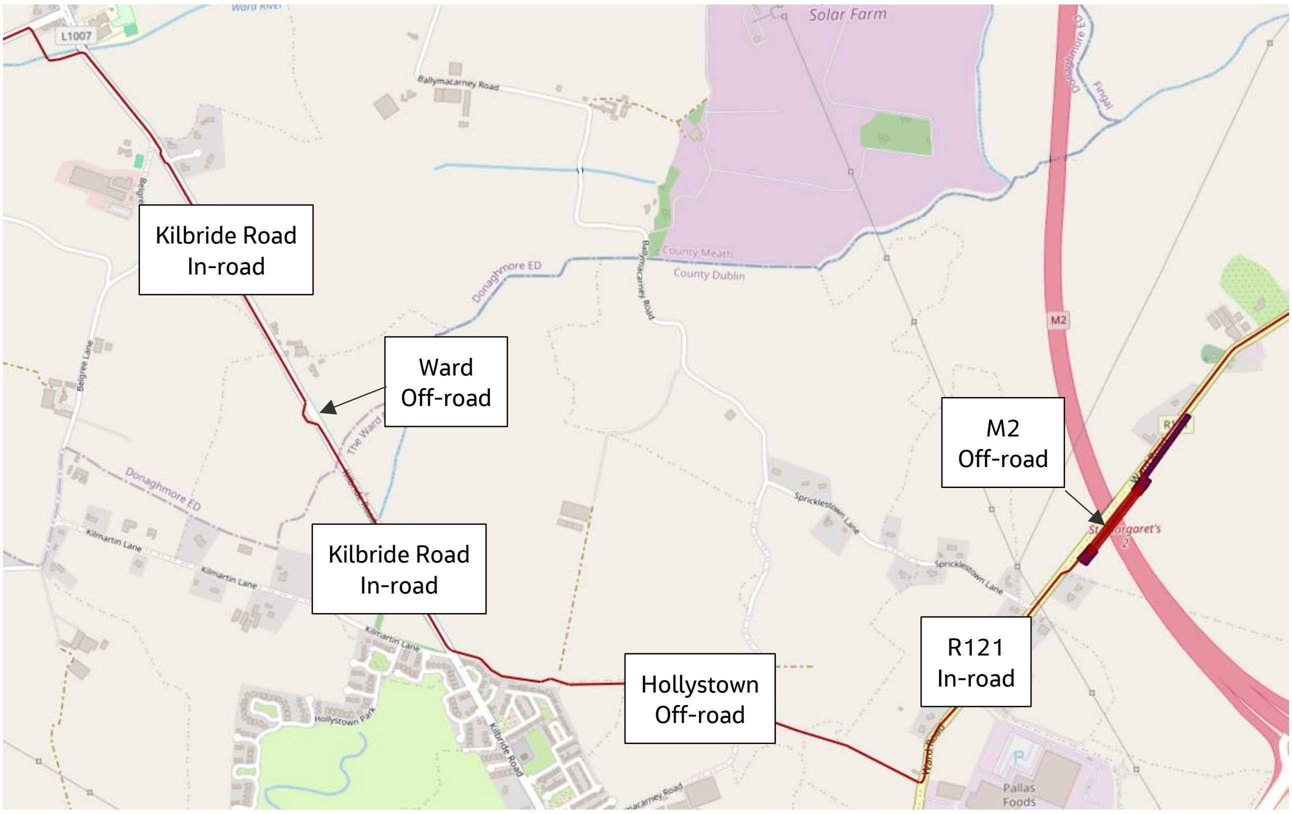

Image 4.8: Proposed Cable Route Along Kilbride Road, Off-Road to the R121 Regional Road and M2 Motorway Crossing

The proposed cable route will remain in-road to cross the roundabout with the R135 Regional Road and will continue to follow the R121 Regional Road through the townlands of Ward Lower, Newpark and Shallon. As the proposed cable route will pass from Newpark to Shallon, there will be a localised off-road section in order to cross the Ward_030 watercourse on the south side of the existing road. At the junction with the R122 Regional Road in Skephubble, the proposed cable route will turn to the south-east following an on-road route through Ballystrahan (Image 4.9).

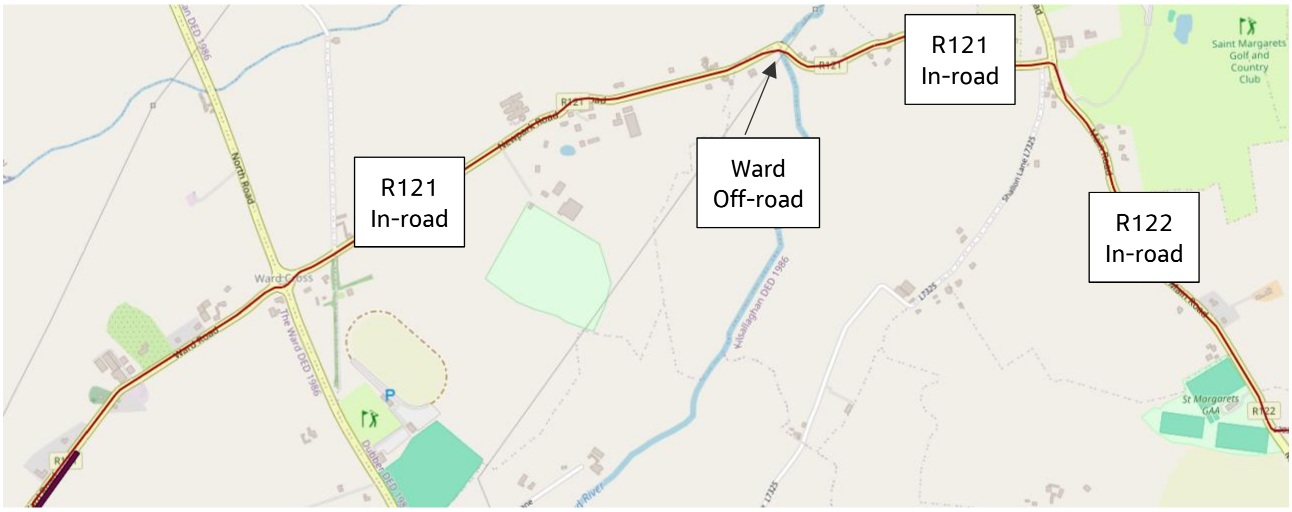

Image 4.9: Proposed Cable Route Along R121 Regional Road to the R122 Regional Road

At the junction with Toberburr Link Road (known locally as Kilreesk Lane), the proposed cable route will turn from the R122 Regional Road onto Toberburr Link Road in an easterly direction towards St. Margaret's, where the proposed cable route will follow an off-road section, crossing a watercourse, Toberburr Road and a short section of agricultural land. Following the off-road section near St. Margaret's, the proposed cable route will turn back on-road, following the R108 Naul Road to the east and remaining in-road. At the roundabout at Forest Great, the proposed cable route will remain on-road, following the L2020 Local Road to the east, passing through Forest Little (Image 4.10).

Image 4.10: Proposed Cable Route Along R108 Regional Road and Naul Road (North of Dublin Airport)

The proposed cable route will remain on-road to cross the roundabout with the R132 Regional Road and will follow the L2753 Local Road in an easterly direction, through the townland of Cloghran towards the M1 Motorway. The proposed cable route will follow an off-road section at the M1 Motorway, to allow for an HDD crossing to the north of the overbridge. Following the motorway crossing, the proposed cable route will remain off-road, crossing the L2055 Baskin Lane and following an off-road corridor to Belcamp Substation (Image 4.11).

Image 4.11: Proposed Cable Route Along the L2753 Local Road, across the M1 Motorway to Belcamp Substation

Table 4.1 describes the local constraints associated with the off-road sections of the proposed cable route.

Table 4.1: Description of the Off-Road Sections of the Proposed Cable Route

Off-Road Section		Length (km)	Local Constraints
1	Woodland to R156	3.6	The use of the local road network in this area was technically challenging due to two existing masonry arch road bridges on the Red Road that were unsuitable. An off-road corridor also minimises the risk of disrupting access to the Woodland Substation and adjacent converter station. The Proposed Development also makes optimal use of a corridor shared with another EirGrid project, CP0966 Kildare Meath Grid Upgrade.
2	M3	0.9	At the M3 Motorway, the proposed cable route follows a localised off-road section, to allow for an HDD crossing to the north of the junction (it was not feasible to cross the junction overbridge due to a lack of space for the cable).
3	Pinkeen River	0.6	An off-road watercourse crossing was required to avoid two existing bridges on the road, the depth of which has been determined by technical assessments to be insufficient to accommodate the proposed cable circuit.
4	Ward River – Nuttstown	0.1	An off-road watercourse crossing was required to avoid an existing bridge on the road, the depth of which has been determined by technical assessments to be insufficient to accommodate the proposed cable circuit.
5	Ward River – Priest Town	0.2	An off-road watercourse crossing was required to avoid close proximity to a school and an existing bridge on the road, the depth of which has been determined by technical assessments to be insufficient to accommodate the proposed cable circuit.
6	Ward River – Kilbride Road	0.1	An off-road watercourse crossing was required to avoid an existing bridge on the road, the depth of which has been determined by technical assessments to be insufficient to accommodate the proposed cable circuit.
7	Hollystown	1.4	The use of the local road through the village of Hollystown was considered challenging from a deliverability perspective due to potential disruption during construction and the presence of numerous existing utilities in the road. An off-road corridor will minimise disruption to the local community, businesses and road users.
8	M2	0.4	At the M2 Motorway, the route follows a localised off-road section, to allow for an HDD crossing to the south of the overbridge (it was not feasible to use the overbridge due to a lack of space for the cable).
9	Ward River - Shallon	0.1	An off-road watercourse crossing was required to avoid an existing bridge on the road, the depth of which has been determined by technical assessments to be insufficient to accommodate the proposed cable circuit.
10	St. Margaret's	0.8	The use of the local road network in this area was considered to be technically challenging due to potential risk of disruption to strategic infrastructure associated with the airport (i.e., runway landing lights).
11	M1 to Belcamp	3.7	At the M1 Motorway, the route follows an off-road section, to allow for an HDD crossing to the north of the overbridge (it was not feasible to cross in the bridge due to a lack of space for the cable). The use of the local road (Stockhole Lane) was challenging from a deliverability perspective due to the presence of numerous existing utilities in the road and potential disruption during construction. An offroad corridor minimises disruption to the local community, businesses and road users.

TCCs will provide laydown areas where construction materials, plant and equipment can be temporarily stored, in addition to office accommodation, vehicle parking and welfare facilities. These will be temporary and will be removed on completion of the Construction Phase of the Proposed Development, and the land will be reinstated to its original condition. These areas will all be within the Planning Application Boundary for the Proposed Development and are described in more detail in Section 4.5.6.

4.4 Substations

4.4.1 Woodland Substation

The Proposed Development at Woodland Substation will consist of the provision of new electricity transmission infrastructure, comprising the elements outlined Point B in Section 4.2 (refer to Figure 4.1 (Sheet 2) in Volume 4 of this EIAR for a graphic of the proposed works at Woodland Substation). This infrastructure will be located within the extension to the hardstand compound at Woodland Substation which forms part of a planning application which has been recently granted permission (in April 2023) by Meath County Council (planning reference 221550).

4.4.1.1 Woodland Substation Construction Phase Activities

The proposed works at Woodland Substation will be undertaken in parallel with the proposed underground cable works between Woodland and Belcamp Substations. Proposed construction access for the works at Woodland Substation will be via the existing substation access road (i.e., Redbog Road, off Red Road). A TCC (TCC0) will be set up in the south-east corner of the substation and will provide site office and welfare facilities, as well as material and plant storage for the substation works. There will be no access to the proposed cable route easement from this TCC. The area for the proposed works in Woodland Substation will be cleared and shallow founded reinforced concrete bases will be installed for the new Air Insulated Switchgear (AIS) plant, as well as a Reinforced Concrete (RC) bund for the reactor. The AIS plant will be installed on the RC base slabs and associated connections installed. The reactor will be delivered to site as an abnormal load, with the appropriate measures to minimise any potential impacts to local traffic outlined in Appendix B (Construction Traffic Management Plan) of the Construction Environmental Management Plan (CEMP) (included as standalone documents in the planning application pack). The reactor will be slid into place on its bund off the delivery trailer. A mobile crane will be used to lift the new AIS plant into place. The proposed underground cable will be trenched across the substation from the south-west corner to connect to the new cable sealing end. Once the proposed underground cable has been installed, and the works at Belcamp and Woodland Substations have been completed, the whole system will be tested and commissioned.

4.4.2 Belcamp Substation

The Proposed Development, at Belcamp Substation, will consist of the provision of new electricity transmission infrastructure, comprising the elements outlined in Point C in Section 4.2 (refer to Figure 4.1 (Sheet 48) in Volume 4 of this EIAR for a graphic of the proposed works at Belcamp Substation).

This infrastructure will be located within the extension to the hardstand compound at Belcamp Substation which forms part of a planning application that has been recently granted permission (in December 2023) by Fingal County Council (planning reference F23A/0040). This is likely to require modifications to the permitted development per Planning Ref. F23A/0040 – such modifications are separate to, and thereby do not form part of, the Proposed Development.

4.4.2.1 Belcamp Substation Construction Phase Activities

The works at Belcamp Substation will be undertaken in parallel with the proposed underground cable construction works. A TCC (TCC6) will be established to the west of the substation accessed along a temporary access track off Stockhole Lane. This access track was recently constructed as part of the Belcamp to Shellybanks 220kV project. Construction materials will be delivered to site via the existing substation main entrance off the R139 Regional Road.

The area for the proposed works at Belcamp Substation will be prepared to install the new in-situ reinforced concrete bases for the proposed GIS Hall, transformers and other miscellaneous AIS plant. The steel frame of the proposed GIS Hall will be erected and then the roof and wall cladding added to make it weather tight. A mobile crane will be used for the erection of the steel frame and cladding. The GIS equipment will be craned into place inside the proposed GIS Hall using the gantry crane within the building, and then the proposed GIS Hall will be fitted out with all associated protection and control equipment, Low Voltage Alternating Current (LVAC) equipment etc.

At the same time, the external AIS equipment and associated connections will be installed. The reactor and transformer will be delivered to site as abnormal loads with all the relevant traffic management requirements / restrictions in place for such abnormal loads (refer to Appendix B (Construction Traffic Management Plan) of the CEMP, which are included as standalone documents in the planning application pack). These will be slid into place directly from their transport trailer onto their RC bunds. The new proposed underground cable will be trenched into Belcamp Substation and under the perimeter wall to connect up to the AIS cable sealing end, outside of the proposed GIS Hall. Once the new proposed underground cable has been installed and tested, and the works at Woodland Substation completed, the whole system will be connected together, tested and then commissioned.

4.5 Cable Construction Phase Activities

The following sections describe the proposed Construction Phase activities associated with the installation of the new proposed underground cable. The laying of the new proposed underground cables is a standard construction technique undertaken by a range of utility and other services providers. The proposed underground cables will be installed in a flat formation in the following phases:

- Phase 1 – Installation of Joint Bays and Passing Bay structures;
- Phase 2 – Excavation and installation of cable ducts; and
- Phase 3 – Installation and jointing of cables.

Duct and Joint Bay installation are the most construction-intensive and invasive elements of cable route installation, as digging of a trench is required. For in-road cable laying, this phase will have the largest potential impact on traffic, including the potential need for rolling road closures (to through traffic) and diversions.

While the specifics of any cable-laying schedule are dependent upon the appointed contractor and the nature and location of the development, it is anticipated that the cable ducts will be laid in a road at a rate of 40m to 50m per day, although a reduced rate of 10m to 20m per day is anticipated in constrained sections of the proposed cable route, for example where existing utilities are present.

Joint Bays are proposed to be located at typical intervals of 750m along the proposed cable route of the Proposed Development. However, intervals between Joint Bays will vary (approximately 550m to 900m) depending on complexity of route alignment, site conditions and technical constraints. Joint Bays are anticipated to be installed in three days. Road reinstatement along the proposed cable route trench will follow the completion of the trenching and ducting, moving in sequence along the proposed cable route.

Cable pulling and jointing, which will commence when the trenching and ducting is well advanced along the proposed cable route, will be executed from the Joint Bay locations. Where this activity is likely to require a road closure, the provision of a Passing Bay at the location of the Joint Bay, where possible, will facilitate movement of traffic along the road by means of a signal-controlled lane adjacent to the Joint Bay.

Image 4.12 shows an example of a cable trench in a public road after installation of ducts and prior to backfilling. Marker boards can be seen within the trench prior to final reinstatement. Image 4.13 presents an example of a reinstated road following laying of the underground cable circuit.

Image 4.12: Example of a Cable Trench In-Road with Cables in Flat Formation

Image 4.13: Example of a Reinstated Road Following the Laying of Underground Cables

4.5.1 Phase 1 – Installation of Joint Bays and Passing Bay Structures

4.5.1.1 Joint Bays

Joint Bays will consist of precast concrete walls and bases located below-ground. The Joint Bays will be 10m long x 2.5m wide x 2.5m deep overall. Lean mix concrete (blinding) will be used as a regulating layer to the underside of the chamber. The ducts will be installed to each end of the chamber, then checked, cleaned and sealed. The open concrete chamber will temporarily support the retained ground on the outside of the chamber during the ducting activities. Once these activities are completed, the open chamber will be temporarily backfilled with appropriate material and the road temporarily reinstated until cable installation. During cable installation, the Joint Bay will be reopened, and material within the chamber will be removed and replaced following completion of the cable installation.

The proposed Joint Bay locations are provided in Table 4.2.

Table 4.2: Proposed Joint Bay Locations

Joint Bay Number	Approximate Chainage	Approximate Distance from Previous Joint Bay	Joint Bay Location	Passing Bay Provision	Side of Road Passing Bay to be Located	Maintenance Hardstanding Provision
1	812	812	Off-road	Not required	-	Yes
2	1560	748	Off-road	Not required	-	Yes
3	2384	824	Off-road	Not required	-	Yes
4	3080	696	Off-road	Not required	-	Yes
5	3807	727	In-carriageway	Yes	South	Not required
6	4587	780	In-verge	Not required	-	Yes
7	5390	803	In-verge	Not required	-	Yes
8	6022	632	In-verge	Not required	-	Yes
9	6821	799	In-carriageway	Passing Bay not provided	-	Not required
10	7646	825	In-carriageway	Yes	North	Not required
11	8358	712	In-carriageway	Passing Bay not provided	-	Not required
12	9088	730	In-verge	Not required	-	Yes
13	9936	848	In-verge	Not required	-	Yes
14	10771	835	In-verge	Not required	-	Yes
15	11577	806	In-verge	Not required	-	Yes
16	12417	840	Off-road	Not required	-	Yes
17	13163	746	Off-road	Not required	-	Yes
18	13764	601	In-carriageway	Not required	-	Not required
19	14549	785	In-carriageway	Passing Bay not provided	-	Not required
20	15327	778	In-carriageway	Passing Bay not provided	-	Not required
21	15920	593	Off-road	Not required	-	Yes
22	16719	799	In-carriageway	Passing Bay not provided	-	Not required
23	17518	799	In-carriageway	Passing Bay not provided	-	Not required
24	18366	848	In-carriageway	Yes	South	Not required
25	19037	671	In-carriageway	Yes	South	Not required
26	19749	712	In-verge	Not required	-	Yes
27	20613	864	In-carriageway	Yes	South-west	Not required
28	21393	780	Off-road	Not required	-	Yes
29	22036	643	Off-road	Not required	-	Yes
30	22593	557	Off-road	Not required	-	Yes
31	23349	756	Off-road	Not required	-	Yes
32	24215	866	In-carriageway	Passing Bay not provided	-	Not required
33	25100	885	In-carriageway	Yes	South	Not required
34	25875	775	In-carriageway	Yes	South	Not required
35	26481	606	In-carriageway	Yes	North	Not required
36	27111	630	In-verge	Not required	-	Yes
37	27929	818	In-verge	Not required	-	Yes
38	28767	838	Off-road	Not required	-	Yes
39	29484	717	In-carriageway	Yes	North	Not required
40	30187	703	In-carriageway	Yes	North	Not required
41	30940	753	In-carriageway	Yes	North	Not required
42	31651	711	In-carriageway	Yes	North	Not required
43	32531	880	In-carriageway	Yes	North	Not required
44	33088	557	In-verge	Not required	-	Yes
45	33838	750	In-carriageway	Yes	South	Not required

Joint Bay Number	Approximate Chainage	Approximate Distance from Previous Joint Bay	Joint Bay Location	Passing Bay Provision	Side of Road Passing Bay to be Located	Maintenance Hardstanding Provision
46	34657	819	Off-road	Not required	-	Yes
47	35424	767	Off-road	Not required	-	Yes
48	36172	748	Off-road	Not required	-	Yes
49	36960	788	Off-road	Not required	-	Yes

4.5.1.2 Passing Bays

Passing Bays are short sections of temporary road around Joint Bays where insufficient space would otherwise have potentially resulted in closure of the road to traffic. The Passing Bays will include temporary traffic management arrangements, such as signage and traffic signals, as agreed with the relevant local authority. The proposed Passing Bay locations, of which there will be 14 in total, are outlined in Table 4.2.

The installation of a Passing Bay will require removing and temporarily storing topsoil in an area of land adjacent to the road. This material will be used for reinstatement of the ground at a later stage in the construction process. The Passing Bays will be subject to detailed design and constructed in accordance with the relevant local authority's requirements. The Passing Bay will be constructed to a similar finished road level to the existing roadway. Subject to detailed design, and site-specific conditions, this may require the placing and provision of fill material. Roadside drainage, including filter drains, drainage carrier pipes and drainage culverts, will be extended under Passing Bays using temporary measures, where required. Passing Bays will be designed to allow suitable runoff from the temporary road surface and to avoid ponding.

Image 4.14 illustrates the proposed arrangement of a Passing Bay and associated traffic management where the Joint Bay is located in the roadway. Image 4.15 illustrates the proposed arrangement of a construction platform and associated traffic management where the Joint Bay is located in the road verge. Image 4.16 and Image 4.17 show examples of Passing Bays that have been developed for other cable projects.

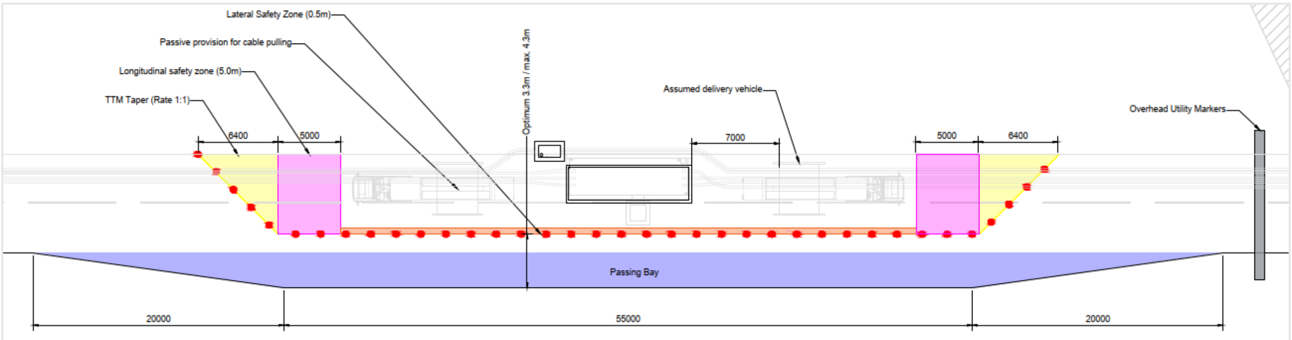

Image 4.14: Proposed Traffic Management and Passing Bay Arrangement for a Joint Bay in the Roadway (Indicative Layout)

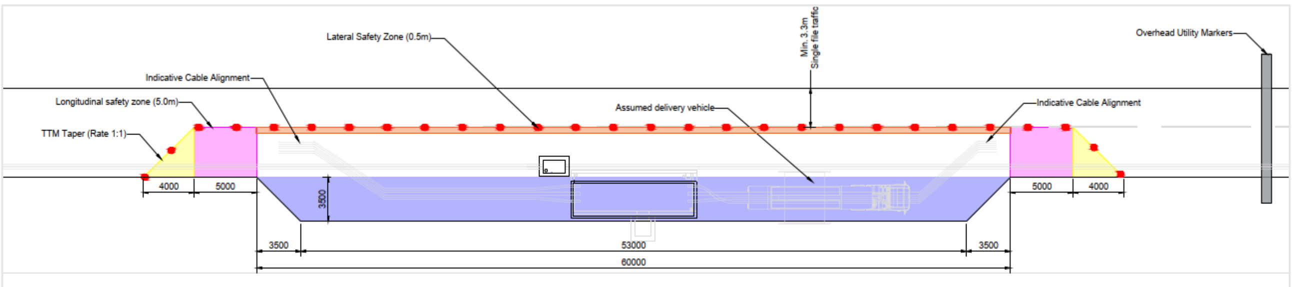

Image 4.15: Proposed Traffic Management and Construction Platform Arrangement for a Joint Bay in the Road Verge (Indicative Layout)

Image 4.16: Example of Passing Bay Construction

Image 4.17: Example of an Operational Passing Bay with Joint Bay under Construction

Where a Passing Bay is not provided due to local constraints, or where it is otherwise unsuitable for a Passing Bay and depending on the available space, a partial or full road closure may be required to safely undertake the construction works. Further detail on proposed road closures and diversions is provided in Appendix B (Construction Traffic Management Plan) to the CEMP, which is included as a standalone document in the planning application pack.

The Passing Bays will not be in use for the full duration of the Construction Phase. The Passing Bays will be used during the Joint Bay construction, cable pulling and cable jointing and testing processes, as follows:

- During Joint Bay construction, for approximately three working days;
- During the cable pulling process, for approximately five to 10 working days (depending on requirement for single or double pull); and
- During the cable jointing and testing process, for approximately 20 to 25 working days.

When the Passing Bays are not in use, measures will be put in place to prevent parking.

The reinstatement of the Passing Bays will occur on the completion of Phase 3 of the Construction Phase. The materials used to construct the Passing Bays will be removed from site and taken to a suitably licensed facility. The area will be reinstated and relandscaped to reflect the previous landform at each location. In line with best practice, no ash trees will be planted, and only native species will be used. Where affected, species-rich hedgerows will be planted. The adjacent road surface, painted lines, and other requirements will be restored in line with The Purple Book (Department of Transport, Tourism and Sport 2017).

4.5.2 Phase 2 – Excavation and Installation of Cable Ducts

4.5.2.1 Duct Installation

The proposed underground cables will be pulled into ducts pre-installed in the cable trench. When a length of trench has been excavated, the ducts will be laid on bedding material of cement bound granular mixture. Once laid, the ducts will be backfilled with a thermally suitable material. The fibre optic ducts will be laid and backfilled before the trench is reinstated.

Associated route marker posts (refer to Image 4.18) will be positioned at regular intervals within the Planning Application Boundary. This is a common safety measure for underground utilities and the markers will be located at:

- Field boundaries where the proposed underground cable is laid in private land;
- At regular intervals in road verges when the proposed underground cable is in-road;
- In road verges where the proposed underground cable crosses any roads; and
- At HDD crossing locations.

The markers will be positioned to be visible for safety reasons but located in a manner that is not obstructive.

Duct installation will progress sequentially, starting at one Joint Bay and moving towards the next along the proposed cable route. The construction area will move along in tandem with the progress of the duct installation, with only the area necessary to provide a safe working area cordoned off. It is anticipated that multiple crews will work at several locations along the approximate 37.5km proposed cable route simultaneously.

Image 4.18: Examples of an Above-Ground Cable Route Marker Post

4.5.2.2 Underground Cable Installation in Roads

The primary difference between construction in off-road areas and in-road areas is that there is generally little space within road areas for local storage of construction materials, such as excavated material and new fill material. This means that designated laydown areas may be required along the road to support construction activities.

For trench excavation works in roads where there is a reasonable availability of space, vacuum excavation or mechanical excavators will be used. In constrained locations, excavation will be undertaken using hand operated tools. The excavated material will be loaded into lorries for removal off site at a suitably licensed facility.

The average rate of construction for the proposed cable route is anticipated to be approximately 40m to 50m per day. Excavation for the proposed underground cable in areas of road with heavy utility congestion can become slower (10m to 20m per day) due to the challenges of working around high numbers of existing utilities. Generally, it is proposed to retain the existing services in place by working around them. The utilities may either be parallel to the Proposed Development (i.e., alongside the duct run) or may cross the duct run.

The appointed contractor or contracting authority for the Proposed Development will engage with the relevant utility owners, prior to construction, and in accordance with discharging the relevant planning conditions, consents and licence requirements. Significant consultation has already taken place with utility providers and construction principles have been established, subject to further consideration at the detailed design stage. Arrangements will be in place to ensure that utilities are crossed by the proposed underground cable safely and with appropriate methodologies to support and protect existing assets. In some instances, where there is an interface with a particularly sensitive utility, works will be carried out with prior agreement and / or supervision by the utility provider.

Hand digging methods and smaller excavators will be used, if required. To protect the working area, temporary traffic management may be required to divert traffic.

For roads with heavy congestion of existing utilities, the progress rate for site preparation, excavation, cable duct installation and reinstatement is estimated at approximately 20m to 50m per day.

4.5.2.3 Underground Cable Laying in Agricultural Lands

For agricultural lands, such as grassland and tillage, the proposed underground cable design is essentially similar to that which will be installed in the roads, with the exception of the restoration of subsoil and topsoil instead of road construction material. The methodology for duct construction is similar with construction of Joint Bays, ducting, and cable installation and jointing being essentially the same.

As these construction works will be located off-road in agricultural lands, the Planning Application Boundary includes a temporary working area for the appointed contractor. The width of this temporary construction swathe will vary depending on the off-road section, and will range from 20m to 70m. A 30m wide corridor is illustrated in Image 4.19.

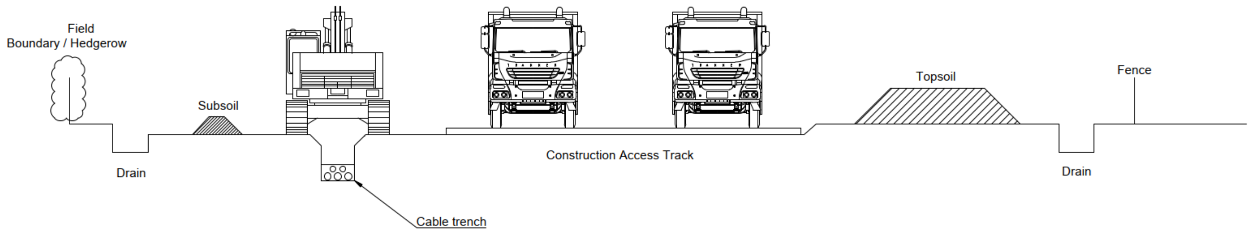

Image 4.19: Construction Swathe in Agricultural Lands (30m Wide Corridor)

The temporary working area is required to:

- Facilitate temporary storage of subsoil and topsoil which must be removed from:
    - The footprint of the proposed temporary construction access track (6m wide);
    - The footprint of the proposed underground cable trench; and
    - A safety buffer strip between the proposed temporary access track and the proposed underground cable trench.
- Allow construction of a proposed temporary construction access track alongside the proposed underground cable trench to allow for the movement of construction equipment and materials along the section of the route on the agricultural land;
- Ensure sufficient working space for the excavation of the proposed underground cable trench and the installation of the cable ducting; and
- Allow segregated storage of the various types of topsoil and subsoils from the proposed underground cable trench for later reuse or disposal from site.

Image 4.20 shows an example of a typical temporary working strip on agricultural land for an electricity cable project. Stripped topsoil can be seen stored to the left of the strip with a temporary construction access track in the centre right. Subsoil is also temporarily stripped from areas either side to create space for trench installation, materials storage and subsoil storage.

Where possible, an off-road cable alignment will seek to follow field boundaries to minimise potential impacts on farm operations. However, where the route of the Proposed Development crosses between adjacent fields, there will be a requirement to cross field boundaries, including ditches, hedgerows and other features, as necessary.

Image 4.20: Example of Underground Cable Construction in Agricultural Lands

The cable installation and jointing will be undertaken as part of a separate phase later in the construction programme since access is provided via the public road network. On agricultural land, the temporary access tracks need to remain in place until after the completion of the cable pulling and jointing works. This is due to the fact that there is no other way to provide access to these off-road locations. For this reason, it is proposed that for the Proposed Development, any off-road working strip will be unavailable to an affected landowner for the duration of the Construction Phase. This will include from initial fencing-off, to the removal of the fence, following reinstatement of land along the working strip.

Temporary access tracks, totalling approximately 12km in length, are proposed to provide access at each of the off-road sections and to provide access to TCC5 and TCC6, which are setback from adjacent public roads. The proposed temporary access tracks will be provided within the Planning Application Boundary.

After construction, the proposed temporary access tracks will be removed. However, the Proposed Development will require 12 proposed permanent access tracks, which will be unbound, 4m wide tracks. These will allow access to off-road Joint Bays from either existing access tracks or entrances. These tracks will be used infrequently for operational maintenance by the ESB. Where an access track will cross an existing field boundary, a gate will be provided to maintain the boundary. Where adjacent fields belong to different landowners, access will be provided for the ESB only, with measures in place to ensure control of livestock during ESB access (e.g. the use of locking double gates).

Permanent access tracks are proposed to provide access to the following Joint Bays (as shown on Figure 4.1 (Sheet 1 to Sheet 48) in Volume 4 of this EIAR):

- JB 1, JB 2, JB 3 and JB 4 (access track to be shared with the Kildare Meath Grid Upgrade An Bord Pleanála planning application reference number 316372));
- JB 17;

- JB 21, JB 28 and JB 29;
- JB 30, JB 31 and JB 38; and
- JB 46, JB 47, JB48 and JB 49.

The proposed permanent access track leading to Joint Bays 1 and 2 will cross a watercourse (Watercourse ID 1 – Dunboyne Stream_010). This watercourse will also be crossed by the cable as an open-cut trench. A culvert or bridge structure may be used to facilitate the proposed permanent access track watercourse crossing. The culvert or bridge structure will be designed in accordance with the Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016) so that there are no significant environmental impacts.

The use of HDD below existing infrastructure (e.g., motorways) will require temporary HDD Compounds. These areas will be required to create launch and reception pits for the HDD equipment and to facilitate logistics and storage works.

Watercourse crossings will employ an open trench method. Where water bodies are located adjacent to, or in close proximity to field boundaries, these will be removed and ditches culverted to ensure continuity of drainage. Each work area will be demarcated securely with fencing, and this will prevent works outside of the agreed areas.

Further details of open cut crossings and HDD and are provided in the sections below, as applicable.

4.5.2.4 Cable Crossings (Water, Utility, Bridges etc.)

The proposed cable route will cross existing structures, utilities and watercourses at various locations. These crossings will be facilitated by either open cut trenching or HDD, as appropriate. Descriptions of open cut trenching and HDD methods is provided in Section 4.5.2.6 and Section 4.5.2.7, respectively. The proposed underground cable will be a minimum of 300mm from existing services as per EirGrid's 110kV, 220kV and 400kV Underground Cable Functional Specification (EirGrid 2021).

Prior to the cable crossing works, detailed utility and services surveys will be undertaken. The identification of crossings along the proposed cable route thus far has been based on consultation with utility providers, site walkovers, field studies, and reviews of publicly available information such as EPA datasets and mapping (refer to Chapter 17 (Material Assets) for details of utility crossings). All crossings will be confirmed at the detailed design stage within the parameters proposed in this planning application, and the mitigation detailed and proposed as part of this EIAR will be implemented when dealing with any such features. Where it would be necessary for third party services to be diverted, it is considered that this will not have any material impact on assessments given the highly localised extent of such diversions and short duration (only a few days in each instance) of associated works.

4.5.2.5 Watercourse Crossings

Details of the proposed Water Framework Directive (WFD) designated water body crossings, and any unnamed non-designated water body crossings are provided in Chapter 12 (Hydrology) in this EIAR.

In summary:

- No watercourse crossings (WFD designated or non-designated) are proposed to be undertaken by HDD;
- Ten watercourse crossings of WFD designated water bodies, are proposed to be undertaken by open cut trench crossing;
- Nine watercourse crossings of WFD designated water bodies, are proposed to be crossed within the road structure;
- Seven crossings of unnamed non-designated water bodies are proposed via open cut trenching;

- 21 in-road crossings of unnamed non-designated water bodies are proposed;
- There are five water bodies for which it is currently unclear if they will be crossed. However, if the water body extends upstream, then the crossing will be in-road;
- There is one water body for which it is currently unclear if it will be crossed, but if the water body extends upstream, it will be crossed off-road;
- One watercourse (WFD designated water body) is predicted to be affected by a Passing Bay; and
- A permanent crossing of one watercourse will be required to maintain access to Joint Bay 1 during the Operational Phase.

Trench crossings of watercourses have the potential to stir up sediment in the water body, increasing turbidity, which has the potential to result in negative impacts to the hydromorphology, and water quality of the receptor. To reduce the risk of discharging sediment, it is proposed to carry out all of these works in a dry works area.

A number of design options for open cut crossings were assessed by the project team, in consultation with IFI, to-date. The options considered were temporary watercourse diversions, fluming and over pumping. An exercise was undertaken to look at the required space needed to temporarily realign the channels during construction, and this concluded that temporary realignment would not be feasible within the footprint of the Proposed Development due to the limited space available within the Planning Application Boundary and / or the presence of nearby infrastructure. Following consultation with IFI to-date, fluming was agreed to be the preferred option to over pumping. Where watercourses are flumed, the dry works area will be isolated by installing an impermeable barrier between the watercourse and the works area, as per consultation with IFI to-date. The impermeable barrier will be tailored to the watercourse in question. Techniques will include the use of inflatable dams, frame dams, or sandbags in smaller watercourses. For larger watercourses, water will be carried over or around the isolated dry works area. The appointed contractor will consult IFI prior to a final decision being made on water crossing techniques.

The proposed fluming arrangement is illustrated in Image 4.21.

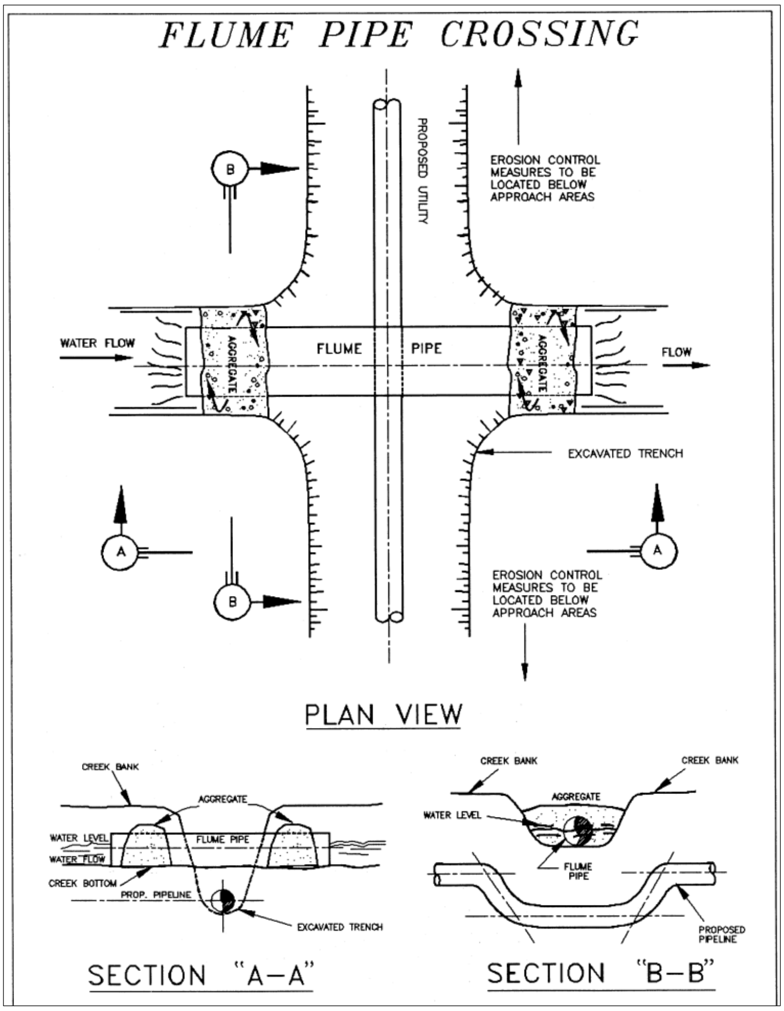

Image 4.21: Example Diagram of a Flume Pipe Crossing (Construction Industry Compliance Assistance Centre 1992)

Where over pumping is required due to site constraints, water pumped from the dry works area will be treated using settlement tanks to remove sediment prior to discharge back to the watercourse. Discharge water will be to a standard agreed with IFI. Silt fences and silt traps will be installed prior to the commencement of works and will be inspected daily by the site team and Environmental Clerk of Works (EnCoW) to inform adaptive management as required. The locations of the same will be determined by the EnCoW.

Water will be carried over or around the isolated dry works area. This may be achieved by either fluming, pumping or if there is enough space, temporary diversion. Where possible, provided that there is no risk of excessive scour, the diversion will be within the footprint of the existing channel. The existence of a temporary impermeable barrier within the channel will have a direct impact on the cross section of the channel and is expected to give rise to localised changes in water depth, velocities and sediment erosion / deposition. Once the underground cable crossing is completed, the landscape will be restored in accordance with agreed requirements. These works will include riverbank stabilisation, gravel replacements, bank profiling and planting where required. In all cases, the site will be restored post installation.

Open cut trenching works will not be carried out during extreme rainfall or high flow events. Met Éireann provides a five-day weather forecast via its website (Met Éireann 2024). Generally, works will not take place during certain categories (i.e., during red weather warnings). Depending on the specific circumstances, works may also not take place during yellow and orange warnings based on the site-specific conditions and based on an assessment by the appointed contractor. The appointed contractor’s EnCOW will monitor watercourse crossings and weather warning forecasts and ensure that appropriate records are maintained for audit.

At this stage of the design process, the design details associated with the permanent crossing of Dunboyne Stream_010 are unknown. This water body crossing will be subject to options appraisal during the detailed design stage and will likely take the form of a culvert or bridge crossing.

Given the requirement for a temporary culvert in the same location it is likely that the permanent structure would take the form of a culvert. This would allow the appointed contractor to construct the permanent structure prior to the formation of construction access and would allow for the structure to be retained post-construction to allow permanent access to Joint Bay 1 during the Operational Phase. However, given that this design decision has not yet been confirmed, the crossing has been assessed within Chapter 12 (Hydrology) in Volume 2 of the EIAR for both a bridge and culvert crossing, with appropriate mitigation measures outlined for each structure type in Chapter 12 (Hydrology).

4.5.2.6 Open-Cut Trenches at Utility Crossings

Numerous existing utility services will be crossed by the proposed cable route, as described in Appendix A4.1 in Volume 3 of this EIAR. Where these occur, the proposed crossing options will be as follows:

- **Located below the existing service**: The proposed underground cable will be positioned locally below the existing service. This will be to the minimum allowed spacing, as per utility owner requirements;
- **Located above the existing service**: The depth to the top of the proposed underground cable ducts could be reduced to a minimum of 450mm below surface level as per the Health and Safety Authority's (HSA's) paper entitled, Code of Practice for Avoiding Danger from Underground Services (HSA 2010). This depth will accommodate the required separation from the service being crossed and will provide protection to the proposed underground cable system. Steel plates and steel mesh will be installed above concrete-encased ducts; and
- **Realignment of existing utility**: The works required to realign an existing utility will be coordinated with the service / utility provider and a complete coordinated methodology will be mutually agreed between all parties, prior to the commencement of any work.

All proposed work methodologies will aim to prevent any outages or loss of services. If the risk cannot be avoided, prearranged agreements on outages will be in place prior to the commencement of the works.

4.5.2.7 Horizontal Directional Drilling

There will be three HDD crossings along the proposed underground cable route:

1. M1 Motorway;
2. M2 Motorway; and
3. M3 Motorway and adjacent rail line.

HDD technology has been widely used on infrastructure projects for several decades. Competent specialist contractors will be appointed to undertake the work. The appointed HDD contractor will conduct the drilling works in a safe and controlled manner with appropriate planning for site and environmental constraints. The HDD design and the appointed HDD contractor's methodologies will ensure that the proposed works do not adversely affect existing utilities, third-party infrastructure and groundwater.

Temporary HDD Compounds (six in total at three crossing locations) have been included within the Planning Application Boundary for the Proposed Development. The sites will be temporarily covered with a gravel hardstanding to allow construction plant to operate safely. Launch and reception pits of approximately 3m x 5m will be constructed for the HDD tunnel.

The drill rig will bore a pilot tunnel between one side of the crossing to the other. The HDD technique will use a drilling fluid called bentonite to support the borehole during construction. The bentonite fluid also carries away flushings which are the unwanted materials removed by the drill bit. The drill bit will be kept on its planned alignment using technology such as guidance systems and sensors which will be continuously monitored by the drill rig operator.

The drilled arisings will be flushed to the surface where they will be separated from the fluid fraction for disposal. The drilling fluid will be maintained in a closed loop, meaning that the bentonite will be pumped, captured, cleaned and circulated again. An example of an HDD rig is shown in Image 4.22.

Image 4.22: Example of an HDD Rig

Continuous monitoring by the specialist drilling team of fluid volume pressure, pH, weight and viscosity will be carried out. The volume of cuttings produced will also be monitored to ensure that no over-cutting takes place, and that tunnel cleaning is maintained. The nature of the cuttings will also be monitored to understand the ground conditions as the drilling progresses.

After the initial pilot tunnel is completed, it will be reamed in a number of passes. This will enlarge the tunnel to the required bore size to enable the cable ducts to be pulled through. The specialist drilling team will constantly monitor the operation, and will:

- Check that actual load stress matches designed load stress, to ensure hoop stress and buckling stress is not exceeded; and
- Monitor drilling progress to identify voids or changes in geological conditions.

When the HDD works are completed, the working platform will be removed, and the site reinstated to its original condition.

4.5.3 Phase 3 – Installation and Jointing of Cables

4.5.3.1 Cable Installation

The cables will be brought to site on cable drums. The cable drums will be moved into position using specialist trailers. For in-road sections, these trailers will be lorry type, while for off-road sections, the trailers may be tractor type. The drums will be brought to the Joint Bay location for cable installation by 'pulling' the cable into the pre-installed duct.

Once the drum is set up, a winch system at the next Joint Bay including a pulling cable will be attached to the nose of the cable and rollers will be used to guide the cable end towards the duct. The cables will then be pulled into the duct with lubrication being applied to the cable and duct throughout the process to control pulling tensions.

4.5.3.2 Cable Jointing

The individual lengths of cable need to be joined or 'jointed' together to create a single circuit. This will be carried out at the Joint Bays along the cable route. The cables will be pulled into each end of the chamber and the cable ends jointed together within the chamber. Jointing is expected to take approximately one to two weeks per Joint Bay.

The cable jointing process is highly skilled, labour intensive, technically demanding and essential to the effective operation of the cables. For worker safety and comfort, a temporary waterproof shelter system with the same visual appearance as a shipping container will either be placed or constructed around the Joint Bay chamber. This will provide a clean environment for the jointing process to be undertaken in. In some areas, the width of the Joint Bay and shelter may require temporary traffic management, including use of Passing Bays. Road closures and diversions will be required in some areas along the route during construction and operation, depending on the width of the Joint Bays and the nature of the road network in the area.

Following jointing, the Joint Bay will be backfilled, and the road surface permanently reinstated. An example of proposed cable pulling is shown in Image 4.23. An example of a proposed joint bay shelter used during jointing is shown in Image 4.24.

Image 4.23: Example of a Cable Pulling at a Joint Bay

Image 4.24: Example of a Joint Bay Shelter

4.5.4 Construction Traffic

A Construction Traffic Management Plan has been prepared for the Proposed Development and is contained as Appendix B of the CEMP, which is included as a standalone document in this planning application pack.

The proposed construction sequence to support the temporary traffic measures for the in-road sections of the proposed cable route is as follows:

- Phase 1 – Installation of Passing Bay and Joint Bay structures: The Passing Bays (where required) will be constructed at the Joint Bay locations. Following the completion of the Passing Bay, the installation of the Joint Bay will take place under the same phase;
- Phase 2 – Excavation and installation of ducts: A trench will be dug along the proposed cable route, ducts will be installed, the trench backfilled, and the ground reinstated to match existing conditions; and
- Phase 3 – Installation of cables: The cables will be installed at Joint Bay locations within the ducts. The cables will then be jointed (connected) at each Joint Bay location to allow the installation of a continuous circuit.

The scale and nature of the temporary traffic management will vary from phase to phase due to the different effects. Works during Phase 1 and Phase 3 will be discrete locations along the proposed cable route, whereas Phase 2 will be a rolling working area as the proposed cable trench will run the entire length of the Proposed Development.

In Phase 1 and Phase 3, the following measures will be applied:

- Lanes closure: Where the road width at the location of the Joint Bay is greater than 10.5m, a Passing Bay is not expected to be required and only lanes closure will be required;
- Passing Bay with lanes closure: Where the road width is less than or equal to 10.5m, and where land is available, a Passing Bay with lanes closure will be constructed; and
- Full road closure (with local access arrangements): Where the road width is less than or equal to 10.5m, and where there is no land available to construct a Passing Bay, a road closure with local access arrangements will be provided for the affected area with signposted diversions.

In Phase 2, the following measures will be applied:

- Full road closure (with local access arrangements): Where the residual open carriageway is less than 2.5m, the road will be required to be closed, with local access arrangements, where necessary. Allowing vehicles to pass on a carriageway less than this width would pose significant risk to road users and the delivery teams (please note that the length of road that will be closed will be minimised and made appropriate to the area of the works). The closed section will be based on the nearest diversion point and the works required in that area;
- Lane Closure with Heavy Goods Vehicles (HGV) Diversion: Where the residual open carriageway is between 2.5m and 3m, the road will be required to be closed to HGVs but open to Light Goods Vehicles (LGVs) (e.g. Ford Transit vans) and cars. All HGVs will be required to use the diversion route, requiring signage to mitigate the risk of HGVs passing the works sites; and
- Lane Closure: Where the residual open carriageway is greater than 3m, it is proposed to keep the road open to all road users, using traffic signal control. Automatic or intelligent signalling should be used to account for the traffic flow and demand in order to reduce potential delays. The lane closures will remain during the entirety of the section of works (i.e., out of hours included) to ensure safety to all road users and delivery teams.

Table 4.3 provides a description of the Traffic Management Sections of the proposed underground cable route. Table 4.4 summarises the proposed indicative temporary traffic measures that will be applied during Phase 2 for the Proposed Development. The proposed cable route has been divided into a number of sections due to the different sections being in-carriageway, in verge or off-road; the nature of the works in that area; the difference in road widths; and other factors.

Table 4.4 contains only those sections where temporary traffic measures will be required and also identifies the maximum diversion length where they will be required in certain sections. The diversions have been calculated on a like-for-like basis (i.e., where a regional road is to be affected by the Proposed Development, the proposed diversion will only use regional roads and will not include local roads in the area). In some areas, this approach will significantly increase the length of the diversion.

Table 4.3: Description of the Traffic Management Sections of the Proposed Underground Cable

Section Number	Section Name	Length (m)	Start Chainage	End Chainage	Type	Number of HDD Crossings	HDD Locations	Roads
1.01	Woodland	3635	0	3635	Off-road			N/A
1.02	R156	7185	3635	10820	In-carriageway			R156
1.03	R157	1530	10820	12350	In-verge			R157
1.04	M3	873	12350	13223	Off-road	1	M3	N/A
1.05	R147	327	13223	13550	In-carriageway			R147
1.06	L5026	1610	13550	15160	In-carriageway			L5026
1.07	L1010 West	695	15160	15855	In-carriageway			L1010
1.08	Pinkeen River	605	15855	16460	Off-road			N/A
1.09	L1010 East	340	16460	16800	In-carriageway			L1010
1.10	Nuttstown Road	1410	16800	18210	In-carriageway			Nuttstown Road
1.11	Ward River	70	18210	18280	Off-road			N/A
1.12	Priestown Road	915	18280	19195	In-carriageway			Priestown Road
1.13	Priest Town	195	19195	19390	Off-road			N/A
1.14	Kilbride Road North	1115	19390	20505	In-carriageway			Kilbride Road
1.15	Kilbride Off-road	80	20505	20585	Off-road			N/A
1.16	Kilbride Road South	695	20585	21280	In-carriageway			Kilbride Road
1.17	Hollywood	1346	21280	22626	Off-road			N/A
1.18	M2 HDD South	684	22626	23310	In-carriageway			R121
1.19	M2 HDD	360	23310	23670	Off-road	1	M2	N/A
1.20	M2 HDD North	950	23670	24620	In-carriageway			R121
1.21	The Ward Cross / R121	1575	24620	26195	In-carriageway			R121
1.22	Ward River	70	26195	26265	Off-road			N/A
1.23	R121	805	26265	27070	In-carriageway			R121
1.24	R122	1250	27070	28320	In-carriageway			R122
1.25	Kilreesk Lane	50	28320	28370	In-carriageway			Kilreesk Lane
1.26	Kingstown	790	28370	29160	Off-road			N/A
1.27	R108	1640	29160	30800	In-carriageway			R108
1.28	Naul Road	2450	30800	33250	In-carriageway			Naul Road
1.29	Stockhole Lane West	810	33250	34060	In-carriageway			Stockhole Lane
1.30	M1 East	3706	34060	37766	Off-road	1	M1	N/A

Table 4.4: Summary of the Proposed Temporary Traffic Measures for Phase 2

TTM Sections	Name of Section	Length (km)	Average Road Width (m)	Phase TTM	Diversion Length (km)	Diversion Council Authority
1.02	R156	7.2	6.5	Full Road Closure	24.1	Meath
1.03	R157	1.5	14.5	Hard Shoulder Closure	N/A	N/A
1.05	R147	0.3	14.5	Lanes Closure – min 4.2m wide construction space	N/A	N/A
1.06	L5026	1.6	5.0	Full Road Closure	3.3	Meath
1.07	L1010 West	0.7	5.3	Full Road Closure	20.9	Meath
1.09	L1010 East	0.3	5.3	Full Road Closure	21.3	Meath
1.10	Nuttstown Road	1.4	5.5	Full Road Closure	20.2	Meath
1.12	Priestown Road	0.9	5.3	Full Road Closure	20.7	Meath
1.14	Kilbride Road North	1.1	5.7	Full Road Closure	13.8	Meath / Fingal
1.16	Kilbride Road South	0.7	5.7	Full Road Closure	14.2	Meath / Fingal
1.18	M2 HDD South	0.7	5.8	Full Road Closure	6.5	Fingal
1.20	M2 HDD North	0.9	6.0	Full Road Closure	6.3	Fingal
1.21	The Ward Cross / R121	1.6	5.5	Full Road Closure	8.5	Fingal
1.23	R121	0.8	5.3	Full Road Closure	9.2	Fingal
1.24	R122	1.2	5.0	Full Road Closure	8.7	Fingal
1.25	Kilreesk Lane	0.1	6.5	Full Road Closure	2.5	Fingal
1.27	R108	1.6	7.5	Lane Closure	11.7	Fingal
1.28	Naul Road	2.5	7.5	Lane Closure	10.9	Fingal
1.29	Stockhole Lane West	0.8	7.5	Lane Closure	11.7	Fingal

4.5.4.1 Construction Staff and Vehicle Movements

Construction of the Proposed Development will require the movement of workers to and from various points along the proposed cable route, throughout the entire Construction Phase. Due to the typically rural nature of the proposed cable route, it is expected that all workers will use private vehicles to travel to and park at a TCC. From each TCC they will consolidate to a smaller number of LGVs to travel to specific construction locations. The appointed contractor will also be required to ensure that their staff may not park on public roads (except within the work areas).

Summing projections for required personnel for the entire Construction Phase of the Proposed Development, the total average estimated number of daily workers at any time does not exceed 215, as shown in Table 4.5. The peak workforce attracted by any of the TCCs will be highest, with an estimated 80 workers at TCC3 at peak construction.

Table 4.5: Average Daily Workforce Numbers

TCC	2026		2027				2028				2029			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
TCC0	0	0	0	0	0	0	0	0	6	33	45	14	8	0
TCC1	32	50	46	22	24	30	13	5	5	5	5	5	5	8
TCC2	20	7	27	54	6	5	7	16	16	7	5	5	5	8
TCC3	45	80	20	34	52	5	5	7	11	15	17	16	9	8
TCC4	24	25	54	26	19	21	16	17	5	5	5	5	5	8
TCC5	25	17	5	55	48	14	5	7	17	16	17	20	7	8
TCC6	12	5	5	24	45	45	45	45	24	6	5	5	5	8
Total	158	184	157	215	194	120	91	97	84	87	99	70	44	48

Generally, the number of construction workers required during the Construction Phase at the substations is expected to peak at approximately 20 persons for each of the two substation sites. Crew sizes for the activities of cable trenching, ducting, and resurfacing is estimated at approximately 12 persons per crew with two crews (teams) working simultaneously. Crew sizes for the installation of the proposed underground cables is estimated at approximately six persons per crew. Additionally, it is estimated that there will be approximately up to four traffic management operatives with each crew. The project offices located at the Temporary Construction Compounds is estimated at approximately five staff (engineers, project managers etc.) at seven locations.

The estimated peak daily traffic movements associated with the installation of the proposed underground cable are presented in Table 4.6. It should be noted though that the ultimate approach will be determined by the appointed contractor, within the parameters assessed in this EIAR.

The Construction Phase of the Proposed Development will require the delivery and removal of various construction materials and equipment including excavated material, asphalt, engineered fill, concrete and facility equipment. The vehicles used for this purpose will be HGVs and ready mixed trucks and their volumes are estimated based on the Construction Phase programme requirements to deliver and remove these various materials from along the proposed cable route. Table 4.6 shows the peak construction traffic associated with each of the Temporary Traffic Management Sections. It should be noted though that the ultimate approach will be determined by the appointed contractor, within the parameters assessed in this EIAR.

Table 4.6: Estimate of Peak Daily Construction Vehicles Movements

TTM Sections	HGV Movements	LGV Movements	Total Movements	Number of Peak Days
1.01	75	134	209	2
1.02	107	117	224	2
1.03	55	7	62	2
1.04	77	5	82	2
1.05	14	1	15	13
1.06	64	9	73	6
1.07	22	5	27	3
1.08	64	7	71	2
1.09	24	2	26	16
1.10	37	6	43	3
1.11	20	3	23	4
1.12	71	7	78	6
1.13	13	3	16	3
1.14	31	4	35	2
1.15	40	0	40	40
1.16	62	6	68	3
1.17	52	153	205	2
1.18	14	1	15	16
1.19	94	9	103	5
1.20	23	2	25	18
1.21	86	8	94	6
1.22	14	1	15	13
1.23	49	10	59	1
1.24	74	8	82	4
1.25	12	1	13	17
1.26	41	4	45	2
1.27	89	9	98	6
1.28	117	11	128	6
1.29	56	7	63	3
1.30	155	177	332	3

4.5.4.2 Cable Drum Delivery

The cable will be delivered to site on cable drums with an approximate length of 750m of cable per drum (the exact lengths will be sized to suit the distance between each Joint Bay). Each cable drum will be approximately 4.3m in external diameter, and 4m wide. This will require a large trailer to allow for transport and will be classed as an abnormal load.

There are no high-voltage cable manufacturers in Ireland. Therefore, it is assumed that the cable drums will be delivered by ship from an overseas manufacturer. An assessment has been made of Dublin Port and Belview Port in Waterford for the arrival of these drums. Both ports are well suited for the delivery and transportation from the port to the construction area. However, due to the size of the cable drums these will be an abnormal load. An assessment has been undertaken as part of the Construction Traffic Management Plan (refer to Appendix B of the CEMP which is included as a standalone document in the planning application) for the Proposed Development, but further assessment and consultation will be required at the detailed design stage (e.g., delivery schedules, selection of port, etc).

It is estimated that there will be approximately 300 abnormal load deliveries. Depending on manufacturing details, these could be completed directly from the port to the construction area, or from the port to a TCC and onwards to the construction area.

Following consultation with an abnormal load specialist (see Appendix B (Construction Traffic Management Plan) to the CEMP, which is included as a standalone document in this planning application pack), at this stage it is not foreseen that specific road closures will be required to transport the drums, provided that they are accompanied by escort vehicles. The escort vehicles will ensure the safety of all road users but also to support the oversized load vehicle with overcoming particular obstructions. The requirement and number of escort vehicles and support from An Garda Síochána is at the discretion of the Permits Officer for each County Council or Consenting Authority along the route. On agreement of the final number and design of cable drums, the delivery port, and specific abnormal load vehicle, the consenting authorities can be engaged and the exact requirements for permits can be jointly agreed.

It is likely that an element of enabling works may be required. This is expected to be vegetation trimming (within the permissible environmental timeframes), the temporary movement of some street furniture, and raising any low overhead lines.

The Construction Traffic Management Plan (Appendix B to the CEMP, which is included as a standalone document in this planning application pack) provides a minimum level of requirements for the appointed contractor to adhere to. The Construction Traffic Management Plan will be further developed during detailed design, based on specific design proposals within the parameters assessed in this EIAR, and as approved by the relevant local authority. A Temporary Traffic Management Designer will be appointed and will prepare Detailed Temporary Traffic Management Designs for all locations where works are planned to, or have the potential to impact, any public road. Prior to commencing the works, the plan will be developed into an Operational Traffic Management Plan by the Project Supervisor Construction Stage (PSCS). The appointed PSCS / appointed contractor for the Proposed Development will be required to carry out the Safety Audit on Operational Traffic Management Plans prior to commencing the works. The PSCS will coordinate the implementation of the developed Construction Traffic Management Plan during construction of the works. The Construction Traffic Management Plan requirements will include the provision of facilities for the safe passage of pedestrian and vehicular traffic and measures to keep the impact of the works on the roads, and local communities and road users, to a minimum. All traffic management controls proposed by the appointed contractor will be in accordance with standards and guidance documents referenced in the Construction Traffic Management Plan.

4.5.4.3 400kV Transformer Delivery

The 400kV transformer will be delivered directly from port to Belcamp Substation. The transformer will be lifted via a crane onto the specialist multi-axle vehicle trailer at port and the vehicle will transport the transformer to the substation where it will be lifted from the trailer into position during the proposed substation works. Although dependent on shipping logistics, it is anticipated that a route from Belview Port to Belcamp Substation, largely comprising the motorway network, will be considered.

The vehicle to be used will be a multi-axle trailer and tractor unit, adopting a conventional approach for abnormal deliveries of this nature. The multi-axle trailer is generally comprised of several modular platform vehicles, which are typically available in 2-axle, 3-axle, 4-axle and 6-axle versions.

Considering the overall length of the tractor and trailer unit, which is approximately 40m in length, this load is not expected to be covered under the remit of the permitting process administered by An Garda Síochána, and independent authorisation from the relevant local authorities and / or the Minister for Transport is likely to be required.

4.5.5 Outline Construction Schedule and Timing of Works

Subject to the grant of statutory approvals, it is anticipated that the Construction Phase will commence in Q2, 2026 with the underground cable element of the Proposed Development becoming fully operational after construction and testing in Q4, 2029.

The works at the Woodland Substation are expected to last approximately seven months, while the works at Belcamp Substation are expected to last approximately 17 months. Works to both substations will run concurrently with cable installation works.

Construction activities will gradually phase out from pre-construction to predominantly civil activities, followed by commissioning and testing.

In general, it is anticipated that construction will occur during normal working hours (i.e., Monday to Friday 7am to 7pm and Saturday from 8am to 2pm). There may be localised instances where night-time working is required to facilitate traffic management. However, work outside these hours and days will only be undertaken with prior agreement with Meath and Fingal County Councils.

Clearance of hedgerow, treeline or scrub vegetation, where required, will take place after 31 August and before 1 March in order to protect breeding birds (i.e., outside of the bird breeding season). Clearance may take place during the restricted period, if a suitably qualified ecologist has determined that nesting birds and other protected species are absent. Enabling works are provisionally programmed for Q3 2026. This will allow sufficient time for habitat clearance outside of the breeding season.

Any element of the Proposed Development requiring in-stream works in watercourses with fisheries value will be restricted to the fisheries open season (i.e., will only take place during the period July to September), unless there is an agreement in place with IFI.

The duration of the installation of each Joint Bay and each Passing Bay (Phase 1 of the works) will be approximately six days in total. Installation and reinstatement of the Joint Bays and Passing Bays is expected to start in Q4 2026 and last until Q3 2029.

The duration of the construction of each TCC will be approximately 20 days, though they will be in operation for the full duration of the Construction Phase. Construction of the TCCs / HDD Compounds is likely to begin in Q3 2026.

The duration of HDD works at each location will be approximately 54 days and will be undertaken during Phase 2 of the works. HDD works are likely to begin in Q3 2026 and be completed in Q2 2027.

Excavation and installation of ducts (Phase 2 of the works) are expected to progress at a rate of 50m per day. These activities are likely to begin in Q3 2026 and be completed in Q4 2027.

Installation and jointing of cables (Phase 3 of the works) is likely to begin in Q4 2026 and last until Q3 2029. Proposed works are summarised schematically in Table 4.7.

Table 4.7: Indicative Preliminary Construction Programme

Description	Est. Construction Programme (Months)	2026				2027				2028				2029			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Proposed Development - Construction Duration																	
Overall Construction Duration	42																
Preliminary & Planning Works	3																
Enabling Works (including TCC / HDD Compound, devegetation, temporary haul roads and permanent access tracks)	39																
Phase 1: Installation and reinstatement of joint bay and passing bays structures	34																
Phase 2: Excavation and Installation of cable ducts	12																
Phase 3: Installation and Jointing of Cables	32																
Substation works	24																
Testing & Commissioning	3																
Energisation and permanent works construction complete	3																

Subject to the grant of consents, it is anticipated that construction (including testing, commissioning and energisation) of the Proposed Development will take approximately 42 months in total. However, safety requirements for the installation operations / procedures, detailed design considerations and weather conditions will ultimately dictate the final programme within the parameters assessed in the EIAR.

The majority of the construction activities will not be dependent on outages on the existing transmission system. However, specific activities associated with the connection at the existing Woodland and Belcamp Substations on to the existing transmission infrastructure will be planned and programmed into EirGrid's multi-year outage programme, as the existing live infrastructure will need to be switched off during such connection activities. EirGrid, as Transmission System Operator, develops a detailed plan for such outages each year to ensure the safe and efficient undertaking of construction and maintenance activities involving, or in proximity to, existing infrastructure.

4.5.6 Temporary Construction Compounds

All TCCs will be secured with hoarding / fencing around their perimeter, as appropriate. TCCs will include facilities such as Construction Phase car parking, welfare facilities, offices and temporary material storage areas, as necessary. Any sewage discharges from temporary welfare facilities will be connected to a sealed holding tank to be emptied and disposed off-site by a licensed contractor to an approved and licensed facility. Temporary surface water drainage will also be provided to control run-off from the compound, including any runoff from trafficked areas such temporary access tracks, plant/equipment storage and car parking.

Where a construction access track is required, engineering stone fill will be laid and compacted and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed, and the land will be reinstated to its original condition.

All construction workers will be required to use the designated access / egress routes only. Storage of fuel and refuelling will be undertaken within bunded areas. Water will be brought to site via tankers, as required.

Security lighting will be directional and cowled. The appointed contractor will regularly review security lighting in this regard, to inform adaptive management if necessary and to report the monitoring findings regularly to ESB, EirGrid and the relevant local authority.

The TCCs will be located within the Planning Application Boundary and are as follows:

- TCC0: Chainage 0, located off the Redbog Road, with an approximate area of 1ha (refer to Image 4.25);
- TCC1: Chainage 3,550, located off the R156, with an approximate area of 0.8ha (refer to Image 4.26);
- TCC2: Chainage 10,600, located off the R156, with an approximate area of 1ha (refer to Image 4.27);
- TCC3: Chainage 21,600, located off the Ballymacarney Road, with an approximate area of 1.6ha (refer to Image 4.28);
- TCC4: Chainage 26,850, located off the R121, with an approximate area of 1ha (refer to Image 4.29); and
- TCC5: Chainage 34,800, located off the Stockhole Lane, with an approximate area of 1ha (refer to Image 4.30).
- TCC6: Chainage 37,700, located off the Stockhole Lane adjacent to Belcamp Substation, with an approximate area of 1.6ha (refer to Image 4.31).

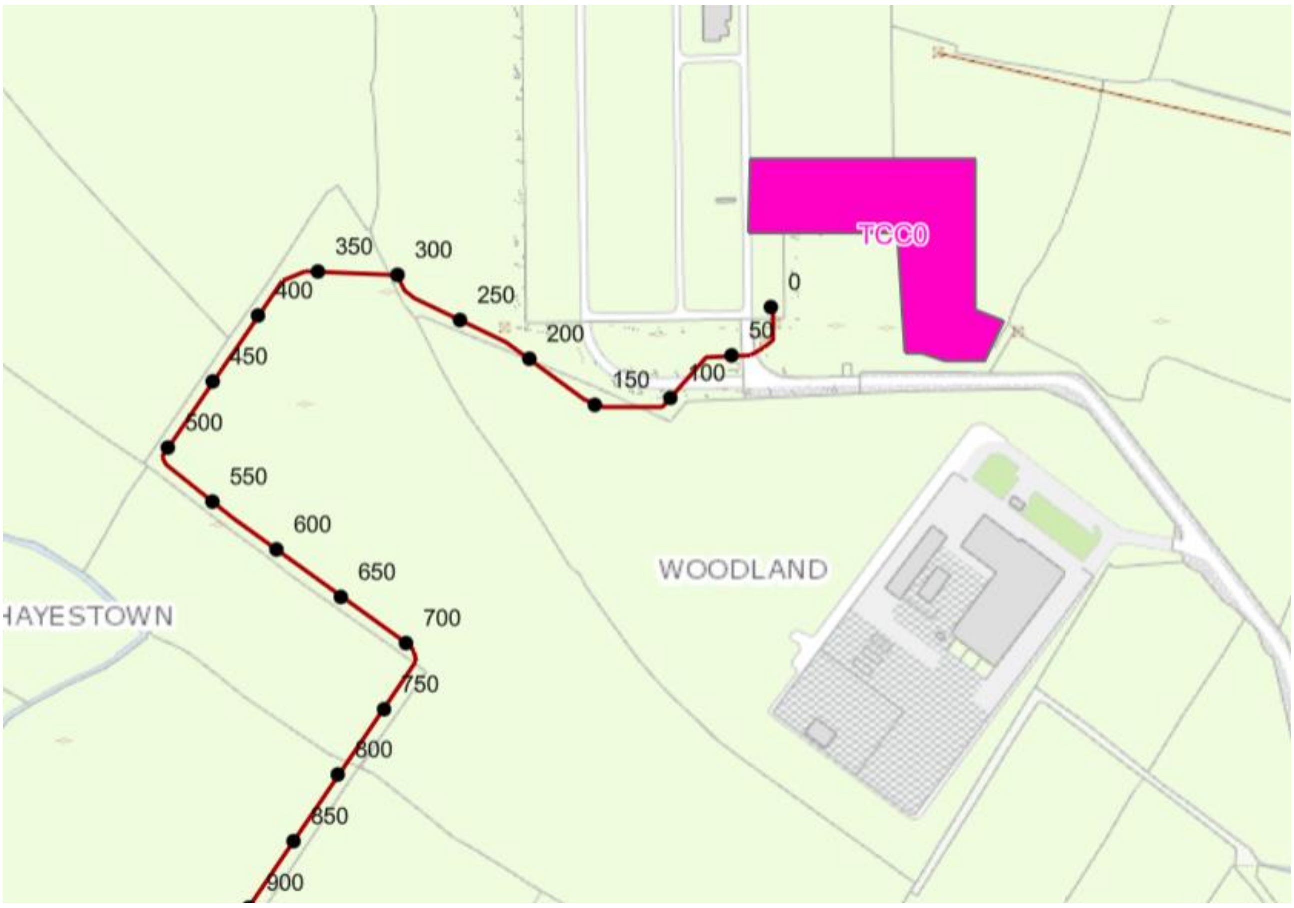

Image 4.25: Proposed TCC0

Image 4.26: Proposed TCC1

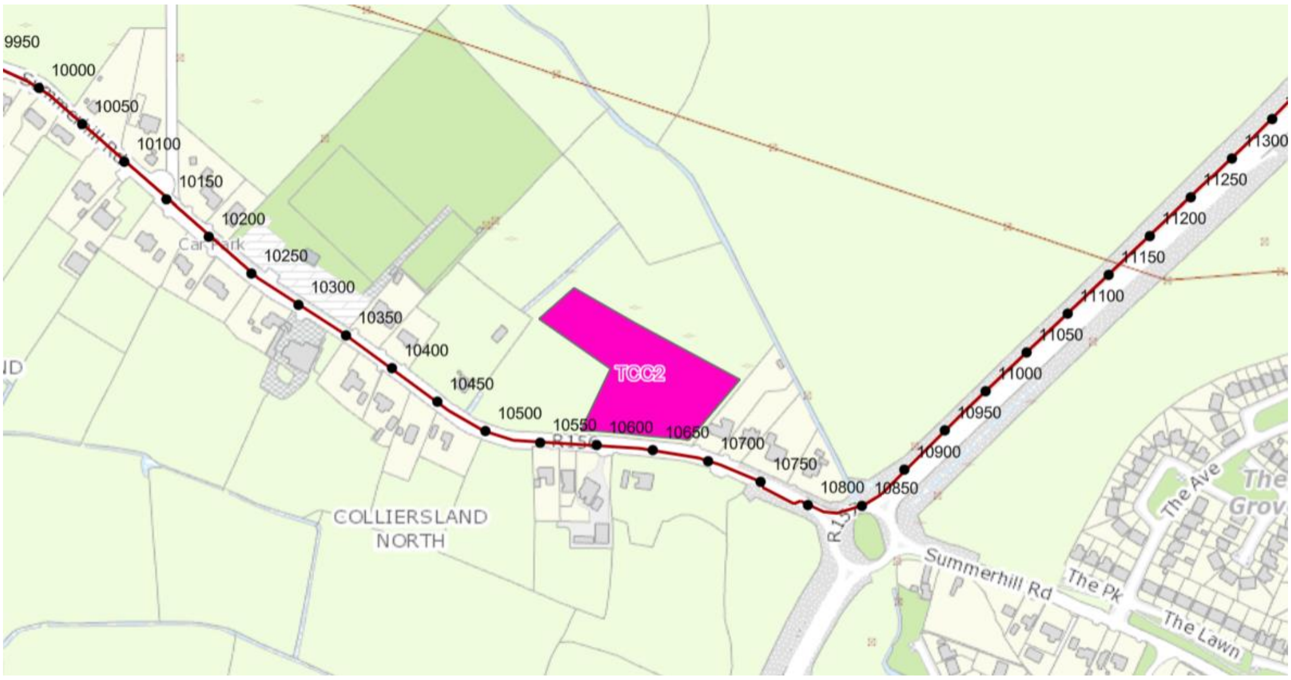

Image 4.27: Proposed TCC2

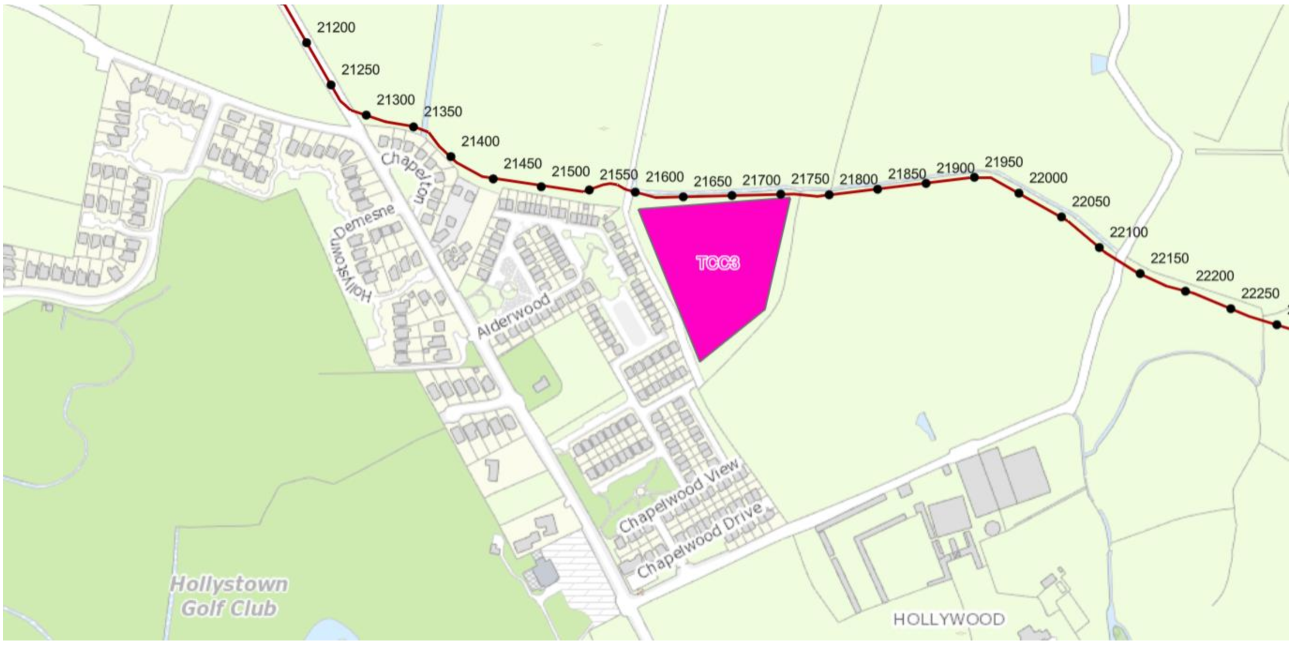

Image 4.28: Proposed TCC3

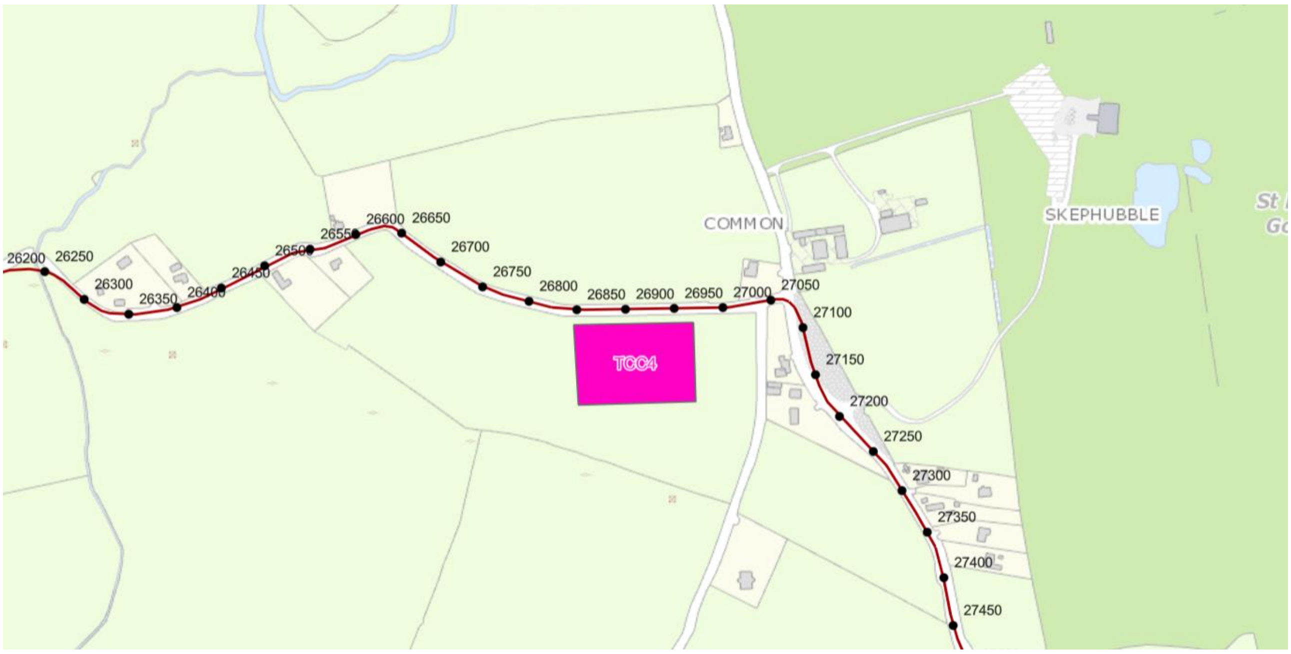

Image 4.29: Proposed TCC4

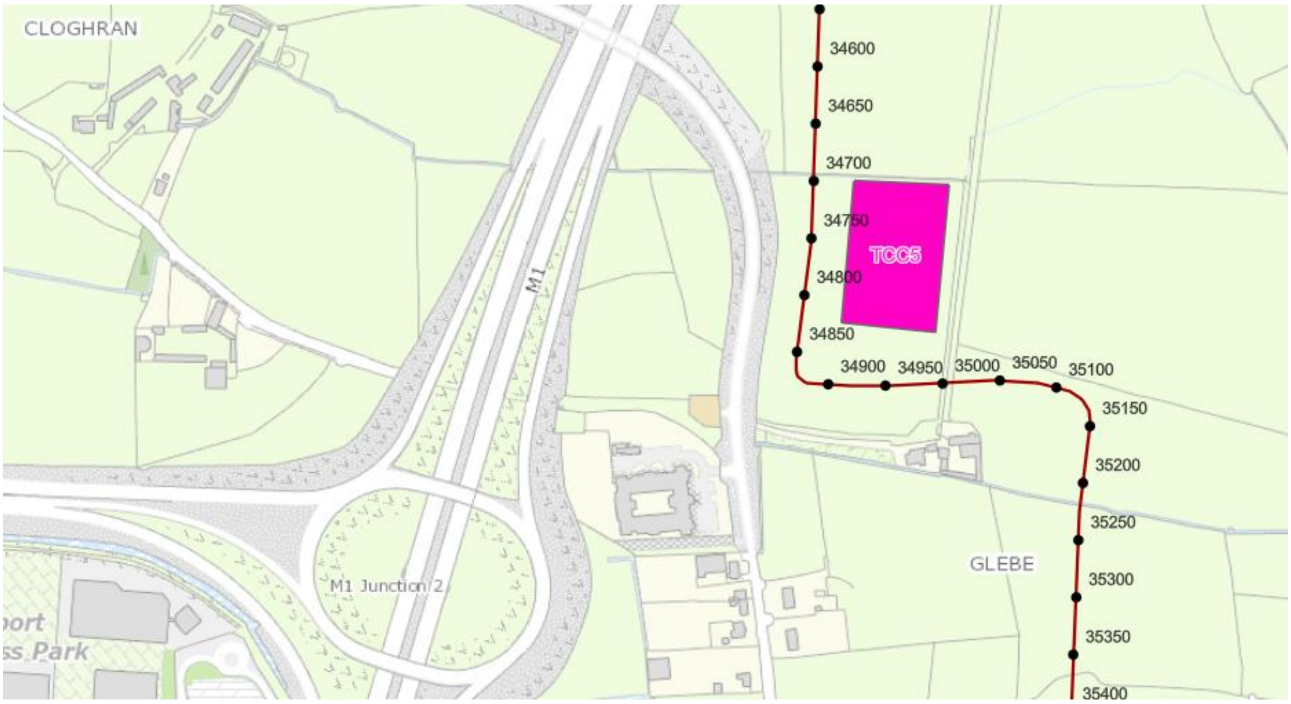

Image 4.30: Proposed TCC5

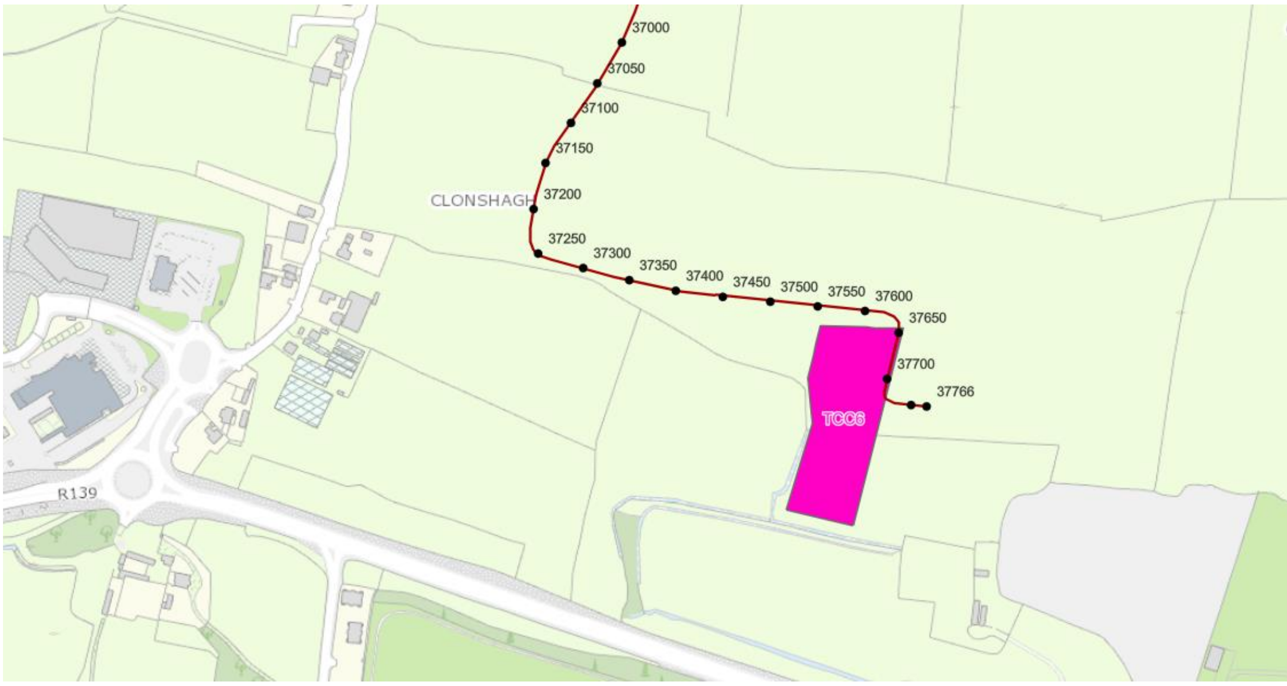

Image 4.31: Proposed TCC6

There will also be a temporary HDD Compound at both the reception and launch locations at each of the three HDD crossings. These temporary HDD Compounds will not be used for the storage of materials for the wider route or for site offices but will be used to facilitate the works required adjacent to and under the motorways and railway. A laydown area is also required for each HDD crossing. The temporary HDD Compounds will be located within the Planning Application Boundary and are as follows:

- M3 HDD Compound West (HDD 1a): Chainage 12,850, located off the Woodpark Road, with an approximate area of 0.23ha (refer to Image 4.32);

- M3 HDD Compound East and Laydown Area (HDD 1b): Chainage 13,050, located off the R147, with an approximate area of 0.31ha (refer to Image 4.32);
- M2 HDD Compound South (HDD 2a): Chainage 23,400, located off the R121, with an approximate area of 0.15ha (refer to Image 4.33);
- M2 HDD Compound North and Laydown Area (HDD 2b): Chainage 23,600, located off the R121, with an approximate area of 0.45ha (refer to Image 4.33);
- M1 HDD Compound West (HDD 3a): Chainage 34,250, located off the Stockhole Lane, with an approximate area of 0.22ha (refer to Image 4.34); and
- M1 HDD Compound East and Laydown Area (HDD 3b): Chainage 34,450, located off the Stockhole Lane, with an approximate area of 0.43ha (refer to Image 4.34).

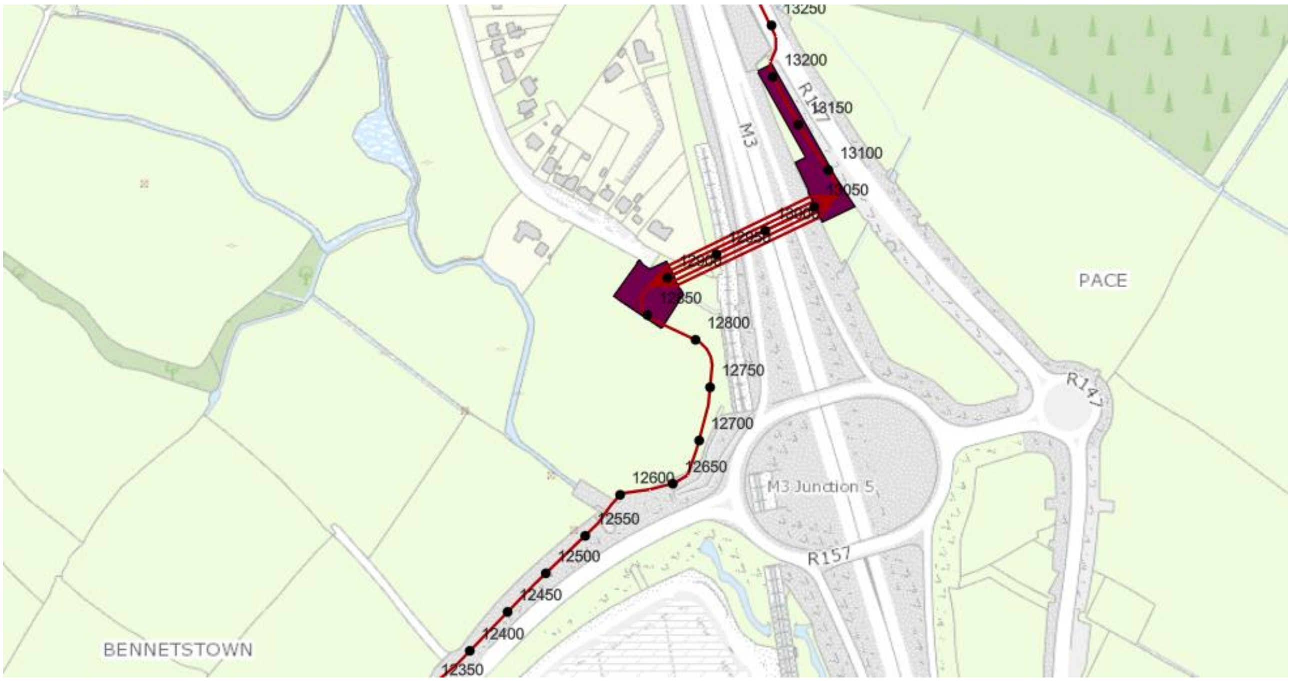

Image 4.32: Proposed M3 HDD Compounds and Laydown Area (HDD1a and HDD1b)

Image 4.33: Proposed M2 HDD Compounds and Laydown Area (HDD 2a and HDD 2b)

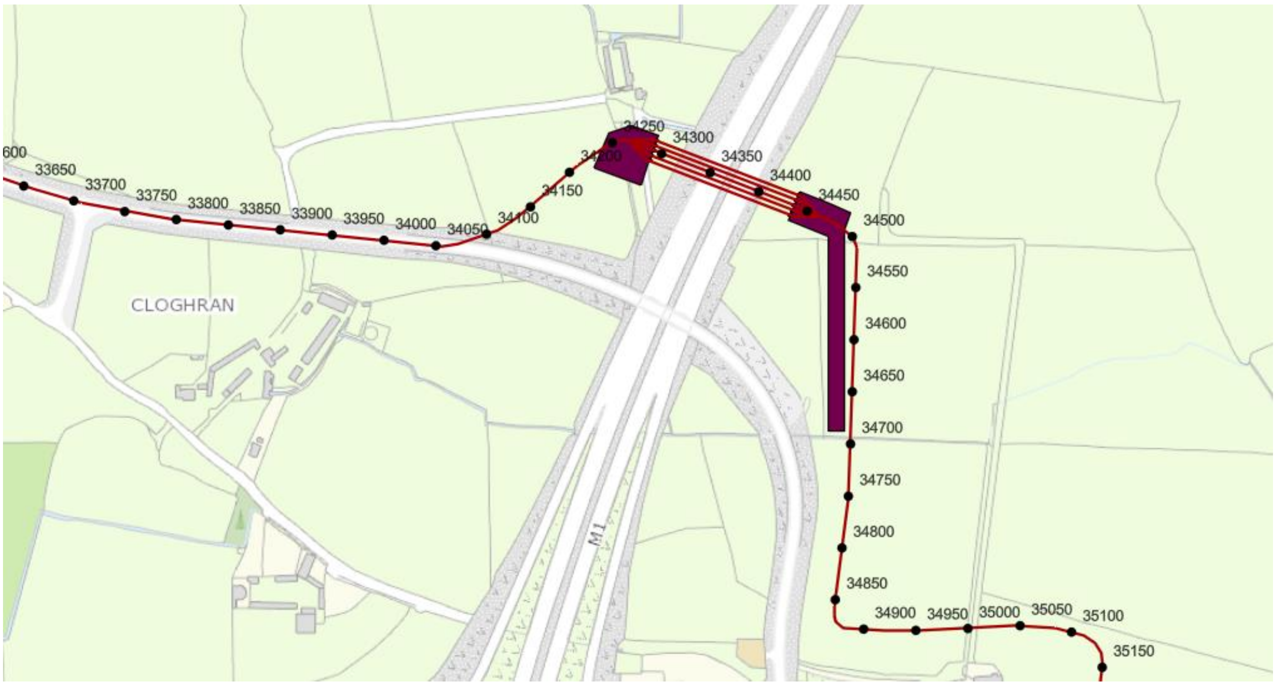

Image 4.34: Proposed M1 HDD Compounds and Laydown Area (HDD 3a and HDD 3b)

4.5.7 Construction Environmental Management Plan

A CEMP is included as a standalone document in this planning application pack and will be implemented during the Construction Phase in consultation with Meath County Council and Fingal County Council. This CEMP will be a key construction contract document, which will ensure that all Pre-Construction and Construction Phase mitigation measures that are considered necessary to protect the environment, are implemented.

The CEMP will remain a 'live' document which will be reviewed regularly and revised as necessary in consultation and agreement with the two local authorities to ensure that the measures implemented are effective, as part of an ongoing review throughout the Construction Phase of the Proposed Development. This will confirm the efficacy and implementation of all relevant mitigation measures and commitments identified in the planning application documentation.

The primary objective of the CEMP is to safeguard the environment, site personnel and nearby sensitive receptors from site activity which may cause harm or nuisance. As such, the CEMP sets out a framework to ensure that key mitigation measures and conditions set out as part of the planning consent process are translated into measurable actions and are appropriately implemented during the Construction Phase of the Proposed Development. As part of this framework, transparent and effective monitoring of the receiving environment during construction will be used to inform and manage ongoing activities on-site and to demonstrate effectiveness of the measures outlined therein.

The ESB will monitor the appointed contractor's performance on a regular basis and will undertake various compliance checks throughout the duration of the Construction Phase, including the following:

- Review appointed contractor documents against the requirements of the CEMP;
- Undertake regular audits;
- Ensure site records are checked regularly;
- Set up a reporting structure for the appointed contractor; and
- Conduct regular meetings (at least fortnightly) where Environmental Health and Safety is an agenda item.

4.5.7.1 Construction Traffic Management Plan

The appointed contractor will implement the Construction Traffic Management Plan, included as Appendix B of the CEMP, which is included as a standalone document in the planning application, in ongoing consultation with Meath County Council and Fingal County Council. The Construction Traffic Management Plan may be subject to iterative updates in consultation and agreement with the two local authorities, as part of ongoing review and design development throughout detailed design and the Construction Phase of the Proposed Development. The implementation of the Construction Traffic Management Plan will mitigate potential construction traffic impacts on the public road network. All construction activities, including construction traffic, will be managed through the Construction Traffic Management Plan.

4.5.7.2 Construction Resource and Waste Management Plan

Prior to commencement of the Proposed Development, the appointed contractor will implement the Construction Resource and Waste Management Plan (see Appendix C of the CEMP, which is included as a standalone document in the planning application pack), which will ensure that optimum levels of waste prevention, reduction, reuse, recycling, and recovery are achieved. As with the CEMP and the Construction Traffic Management Plan, the Construction Resource and Waste Management Plan may be subject to iterative updates in consultation and agreement with the two Local Authorities.

The Construction Resource and Waste Management Plan has been prepared in accordance with waste management guidance and principles as outlined in the EPA's Best Practice Guidelines For The Preparation of Resource and Waste Management Plans For Construction and Demolition Projects (EPA 2021).

All operations during the Construction Phase will be managed and programmed in such a manner as to prevent / minimise waste production and maximise upper-tier waste management (i.e., reuse, recycling and recovery) in line with the Waste Hierarchy, where technically and economically feasible.

The requirement to develop, maintain and operate the Construction Resource and Waste Management Plan will form part of the contract documents for the Proposed Development and will be updated by the appointed contractor (as set out above) in advance of the commencement of construction activities on-site. Waste sent off site for recovery or disposal will only be conveyed by an authorised waste contractor, and transported from the Proposed Development site to an authorised site of recovery / disposal, in a manner which will not adversely affect the environment. All construction employees will be required to comply with the obligations under the Construction Resource and Waste Management Plan.

4.5.8 Environmental Clerk of Works

The appointed contractor will appoint an EnCoW, who will have suitable environmental qualifications. The EnCoW will have the necessary experience and knowledge appropriate to the role (including experience of linear infrastructure projects and HDD) to ensure all monitoring and mitigation measures are properly implemented. The EnCoW will be a member of a relevant professional body, such as the Institute of Environmental Management and Assessment (IEMA)). The suitability of qualifications / experience of the proposed EnCoW will be confirmed by a senior/ principal environmentalist / ecologist from ESB. The EnCoW will be delegated sufficient powers under the construction contract so that they will be able to instruct the appointed contractor to stop works and to direct the carrying out of emergency mitigation / clean-up operations. The EnCoW will also manage consultation with environmental bodies including the National Parks and Wildlife Service (NPWS) and IFI. The EnCoW will be responsible for carrying out regular monitoring of the CEMP and will report monitoring findings in writing to ESB on a regular basis (at least weekly, but immediately in the case of incidents or accidents).

4.5.9 Habitat Restoration Works

The following enhancement measures will be incorporated into the Proposed Development:

- Unless otherwise agreed with the ESB and the local authority, the appointed contractor will reinstate hedgerows and treelines to a species-rich condition (i.e., five woody species per 30m), comprising only native species of local provenance; and
- All other sites will be returned as close as possible to their pre-existing condition, using the same woody species removed, or similar verge seed mixes, under the supervision and direction of the appointed contractor's EnCoW.

4.6 Operation and Maintenance

4.6.1 Underground Cable

A permanent easement of 5m will generally be required above the proposed cable trench. A wider easement will be required on certain land holdings for proposed permanent access tracks and Joint Bays, HDD splayed sections and other features. Specifically, a wider permanent easement will be required at the following off-road sections:

- Woodland Substation to the R156 Regional Road – a 15m wide permanent easement is assumed for assessment purposes; and
- M1 Motorway to Belcamp Substation – a 30m wide permanent easement is assumed for assessment purposes.

This will be discussed and agreed with the affected landowners and all permanent easement areas are included within the Planning Application Boundary for the Proposed Development.

Routine maintenance will be required along the proposed cable route. Access to link boxes and communications chambers will be required on an annual basis for inspection and for any necessary maintenance. The ESB will undertake maintenance of the Proposed Development as electricity Transmission System Owner, through its business unit ESB Networks. A crew size of three persons is expected for inspection of the Joint Bays and their associated communications chambers and link boxes. Traffic management may be required for Joint Bay locations positioned in-road or on verges. Access to off-road Joint Bays will be provided via the proposed permanent access tracks, as described in Section 4.5.2.3. Access to these locations will be coordinated with the landowners to minimise disruption. Prior to the works commencing, consultation will be undertaken with the local authorities. Traffic management will likely be stop-go systems and specific measures will be presented within a Traffic Management Plan for the Operational Phase.

4.6.2 Substations

Following the Construction Phase, operation and maintenance of Woodland and Belcamp Substations will be managed by the ESB. The substations do not currently require any personnel for operation and this will remain the case following the implementation of the Proposed Development. Scheduled maintenance of the substations will continue to occur approximately once a year, in line with the current maintenance schedule. It is expected that approximately five persons would attend each of the substation sites.

4.7 Health and Safety Considerations

4.7.1 Project Supervisor for the Construction Phase

A PSCS will be appointed for the Proposed Development when the contractors are appointed to carry out the works. The PSCS will be responsible for developing the Construction Phase Health and Safety Plan, coordinating the works of appointed contractors and providing the Project Supervisor Design Process (PSDP) with information required in the Safety File.

4.7.2 Project Supervisor Design Phase Process

The PSDP will ensure coordination of the work of designers throughout the Proposed Development. This will ensure that they are addressing and coordinating safety and health matters from the very early stages of the Proposed Development.

4.8 Reinstatement and Decommissioning

All temporary works such as Passing Bays, HDD Compounds and TCCs, and working areas within the Planning Application Boundary will be restored to their current land use. The materials such as temporary culverts or roadside drains or stoning will be removed in the reverse of the process described above. Planting will be provided where existing vegetation has been removed for temporary works areas. Species-rich hedgerows will be provided where existing hedgerows are affected to seek to improve existing biodiversity levels. Trees will also be provided, where it is appropriate, ensuring sufficient set-back from the proposed cable route.

Permanent works will include the Joint Bays and 12 proposed permanent access tracks, and hardstanding areas around the off-road Joint Bays. These areas will be maintained by the ESB, as necessary. Hedgerows / treelines within the permanent easement will not be replanted. However, offsite compensatory planting will be undertaken considering all permanent losses within the easement.

The following will apply for field boundaries within the permanent easement:

- For field boundaries between the same landowner, affected hedgerows will be replaced with a suitable stock-proof fence. Where one currently exists, access will be provided with a gate (standard 3.6m width unless wider is required by the landowner);
- For field boundaries between different landowners, affected hedgerows will be replaced with a suitable stock-proof fence and no gates will be provided; and

- For field boundaries between different landowners on the Woodland Corridor, affected hedgerows will be replaced with a suitable stock-proof fence. A double gate will be provided so that access along the Joint Bay permanent access track is possible for ESB, but it will not be possible for adjacent landowners to access each other's land. The double gate will be a gate on either side of the landowner boundary and will ensure no issue with livestock escaping in the adjacent field. This will be one gate width (standard 3.6m width).

All affected landowners will be provided with detailed plans outlining the location(s) of permanent works on their land. The location of the cable route and associated permanent works will be provided to all statutory undertakers, Meath and Fingal County Councils, and will be included on ESB's register for its 'Dial Before You Dig' programme (ESB 2023).

The works within the substations will also be permanent features.

Affected roads will be resurfaced in agreement with Meath and Fingal County Councils in line with the principles of The Purple Book (Department of Transport, Tourism and Sport 2017).

It is not intended to decommission the proposed electricity infrastructure. Equipment will be replaced but decommissioning is not intended. In the highly unlikely event that decommissioning is required, the effects would be similar, but less, than those assessed during construction of the proposed underground cables.

4.9 References

Construction Industry Compliance Assistance Centre (1992). STD & SPEC 3.25 Utility Stream Crossing. [Online] Available at https://www.cicacenter.org/bmp/0591.pdf.pdf

Department of Transport, Tourism and Sport (2017). The Guidelines for Managing Openings in Public Roads (The Purple Book)

EirGrid (2021). 10 kV, 220 kV and 400 kV Underground Cable Functional Specification

Electricity Safety Board (2023). ESB Register for Dial Before You Dig' programme. [Online] Available from https://www.esbnetworks.ie/contact-us/safe-digging

Environmental Protection Agency (2021). Best Practice Guidelines For The Preparation of Resource and Waste Management Plans For Construction and Demolition Projects

Health and Safety Authority (2010). Code of Practice for Avoiding Danger from Underground Services

IFI (2016). Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters

Met Éireann (2024). National Forecast. [Online] Available from https://www.met.ie/forecasts/national-forecast

<u>Directives and Legislation</u>

Directive 2014/52/EU of the Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 5 - Population

EirGrid

March 2024

Contents

5. Population

5.1 Introduction

This Chapter presents the assessment of the likely potential impacts of the Construction and Operational Phases of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) on people and communities. A full description of the Proposed Development is presented in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

This assessment has considered and assessed the potential impacts of how the Proposed Development may affect the way in which people live, work, relate to one another, organise to meet their needs, and generally operate as members of society. In doing so, this assessment considers demographics, community composition, land use, the location of residential, commercial, community receptors and recreational (including tourism) amenities as well as economic activity in general.

Consideration and assessment of potential impacts related to human health are outlined in Chapter 6 (Human Health) in Volume 2 of this EIAR.

5.2 Methodology

The following sections outline the parameters considered in respect to establishing study area(s), in compliance with relevant guidelines, policies and legislation, the data collection and collation undertaken, as well as the appraisal method(s) for the assessment of impacts on people and communities.

This assessment of the likely potential impacts on people and communities as a result of the Construction and / or Operational Phases of the Proposed Development comprises the assessment of potential impacts on the following assessment topics:

- Population:
  - Amenity;
  - Accessibility and Severance;
  - Land Use / Land Take; and
  - Local Economy.

5.2.1 Study Area

The study area(s) for this assessment of the likely potential impacts on people and communities during the Construction and Operational Phases of the Proposed Development has been determined with these assessment topics in mind. Given the different spatial scales that apply to assessment topics, different study areas have been set accordingly:

- For the assessment topic of Amenity, the study area comprises an area of a 300m (metre) buffer from the Planning Application Boundary (as shown in Figure 5.1 in Volume 4 of the EIAR), as this is considered to be the typical distance in which potential impacts associated with air quality, noise and vibration, visual and traffic are likely to occur and potentially combine to have a potential impact on amenity;
- For the assessment topic of Accessibility and Severance, the study area comprises an area of 300m from the Planning Application Boundary, as this is considered to be the typical distance in which potential impacts on accessibility and severance can occur;

- For the assessment topic of Land Use / Land Take, the study area consists of the footprint of the Proposed Development (i.e., within the Planning Application Boundary as shown in Figure 5.1 in Volume 4 of this EIAR); and
- For the assessment topic of Local Economy, the study area comprises the area of County Meath as well as the Local Authority area of Fingal in County Dublin, as these are the areas in which the Proposed Development is to be situated, and therefore, determined to be the extent to which potential impacts on the economy are experienced.

5.2.2 Relevant Guidelines, Policy and Legislation

The assessment has been undertaken with regard to the following relevant guidelines, policies and legislation:

- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022);
- Environmental Impact Assessment of Projects. Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Government of Ireland 2018);
- Design Manual for Roads and Bridges (DMRB) LA 112 Population and Human Health (hereafter referred to as the DMRB Guidance) (Highways England 2020);
- EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects (Fáilte Ireland 2023)
- Meath County Development Plan 2021-2027 (Meath County Council (MCC) 2021);
- Fingal Development Plan 2023-2029 (Fingal County Council (FCC) 2023);
- Dublin Airport Local Area Plan 2020 (FCC 2020); and
- Number 30 of 2000 - Planning and Development Act, 2000 (as amended).

5.2.3 Data Collection and Collation

A desk-based study was undertaken in November 2023, and further checked in January 2024, to access all relevant information to inform the assessment. The following data sources and records were used:

- 2022 Census data from the Central Statistics Office (CSO), comprising statistical data and information at county, settlement, and small area (SAPS) geographical levels (CSO 2023a);
- County Meath Local Economic and Community Plan 2016-2021 (MCC 2016);
- Dublin Airport Local Area Plan 2020 (FCC 2020);
- Eastern and Midland Regional Assembly (EMRA) Regional Spatial and Economic Strategy 2019 - 2031 (hereafter referred to as the RSES) (EMRA 2019);
- EirGrid Evidence Based Environmental Study 9: Settlement and land-use (EirGrid 2016);
- EPA Maps (EPA 2024);
- Fingal Development Plan 2023 - 2029 (FCC 2023);
- Fingal Local Economic and Community Plan 2016 – 2020 (FCC 2016);
- GeoDirectory Address Data Information (An Post and Tailte Éireann 2023); and
- Meath County Development Plan 2021 - 2027 (MCC 2021).

5.2.4 Appraisal Method for the Assessment of Impacts

5.2.4.1 Assessment Topics

5.2.4.1.1 Amenity

'Amenity' describes the perceived character or attractiveness of an area in which people live, work, or socialise. Changes in the amenity of an area (as a result of a development or project) can affect how people perceive or recognise their communities or how they go about their daily routine or use community / recreational facilities and / or commercial resources.

Factors that influence the amenity of an area include those that contribute to the 'look and feel' of a particular location or space. As such, potential impacts on air quality, noise and vibration, visual and traffic resulting from the Construction and / or Operational Phases of the Proposed Development are important contributing factors that are most likely to determine whether a considerable or notable change in amenity is likely.

Therefore, the assessment of potential impacts on amenity (as set out in Section 5.4.2.1) essentially comprises an in-combination assessment of the findings of the following accompanying environmental assessments of the Proposed Development within this EIAR:

- Chapter 7 (Air Quality);
- Chapter 9 (Noise and Vibration);
- Chapter 14 (Traffic and Transport); and
- Chapter 18 (Landscape and Visual).

Potential impacts on amenity have been considered during the Construction and / or Operational Phases of the Proposed Development and have been considered and assessed using professional judgement (aided by the EPA Guidelines (EPA 2022)), whereby only significant residual impacts (either negative or positive), as reported by these environmental assessments are considered within the assessment of potential impacts on amenity. There is only considered to be the potential for impacts on amenity where two or more of these environmental assessments report significant residual impacts.

5.2.4.1.2 Accessibility and Severance

Accessibility relates to the ability of users to access community facilities, recreational resources, and residential properties. Change in access to facilities can significantly affect users, particularly if these are important facilities (e.g., healthcare facilities), or if there are a lack of alternative facilities available.

During the Construction Phase, where access points to residential, commercial and community receptors are to be crossed by the Proposed Development, temporary measures will be required to facilitate access at all times until construction activities are completed. The assessment considers these access points and the potential for impacts in relation to accessibility and severance, and these are assessed using professional judgement (aided by the EPA Guidelines (EPA 2022)).

5.2.4.1.3 Land Use / Land Take

The assessment of potential impacts on land use / land take considers and assesses the implications of the temporary and permanent land take required from residential and commercial receptors and community / recreational facilities during the Construction and / or Operational Phases of the Proposed Development. Temporary land take is typically short-term (see Table 5.3 for a definition of durations) and only required for the duration of the Construction Phase. However, permanent land take is long-term and often is required from the outset of construction activities and throughout the lifetime of the Proposed Development.

Given the nature of the Proposed Development, there are no permanent land take requirements from private residential and commercial properties or public community lands during the Operational Phase. Therefore, all potential impacts that are referred to in Section 5.4.2.3 are considered to be temporary land take requirements that would occur during the Construction Phase only.

Only potential impacts on the land use of private land holdings and public community lands are included in this assessment. All potential impacts on the land use of agricultural businesses (including land holdings) are considered in Chapter 15 (Agronomy and Equine) in Volume 2 of this EIAR.

5.2.4.1.4 Local Economy

The assessment of potential impacts on the local economy as a result of the Proposed Development, outlined in Section 5.4.2.2, is considered to be an assessment of the potential impacts on employment within County Meath and Fingal in County Dublin generally, but also on local businesses in these locations. This assessment is not considered to be an attempt to calculate or measure the economic benefits or otherwise of the Proposed Development, which are determined separately from this EIAR.

5.2.4.2 Determination of Sensitivity, Magnitude and Significance

There is no prescribed method for determining the sensitivity (of receptors), magnitude of change, and / or significance of impacts in respect to the assessment of potential impacts on people and communities. Therefore, professional judgement and past experience on other major infrastructure projects has been used, aided by, and with regard to, the EPA Guidelines (EPA 2022) and the DMRB Guidance (Highways England 2020) to establish an appraisal method for the assessment of potential impacts and determine the sensitivity of receptors, magnitude of change, and / or significance of potential impacts.

Table 5.1 presents the sensitivity criteria applied to residential, commercial and community receptors in the study area outlined in Section 5.3.2.

Table 5.1: Sensitivity Criteria for Residential, Commercial and Community Receptors

Sensitivity Category	Description
Very high	Health, social, leisure or commercial facilities that serve a population at a regional or national level. Examples would include regional hospitals, national stadiums and strategic employment sites (>5ha). These are considered very high sensitivity on the basis that disruption of access or loss of the resource would affect a population at a regional or national scale and there would be limited alternative options.
High	Health, social, residential, leisure or commercial facilities that serve the local or regional community, including vulnerable groups such as the elderly, children or people with disabilities. Examples would include local health centres, schools, leisure centres, local shopping centres, housing and employment sites (1-<5ha). These are considered of high sensitivity on the basis that disruption of access or loss of the resource could undermine the ability of the community to support its health, social and cultural wellbeing and/or affect community cohesion.
Medium	Health, social, residential, leisure or commercial facilities that serve a minority in the community and for which many alternatives exist locally. Examples would include individual houses and small businesses (<1ha). It is considered that these properties would be of medium sensitivity, since impacts on them would affect the individuals concerned but not affect any population at community level.
Low	Land allocated for development. It is considered that this land is of low sensitivity since proposed development is yet to be incorporated into the community. This is considered low sensitivity on the basis that whilst the individual developers may be affected, there is opportunity to compensate or alter proposals to accommodate the impact.
Very low	Land such as derelict sites that are not currently serving individuals or communities with any specific service or facility.

The significance of impacts matrix, as set out in Table 5.2 (adapted from the EPA Guidelines) was used, together with professional judgement, to determine the significance of potential impacts associated with the Construction and / or Operational Phases of the Proposed Development.

Table 5.2: EPA Significance Matrix

		Sensitivity				
Magnitude		**Very Low**	**Low**	**Medium**	**High**	**Very High**
	Very Low	Imperceptible	Not Significant	Slight	Slight	Slight
	Low	Not Significant	Slight	Moderate	Moderate	Moderate
	Medium	Slight	Moderate	Moderate	Significant	Significant
	High	Slight	Moderate	Significant	Very Significant	Profound
	Very High	Slight	Moderate	Significant	Profound	Profound

The duration of impacts was determined using the EPA Guidelines definitions, as outlined in Table 5.3.

Table 5.3: Duration of Impacts (EPA 2022)

Describing the Duration and Frequency of Effects	
'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**Momentary Effects** Effects lasting from seconds to minutes
	Brief Effects Effects lasting less than a day
	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
	Frequency of Effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

5.3 Baseline Environment

This Section presents information on the baseline environment in which the Proposed Development is situated, and which is of particular relevance to the assessment of potential impacts on people and communities. The information on the baseline environment provides the basis for the assessment of potential impacts that is outlined in Section 5.4. A brief description of the local community area is provided, as well as the nature and type of community and commercial receptors and any notable features in the proximity of the Proposed Development. The baseline environment in terms of air quality, noise and vibration, traffic and transport and landscape and visual, which inform the amenity and accessibility assessments, are described in Chapter 7 (Air Quality), Chapter 9 (Noise and Vibration), Chapter 14 (Traffic and Transport) and Chapter 18 (Landscape and Visual) in Volume 2 of this EIAR.

5.3.1 Overview

According to the County Meath Development Plan 2021-2027 (MCC 2021), County Meath covers an area of over 230,000 hectares (ha) and is the second largest county in Leinster. It adjoins County Dublin to the south, and this geographical proximity and the strong functional relationship between the two counties, results in

County Meath being a vital supporting partner in the recent growth of the Greater Dublin Area (GDA). Furthermore, it also states that the county benefits from a wealth of natural and man-made resources and is supported by a well-developed road and rail infrastructure system which provides access to international transport networks at Dublin Airport and Dublin Port as well as the remainder of the country. The fertile soils provide the basis for a thriving agricultural and food sector, and the natural and built heritage enhances the quality of life for the people of the county and has long enticed visitors to Meath.

According to the Fingal Development Plan 2023-2029 (FCC 2023), Fingal is 465 square metres (sq. m.) in area, hosts a variety of landscapes, enjoys significant economic advantages and is the fastest growing local authority area in Ireland. Fingal is well served by air, sea and national roads, with key economic sectors in Fingal including tourism, retail and hospitality, information technology and communications, agriculture, public administration and commerce and trade.

As set out in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR, the proposed cable route of the Proposed Development will be approximately 37.5 kilometres (km) in length and will connect Woodland Substation in the townland of Woodland in County Meath to Belcamp Substation in the townlands of Clonshagh and Belcamp in Fingal, North County Dublin. The route of the Proposed Development will pass through both rural and urban areas along its length.

According to the 2022 Census (CSO 2023a), County Meath has a population of 220,826, comprising 110,838 females and 109,988 males; while Fingal has a population of 330,506, consisting of 167,974 females and 162,532 males. To ascertain the number of people within the study area (i.e. within 300m of the Proposed Development Planning Application Boundary (see Section 5.2.1 for details)) and therefore likely to experience potential impacts during the Construction and / or Operational Phases of the Proposed Development, Small Area Population Statistics (SAPS) were used, as presented in Table 5.4. SAPS are the smallest geographical area for which census information is provided by the CSO. As shown in Table 5.4, approximately 13,024 people reside within the SAPS areas that are within 300m of the Proposed Development Planning Application Boundary.

Table 5.4: Population of SAPS Areas within 300m of the Proposed Development Planning Application Boundary

Small Area Population Statistics (SAPS) Area	Total Population	No. of Females	No. of Males
167029004	230	123	107
167029015	485	246	239
167025001/03	509	245	264
267158009/02	591	290	301
267066001	298	153	145
167024003	443	213	230
167030019	220	106	114
167024002	330	171	159
167030021	255	122	133
167029001	286	140	146
267158012	484	237	247
267158001	306	152	154
267098001	349	170	179
267001009/02	1256	599	657
267005001	1112	563	549
267132011	263	131	132
267099015	624	333	291
267099021	416	194	222
267099020	383	194	189
167029003	305	150	155
167029022	407	207	200
268121002	220	124	96
268122003	503	257	246
167029021	374	197	177
267132001/03	199	105	94
267132001/02	362	175	187
167029018	336	173	163
267158022	283	135	148
267158024	245	130	115
267158025	458	223	235
268122007	492	255	237
Total:	**13,024**	**6,513**	**6,511**

5.3.2 Residential, Commercial and Community Receptors

The closest settlements to the Proposed Development are Dunboyne, Fosterstown, Swords and Darndale. There are approximately 652 residential receptors within 300m of the Proposed Development Planning Application Boundary, in addition to 11 community receptors and 56 commercial receptors. No tourism receptors are located within 300m of the Proposed Development Planning Application Boundary.

Table 5.5 lists the known commercial receptors that are situated within the 300m study area. These receptors are shown on Figure 5.1 in Volume 4 of this EIAR.

Table 5.5: Known Commercial Receptors Located Within 300m of the Proposed Development Planning Application Boundary

Commercial Receptors	Address / Location
Barstown Commercial Park	Barstown, Dunboyne, Co. Meath. A86 T289
Voltapak Ltd Packaging Machinery	Harlockstown, Dunboyne, Co. Meath, A86 P027
Paul Whelan Motors	Harlockstown, Summerhill Road, Dunboyne, Co. Meath, A86 D267
Swaggers Dog Grooming and Kenneling	Cushinstown, Co. Meath
S Kiernan Sand & Gravel	Colliersland North, Summerhill, Co. Meath
Dunboyne Business Park	Dunboyne Business Park, Unit68, Dunboyne, Co. Meath, A86 YE81
JLK Valet Services	14 The Court, Plunkett Hall, Dunboyne, Co. Meath A86 RF77
Avoca Dunboyne	Pierce, Dunboyne, Co. Meath, A86 PR26
Kilsaran Head Office Construction Company	Cradockstown, Piercestown, Co. Meath, A86 W820
Clifford Barron Auto Solutions	Ballymagillin, Piercetown, Co. Meath, A86 EP82
Gordon Barron Crash Repairs	Piercetown, Dunboyne, A86 EP82
Nuttstown Storage	Nuttstown Farm, Nuttstown, Clonee, Co. Dublin, D15 VY0Y
Autoplanet	Nuttstown, Clonee, Co. Meath
D&D Kitchens Carpentry	Nuttstown Farm, Nuttstown, Kilbride, Co. Meath D15 VF96
Top Oil Kilbride Service Station	Kilbride Road, Priest Town, Kilbride, Co. Meath, D15 EW6T
Park Electrical Services	Belgree Enterprise Park, Belgree, Kilbride, Co. Dublin, D15 CFY5
YPD Golf Ltd.	YPD GOLF LTD, Court, Kilbride, Co. Meath, D15 W4AV
Aura Foods Ltd.	Court, Co. Meath, D15 XF62
Inta Dental Studio	9 Hollystown Demesne, Hollystown, Dublin, D15 V1Y6
RCRT Roofing	Hollystown Demesne, Gallanstown, Co. Dublin
EcoMod Modular Buildings Ltd	Kilnamonagh, The Ward, Co. Dublin, D11 Y925
Sysco Ireland	Killamonan, The Ward, Co. Dublin, D15 KA03
Graeme Colfer Autos	Spricklestown, The Ward, Co. Dublin, D11 Y52H
Metweld Fabrication	Spricklestown, The Ward, Co. Dublin, D11 TA40
Newpark Motor services	Newpark, The Ward, Co. Dublin, D11 XT9V
Eirgo Group	Newpark, The Ward, Co. Dublin, D11 XT9V
Builders Hoists	Newpark, The Ward, Co. Dublin, D11 XT9V
Scaffolding & Formwork Sales Ltd	Newpark, The Ward, Co. Dublin, D11 XT9V
Ratcliffe Gates	Newpark The Ward Co, Dublin, D11 WF99
Keelings Farm Shop	FoodCentral, St. Margaret's, Co. Dublin
BUSTEC	Forrest Great, Swords, Co. Dublin
Parfit Mobility Equipment Supplier	Old Schoolhouse Works, Cloghran, Swords, Co. Dublin
The Coachman's Inn	Cloughran, Airport Road, Dublin
Dublin Plant & Digger Hire	Baskin Ln, Glebe, Swords, Co. Dublin, K67 CX34
Street & Park Equipment Lighting Shop	Stockhole Lane, Cloghran, Swords, Co. Dublin
Ace Vegetable Suppliers	Stockhole Lane, Cloghran, Swords, Co. Dublin, K67 C2P1

Table 5.6 lists the known community receptors that are situated within the 300m study area. These receptors are shown on Figure 5.1 in Volume 4 of this EIAR.

Table 5.6: Known Community Receptors Located Within 300m of the Proposed Development Planning Application Boundary

Community Receptors	Address / Location
Karlswood Equestrian Centre	Blackhall Big, Batterstown, Co. Meath, A86 WV56
Dunboyne Nursing Home	Summerhill Road, Waynestown, Dunboyne, Co. Meath
Dunboyne AFC (Soccer Club)	Summerhill Road, Colliersland North, Dunboyne, Co. Meath, A86 KT68
Thorntons Civic Amenity Centre	Dunboyne Business Park, Dunboyne, Co. Meath
M3 Parkway Train Station	Pace, Co. Meath
Kilbride National School (Scoil Bhríde)	Priest Town, Kilbride, Co. Meath, Ireland
Crown Jesus Ministries Dublin (Religious Organisation)	Belgree Enterprise park, Court, Kilbride, Co. Dublin, D15 CFY5
Tyrrelstown Karate Club Dojo	Court, Hynestown, Co. Dublin
Classic Pilates	Hollystown Park, Yellow Walls, Dublin 15
St. Thomas Church	10 Church View, Hollywood, Dublin 15, D15 XR89
Dublin Ward Cross Indoor Football	Zero, Newpark, The Ward, Dublin, D11 TF72
St. Kevin FC (Wards Cross)	Zero, Newpark, The Ward, Dublin, D11 TF72
New Park Care Centre	New Park, The Ward Dublin, D11 TF72
St. Margaret's Golf & Country Club	Skephubble, St Margaret's, Co. Dublin, K67 K339
Little Moos Moos Playschool	Skephubble Farm, St. Margaret's, Co. Dublin
St. Margaret's GAA Club	Ballystrahan, St. Margaret's, Co. Dublin, K67 EY27
Forest Little Golf Club	Forest Rd, Fosterstown North, Swords, Co. Dublin, K67 K825
Swords Open Golf Course	Naul Road Swords K67 County Dublin
The National Show Centre	The National Show Centre, Stockhole Lane, Cloghran, Dublin, K67 VF43
Trinity Care Anovocare Nursing Home	Stockhole Lane, Cloghran, Swords, Co. Dublin, K67 T8P0
New Ground Football Club	Saint Martin's, Baskin Ln, Cloghran, Swords, Co. Dublin
AUL Sports Complex	Aul Complex, Clonshaugh, Dublin
Shampoodles Dog Day Centre	Clonshagh, Co. Dublin
Craobh Chiaráin GAA Football Club	Belcamp, Co. Dublin
St Michael's House (Nursing Home)	St Michaels House, Belcamp Lane, Priorswood, Dublin

In terms of sensitivity of these receptors, due to the relatively rural nature of much of the study area, there is a likelihood that there are limited alternative facilities available locally for people within these relatively isolated communities. Any potential impacts on availability or access to these facilities may disproportionately affect these communities as a result. On this basis, the sensitivity of the residential, commercial and community receptors in the study area is judged to be 'High'. This is a conservative judgement, guided by the criteria in Table 5.1.

5.3.3 Land Use

A large proportion of the study area is occupied by agricultural fields composed of small to medium sized fields with mature hedgerows. Outside of agricultural land use, the predominant land use is urban, in the form of built-up residential areas and industrial estates in and around Dublin Airport and surrounding Dunboyne. The sections where the proposed cable route will be located within County Dublin present as a typical modified landscape under anthropogenic influence, whilst the sections of the proposed cable route that will be located within County Meath reads as a typical productive rural landscape that is not particularly rare or distinctive at a National or Regional scale.

Table 5.7 outlines the sections of the proposed cable route of the Proposed Development which will be located off-road and in private lands, along with the current land use of the associated land. As can be seen in Table 5.7, the land use of the majority of these off-road sections comprises agricultural lands with crossings of watercourses and sections of the national road network (i.e. motorways) (refer to Chapter 15 (Agronomy and Equine) in Volume 2 of this EIAR for further detail).

Table 5.7: Current Land Use of Off-Road Sections of the Proposed Development

Approximate Chainage	Location	Current Land Use
0 – 3,625	Between Woodland Substation and R156 Regional Road	Agricultural land predominantly but also a watercourse crossing (Dunboyne Stream)
16,050 – 16,425	Along or adjacent to Local Road	Agricultural land but also watercourse crossing (Pinkeen)
19,150 – 19,350	Between junction of Local Road and Kilbride Road	Agricultural land
21,225 – 22,575	Between Kilbride Road, north of Hollystown, and the R121 Regional Road	Agricultural land
23,275 – 23,575	Along or adjacent to R121 Regional Road	Agricultural land and crossing of M2 Motorway.
28,550 – 29,100	Between Kilreesk Lane and R108 Regional Road	Agricultural land
34,025 – 37,624	Along or adjacent to R108 Regional Road	Agricultural land and crossing of M1 Motorway and Baskin Lane

5.3.4 Local Economy

5.3.4.1 Overview

According to the KPMG Global Economic Outlook (KPMG 2023), Ireland’s economy has been performing strongly for a number of years recently and was one of a small number of countries to experience economic growth during the COVID-19 pandemic. Over the course of 2022, the economy as measured by Gross Domestic Product (GDP) grew by 12.2%, while the domestic economy grew by 8.2%. These rates made the Irish economy the fastest growing economy in Europe in 2022. This growth was driven by high levels of investments by multi-nationals and continued growth in exports and higher private consumption.

As with most countries in Europe, Ireland is facing global downturn risks and a major cost of living challenge. Domestically, infrastructure bottlenecks are a further barrier to growth. Despite the economic growth in 2022, many households and businesses may claim that they do not feel the economy growing by 8% to 12%. Inflation has been reducing disposable incomes and increasing pressure on lower income individuals. As 2023 progresses, inflation is expected to fall, potentially to 5%, on the back on falling energy prices.

Global-domestic interdependencies have been key drivers of Ireland’s economic fortune over the past two decades. The country’s skilled and open labour market, talent pipeline, and easy access to both the European and United Kingdom (UK) market, are all likely to contribute to economic growth over the coming years. Ireland’s strong industrial base in key sectors, in particular Life Sciences and Information and Communications Technology (ICT), both owes and lends itself to multi-decade long investments by multi-nationals. The Tech Sector has seen a slowdown in 2023. However, it has remained relatively resilient, with total layoffs to date accounting for around 1% of the sector’s workforce in Ireland, compared to around 1.5% to 2% of the sector’s global workforce. Foreign direct investment appetite remains strong post-pandemic and post-Brexit, and further investment can be expected in the medium-term, positioning Ireland well to take advantage of wider long-term trends in global economic growth.

This economic outlook, together with the objectives and targets outlined within the Climate Action Plan 2023 (Government of Ireland 2022), the most recent plan at the time the KPMG Global Economic Outlook was published, in respect to harnessing renewable energy and developing cleaner modes of transport, will result in higher demand for electricity in future years. This demand will be required to be met to continue the positive economic outlook for the country.

This demand for electricity is likely to be highest within the GDA, which County Meath and Fingal are considered a part of. This is due to a number of large industrial energy consumers being located within these areas (for example, MSD, Meta Data Centre etc.) making it an attractive location for further similar development. In addition to this, is the large portion of the current population within these areas that are commuters, as well as the forecasted increase in population in the coming years (for example there was an 11.6% and 13.2% increase in the population of Fingal and County Meath respectively between 2016 and 2022 (CSO 2023a). The local businesses in proximity to the Proposed Development are listed in Table 5.5 and are shown on Figure 5.1 in Volume 4 of this EIAR.

5.3.4.2 Employment

The Construction Phase of the Proposed Development is likely to have potential impacts on the employment sector within County Meath and Fingal. Table 5.8 outlines the number of people employed in the construction industry within the Local Authority areas of Fingal and County Meath, as well as nationally in the 2022 Census (CSO 2023a).

Table 5.8: Employment in Construction Industry in Local Authority Areas of Fingal and County Meath

Location	Number Employed	% of Total Construction Workforce in Ireland
Ireland	134,482	100%
Meath	8,350	6.2%
Fingal	8,258	6.1%

5.3.4.3 Local Economy

5.3.4.3.1 County Meath

According to the CSO Business Demography NACE (CSO 2021), which is the most up-to-date information available at the time of writing, there were 14,014 active enterprises in County Meath in 2021. These active enterprises (comprising both indigenous and foreign-owned companies) had a combined number of employees of approximately 58,416, while the total number of persons engaged by them was 66,914. The vast majority of these active enterprises (approximately 13,051) had an employment size of under 10 persons. In contrast, there were 507 active enterprises with 10 to 19 employees, 330 active enterprises with 20 to 49 employees, 108 active enterprises with 50 to 249 employees and only 18 active enterprises with 250 or more employees.

According to the 2022 Census (CSO 2023b), County Meath's labour force participation rate was 64.1%, which is the third highest labour force participation rate in the country, and higher than the national average of 61.2%. There were 8,124 people unemployed in 2022 in County Meath, representing an unemployment rate of 7.4%. This is the fifth lowest in the country and lower than the national average of 8.3%. This is an improvement compared to the 2016 Census (CSO 2016) when County Meath had an unemployment rate of 11.2%, accounting for approximately 10,523 people.

5.3.4.3.2 Fingal

Fingal has experienced significant growth in employment in the past number of years and has major economic assets (including Dublin Airport) and is in close proximity to Dublin City, Dublin Port Tunnel, road and rail infrastructure, and a prime location on the Dublin to Belfast Economic Corridor (DBEC). According to the CSO Business Demography NACE (CSO 2021), there were 123,874 active enterprises in County Dublin in 2021 (data specific to Fingal was not available at the time of writing). These active enterprises (comprising both indigenous and foreign-owned companies) had a combined number of employees of approximately 947,794, while the total number of persons engaged by them was 1,007,793. Similar to County Meath, the vast majority of these active enterprises (approximately 113,877) had an employment size of under 10 persons. In contrast, there were 4,657 active enterprises with 10 to 19 employees, 3,018 active enterprises with 20 to 49 employees, 1,811 with 50 to 249 employees and only 511 active enterprises with 250 or more employees.

According to the 2022 Census (CSO 2023b), Fingal's labour force participation rate was 65.6%, the highest in the state, and higher than the national average of 61.2%. There were 13,050 people unemployed in 2022 in Fingal, which is an unemployment rate of 7.8%, and the seventh lowest in the country. This rate is lower than the national average of 8.3% and represents an improvement compared to the 2016 Census (CSO 2016), when Fingal had an unemployment rate of 10.3%, accounting for approximately 15,415 people.

The economy, as a receptor, is valued as 'High' on the basis that the population within the study area would be supported by the businesses and employment in the region.

5.4 Potential Impacts

This Section outlines the assessment of potential impacts on people and communities as a result of the Construction and / or Operational Phases of the Proposed Development. As mentioned in Section 5.2, the assessment of such potential impacts has been undertaken with respect to the following assessment topics:

- Population:
  - Amenity;
  - Accessibility and Severance;
  - Land Use / Land Take; and
  - Economy.

5.4.1 'Do Nothing' Scenario

In the Do Nothing scenario, the Proposed Development would not be implemented, and therefore, there would be no changes to amenity, accessibility and severance, land use / land take and economy as a result of the Proposed Development. Therefore, there would be a Neutral impact on these assessment topics under the Do Nothing scenario.

5.4.2 Construction Phase

5.4.2.1 Amenity

As outlined in Section 5.2.4.1.1, the findings of the air quality (Chapter 7), noise and vibration (Chapter 9), traffic and transport (Chapter 14), and landscape and visual (Chapter 18) assessments are considered in-combination to each other to determine the overall impact on amenity.

Chapter 7 (Air Quality) in Volume 2 of this EIAR considers and assesses the potential impacts of the Proposed Development on air quality, particularly in relation to construction-related dust emissions, construction site plant and machinery emissions, and road traffic emissions. The assessment of these potential impacts within Chapter 7 (Air Quality) concluded that the residual significance of these potential impacts during the Construction Phase will be Not Significant.

Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR considers and assesses the potential impacts of noise and vibration associated with the Proposed Development. The assessment of potential noise and vibration impacts within Chapter 9 (Noise and Vibration) concluded that the residual significance of potential noise impacts from construction activities during the Construction Phase of the Proposed Development will be Adverse, Not Significant and Temporary, while the residual significance of potential vibration impacts (in particular, associated with Horizontal Directional Drilling (HDD) works) will be Adverse, Not Significant and Temporary . During the Construction Phase there will be Adverse, Significant and Temporary residual impacts as a result of some diversion routes (Diversion Route 1.2, 1.14, 1.16 and 1.24), and an Adverse, Moderate to

Significant and Temporary residual impact as a result of some diversion routes (Diversion Route 1.6,1.18, 1.20, 1.21 and 1.23) required to facilitate the laying of the proposed cable route. There are no appropriate measures to mitigate impacts resulting from diversion routes but it is important to note that these impacts will be temporary in duration.

Chapter 14 (Traffic and Transport) in Volume 2 of this EIAR considers and assesses the potential impacts of the Proposed Development on traffic and transport. The assessment of potential impacts on traffic and transport during the Construction Phase of the Proposed Development concluded that the residual significance of such potential impacts will be Not Significant and Temporary.

Chapter 18 (Landscape and Visual) in Volume 2 of this EIAR considers and assesses the potential impacts of the Proposed Development on the landscape as well as visual amenity. As outlined in Section 5.2.4.1.1, it is potential impacts on visual amenity that are of interest when determining potential impacts on amenity. The assessment of potential visual impacts, as outlined in Chapter 18 (Landscape and Visual) in Volume 2 of this EIAR, concluded that the residual significance of such impacts during the Construction Phase of the Proposed Development will be Negative, Slight to Imperceptible and Short-Term.

As stated in Section 5.2.4.1.1, only significant residual impacts (either negative or positive) as reported by the aforementioned environmental assessments are considered within the assessment of potential impacts on amenity; and there is only considered to be the potential for impacts on amenity where two or more of these environmental assessments report significant residual impacts. As can be seen above, significant residual impacts (negative) are only reported in respect to potential traffic diversions and these impacts will be temporary in duration and will occur along existing road networks, for which noise from traffic is predominant in the baseline. As such, no significant negative impacts are anticipated on amenity during the Construction Phase of the Proposed Development. Using professional judgement, aided by the EPA Guidelines (EPA 2022), the significance of potential impacts on amenity during the Construction Phase of the Proposed Development is considered to be Negative, Slight and Temporary.

5.4.2.2 Accessibility and Severance

Section 4.5 of Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR sets out the proposed Construction Phase activities associated with the installation of the new underground cable and the proposed substation works. Approximately 26km, equating to approximately 70% of the Proposed Development will be located within the road network, constructed on a section-by-section basis, which will facilitate the maintaining of access to all residential, commercial and community receptors throughout the Construction Phase. Duct and Joint Bay installation are the most construction-intensive and invasive elements of cable route installation as digging of a trench is required. For in-road cable laying, this phase will have the largest potential impact on traffic, including the potential need for rolling road closures (to through traffic) and road diversions.

Where access points to residential, commercial and community receptors are crossed by the Proposed Development, temporary measures will be implemented to facilitate access at all times until construction activities are completed. This will be a temporary impact due to the rolling nature of the works (refer to Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR for details on the construction programme). As such, the magnitude of change in terms of accessibility and severance as a result of these construction works is considered to be ‘low’.

Therefore, given the ‘medium’ or ‘high’ sensitivity assigned to residential, commercial, and community / recreational receptors situated within proximity of the Proposed Development, and the magnitude of change is considered to be ‘low’, the significance of potential impacts on these receptors in terms of accessibility and severance is considered to be Negative, Moderate and Temporary.

5.4.2.3 Land Use / Land Take

Approximately 70% of the Proposed Development will be located within the road network while approximately 30% will be located off-road in private lands. Table 5.7 presents the sections of the Proposed Development that will be situated off-road, in private lands. All of the off-road sections of the Proposed Development will be situated in agricultural lands, the potential impacts of which are considered and assessed in Chapter 15 (Agronomy and Equine) in Volume 2 of this EIAR.

As such, no impacts on the land use of residential, commercial receptors or community / recreational facilities are expected as a result of land take requirements during the Construction Phase of the Proposed Development.

5.4.2.4 Local Economy

5.4.2.4.1 Employment

As mentioned in Section 4.5.4 in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR, the number of construction workers that will be required during the Construction Phase at Woodland and Belcamp Substations is expected to peak at approximately 20 persons for each of the two substation sites. Crew sizes for the activities of cable trenching, ducting, and resurfacing is estimated at approximately 12 persons per crew with two crews (teams) working simultaneously. Crew sizes for the installation of the proposed underground cables are estimated at approximately six persons per crew. Additionally, it is estimated that there will be approximately up to four traffic management operatives with each crew. The project offices that will be located at the Temporary Construction Compounds are estimated at approximately five staff (engineers, project managers etc.) at seven locations. The Construction Phase is anticipated to take approximately three years and will therefore be short-term.

Overall, the total average estimated number of daily workers at any time will not exceed 215, as outlined in Chapter 4 (Proposed Development Description). In addition, the nature of the Proposed Development (i.e. underground high-voltage cables) will likely require specialist contractors in order to construct, thereby limiting the potential for employment benefits.

When considered against the size of the wider labour force within the study area (i.e. County Meath (third highest labour force in the State) and the local authority area of Fingal (highest labour force in the State)), the magnitude of change in terms of employment levels is considered to be ‘very low’. As such, with the ‘high’ sensitivity assigned to employment, the significance of potential impacts on employment during the Construction Phase of the Proposed Development is considered to be Positive, Slight and Short-Term.

5.4.2.4.2 Local Economy

Potential impacts on the amenity of commercial receptors situated in proximity to the Proposed Development during the Construction Phase have been considered and assessed in Section 5.4.2.1 of this Chapter and therefore are not repeated here. Furthermore, issues regarding access and severance to and from commercial receptors during the Construction Phase as a result of construction traffic and / or other related activities resulting from the Proposed Development have been considered and assessed in Section 5.4.2.2, and as such, are also not repeated here. Issues related to land use and land take are also considered and assessed in Section 5.4.2.3 and are not repeated here.

Given the findings of the aforementioned assessments, as well as the nature of the proposed construction methodology for the Proposed Development (i.e. on a rolling basis), there is not expected to be any impact on the ability of any commercial receptors to operate during the Construction Phase. As such, the magnitude of change in terms of the ability of commercial receptors to trade is considered to be ‘very low’. Therefore, given the ‘high’ sensitivity assigned to commercial receptors, the significance of potential impacts on the ability of commercial receptors to trade during the Construction Phase of the Proposed Development is considered to be Negative, Slight and Temporary.

5.4.2.5 Summary of Assessment of Potential Construction Phase Impacts

Table 5.9 provides a summary of the assessment of potential impacts on people and communities during the Construction Phase of the Proposed Development.

Table 5.9: Summary of Assessment of Potential Impacts During Construction

Assessment Topic	Sensitivity of Receptors	Magnitude of Change	Nature of Impact	Significance of Impact
Amenity	-	-	Negative	Negative, Slight and Temporary
Accessibility and Severance	High	Low	Negative	Negative, Moderate and Temporary
Land Use / Land Take	High	-	-	No impact
Local Economy	High (Employment)	Very Low	Positive	Positive, Slight and Short-Term
	High (Economy)	Very Low	Negative	Negative, Slight and Temporary

5.4.3 Operational Phase

During the Operational Phase, the proposed underground cable will be buried and sporadic access for maintenance will only be required on agricultural land and along the existing road network, and will therefore have no impact on residential, commercial, community receptors and recreational (including tourism) amenities (please refer to Chapter 15 (Agronomy and Equine) in Volume 2 of this EIAR for the impact assessment for agricultural land). In addition, the proposed works at Woodland and Belcamp Substations will be within the footprint of, or within the immediate vicinity of the existing substations, and maintenance activities will occur in the same manner as currently carried out at these substations. Therefore, the operation of the substations will also have no impact on residential, commercial, community receptors and recreational (including tourism) amenities, above the current baseline. As a result, no potential impacts are expected on amenity, accessibility and severance, land use / land take or the local economy during the Operational Phase.

5.5 Mitigation and Monitoring Measures

As no significant negative impacts (Significant or above) are anticipated during the Construction and Operational Phases of the Proposed Development, in respect to any of the assessment topics considered and assessed in Section 5.4, no mitigation or monitoring measures are proposed.

5.6 Residual Impacts

No significant residual negative impacts are anticipated in regard to people and communities as a result of the Construction and Operational Phases of the Proposed Development.

5.7 Conclusion

This Chapter presented the results of the assessment for the likely potential impacts arising from the Proposed Development on people and communities. Following the assessment, it is considered that the Proposed Development will have no significant negative impact on people and communities.

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 6 – Human Health

EirGrid

March 2024

Contents

6. Human Health

6.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) has considered the likely potential human health impacts associated with the Construction and Operational Phases of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). A full description of the Proposed Development is presented in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.

This assessment uses the World Health Organization (WHO) definition of health which reflects that health is determined by a complex interaction between individual characteristics, lifestyle and the physical, social and economic environment. These 'wider determinants of health' can have a greater influence than medical healthcare for ensuring a healthy population (WHO 2022). Diagram 6.1 provides a conceptual illustration of the wider determinants of health.

A concept of key importance to public health is the issue of health inequalities which refers to the:

> "*avoidable gap in health outcomes between those at the top and bottom ends of the social class or socioeconomic classification scale… People in higher socioeconomic groups are more likely to live longer and enjoy more years of good health than those in lower socioeconomic groups. There are also notable differences in the health experiences of men and women. Health inequalities and social inequalities are closely linked*" (Pyper *et al.* 2021).

Addressing the wider determinants of health is seen as an important means of tackling social inequalities of health and improving population health as a whole. The aim of this assessment is therefore to identify the wider determinants of health that would likely be affected by the Proposed Development, which population groups would be affected, and whether these impacts could be associated with changes to health outcomes of that population.

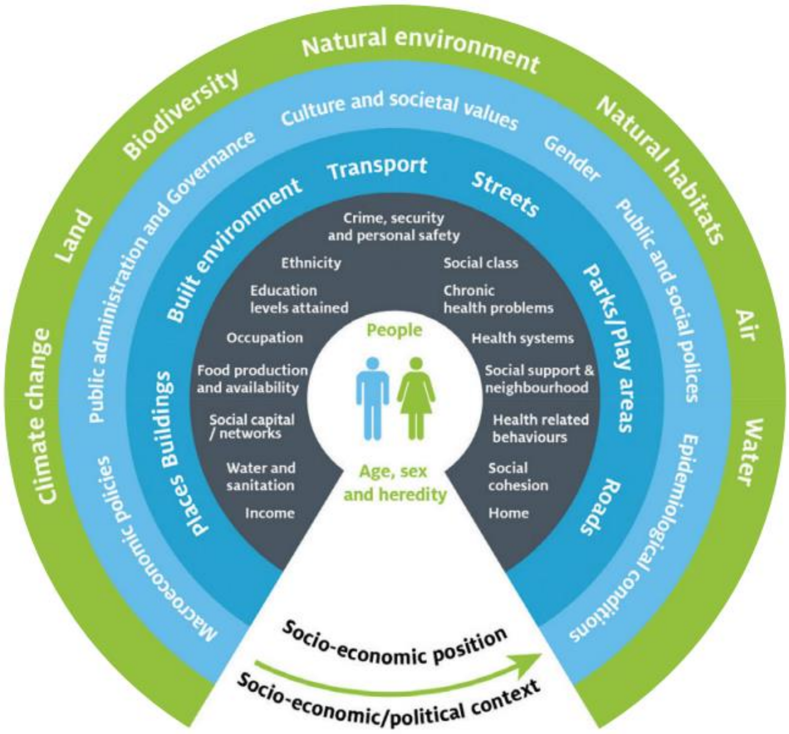

Diagram 6.1: Wider Determinants of Health (From 'Healthy Ireland' (Department of Health 2013), Developed from Barton and Grant (2006) and Dahlgren and Whitehead (1991))

6.2 Methodology

6.2.1 Study Area

The study area (see Figure 6.1 in Volume 4 of this EIAR) is defined as all small areas (i.e., a Central Statistics Office (CSO) administrative unit generally covering 50 to 200 households and which are generally comprised of complete townlands or neighbourhoods (CSO n.d.) which intersect (i.e., fall within or partially within) the Planning Application Boundary for the Proposed Development. This study area is considered sufficient to capture the exposure pathways of the Proposed Development such as construction noise and air pollution, as well as encompassing any impacts on land use. Beyond this distance there is no likelihood of exposure to significant noise or air pollution impacts from the Proposed Development, and the intervening distance and land use is likely to reduce the physical and psychological influence of the Proposed Development on local communities, and therefore based on professional judgement, no significant impacts on human health are anticipated.

6.2.2 Relevant Guidelines, Policy and Legislation

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the EIA Directive) replaced the factor 'human beings' with 'population and human health' to clarify the requirement to consider human health in Environmental Impact Assessment (EIA). The EIA Directive is transposed into Irish law via S.I. No. 296/2018 - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

In terms of policy, Healthy Ireland – A Framework for Improved Health and Wellbeing 2019 – 2025 (hereafter referred to as the Healthy Ireland Framework) (Department of Health 2019) provides a roadmap for building a healthier Ireland. The policy framework is based around the following four goals:

- To increase the proportion of people who are healthy at all stages of life;
- To reduce health inequalities;
- To protect the public from threats to health and wellbeing; and
- To create an environment where every individual and sector of society can play their part in achieving a healthy Ireland.

The Healthy Ireland Framework recognises the importance of intersectoral collaboration (for example involving the health, transport, education, planning, business sectors) to address the social, environmental and economic determinants of health required for health improvement and protection. This assessment has, therefore, taken account of the policy goals when considering the potential significance of the Proposed Development in terms of health improvement, reducing health inequalities, health protection, and creating an environment that supports a healthy society.

The following guidelines have informed the interpretation of the human health factor in EIA and the overall approach to this assessment:

- Environmental Impact Assessment of Projects. Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017);
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022);
- Human Health: Ensuring a High Level of Protection. A reference paper on addressing Human Health in Environmental Impact Assessment (hereafter referred to as the IAIA and EUPHA Guidance) (International Association for Impact Assessment (IAIA) and European Public Health Association (EUPHA) 2020);
- Institute of Public Health Ireland (IPH) Health Impact Assessment Guidance for Ireland and Northern Ireland (Pyper *et al*. 2021);
- Institute of Environmental Management and Assessment (IEMA) Guide to: Effective Scoping of Human Health in Environmental Impact Assessment (IEMA 2022a);
- IEMA Guide to: Determining Significance for Human Health in Environmental Impact Assessment (IEMA 2022b);
- Environmental Noise Guidelines for the European Region (hereafter referred to as the World Health Organisation (WHO) Noise Guidelines) (WHO 2018); and
- WHO Global Air Quality Guidelines: Particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide (WHO 2021).

The European Commission's Guidance on the Preparation of the Environmental Impact Assessment Report notes that 'human health is a very broad factor' that is 'highly project dependent'. It states that:

> "*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*." (European Commission 2017)

This assessment recognises that human health is interrelated with several other environmental factors. The assessment has sought to identify the potential changes to emissions, health risks, the built environment and traffic that could be caused by the Proposed Development, and how these changes may in turn be associated with health outcomes.

The EPA Guidelines state that:

> "*The evaluation of effects on these pathways is carried out by reference to accepted standards (usually international) of safety in dose, exposure or risk. These standards are in turn based upon medical and scientific investigation of the direct effects on health of the individual substance, effect or risk. This practice of reliance upon limits, doses and thresholds for environmental pathways, such as air, water or soil, provides robust and reliable health protectors [protection criteria] for analysis relating to the environment.*" (EPA 2022)

This assessment has therefore taken account of the relevant guidelines on limit values and thresholds which are listed in the following Chapters within Volume 2 of this EIAR:

- Chapter 7 (Air Quality);
- Chapter 9 (Noise and Vibration); and
- Chapter 11 (Soils, Geology and Hydrogeology).

Information about the health status of communities has been obtained from various sources such as the CSO, Lenus (a central source for open access health research in Ireland), the Health Service Executive (HSE) and the IPH. Evidence for associations between health outcomes and certain determinants has been drawn from a wide range of published health literature and is referenced throughout the assessment.

6.2.3 Data Collection and Collation

This assessment has been informed by desk-based data collection only. No survey work has been undertaken. The following sources of data are referenced throughout Section 6.3.

- CSO small area Census 2022 statistics (CSO 2022);
- 2022 Pobal HP deprivation index data for electoral divisions (Pobal 2023);
- County health profiles for Dublin City, Fingal and County Meath (HSE 2016);
- Ordnance Survey Ireland (OSI) mapping (OSI);
- Aerial imagery on Geographic Information System (GIS) platform used for the Proposed Development;
- GeoDirectory Address Data Information (An Post and Tailte Éireann 2023); and
- Additional data sources as identified in Chapter 5 (Population), Chapter 7 (Air Quality), Chapter 9 (Noise and Vibration), Chapter 14 (Traffic and Transport) and Chapter 15 (Agronomy and Equine) in Volume 2 of the EIAR.

6.2.4 Appraisal Method for the Assessment of Impacts

6.2.4.1 General Approach to the Human Health Assessment

A desk-based study of the available data was undertaken to identify the populations of interest and to characterise them in terms of their population size, socio-economic status, burden of disease and the distribution of those existing factors.

Baseline data from the assessments of other chapters in this EIAR was then reviewed to understand baseline determinants of health. Information on air pollution levels and existing noise was obtained from Chapter 7 (Air Quality) and Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR, respectively. Other relevant information on access to community and health facilities, facilities used for outdoor recreation, land use and local economic conditions were obtained from Chapter 5 (Population) in Volume 2 of this EIAR. Information on walking and cycling facilities and existing traffic patterns were obtained from Chapter 14 (Traffic and Transport) in Volume 2 of this EIAR. These were considered the most relevant aspects of the environment to understand in terms of human health.

Consultation is identified as an important part of the health assessment process as identified within the IPH Guidance (Pyper *et al*. 2021) and Effective Scoping of Human Health in Environmental Impact Assessment (IEMA 2022a). External stakeholder consultation is described within Section 1.6 of Chapter 1 (Introduction and the Environmental Impact Assessment Process) in Volume 2 of this EIAR, and internal stakeholder consultation has been ongoing throughout outline design development. This approach is considered proportionate for the nature of the Proposed Development.

The overall approach to the human health assessment is illustrated in Diagram 6.2.

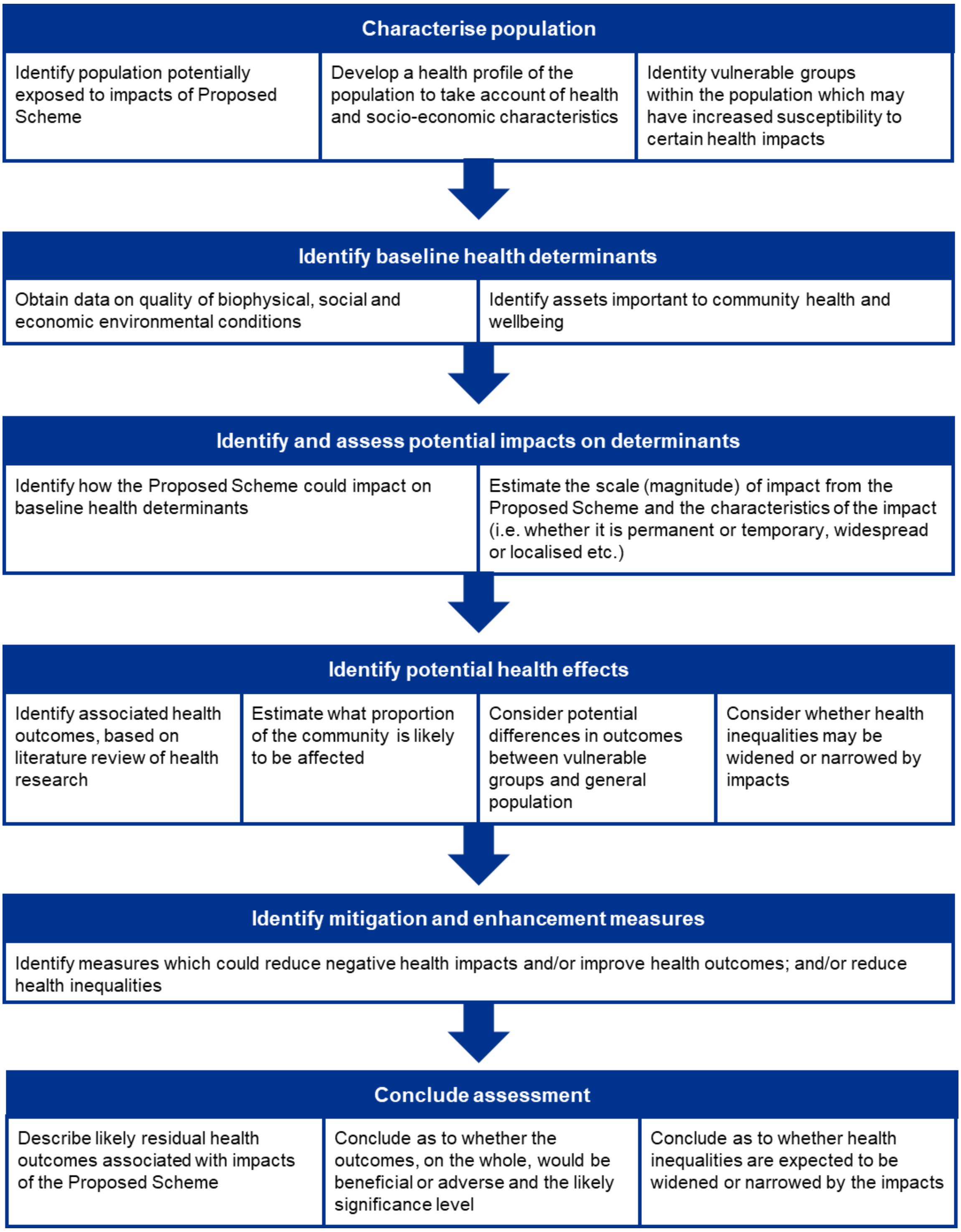

Diagram 6.2: Approach to the Human Health Assessment (Source: Jacobs 2024)

6.2.4.2 Scoping of Health Assessment

The scoping assessment provided in Appendix A6.1 in Volume 3 of this EIAR identifies health determinants and confirms which are considered to potentially be affected by the Proposed Development, and are therefore scoped in for further assessment, or which have been scoped out. Table 6.1 lists the determinants that have been scoped into the health assessment.

Table 6.1: Summary of Health Scope

Determinant	Scoped into Assessment?	
	Construction Phase	Operational Phase
Open space, leisure and recreation	Yes	Yes
Transport modes, access and connections	Yes	No
Employment and income	Yes	No
Air quality	Yes	No
Noise and vibration	Yes (noise only)	No

Electromagnetic Fields (EMFs) surround any object that is generating, transmitting or using electricity, including appliances, wiring, office equipment, batteries and any other electrical devices. Therefore, EMFs are common in modern life. EMFs are invisible and cannot be felt or heard. In many cases, domestic electrical appliances and tools can generate much higher magnetic and electric fields, if in close proximity to a sensitive receptor, than transmission lines at standard separation distances. EirGrid designs, develops and operates the transmission grid in accordance with stringent safety recommendations which are made by national and international agencies. Several of these recommendations come from the International Council on Non-Ionising Radiation Protection (ICNIRP). This is an independent body, funded by public health authorities around the world. ICNIRP has reviewed the safety of EMFs and recommended limits on exposure that are far below levels where adverse effects might occur. Electricity cables have been placed underground in Ireland since the 1960s. There are currently approximately 320 kilometres (km) of underground transmission cables in Ireland, with multiples of this figure of underground cabling associated with the lower-voltage distribution system. Given that EirGrid design standards require all electricity infrastructure to operate under existing public exposure guidelines from ICNIRP, there would be no direct impact on human health from EMFs. As a result, they are scoped out of further assessment within this Chapter, as no significant impacts on health as a result of exposure to EMF are considered likely.

6.2.4.3 Approach to Judgement of Significance

The health determinants from the Healthy Ireland conceptual illustration (see Diagram 6.1) and Annex 2 of the IEMA Guide to Effective Scoping of Human Health in Environmental Impact Assessment (IEMA 2022a) were considered in relation to their potential relevance to the Proposed Development. The key considerations made for each health determinant, and reasons for why they have been scoped in or out of the assessment are documented in Appendix A6.1 in Volume 3 of this EIAR.

Each assessment of health impact includes a narrative to explain the sensitivity of the population groups affected, guided by the criteria outlined in Table 6.2.

Table 6.2: Human Health Sensitivity Criteria

Level	Indicative Criteria*
High	• High levels of deprivation (including pockets of deprivation); • Reliance on resources shared (between the population and the project); • Existing wide inequalities between the most and least healthy; • A community whose outlook is predominantly anxiety or concern; • People who are prevented from undertaking daily activities; • Dependents; • People with very poor health status; and / or • People with a very low capacity to adapt.
Medium	• Moderate levels of deprivation; • Few alternatives to shared resources; • Existing widening inequalities between the most and least healthy; • A community whose outlook is predominantly uncertainty with some concern; • People who are highly limited from undertaking daily activities; people providing or requiring a lot of care; • People with poor health status; and / or • People with a limited capacity to adapt.
Low	• Low levels of deprivation; • Many alternatives to shared resources; • Existing narrowing inequalities between the most and least healthy; • A community whose outlook is predominantly ambivalence with some concern; • People who are slightly limited from undertaking daily activities; • People providing or requiring some care; • People with fair health status; and / or • People with a high capacity to adapt.
Negligible	• Very low levels of deprivation • No shared resources; existing narrow inequalities between the most and least healthy; • A community whose outlook is predominantly support with some concern; • People who are not limited from undertaking daily activities; • People who are independent (not a carer or dependent); • People with good health status; and / or • People with a very high capacity to adapt.
Adapted from the IEMA Guide to: Determining Significance for Human Health in Environmental Impact Assessment (IEMA 2022b) with categories of sensitivity aligned to EPA Guidelines (EPA 2022) terminology. * Judgement based on most relevant criteria - some criteria will span categories	

The magnitude criteria presented in Table 6.3 have also been adapted from the IEMA Guide to: Determining Significance for Human Health in Environmental Impact Assessment (IEMA 2022b). Long term (15 years or greater), medium term (7 to15 years), short term (1 to 7 years) and temporary (less than 1 year) effects are defined as per the EPA Guidelines (EPA 2022).

Table 6.3: Human Health Magnitude Criteria

Level	Indicative criteria*
High	• High exposure or scale; • Medium to long-term duration; • Continuous frequency; • Severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness / injury outcomes; • Majority of population affected; • Permanent change; and • Substantial service quality implications.
Medium	• Low exposure or medium scale; • Temporary to medium-term duration; • Frequent events; • Severity predominantly related to moderate changes in morbidity or major change in quality-of-life; • Large minority of population affected; • Gradual reversal; and • Small service quality implications.
Low	• Very low exposure or small scale; temporary duration; • Occasional events; • Severity predominantly related to minor change in morbidity or moderate change in quality-of-life; • Small minority of population affected; • Rapid reversal; and • Slight service quality implications.
Negligible	• Negligible exposure or scale; • Momentary or brief duration; • One-off frequency; severity predominantly relates to a minor change in quality-of-life; • Very few people affected; • Immediate reversal once activity complete; and • No service quality implication.
Adapted from the IEMA Guide to: Determining Significance for Human Health in Environmental Impact Assessment (IEMA 2022b) with categories of sensitivity aligned to EPA Guidelines (EPA 2022) terminology. * Judgement based on most relevant criteria – some criteria will span categories	

The judgement of significance relies on an informed professional judgement about what is important, desirable or acceptable with regards to changes triggered by the Proposed Development. In arriving at a conclusion on significance for decision-making purposes, the assessor has considered the following interrelated questions:

- Is the impact important, desirable or acceptable in terms of public health?; and
- Is the impact important, desirable or acceptable in terms of the affected community's resilience, service provision and wellbeing?

The judgement of significance is guided by Diagram 6.3 and has taken account of evidence in scientific literature, the baseline conditions for the population and communities affected, the health priorities of the study area, community concerns identified through consultation, regulatory standards and Ireland health and sustainable development policy context.

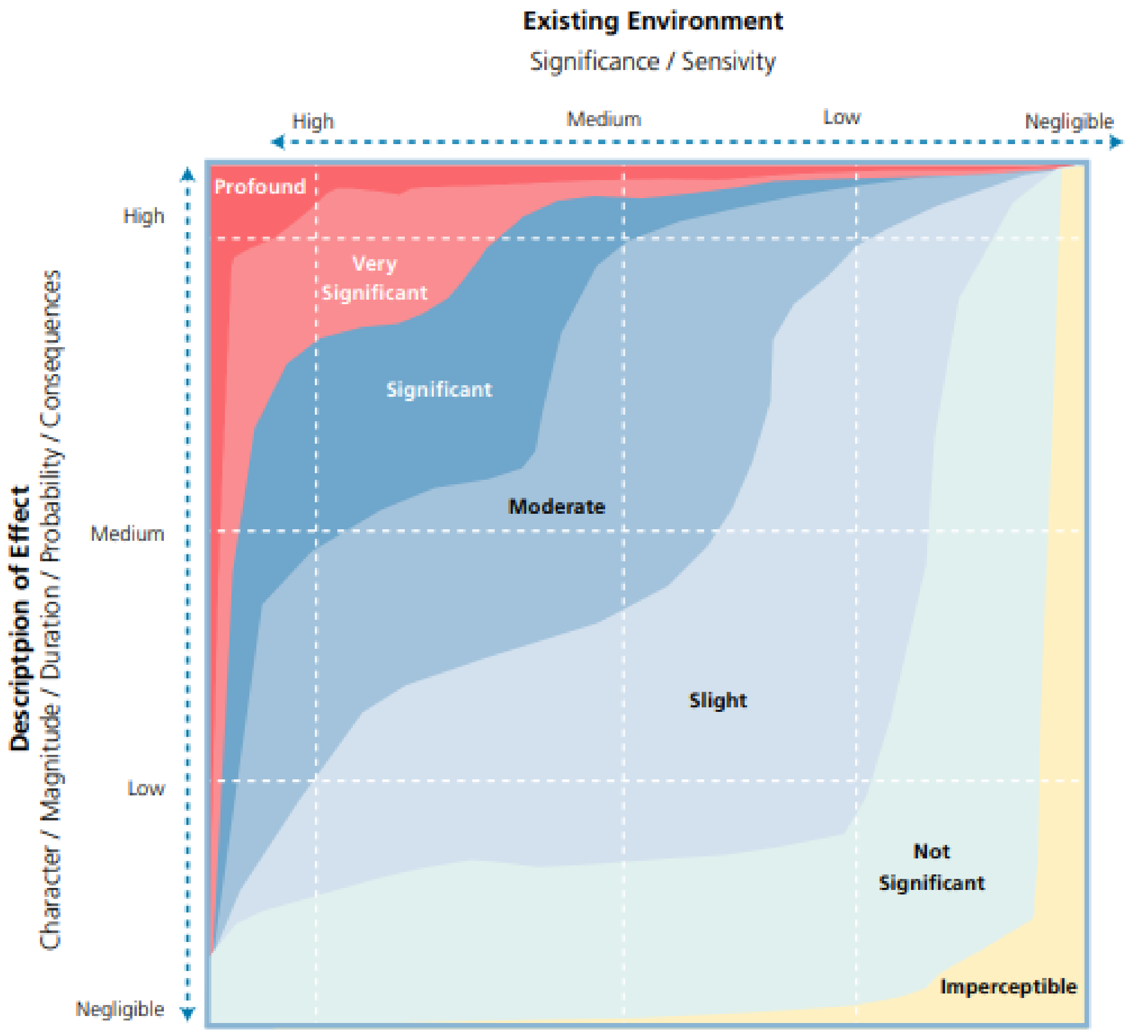

Diagram 6.3: Guide to Significance Classification (EPA 2022)

For each conclusion of significance against impacts relating to the assessed health determinants, a reasoned statement is provided. The reasoned statement on significance is guided by the criteria in Table 6.4. It should be noted that not all criteria are relevant to every conclusion made. For decision-making purposes, a significant impact is one classed as 'Significant' or higher using the EPA significance classification categories. Impacts which are judged to be 'Moderate' or 'Slight' may become 'Significant' where several such impacts combine and interact on a single community. Such impacts will be captured within the assessment.

Table 6.4: Human Health Significance Criteria

Level	Indicative Criteria*
Profound	The narrative explains that this is significant for public health and / or community wellbeing because (select as appropriate) • Changes, due to the project, would compromise the ability to deliver current health policy and / or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity levels), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show consensus on the importance of the impact. • Change, due to the project, would result in a regulatory threshold or statutory standard being crossed (if applicable). • There is likely to be a substantial change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a causal relationship between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant study area are of specific relevance to the determinant of health or community affected by the project.
Very Significant	The narrative explains that this is significant for public health and / or community wellbeing because (select as appropriate) • Changes, due to the project, have a substantial effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity levels), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show broad consensus on the importance of the impact. • Change, due to the project, could result in a regulatory threshold or statutory standard being crossed (if applicable). • There is likely to be a sizeable change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a clear relationship between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant study area are of specific relevance to the determinant of health or community affected by the project.
Significant	The narrative explains that this is significant for public health and / or community wellbeing because (select as appropriate) • Changes, due to the project, have an influential effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show mixed views. • Change, due to the project, could result in a regulatory threshold or statutory standard being approached (if applicable). • There is likely to be a small change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is good evidence of a relationship between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant study area are of general relevance to the determinant of health or community affected by the project.
Moderate	The narrative explains that this is not significant for public health and / or community wellbeing because (select as appropriate) • Changes, due to the project, have a marginal effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that limited relevant consultation themes emerge among stakeholders. • Change, due to the project, would be well within a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable). • There is likely to be a slight change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is some evidence of a relationship between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant study area are of partial relevance to the determinant of health or population group affected by the project.
Slight	The narrative explains that this is not significant for public health and / or community wellbeing because (select as appropriate) • Changes, due to the project, have a marginal effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that no relevant consultation themes emerge among stakeholders.

Level	Indicative Criteria*
	• Change, due to the project, would be well within a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable). • There is likely to be a slight change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a suggestive relationship between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant study area are of low relevance to the determinant of health or population group affected by the project.
Not Significant	The narrative explains that this is not significant for public health and / or community wellbeing because (select as appropriate) • Changes, due to the project, do not affect the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by the project having no responses on this issue among stakeholders. • Change, due to the project, would not affect a regulatory threshold, statutory standard or guideline (if applicable). • There is likely to be a very limited change in the health baseline of the population, including as evidenced by the effect size and/or lack of scientific literature showing any evidence of a relationship between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant study area are not relevant to the determinant of health or population group affected by the project.
Imperceptible	The narrative explains that this is not significant for public health and / or community wellbeing because (select as appropriate) • Changes, due to the project, are not related to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by the project having no responses on this issue among stakeholders. • Change, due to the project, would not affect a regulatory threshold, statutory standard or guideline (if applicable). • There is likely to be a very limited change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an unsupported relationship between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant study area are not relevant to the determinant of health or population group affected by the project.
Adapted from the IEMA Guide to: Determining Significance for Human Health in Environmental Impact Assessment (IEMA 2022b) with categories of sensitivity aligned to EPA Guidelines (EPA 2022) terminology. * Judgement based on most relevant criteria - some criteria will span categories	

6.2.4.4 Assumptions and Limitations

Health data used to inform this assessment are at population level rather than clinical level. Since the assessment is reliant on aggregated data at population level, it cannot be used to infer potential impacts on health outcomes at individual (clinical) levels.

Although the assessment refers to research that demonstrates evidence of association between changes in health determinants and effects on health, this should not be interpreted as causation. It is not possible to draw conclusions on cause-and-effect relationships for human health using aggregated population-level data.

There are difficulties in estimating the level of exposure of the population to impacts on certain health determinants. For example, it is difficult to ascertain what proportion of their lives each individual within a given population spends in a place that is exposed to the impact and also whether individuals have been exposed to other factors also associated with a given health outcome. It is also difficult to estimate exposure due to the nature of environmental assessment results yielded by the industry standard guidelines applied for various environmental aspects. Any such uncertainty is set out in the assessment reported in Section 6.4.

The availability of health data in some cases is limited either due to the geographic scale, or the timescale that it covers. The nature of limitations, as relevant to specific baseline data, is explained in Section 6.3.

6.3 Baseline Environment

6.3.1 Population and Sociodemographics

Table 6.5, Table 6.6 and Table 6.7 set out population demographic data for the study area. It is notable that many of the small areas within the study area in Fingal, and to a lesser extent Dublin City, have a high proportion of children (aged under 16) relative to the national average. There are also two small areas within Fingal (267099015/01 and 267066001) which have a notably higher proportion of older adult residents than the national average. In contrast, small areas within County Meath generally have a higher proportion of older adults than the national average, with only one small area (167054005) having a high proportion of under 16-year-olds.

Figure 6.1 in Volume 4 of this EIAR shows the 2022 Pobal HP deprivation index data (Pobal 2023) for the study area presented at electoral division level. The Pobal HP index measures an area's level of relative affluence or disadvantage based on 10 measures including educational attainment and employment status. The electoral divisions which coincide with the study area within Dublin City are classified as 'Disadvantaged' and 'Very disadvantaged', whereas the remainder of the study area is classified as 'Marginally above average' (with the exception of Kilsallaghan electoral division in Fingal which is classified as 'Marginally below average').

Table 6.5: Population Demographics for Dublin City

Indicator	Small Areas – Dublin City				Republic of Ireland (ROI)
	268121002	268121001	268122003	268122007	
Males (%)	48	47	48	49	49
Females (%)	52	53	52	51	51
Age under 16 (%)	**26**	19	**26**	20	20
Age 65 and over (%)	6	14	11	11	15
Note: Data obtained from CSO (CSO 2023). Bolded values are considered notably higher than the ROI average.					

Table 6.6: Population Demographics for Fingal

Indicator	Small Areas - Fingal													ROI
	267098001/01	267001009/03	267158009/02	267158024	267158022	267005001/02	267099015/01	267099021	267066001	267158025	267158001	267132011	267132001/03	
Males (%)	50	53	55	47	52	47	59	51	50	51	48	50	47	49
Females (%)	50	47	45	53	48	53	41	49	50	49	52	50	53	51
Age under 16 (%)	12	**32**	13	**27**	**23**	**45**	**25**	**26**	12	**37**	23	24	**33**	20
Age 65 and over (%)	13	7	18	6	2	10	**26**	11	**37**	2	7	5	2	15
Note: Data obtained from CSO (CSO 2023). Bolded values are considered notably higher than the ROI average.														

Table 6.7: Population Demographics for County Meath

Indicator	Small Areas – County Meath													ROI
	167024002/01	167024003	167025001/03	167029019	167029021	167029003	167029018	167030019	167030021	167029015	167029001	167029004	167054005	
Males (%)	49	51	51	50	48	52	47	48	50	50	47	51	49	49
Females (%)	51	49	49	50	52	48	53	52	50	50	53	49	51	51
Age 16 and under (%)	23	22	17	24	18	22	21	22	18	19	17	16	**26**	20
Age 65 and over (%)	**20**	**22**	19	4	13	9	3	**22**	**27**	**27**	**22**	**20**	18	15
Note: Data obtained from CSO (CSO 2023). Bolded values are considered notably higher than the ROI average.														

6.3.2 Health Profile

Table 6.8, Table 6.9 and Table 6.10 show health indicator data for the study area. Health indicator data is presented at small area level where publicly available, and at the smallest publicly available geographical unit in all other cases.

Within Dublin City, two of the small areas within the study area have several indicators that suggest the population may be vulnerable to changes in health status, including a relatively high proportion of people who are long term unemployed or unable to work due to illness compared to the national average, a relatively high proportion of people with some level of disability and a relatively low level of people with either good or very good self-reported health (see Table 6.8). At county level, the proportion of people with 'good' or 'very good' health is notably lower than the national average and the Standardised Mortality Ratio (SMR) (the SMR is a measure which adjusts for differences in age structure between populations, so that the death rates of those populations can be compared without age being a factor in the differences seen) for cancer deaths in Dublin City is above the Ireland average, but the SMRs for deaths from heart disease and stroke and for deaths from respiratory disease are below or similar to the national average.

Health indicator data for small areas within Fingal (see Table 6.9) suggest generally resilient populations, with lower than average levels of people who are unemployed or unable to work due to illness or disability or with some level of disability. There are however a few small areas (e.g. 267001009/03, 267158009/02, 267005001/02 and 267066001) with notably lower than average proportions of people with good or very good self-reported health, although proportions of people with bad or very bad health in these small areas are not correspondingly higher.

Small area 67099015/01 (a rural area immediately north-east of Dublin Airport) is a notable exception within Fingal as it has substantially higher than average levels of people who are unemployed or unable to work due to illness or with some level of disability. The SMR for deaths from cancer, heart disease and stroke and deaths from respiratory diseases for Fingal as a whole are in line with or below the national average.

Health indicator data for County Meath (see Table 6.10) also suggests resilient populations, with the proportion of people unemployed or unable to work due to illness or disability, with some level of disability or with bad or very bad self-reported health below the national average and the proportion of people with good or very good self-reported health higher than the national average for all small areas. The SMR for deaths from cancer, deaths from heart disease and deaths from respiratory diseases for County Meath are all below the national average.

Table 6.8: Health Indicator Data for Dublin City

Indicator	Small Areas –Dublin City				Dublin City	ROI
	268121002	268121001	268122003	268122007		
Long term unemployed or unable to work due to illness or disability (%)*	19	10	19	11	7	7
Disability (to some and/or great extent) (%)*	30	18	27	19	22	22
Health 'bad' or 'very bad' (%)*	3	2	4	3	2	2
Health 'good or 'very good' (%)*	71	88	61	57	76	83
Deaths cancer – all ages (5 year age standard deaths 2008 – 2012) (Age standardised mortality rate (SMR))**	Data not available				183.5	175.6
Deaths heart disease and stroke – all ages (5 year age standard deaths 2008 – 2012) (SMR)**	Data not available				169.1	182.6
Deaths respiratory disease – all ages (5 year age standard deaths 2008 – 2012) (SMR) **	Data not available				65.1	64.9

* Data obtained from CSO (CSO 2023)
** Data obtained from HSE (HSE 2015a)
Note: Values in bold are considered notably different than the ROI average.

Table 6.9: Health Indicator Data for Fingal

Indicator	Small Areas -Fingal													Fingal	ROI
	267098001/01	267001009/03	267158009/02	267158024	267158022	267005001/02	267099015/01	267099021	267066001	267158025	267158001	267132011	267132001/03		
Long term unemployed or unable to work due to illness or disability (%)*	7	2	7	4	3	6	21	5	5	4	1	5	1	6	7
Disability (to some and/or great extent) (%)*	16	10	17	11	14	16	33	23	16	13	7	12	9	19	22
Health 'bad' or 'very bad' (%)*	1	1	0	0	0	2	4	1	2	1	0	1	0	1	2
Health 'good or 'very good' (%)*	82	53	71	91	91	47	36	85	68	89	90	79	93	84	83
Deaths cancer – all ages (5 year age standard deaths 2008 – 2012) (Age standardised mortality rate (SMR))**	Data not available													175.6	175.6
Deaths heart disease and stroke – all ages (5 year age standard deaths 2008 – 2012) (SMR)**	Data not available													169.1	182.6
Deaths respiratory disease – all ages (5 year age standard deaths 2008 – 2012) (SMR) **	Data not available													65.1	64.9

* Data obtained from CSO (CSO 2023)

** Data obtained from HSE (HSE 2015b)

Note: Values in bold are considered notably different than the ROI average.

Table 6.10: Health Indicator Data for County Meath

Indicator	Small Areas – County Meath													County Meath	ROI
	167024002/01	167024003	167025001/03	167029019	167029021	167029003	167029018	167030019	167030021	167029015	167029001	167029004	167054005		
Long term unemployed or unable to work due to illness or disability (%)*	3	6	5	3	2	2	2	2	5	3	3	4	3	6	7
Disability (to some and/or great extent) (%)*	14	24	18	9	15	17	14	14	23	20	21	23	18	22	22
Health 'bad' or 'very bad' (%)*	1	3	3	1	1	1	0	1	2	1	2	2	1	1	2
Health 'good or 'very good' (%)*	91	84	87	88	92	92	93	90	85	87	90	89	89	84	83
Deaths cancer – all ages (5 year age standard deaths 2008 – 2012) (Age standardised mortality rate (SMR))**	Data not available													159.4	175.6
Deaths heart disease and stroke – all ages (5 year age standard deaths 2008 – 2012) (SMR) **	Data not available													162.6	182.6
Deaths respiratory disease – all ages (5 year age standard deaths 2008 – 2012) (SMR)**	Data not available													60.5	64.9

* Data obtained from CSO (CSO 2023)

** Data obtained from HSE (HSE 2015c)

Note: Values in bold are considered notably different than the ROI average.

6.3.3 Open Space, Leisure and Recreation

A review on access to greenspace by Public Health England identified pathways through which greenspace can promote positive health and wellbeing outcomes such as encouraging greater physical activity, recreational activities, connection with nature, and community and social cohesion (Public Health England 2020). The health benefits of regular physical activity are well researched and widely accepted. For most people, the easiest forms of physical activity are those that can be built into daily life, for example, by walking or cycling as an alternative to motorised transport for everyday journeys such as commuting to work or school. Active forms of travel, such as walking and cycling, are associated with a range of health benefits. These include improved mental health, reduced risk of premature death and prevention of chronic diseases such as coronary heart disease, stroke, type 2 diabetes, osteoporosis, depression, dementia and cancer (British Medical Association 2012). Research also suggests that countries with the highest levels of active travel (walking and cycling) generally have amongst the lowest obesity rates (Bassett *et al.* 2008). There has been growing concern over increasing levels of obesity in Ireland, with the percentage of people in Ireland who are overweight or obese rising from 31% in 1998 (Kavanagh *et al.* 2005) to 62% in 2017 (CSO 2019). Physical inactivity is a key risk factor for obesity and switching from active modes of travel (walking and cycling) to car use has helped to fuel physical inactivity.

Section 5.3 of Chapter 5 (Population) in Volume 2 of this EIAR identifies leisure and recreational facilities, including areas of open space, which are located within the study area. Those within or adjacent to the Planning Application Boundary are:

- Athletic Union League (AUL) Sports Complex (Clonshaugh, Fingal);
- Craobh Chiaráin Gaelic Athletic Association (GAA) pitches (Belcamp, Fingal);
- Forest Little Golf Club (Swords, Fingal);
- National Show Centre (Swords, Fingal);
- St Margaret's GAA Club (Skephubble, Fingal);
- Dunboyne Association Football Club (AFC) Grounds (Dunboyne, County Meath); and
- Karlswood Equestrian Centre (Batterstown, County Meath).

The locations of these facilities are shown on Figure 5.1 in Volume 4 of this EIAR. There are 10 further leisure and recreational facilities within the study area, as shown on Figure 5.1 of Volume 4 of this EIAR, including two further golf clubs, four football clubs, a karate dojo, Pilates centre, equestrian centre and sports complex.

6.3.4 Employment and Income

Employment and income are an important determinant of health and wellbeing, with a healthy standard of living such as adequate income and housing associated with many positive health outcomes. The long term unemployed often have a lower life expectancy and worse health than those who are employed (Bartley *et al.* 2005), and evidence from the United Kingdom (UK) shows that children growing up in non-working families are almost twice as likely to fail at education at any stage than children growing up in working families (Department for Work and Pensions 2017). As described in Section 6.3.2 there are relatively high levels of people who are long term unemployed or unable to work due to disability within two of the small areas in Dublin City and one of the small areas within Fingal (refer to Figure 6.1 in Volume 4 of this EIAR).

Section 5.3 of Chapter 5 (Population) in Volume 2 of this EIAR details the economic conditions within the study area, including employment within the construction sector. Section 5.3 of Chapter 5 (Population) describes land uses within the study area that may provide employment opportunities locally. These include two commercial or business parks (Barstown Commercial Park, Dunboyne and Dunboyne Business Park, Dunboyne), five commercial premises relating to the automotive industry, as well as 28 other commercial premises. Figure 5.1 in Volume 4 of this EIAR shows the locations of business, commercial and industrial premises within the study area. In addition, there are 40 agricultural landholdings located within the Planning Application Boundary for the Proposed Development (see Section 15.3 of Chapter 15 (Agronomy and

Equine) in Volume 2 of this EIAR which will also provide employment opportunities within the study area (see Figure 15.1 in Volume 4 of this EIAR).

6.3.5 Transport Modes, Access and Connections

Transport is required for access to a variety of resources important to health and social inclusion, including traveling to work or school, visiting family and friends, accessing health services, and shopping and leisure. Poor access to transport results in barriers to these important health resources and can contribute to health inequalities and social exclusion. In addition, walking, cycling and horse riding for recreational purposes or to access places of employment or study provide opportunities for daily physical activity that are important for maintaining good mental and physical health as described under Section 6.3.3.

Section 14.3 of Chapter 14 (Traffic and Transport) in Volume 2 of this EIAR describes roads, walking and cycling facilities and public transport (bus and rail) facilities within the study area. Routes likely to be affected by the Proposed Development are summarised in the following sections.

6.3.5.1 Private Vehicles

Census 2022 data (CSO 2023) shows that 65% of residents of Dublin City have access to a car, which is aligned with national average of 63%. The proportion of residents with access to a car in Fingal and County Meath is 90% and 93%, respectively, reflecting a tendency for greater car dependency in more rural areas.

The Proposed Development will cross three motorways (M1, M2 and M3), and a further 13 regional and local roads are expected to be affected by Temporary Traffic Management (TTM) measures. No disruption to access is anticipated for the M1, M2 and M3 Motorways as trenchless techniques will be used to avoid direct impacts on these routes. The regional and local roads which may be affected include the R156, R157 and R147 Regional Roads, L5026 Pace, L1010 Nuttstown Road/Priestown Road, L1007 Kilbride Road, the R121 and R122 Regional Roads, Kilreesk Road, R108 Regional Road, Naul Road and Stockhole Lane. Figure 14.1 in Volume 4 of this EIAR shows the location of regional and local roads likely to be affected by TTM sections.

6.3.5.2 Public Transport (Rail and Bus)

The Proposed Development will cross one railway line, the M3 Parkway Service rail line, just north of the M3 Parkway Service station. As for the M1, M2 and M3 Motorways, trenchless techniques will be used to cross this railway line, and no direct impacts are anticipated. For this reason, these routes are scoped out of further assessment.

There are 34 local and regional bus routes which use roads likely to be affected by TTM measures (see Chapter 14 (Traffic and Transport) in Volume 2 of this EIAR) which provide access between Dublin and Swords, Skerries, Balbriggan, Kilsallaghan, Rolestown, Ashbourne, Drogheda, Ratoath, Kells, Trim, Athboy and Clonmellon, between Navan and Dunboyne, and between Drogheda and Blanchardstown or Maynooth, and Maynooth and Kells, Cavan or Carrickmacross.

6.3.5.3 Walking, Cycling and Horse-Riding Facilities

Regional and local roads within the vicinity of the Proposed Development are generally rural in nature and do not have footways. Nevertheless, they are likely still used for active travel and recreational walking and cycling, with some of the more rural routes also likely used for horse riding. Figure 14.6 in Volume 4 shows the existing cycling network within the vicinity of the Proposed Development. In addition to the existing routes shown on Figure 14.6 in Volume 4 of the EIAR, a comprehensive network of new routes is proposed within the Greater Dublin Draft Cycle Network Plan (National Transport Authority (NTA) 2021) and the draft Ireland's Cycle Network plan (NTA 2023).

6.3.5.4 Key Routes for Vulnerable Users

Key routes which may be used by walkers and cyclists and which are also identified as being potentially used by more vulnerable groups (children, older people and people with disabilities) (see Figure 6.1 in Volume 4 of the EIAR) include:

- L1007 Kilbride Road, Kilbride: This may be used by children to access Scoil Bhríde, Kilbride and intersects the Planning Application Boundary;
- R122 Regional Road at Ballystrahan, Swords, Fingal: The proposed cable route will be routed along this road, and Little Moo Moos Playschool is located directly on this road directly adjacent to the Planning Application Boundary;
- R121 Regional Road at New Park, The Ward, Fingal: The proposed cable route will be routed along this road, and New Park Care Centre is located directly on this road directly adjacent to the Planning Application Boundary;
- R156 Regional Road at Harlockstown, Dunboyne, County Meath: The proposed cable route will be routed along this road, and Dunboyne Nursing Home is located on this road directly adjacent to the Planning Application Boundary; and
- Stockhole Lane, Cloghran: Anovocare Nursing Home, Cloghran, Fingal is located adjacent to the Planning Application Boundary at this location.

6.3.6 Air Quality

The WHO Global Air Quality Guidelines: Particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide (WHO 2021) serve as a global target for national, regional and city governments to work towards improving people's health by improving air quality through reducing pollution. Air pollution is a complex mixture of solid particles, liquid droplets and gases. Air pollution is the greatest environmental threat to human health and is the leading cause of non-communicable diseases (NCDs) such as heart attacks and stroke. Air pollutants measured include particulate matter ($PM_{2.5}$ and PM_{10}), ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO) and sulphur dioxide (SO_2) (WHO 2021).

Chapter 7 (Air Quality) in Volume 2 of this EIAR provides a detailed air quality baseline for the Proposed Development, which is summarised briefly as follows. The eastern half of the Proposed Development will be located within the Dublin Conurbation air quality zone (Zone A) and the western half of the Proposed Development will be located in the Rural Ireland air quality zone (Zone D). There is one air quality monitoring station within the study area, located to the east of Dublin Airport, and monitoring data for 2022 (EPA 2023) showed annual mean concentration values for NO_2, PM_{10} and $PM_{2.5}$ were all within the relevant Limit Values, but annual mean $PM_{2.5}$ and NO_2 values exceed the WHO Global Air Quality Guidelines: Particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide values indicating a likelihood of some air pollution related health outcomes within the population, but that the overall level of health protection is considered acceptable against the current Limit Values.

6.3.7 Noise and Vibration

Noise from road traffic alone is the second most harmful environmental stressor in Europe, behind only air pollution (WHO 2018). The harmful effects of noise arise mainly from the stress reaction it causes in the human body, which can also occur during sleep. There is good evidence that increased long-term exposure to traffic noise is associated with significant increases in the prevalence and the incidence of ischaemic heart disease (IHD) (van Kempen *et al.* 2018). It should be noted that while research shows this association, the level of risk attributed to noise exposure is much smaller than for other risk factors such as diet, exercise, and smoking. Noise is also associated with sleep disturbance and annoyance.

Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR provides a noise baseline for the Proposed Development, which is summarised briefly as follows. Baseline noise levels are likely to vary across the study area, with the main noise sources likely to be road traffic and airport noise. Highest noise levels are likely to occur in urban areas towards the east of the study area, and generally lower noise levels in the western extent of the study area, except in close proximity to road or rail infrastructure. Woodland Substation is noted particularly as being within a rural area.

Baseline noise mapping has not been undertaken (see Section 9.2 of Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR). However strategic noise mapping (EPA n.d.) indicates that WHO Noise Guidelines (WHO 2018) values for road traffic noise are exceeded adjacent to major roads within the study area including the M3, M2 and M1 Motorways, R108, R121, R122, R132, and R135 Regional Roads during both the day and the night and that noise levels exceed the WHO Noise Guidelines values for aircraft traffic noise across much of the study area. The WHO notes that the WHO Noise Guidelines values are aspirational and unlikely to be achieved in many urban contexts.

6.3.8 Vulnerable Groups and Sensitive Locations

Certain groups are more vulnerable to changes in the health determinants scoped into the assessment for the Proposed Development (see Table 6.1). These include:

- People who are more likely to have limited mobility (older people and people with disabilities) who would find it more difficult to adapt to changes in access to transport and community facilities, and any increases in road traffic volumes and speeds on diversion routes;
- People who are more likely to have poor health (including older people and people with disabilities) who are more likely to need to access healthcare facilities;
- People who are more sensitive to changes in availability of opportunities for physical activity and access to open space (people with poor health, children);
- People who are more vulnerable to air pollution (children, older people, people in poor health);
- People who are more vulnerable to noise pollution (children and shift workers); and
- The farming community, as this population sub-group is likely to be most affected by temporary and permanent land take as a result of the Proposed Development.

Figure 6.1 in Volume 4 in this EIAR shows locations of facilities of importance to children, elderly and people with poor health and/or disabilities, (e.g. schools, pre-schools and nurseries, nursing homes and care homes) as well as identifying small areas which have relatively high proportions of older people, children, people with disabilities, and people with bad or very bad health. Figure 6.1 in Volume 4 in this EIAR also identifies areas in Dublin City that the 2022 Pobal HP Index (Pobal 2023) assesses as being ‘disadvantaged’ or ‘very disadvantaged’.

6.3.9 Sensitivity of Populations

Three small areas have been identified as having high sensitivity as the sociodemographic and health baseline data presented in Section 6.3.1 and Section 6.3.2 show that these three populations have high proportions of more vulnerable residents (children aged under 16 and / or people aged over 65), as well as other indicators that suggest residents may be more vulnerable to adverse health outcomes (high levels of deprivation and / or high proportions of residents who are unable to work due to disability or are long-term unemployed, and high proportion of residents with a disability). The locations of these high sensitivity populations are shown on Figure 6.1 in Volume 4 in this EIAR, and are as follows:

- Dublin City - 268121002;
- Dublin City - 268122003; and
- Fingal - 267099015/01.

The populations of all other small areas within the study area are considered to have low sensitivity as although all either have relatively high proportions of children or older adults (aged over 65) than the national average, other health indicators are generally better than the national average and levels of deprivation are below the national average.

The population sub-groups of children (aged under 16), older people (aged over 65), and people with disabilities are considered to have high sensitivity as these groups would include a high proportion of dependants, people with very low capacity to adapt and some people prevented from undertaking daily activities.

The farming community is judged to be of medium sensitivity. This reflects a community whose outlook is predominantly uncertainty with some concern. There is significant concern around mental health in the farming community as farmers can face a combination of factors such as increased regulations and costs, unpredictable weather, isolation and long working hours (Rose *et al*. 2023). One recent national level survey on farmer's wellbeing found that 23.4% of the 256 farmers who responded to the survey were considered at risk of suicide (Stapleton *et al*. 2022).

6.4 Potential Impacts

6.4.1 'Do Nothing' Scenario

Under a Do Nothing scenario the health status of populations scoped into the assessment (described in Section 6.3), would be expected to change with time, in accordance with current trends across Ireland, as set out in Health In Ireland: Key Trends (Department of Health 2022) including:

- Increases in the proportion of the population aged over 65;
- Reductions in mortality rates from respiratory diseases and circulatory system diseases; and
- Reductions in suicide rates.

6.4.2 Construction Phase

6.4.2.1 Open Space, Leisure and Recreation

As identified in Section 5.4 of Chapter 5 (Population) in Volume 2 of this EIAR, no land take from residential, commercial receptors or community / recreational facilities is anticipated during the Construction Phase. Construction activities will generate noise and dust (see Chapter 7 (Air Quality) and Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR), which are most likely to affect the following facilities which are located within or adjacent to the Planning Application Boundary:

- AUL Sports Complex (Clonshaugh, Fingal) (small area 267005001/02);
- Craobh Chiaráin GAA pitches (Belcamp, Fingal) (small area 267005001/02);
- Forest Little Golf Club (Swords, Fingal) (small area 267001009/03);
- National Show Centre (Swords, Fingal) (small area 267099015/01);
- St Margaret's GAA Club (Skephubble, Fingal) (small area 267098001/01);
- Dunboyne AFC Grounds (Dunboyne, County Meath) (small area167029004); and
- Karlswood Equestrian Centre (Batterstown, County Meath) (small area 167024003).

As stated in Section 5.4 of Chapter 5 (Population), and with full details in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR, the rolling nature of the construction programme means that the duration of impacts on these facilities will be very short-term in duration, and as such, they are not considered likely to be sufficient to dissuade the use of these facilities for recreational physical activity. The National Show Centre is likely to draw visitors on a regional or national level, rather than serve the local community, with the majority of people who visit the National Show Centre expected to be attending a specific event rather than depending on it on a frequent basis for their health and wellbeing. The magnitude of impact is assessed as negligible given the very localised and short-term nature of the impacts which would affect very few people, and where the health impact is considered likely to relate to a minor change in quality of life to those people who use the facilities. The majority of affected small areas are assessed as having low sensitivity, with the exception of small area 26700015/01. However, the only affected asset in small area 26700015/01 is the National Show Centre which as previously explained is not considered to be an important resource for recreation and wellbeing for the local community. Therefore, the significance of impact is assessed as Negative, Imperceptible and Temporary to public health for all small areas.

6.4.2.2 Employment and Income

Section 5.4 of Chapter 5 (Population) assesses the potential impact of the Construction Phase of the Proposed Development on local employment opportunities and economy. This assessment concludes that due to the low total numbers of construction workers required for the Proposed Development of this scale, and the fact that the nature of the Proposed Development (i.e. high voltage underground cable and upgrade works to the existing Woodland Substations and the construction of a new Gas Insulated Switchgear (GIS) Hall and associated equipment at the extension to the Belcamp Substation) means specialist contractors will likely be required for health and safety reasons, job opportunities for local communities during the Construction Phase are likely to be very limited. For this reason, the magnitude of impact on the general population of all small areas scoped into assessment is considered to be negligible and the significance of the health impact is assessed as Neutral, Imperceptible and Short-Term.

Whilst the majority of the Proposed Development (approximately 70%) will be located within the existing road network, the remaining 30% will be located within land currently used for agricultural purposes. As set out in Table 15.6 in Chapter 15 (Agronomy and Equine) in Volume 2 of this EIAR, in the absence of mitigation it is anticipated that construction impacts on seven of the 40 agricultural land holdings would be sufficient to change the way in which the farm is operated (i.e., a significance of impact assessed as moderate adverse or above as per the assessment methodology in Chapter 15 (Agronomy and Equine)). The farms are located in Fingal on the northern outskirts of Dublin City, within small areas 267099021 and 267005001/02 (see Figure 15.1 in Volume 4 of this EIAR). None of the affected land holdings are considered likely to experience impacts which would threaten or prevent the continued viability of operations. However, in the absence of mitigation, there is the potential for mental health impacts associated with concerns over financial insecurity in the short term. Since mental health concerns in the farming community are considered to be relatively widespread, the magnitude of impact on this sub-population in the study area is considered to be medium and the significance of the impact is assessed as Negative, Moderate and Short-Term.

6.4.2.3 Transport Modes, Access and Connections

Temporary measures will be implemented to ensure that direct access points to community facilities, including places of education or employment, medical facilities, shops and banks, recreational facilities and access points to other transport modes (e.g., bus stops and the M3 Parkway rail station) will be maintained throughout construction (see Section 5.4 of Chapter 5 (Population) in Volume 2 of this EIAR for further detail).

Temporary lane and road closures will be required to facilitate construction activities (see Chapter 14 (Traffic and Transport) in Volume 2 of this EIAR for further details). However, diversion routes will be provided and there will be no loss of access to community facilities. The maximum increase in journey time resulting from road closures is assessed as approximately 20 minutes based on precautionary assumptions, and in most cases, less than 10 minutes.

Section 14.4 in Chapter 14 (Traffic and Transport) presents data showing the anticipated changes in total traffic flows (Annual Average Daily Traffic (AADT) flows) and Heavy Good Vehicles (HGV) flows on the highway network during peak construction. In general, the increase in AADT flows during peak construction will be very low (<11%), with the exception of one route (Ballymacarney Road, west of Chapel Drive) and a motorway onslip / offslip on the M3 Motorway Northbound. However, quite substantial percentage increases in HGV volumes (>30%) will be seen at 22 locations (see Chapter 14 (Traffic and Transport)). Whilst the percentage increase in HGV flows is large on these routes, it mainly reflects the very low numbers of HGVs using these routes under baseline conditions, and in the majority of cases the duration over which the percentage magnitude reported in Chapter 14 (Traffic and Transport) would be seen is less than a week of the total construction period (approximately 42 months).

Of those 22 locations where a large percentage increase in HGV flows is anticipated, four locations are considered particularly sensitive due to the presence of facilities of importance to older people or children nearby who walk or cycle these routes on a regular basis (see Section 6.3.5.4):

- L1007 Kilbride Road (Kilbride (Scoil Bhríde)) (small area 167025001/03 in County Meath);
- R121 Regional Road at New Park, The Ward, Fingal (New Park Care Centre) (small area 267066001 in Fingal);
- R156 Regional Road to the north-west of Dunboyne (Dunboyne Nursing Home) (small area 167024003 in County Meath); and
- Stockhole Lane, Cloghran (Anovocare Nursing Home) (on the boundary between small areas 267005001/02 and 267099021 in Fingal).

Stockhole Lane, Cloghran and the R121 Regional Road at New Park have footways on one or both sides of the carriageway in proximity to the Anovocare Nursing Home, and the L1007 Kilbride Road has footways in close proximity to Scoil Bhríde but not along the full extent of the affected route which links residential areas to the south of Scoil Bhríde. There are no footways or crossing facilities on the R156 Regional Road in close proximity to Dunboyne Nursing Home.

All dedicated walking and cycling routes will remain open. However, temporary increases in traffic volumes are anticipated to affect a number of routes due to the implementation of TTM measures on the road network (see Chapter 14 (Traffic and Transport)). Journey times on 34 bus routes are anticipated to increase as a result of temporary or full road closures. However, all routes will remain operational (with only the 40B Parnell Street – Toberburr and UM03 Dundalk – Maynooth University requiring diversions), and as stated above, no impacts on access points to public transport are anticipated.

There will be no loss of access to community facilities (including public transport access points) or walking and cycling routes. In addition, temporary increases in total traffic (AADT) and HGV volumes will generally be relatively low and will not be sufficient enough to dissuade most people from undertaking active travel journeys (recreational walking and cycling), or travelling to meet friends and family or to partake in social activities. Therefore, the magnitude of impact on the transport modes, access and connections health determinant is considered to be low for most populations. However, in the absence of mitigation, it is considered that the increased volume of HGVs could potentially be sufficient to dissuade the use of these routes by vulnerable road users (children and older people) and present an increased risk of road traffic collisions. However, the duration over which increased HGV volumes are expected will be in the order of weeks rather than months (see Table 14.19 in Chapter 14 (Traffic and Transport)), and so, changes in physical activity levels and social isolation will only be likely to have a minor effect on quality of life. For this reason, the magnitude of impact is also assessed as low for older people and children within three small areas where substantial percentage increases in HGV flows are anticipated in close proximity to locations of importance to older people and children (small areas 167025001/03 and 167025001/03 in County Meath, small areas 267005001/02 and 267099021 in Fingal). However, specific mitigation measures are proposed to minimise risks to these groups (see Section 6.5). The significance of impact, in the absence of mitigation, will be Negative, Slight and Short-Term for older people and children residing in the four small areas within the study area as listed below:

- Fingal - 267005001/02 and 267099021; and
- County Meath - 167025001/03 and 167025001/03.

The significance of impact, in the absence of mitigation, will be Negative, Not Significant and Short-Term for all other small areas in the study area.

6.4.2.4 Air Quality

As identified in Chapter 7 (Air Quality) in Volume 2 of this EIAR, construction activities with the potential to generate dust emissions include excavation of the proposed cable trench (including the creation of temporary lay down areas, Passing Bays and Joint Bays), the laying of the proposed cable circuit, formation of Temporary Construction Compounds (TCCs) / Horizontal Directional Drilling (HDD) Compounds, and upgrades to Belcamp Substation and Woodland Substation. The majority of the Proposed Development will be located within rural areas where there are relatively few nearby residents or users of community facilities. However, the Proposed Development will pass through some settlements and more populated areas including:

- Baskin / Glebe, on the northern outskirts of Dublin City, immediately east of the M1 Motorway Junction 2 (Fingal);
- Northern outskirts of Hollystown, Fingal;
- Southern outskirts of Kilbride, County Meath; and
- Northern outskirts of Dunboyne, County Meath.

The construction dust assessment presented in Chapter 7 (Air Quality) assesses construction dust impacts associated with cable laying for a relatively populated area of the proposed cable route in Hollystown, and concludes that there will be a negligible or low risk of human health impacts associated with construction activities in the absence of mitigation. Risks to human health associated with TCC3 (which was chosen due to its more sensitive location near Hollystown) were also assessed as having negligible to low risk of human health impacts, and those associated with construction works at Belcamp Substation and Woodland Substation were also assessed as having low or negligible risk. Construction dust emissions may present an annoyance in more heavily populated areas as previously described, but this would be of temporary duration and immediately reversible following cessation of construction activities, and so, the magnitude of impact is assessed as low and the significance of impact is assessed as Negative, Slight and Short-Term for small areas 268121002 and 268122003 (Dublin City) and 267099015/01 (Fingal) and Negative, Not Significant and Temporary for all other small areas.

6.4.2.5 Noise

A total of 43 residential dwellings and three nursing homes (Dunboyne Nursing Home (Harlockstown, Dunboyne, Meath), Anovocare Nursing Home (Cloghran, Fingal) and New Park Care Centre (Fingal)) are expected to experience increases in noise levels of 65 decibels (dB) (LAeq (the continuous equivalent sound level)) or greater during construction, with 27 of those expected to experience noise increases of that level during both Phase 1 (installation of Joint Bays and Passing Bay structures) and Phase 3 (installation and jointing of cables) (see Section 4.5 of Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR) of the construction works and Section 9.4 of Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR). The nature of the construction works is such that there will be a rolling programme, for example, cable duct laying is anticipated to progress at a rate of 40m to 50m per day. This will minimise the duration of exposure for residents of nearby houses and users of community facilities to relatively short periods of time in the majority of cases. Therefore, with the exception of eight residential dwellings which will experience noise levels of 65dB LAeq during construction at the HDD1a and 1b and HDD2a and 2b Compounds at the proposed M3 and M2 Motorway crossings for a period of around 54 days, the duration over which effects will be experienced would be less than 10 days in total for each phase of works. Night working is not proposed on a routine basis, although some elements of construction (HDD crossings for example) have the potential to occur outside of normal working hours (i.e., Monday to Friday 07:00hrs to19:00hrs and 08:00hrs to14:00hrs on Saturdays).

Traffic diversion routes implemented during construction will also result in increases in noise exposure for residents. Table 9.13 of Chapter 9 (Noise and Vibration) shows that significant noise impacts are anticipated during one or more phases of construction for nine of the proposed diversion routes. However, these impact will be temporary in nature (maximum duration of 134 days or less than four months for proposed Diversion

Route 1.2, and less than 56 days or two months for all other diversion routes). The locations of the proposed diversion routes are shown in Figure 14.2 in Volume 4 of this EIAR.

No changes in myocardial infarction (heart attack) morbidity are anticipated given the temporary nature of construction related and traffic diversion noise exposure anticipated and impacts on sleep disturbance are also anticipated to be minimal given that night working is not routinely required. Construction related noise, including that associated with traffic diversions, is likely to give rise to annoyance and adversely affect quality of life for nearby residents and users of nearby community facilities and places of employment, but given the temporary duration of exposure, reversibility of the impact, and the fact that the majority of affected residential locations (including nursing homes) are located along or in close proximity to Dublin Airport or to motorways and regional roads within the study area, the magnitude of impact is considered to be low. The significance of impact is therefore assessed as either Negative, Slight and Short-Term (small areas 268121002 and 268122003 (Dublin City), 267099015/01 and 267066001 (Fingal)), or Negative, Not Significant and Temporary for all other small areas).

6.4.3 Operational Phase

6.4.3.1 Open Space, Leisure and Recreation

No permanent land take will be required from areas of open space or facilities used for leisure and recreational purposes, and there will be no potential impacts on this determinant during the Operational Phase. Therefore, there will be no impact on health associated with this determinant.

6.5 Mitigation and Monitoring Measures

All mitigation measures set out in Section 6.5.1 and Section 6.5.2 are included in the Construction Environmental Management Plan (CEMP), which is included as a standalone document in the planning application pack.

6.5.1 Construction Phase

A potential Negative, Moderate and Short-Term health impact on the farming community has been identified as a result of the Construction Phase. The following mitigation measures set out in Section 15.5 of Chapter 15 (Agronomy and Equine) in Volume 2 of this EIAR will be implemented in full to provide support to the farming community likely to be affected by the Proposed Development:

- The appointed contractor will be required to maintain close liaison with local community representatives and landowners and farmers to provide them with adequate progress information and advance notice of works. This will ensure that construction activities are planned around the reasonable access needs of the landowner, so that access is maintained when required by the landowner for farming activities, such as for example, forage and crop harvesting, fertiliser spreading, slurry spreading, and herding of livestock etc. Scheduling of works will be agreed with each landowner to facilitate the operation of the farm and minimise disturbance. Where it is necessary to move livestock along public roads or across the working area, this will be facilitated by the appointed contractor; and
- Where the working area severs land access or access to farmyards, the appointed contractor will ensure that there is adequate access provided to facilitate the farmer to effectively farm severed land.

These mitigation measures will provide farmers with information and support and give them the opportunity to be included in the planning of activities. This will help to reduce uncertainty and allow them to plan their operations more effectively throughout the Construction Phase.

No significant health impacts were identified for the population in the study area as a whole. The following mitigation measures will be implemented to help further reduce the impacts on human health:

- The CEMP, which is included as a standalone document in the planning application pack will be implemented;
- The following mitigation measures set out in Section 14.5 of Chapter 14 (Traffic and Transport) in Volume 2 of this EIAR, will be implemented:
  - An adopted, regulated and approved Construction Traffic Management Plan (CTMP) (refer to Appendix B of the CEMP which is included as a standalone document in this planning application pack) will be implemented;
  - Signed diversion routes will be provided to mitigate journey disruption and to minimise potential driver delay. These are outlined in Chapter 14 (Traffic and Transport) but will be subject to final agreement with the Roads Authorities. Where practically achievable, diversion routes will not apply outside of the working area hours of operation; and
  - Construction activity generated vehicles will travel on predefined construction access routes to and from the relevant working areas to reduce the effects on local traffic.
- Mitigation measures set out in Section 7.5 of Chapter 7 (Air Quality) in Volume 2 of this EIAR, including:
  - 'Highly recommended' measures for 'medium risk' dust soiling impacts, as identified in the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.1) (IAQM 2023), will be implemented.
- Mitigation measures set out in Section 9.5 of Chapter 9 (Noise and Vibration), including:
  - Noise barriers will be installed around the HDD1 and HDD2 Compounds and acoustic enclosures will be placed around HDD plant; and
  - British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (BSI 2014) will be complied with.

In addition, the following specific mitigation measures have been identified for human health and will be implemented during the Construction Phase:

- All proposed traffic diversion routes will remain suitable for walkers, cyclists and horse riders as well as motorised vehicles if these user types are known or anticipated to make use of the closed route;
- A Community Liaison Officer will be engaged who will act as a single point of contact for members of the community who may have concerns about construction related activities, collate data regarding issues raised by members of the community to enable them to be addressed, and who will act to resolve concerns in a timely manner;
- The Community Liaison Officer will be contacted either via telephone or by a suitable online feedback mechanism; and
- There will be specific liaison between the appointed contractor's Community Liaison Officer and the following facilities to develop targeted mitigation measures which will help to minimise adverse effects associated with increased traffic flows on nearby roads:
  - Scoil Bhríde, Kilbride Road, Kilbride;
  - Dunboyne Nursing Home, Harlockstown, Dunboyne; and
  - Anovocare Nursing Home, Stockhole Lane, Cloghran.

6.5.2 Operational Phase

No health impacts are anticipated during the Operational Phase, and therefore no mitigation or monitoring measures are required.

6.6 Residual Impacts

6.6.1 Construction Phase

Table 6.11 presents the predicted residual impacts on human health during the Construction Phase, following the implementation of the mitigation measures outlined in Section 6.5.1.

Table 6.11: Predicted Residual Impacts on Human Health

Determinant (Construction Phase)	Potential Impact		Mitigation that will be implemented	Predicted Residual Impact	
	Magnitude	Significance of Impact		Magnitude of Impact	Significance of Impact
Open space, leisure and recreation	Negligible (all populations)	Negative, Imperceptible and Temporary (all populations).	• Mitigation measures set out in Section 7.5 of Chapter 7 (Air Quality), including those listed under Air Quality mitigation in Section 6.5.1 of this Chapter; and • Mitigation measures set out in Section 9.5 of Chapter 9 (Noise and Vibration), including those listed under Noise and Vibration mitigation in Section 6.5.1 of this Chapter.	Negligible (all populations)	Negative, Imperceptible and Temporary (all populations)
Employment and income	Negligible (general population in all small areas) Medium (farming population in all small areas)	Neutral, Imperceptible and Short-Term (general population in all small areas). Negative, Moderate and Short-Term (farming population in all small areas).	Mitigation measures set out in Section 15.5 of Chapter 15 (Agronomy and Equine), including those listed under Agronomy mitigation in Section 6.5.1 of this Chapter.	Negligible (general population in all small areas) Low (farming population in all small areas) (note: number of farm holdings experiencing moderate adverse effects reduced to two following implementation of mitigation, see Section 15.6 of Chapter 15 (Agronomy and Equine) for further detail).	Neutral, Imperceptible and Short-Term (general population in all small areas) Negative, Slight and Short-Term (farming population in all small areas)
Transport modes, access and connections	Low	Negative, Slight and Short-Term for children and older people resident in small areas: Fingal - 267005001/02 and 267099021 County Meath - 167025001/03 and 167025001/03. Negative, Not Significant, Short-Term (all other small areas)	• Mitigation measures set out in Section 14.5 of Chapter 14 (Traffic and Transport), including those listed under Traffic and Transport mitigation in Section 6.5.1 of this Chapter; and • Mitigation measures as set out for human health in Section 6.5.1 of this Chapter, including the provision of Community Liaison Officer.	Low	Negative, Not Significant and Short-Term (all populations)
Air quality	Low (all populations)	Negative, Slight and Short-Term (small areas 268121002 and 268122003 (Dublin City) and 267099015/01 (Fingal)) Negative, Not Significant and Temporary (all other small areas)	Mitigation measures set out in Section 7.5 of Chapter 7 (Air Quality), including those listed under Air Quality mitigation in Section 6.5.1 of this Chapter.	Low (all populations)	Negative, Not Significant and Temporary (all populations)

Determinant (Construction Phase)	Potential Impact		Mitigation that will be implemented	Predicted Residual Impact	
	Magnitude	Significance of Impact		Magnitude of Impact	Significance of Impact
Noise and vibration	Low (all populations)	Negative, Slight and Short-Term (small areas 268121002 and 268122003 (Dublin City), 267099015/01 and 267066001 (Fingal)) Negative, Not Significant and Temporary (all other small areas)	Mitigation measures set out in Section 9.5 of Chapter 9 (Noise and Vibration), including those listed under Noise and Vibration mitigation in Section 6.5.1 of this Chapter.	Low (all populations)	Negative, Slight and Temporary (all populations)

6.6.2 Operational Phase

No residual impacts on the open space, leisure and recreation health determinant are anticipated during the Operational Phase for the reasons described in Section 6.4.3.1.

6.7 Conclusion

The Proposed Development will not generate any Significant (Significant, Very Significant or Profound) impacts on human health during the Construction and Operational Phases. Construction works will affect two agricultural land holdings (land parcels no. 33 and 40 as outlined in Chapter 15 (Agronomy) in Volume 2 of this EIAR) to the extent that will require moderate changes to the management and operation of their businesses in the long-term. However, this is not considered likely to change the availability of employment or income levels locally to the extent that a population level health effect is likely. Regular communication and support for individuals directly affected by construction (mainly members of the farming community) will help them to better understand the proposals and plan ahead with regard to their farming activities, which is an important factor in helping to protect mental wellbeing. There will be some disruption along routes used to access community facilities by motorised vehicle, or changes in amenity of routes used by walkers and cyclists, due to carriageway or road closures required to facilitate construction works. This will result in changes in traffic patterns on the local road network. However, these will be short-term in nature, and with mitigation in place, they will not affect access to leisure and recreational facilities, places of study, employment or healthcare facilities or reduce physical activity levels, such that changes in morbidity or quality of life are anticipated. Similarly, whilst construction activities will result in noise and dust emissions, due to the rural nature of the majority of the proposed cable route and rolling construction programme, such impacts are at worst likely to result in annoyance and psychosocial distress at on a temporary to short-term, reversible basis.

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 7 – Air Quality

EirGrid

March 2024

Contents

7. Air Quality

7.1 Introduction

This Chapter presents the assessment of the potential impacts of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) on air quality, at sensitive human and ecological receptors, during the Construction and Operational Phases. A full description of the Proposed Development is presented in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR). This Chapter describes the methodology and guidance used, identifies the potential impacts on considered sensitive receptors, discusses the effects of the potential impacts and provides details of the required mitigation measures to reduce any potential impacts.

The term 'air quality' refers to how polluted the air we breathe is, in relation to levels of air pollution that could potentially affect human health. Air quality is affected by emissions of air pollutants from a wide range of sources including the exhausts of petrol / diesel fuelled road vehicles, as a result of brake, tyre and road wear, and other sources such as fossil fuel combustion processes used for power generation (e.g. diesel generators). It also refers to dust, which could affect health or give rise to annoyance due to the soiling of surfaces through deposition. Both air pollution and dust can also affect sensitive vegetation and ecosystems (i.e. ecological receptors).

Specifically, this Chapter considers the following elements:

- Temporary dust impacts generated by construction activities;
- Temporary increases in air pollutant concentrations due to additional vehicle movements during the Construction Phase;
- Emissions of pollutants to air from construction plant and machinery; and
- Increases in air pollutant concentrations due to additional vehicle movements during the Operational Phase.

The key air pollutants considered relevant to the Proposed Development are:

- Nitrogen dioxide (NO_2);
- Dust emissions from construction activities; and
- Particulate matter (PM_{10}, particles with an aerodynamic diameter of 10 microns or less, and $PM_{2.5}$, particles with an aerodynamic diameter of 2.5 microns or less).

Any descriptions of the characteristics of the Proposed Development in this Chapter should be read in conjunction with Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.

7.2 Methodology

7.2.1 Study Area

There are several different types of potential air quality effects or emission sources that require assessment. The study areas for the different air quality effects are set out in the following sections.

7.2.1.1 Construction Dust Emissions

For dust emissions during the construction of the Proposed Development, the assessment of human receptors focused on areas extending up to 250m (metres) from the Planning Application Boundary. This distance is based on the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.1) (hereafter referred to as the IAQM Guidance) (IAQM 2023), which identifies when an assessment of dust effect is required. The effects of 'trackout' also need to be determined up to 50m from the edge of the local road network used by construction vehicles, within 500m of the site exits associated with construction works areas and Temporary Construction Compounds (TCCs) / Horizontal Directional Drilling (HDD) Compounds. Trackout is defined as the transport of dust or mud from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the same road network used by construction vehicles. In line with the IAQM Guidance, the assessment also considers relevant ecological receptors up to 50m from the Planning Application Boundary.

7.2.1.2 Construction Site Plant and Machinery Emissions

Emissions from construction plant and machinery (e.g. generators and Non-Road Mobile Machinery (NRMM)) during construction of the Proposed Development are considered to have the potential to affect sensitive receptors up to 200m, from the Planning Application Boundary, depending upon the scale of the activities (based on professional judgement and consistency with guidance on assessing emissions from road traffic, as outlined in Section 7.2.1.3).

7.2.1.3 Road Traffic Emissions

The study area for the assessment of changes in emissions from road traffic for human receptors is based on identifying where the construction or operation of the Proposed Development will lead to a change in traffic flows on the road network, which exceed the relevant thresholds set out in the Transport Infrastructure Ireland (TII) Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document PE-ENV-01106 (hereafter referred to as the TII Air Guidance) (TII 2022) and are used to identify road links where:

- Annual average daily traffic (AADT) (i.e., the total volume of vehicle traffic of a highway or road for a year is divided by 365 days) flows will change by 1,000 or more; or
- Heavy duty vehicle (HDV) (vehicles greater than 3.5 tonnes, including lorries, buses and coaches) flows will change by 200 AADT or more; or
- Road links where the change in traffic flows exceed these thresholds are considered to be 'affected' roads.

Air quality impacts from road sources are highest at locations closest to the road, as concentrations of pollutants drop off quickly as distance increases from the road. 200m is an accepted distance beyond which specific impacts are likely to be negligible. Assessments focus on receptors closest to the road generally, and a study area of 200m from the 'affected' roads is applied, as set out in the TII Air Guidance.

7.2.2 Relevant Guidelines, Policy and Legislation

7.2.2.1 Ambient Air Quality

Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (hereafter referred to as the Ambient Air Quality Directive), sets legally binding limits for concentrations of major air pollutants in outdoor air that impact public health, such as particulate matter (i.e. PM_{10} and $PM_{2.5}$) and NO_2.

Statutory Instrument (S.I.) No. 739/2022 – Ambient Air Quality Standards Regulations 2022 (hereafter referred to as the Air Quality Standards Regulations 2022) transposed the air quality 'Limit Values' set out in the Ambient Air Quality Directive into Irish legislation.

Table 7.1 presents the air quality Limit Values for the pollutants relevant to this assessment, as prescribed by the European Union and Irish legislation. For the purposes of this Chapter, these standards are collectively referred to as 'Limit Values'.

The Limit Values set for designated ecological receptors are also presented in Table 7.1.

Table 7.1: Relevant Air Quality Limit Values

Pollutant	Averaging Period	Limit Value (µg/m³)	Basis of Application of the Limit Value
NO_2	1-hour	200	Not to be exceeded more than 18 times in a calendar year
	1 calendar year	40	-
PM_{10}	24-hours	50	Not to be exceeded more than 35 times in a calendar year
	1 calendar year	40	-
$PM_{2.5}$	1 calendar year Stage 2	20	-
NOx	Annual mean limit value for the protection of vegetation (referred to as the "critical level")	30	-
SO2	Annual mean limit value (and winter period 1st October – 31st March) for the protection of vegetation (referred to as the "critical level")	20	-
Note: µg/m³ – micrograms per metre cube			

The Limit Values presented in Table 7.1 are for the protection of human health and only apply at locations of relevant exposure (i.e., locations where people are likely to be directly or indirectly exposed for a period which is significant in relation to the averaging period of the Limit Value(s)). However, the Air Quality Standards Regulations 2022 refer to Annex III of the Ambient Air Quality Directive, which states that:

> *"compliance with the limit values directed at the protection of human health shall not be assessed at the following locations:*
>
> - *Any locations situated within areas where members of the public do not have access and there is no fixed habitation.*
> - *In accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply.*
> - *On the carriageway of roads; and on the central reservations of roads except where there is normally pedestrian access to the central reservation."*

7.2.2.2 Dublin Region Air Quality Plan

Due to an exceedance of the annual mean NO_2 Limit Value in Dublin in 2019, the Dublin Region Air Quality Plan (Dublin City Council, 2021) was developed to identify the cause and formulate measures to address this exceedance. Fourteen measures and actions were set as part of the plan to address the exceedance including the development of a Clean Air Strategy for Ireland (Government of Ireland, 2023), active travel programmes, push towards cleaner vehicle fleets.

7.2.2.3 Guidance

This air quality assessment has been completed in accordance with the following guidance:

- IAQM Guidance (IAQM 2023);
- TII Air Guidance (TII 2022); and
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022).

The IAQM Guidance was produced by air quality professionals and regulators, and although aimed at developments in the United Kingdom, the process and principles of the assessment set out in the guidance are applicable for other geographical locations and construction projects. It is also the approach recommended in the TII Air Guidance and therefore considered best practice in Ireland.

7.2.3 Data Collection and Collation

As background ambient concentrations applied in this assessment are well below the relevant Limit Values (see Table 7.1) and sufficient data are available to determine the background concentrations of pollutants, based on professional judgement, it was not considered necessary to undertake supplementary air quality monitoring to aid this assessment. Therefore, this air quality assessment is a desk-based assessment with relevant data taken from the EPA Air Quality website (EPA 2023), as most recently checked in February 2024.

7.2.3.1 Difficulties Encountered or Limitations

There were no significant difficulties encountered when gathering the data required to complete the air quality assessment.

7.2.4 Appraisal Method for the Assessment of Impacts

With regard to the determination of the significance of air quality impacts, the assessment methodology differs from that described in Chapter 1 (Introduction and the Environmental Impact Assessment Report) in Volume 2 of the EIAR, as defining a level of significance beyond either ‘significant’ or ‘not significant’ is not appropriate for air quality impacts. The full details of how the significance of the air quality impacts has been determined are set out later in Section 7.2.4.

The process for defining significance is prescribed in accepted practice guidance documents developed by regulatory authorities and working groups comprising experienced air quality professionals, local authority officers and public healthcare bodies (IAQM 2023; TII 2022). The relevant guidance on this subject relates to defining whether an air quality impact would be significant or not across the study areas as a whole, rather than at individual human receptors, such as residential properties.

The value of a receptor is incorporated into the specific methods prescribed in the IAQM Guidance (IAQM 2023). The approach described does not directly align with the overall approach to the categorisation of the value of receptors, magnitude of change and determination of the significance level set out in the EPA Guidelines significance matrix (EPA 2022). This is because the IAQM Guidance on this subject relates to defining whether an air quality impact is significant or not across the study area as a whole, rather than at individual properties, or at specific sensitive ecological receptors.

7.2.4.1 Construction Dust Emissions

The assessment of dust during construction has been carried out using a qualitative risk-based appraisal with reference to the location of the Proposed Development in relation to sensitive receptors, the planned process and site characteristics, as described in the IAQM Guidance (IAQM 2023) and recommended in the TII Air Guidance (TII 2022).

The methodology for the assessment of construction dust emissions is based on a five-step approach (IAQM 2023), as set out in Image 7.1. Details of this methodology are provided in Appendix A7.1 in Volume 3 of this EIAR.

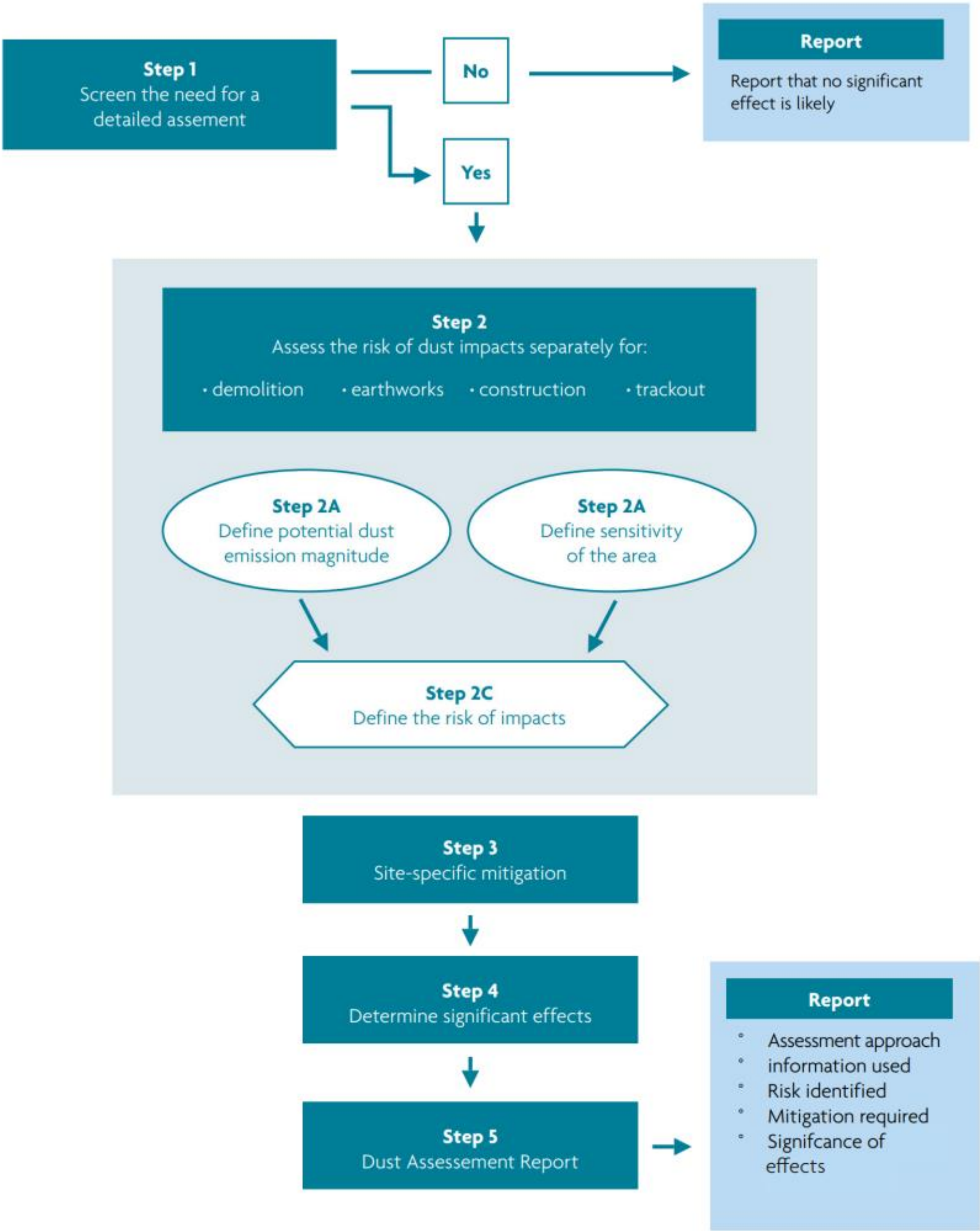

Image 7.1: Structure of the Dust Risk Assessment (IAQM 2023)

Based on the IAQM Guidance, the assessment aims to estimate the impacts of both PM_{10} and dust together, through a combined risk-based assessment procedure. The IAQM Guidance provides a methodological framework but notes that professional judgement is required throughout the assessment to determine the risk of impacts and mitigation requirements. Based on the calculated risk level, the IAQM Guidance sets out clear requirements for the recommended mitigation measures, which can be used to reduce the impact of dust during the Construction Phase of the Proposed Development. These mitigation measures to control dust emissions are included in Section 7.5 and are also set out in the Construction Environmental Management Plan (CEMP), which is included as a standalone document in this planning application pack. It should be noted that the IAQM Guidance does not advocate determination of significance pre-mitigation, and recommends that significance is only assigned to the impact after considering the construction activity with the appropriate level of good practice mitigation in place.

This assessment does not consider the air quality impacts of exposure to contaminated dust that could arise from the excavation of any contaminated material, which is covered in Chapter 11 (Soils, Geology and Hydrology) in Volume 2 of the EIAR. Although $PM_{2.5}$ is not specifically included as a parameter within the assessment, the risk levels associated with PM_{10} and any subsequent mitigation measures will apply to $PM_{2.5}$, as $PM_{2.5}$ is included within the PM_{10} fraction.

Larger dust particles (greater than 30μm (micrometres)) make up the greatest proportion of dust emissions from mineral workings or earthworks and will largely deposit within 100m of sources (Scottish Office 1998). Intermediate sized particles (1μm to 30μm) are likely to travel between 250m to 500m. PM_{10}, including the smaller $PM_{2.5}$ particulates are reported to make up a smaller proportion (approximately 10%) of dust emitted from most workings and the emissions become diluted as they disperse downwind (Ove Arup and Partners 1995).

In accordance with the IAQM Guidance, a 'human receptor' refers to any location where a person spends time, or a property which may experience the adverse effects of airborne dust or dust soiling, or exposure to PM_{10}. An 'ecological receptor' refers to any sensitive habitat that could be affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats).

The study area to define where an assessment is normally required is set out in Section 7.2.1.

The key potential construction dust emission sources have been categorised, according to the IAQM Guidance, as demolition, earthworks, construction and trackout. These have been defined as follows:

- Demolition: any activity involved with the removal of an existing structure (or structures). This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time;
- Earthworks: covers the processes of soil-stripping, ground-levelling, excavation and landscaping;
- Construction activities: any activity involved with the provision of a new structure (or structures), its modification or refurbishment. Structures include residential dwellings, office buildings, retail outlets, roads, etc.; and
- Trackout: the transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on-site.

The IAQM Guidance construction dust methodology provides techniques for three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of human effects due to increased exposure to PM_{10}.

The IAQM Guidance uses a consistent approach to define the risks associated with the construction activities (i.e. demolition, earthworks, construction and trackout), in order to specify the required level of mitigation required to reduce those risks. The risk is defined from the dust emission magnitude (i.e., the scale of the activities being undertaken) (see Table 1 of Appendix A7.1 in Volume 3 of this EIAR) and the sensitivity of the study area (i.e., the number and proximity of sensitive receptors to the Proposed Development, their sensitivity to dust deposition and PM_{10} concentrations, and existing PM_{10} concentrations) (see Table A7-3 and Table 4 of Appendix A7.1 in Volume 3 of this EIAR). Risks are described in terms of there being a low, medium or high risk of dust impacts for each of the four potentially dust emitting activities (i.e., demolition, earthworks, construction and trackout) (see Table 6 of Appendix A7.1 in Volume 3 of this EIAR).

This risk classification is then used to define the recommended site-specific mitigation measures to reduce the potential residual impacts of construction dust emissions to a 'Not Significant' impact. It is not necessarily the case that a low risk of dust impact, in the absence of mitigation, would lead to a significant impact. However, without any good practice mitigation in place there could be occasions where short-term impacts could affect sensitive receptors, leading to a potentially significant impact. The assessment is used to provide a commensurate level of good-practice mitigation regardless of the identified level of risk. Higher risks would require more comprehensive good-practice mitigation to ensure that there would not be a significant impact, compared to than lower risks. The mitigation measures to control dust emissions are included in Section 7.5 and are also set out in the CEMP (included as a standalone document in this planning application pack).

A full description of the methodology, including further explanation on how the dust emission magnitudes and area sensitivity are defined, is provided in Section 7.2 and Section 7.3 of the IAQM Guidance.

7.2.4.2 Construction Site Plant and Machinery Emissions

As per the TII Air Guidance (TII 2022), the assessment of emissions from construction plant and machinery takes into account the number of anticipated construction plant and machinery and their operating hours, in order to assess whether a significant impact is likely to occur.

7.2.4.3 Road Traffic Emissions

Criteria based on changes in road traffic flows are set out in Section 7.2.1. Should changes in road traffic flows exceed these thresholds, an assessment is required to determine the potential air quality impacts at receptors within 200m of these affected roads. Conversely, roads that experience a change in traffic flows below these thresholds do not require further assessment, as the change in concentrations of pollutants at receptors close to these roads will be imperceptible. If that was the case for all roads, no specific study is required to assess changes in road traffic emissions and the impact would be negligible, and therefore represent a Not Significant impact.

7.3 Baseline Environment

7.3.1 Overview

Information on existing air quality in Ireland was available from the EPA who undertake monitoring at a number of locations across the country (EPA 2023). For the purpose of monitoring and assessing air quality, Ireland is split into four main regions:

- Zone A: Dublin conurbation;
- Zone B: Cork conurbation;
- Zone C: 23 cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise; and
- Zone D: Rural Ireland (i.e. the remainder of the state excluding Zones A, B and C).

7.3.2 Background Air Pollutant Concentrations

The eastern half of the Proposed Development will be located within the Dublin Conurbation air quality zone (Zone A) with the western half of the Proposed Development will be located in the Rural Ireland air quality zone (Zone D).

Dublin Airport (Station 55) is the only monitoring site within the study area and is located approximately 2.4km north-west of Proposed Development. The monitoring data from Station 55, as presented in Table 7.2, show that the existing air pollutant concentrations are well within the relevant Limit Values. These background concentrations are considered representative of the conditions experienced at the assessed locations associated with the Proposed Development (see Section 7.4).

Table 7.2: Dublin Airport (Station 55) Monitoring Results

Pollutant	Latitude (N)	Longitude (E)	Limit Values (μg/m^3)	2022 Annual Mean Concentration (μg/m^3)
NO_2	53.4261°	-6.2391°	40	19.8
PM_{10}			40	11.7
$PM_{2.5}$			20	6.7

7.4 Potential Impacts

This Section presents the potential impacts that may occur due to the Proposed Development. This informs the need for mitigation or monitoring to be proposed (refer to Section 7.5). In the context of the Proposed Development, the potential air quality impact on the surrounding environment must be considered for two distinct phases:

- Construction Phase; and
- Operational Phase.

7.4.1 'Do Nothing' Scenario

There will be no significant change in air quality impacts if the Proposed Development does not proceed. Therefore, there would be a Neutral impact on air quality in the Do Nothing scenario.

7.4.2 Construction Phase

7.4.2.1 Construction Dust Emissions

Activities carried out on construction sites have the potential to give rise to emissions of dust that could cause annoyance or damage to vegetation due to the soiling of surfaces. These activities can also lead to increased short-term and long-term concentrations of fine particulate matter (e.g., PM_{10} and $PM_{2.5}$) at off-site locations, which may affect human health, unless appropriate mitigation measures are implemented. The risk of impacts resulting from dust emissions from works associated with the construction of the Proposed Development need to be assessed in order to identify the required mitigation measures.

The IAQM Guidance (IAQM 2023) outlines that, where appropriate, a site can be divided into 'zones' for the purposes of the dust risk assessment, to allow different mitigation levels to be applied to each zone based on the activities being undertaken. As the Proposed Development will consist of several different construction activities, which will be undertaken sequentially at different locations (spanning approximately 37.5km), four separate construction dust risk assessments have been undertaken for the following:

- The excavation of the proposed cable trench and laying of a section of underground cable;
- The formation of a Temporary Construction Compound (TCC);
- Belcamp Substation upgrades; and

- Woodland Substation upgrades.

These represent those construction activities, which have the greatest potential for dust generation at source.

The construction of the Proposed Development will be over a length of approximately 37.5km where there will be a range of dust risks due to variations in the proposed construction activities and sensitivity of the areas (i.e., the number and proximity of sensitive receptors to the activities) close to the construction activities. A precautionary approach was applied to identify the highest dust risks by assessing the location(s) with the greatest number, and proximity of, sensitive receptors to the Planning Application Boundary. This precautionary approach was adopted to determine the highest possible dust risks and identify the appropriate level of mitigation for application across the Proposed Development construction work areas. This approach ensures that the highest dust impact risk is assessed.

As dust emissions from the Proposed Development will only occur during the Construction Phase, all effects from the construction dust emissions are described as either temporary or short-term.

The dust emission magnitude and sensitivity descriptors for the construction dust assessments are provided in Appendix A7.1 in Volume 3 of this EIAR.

7.4.2.1.1 Excavation of the Cable Trench and Laying of a Section of Underground Cable

As described in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR, the proposed underground cable is estimated to be approximately 37.5km in length and will be installed primarily within the existing public road network.

The cable trench is expected to be approximately 1.5m in width and approximately 1.3m in depth in the public road, and approximately 1.8m in depth in private lands, relative to existing ground level (the dimensions may vary depending on utility crossings). The proposed cable will be delivered in lengths and then connected at the Joint Bays, which are underground chambers located at various points on the proposed cable route. The trenches will then be filled before moving on to the next section of the proposed cable route.

A 100m section of the proposed cable route was considered for the assessment. The 100m section assessed is located between Chainage 21,300 and 21,400, approximately 160m north-east of Hollystown Golf Club in Fingal in County Dublin. This assessment also considers the permanent access track (which will be approximately 4m wide), that will allow access to Joint Bay 28 which will be off-road. This section of the proposed cable route was selected for assessment based on the sensitivity of the area being categorised as the highest of all assessment locations along the proposed cable route.

It should be noted that other construction activities associated with the proposed cable trench and route include the creation of temporary laydown areas, Passing Bays (at 14 Joint Bay locations) and 49 Joint Bays. The Joint Bays will be 10m long and 2.5m wide the activities are likely to generate similar dust emission magnitudes to the proposed cable trench and route, as the works will involve similar excavation works to the proposed cable trench and the installation of a chamber. Therefore, separate construction dust assessments have not been undertaken for these activities as the level of risk determined, and the mitigation measures that will be implemented, are also considered to apply to these other activities.

The dust emission magnitudes derived for demolition, earthworks, construction and trackout during the works associated with excavation of the proposed cable trench and laying of a section of underground cable are presented in Table 7.3.

Table 7.3: Dust Emission Magnitude - Excavation and Construction of the Assessed Section of Cable Trench and Route

Activity	Dust Emission Magnitude	Justification
Demolition	N/A	No demolition activities are anticipated.
Earthworks	Small	For the considered 100m section of the cable route, the total site area will be <18,000m^2. There are likely to be <5 heavy earth moving equipment active at any one time.
Construction	Small	For the considered 100m section of the cable route, including the permanent access route, the total building volume will be <12,000m^3.
Trackout	Medium	For the considered 100m section of the cable route, the maximum number of outward HDV movements is predicted to be between 20 and 50 in any one day.

The next step is to determine the sensitivity of the area. The assessed section of the proposed cable route will be located on the periphery of the village of Hollystown, County Dublin. The area surrounding the assessed section of the proposed cable route is a mixture of agricultural and residential land use with residential properties within 20m of the Planning Application Boundary.

Image 7.2 presents the construction dust assessment buffers used for determining the sensitivity of the area to dust soiling effects and human health impacts, as per the IAQM Guidance (IAQM 2023).

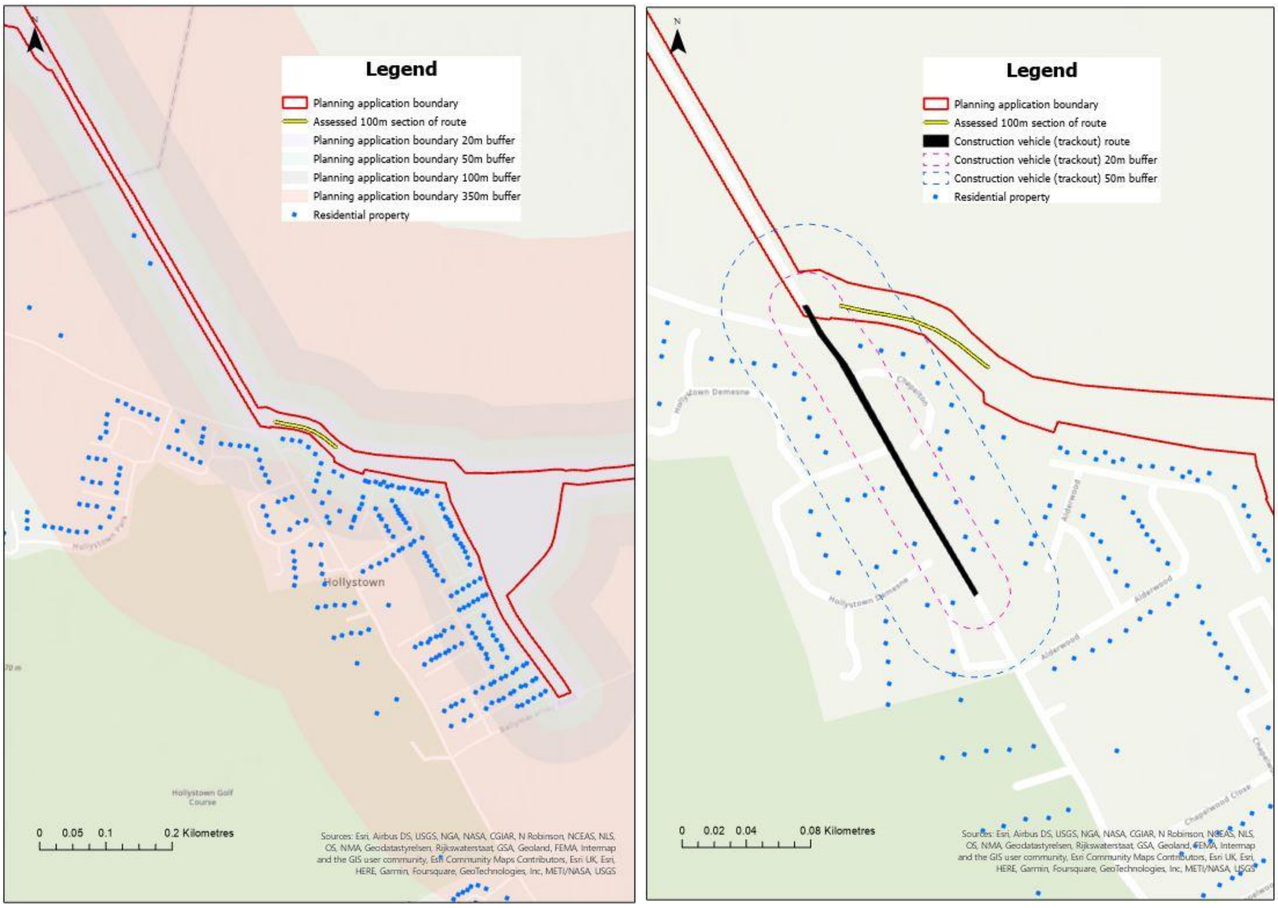

Image 7.2: The Assessed Section of Cable Trench and Route Study Areas (Earthworks and Construction Activities Study Area on the Left Trackout Study Area on the Right)

Table 7.4 presents the sensitivity of the area to effects caused by construction activities associated with the excavation of the proposed cable trench and construction of the proposed cable route.

Table 7.4: Sensitivity of the Area Associated with the Assessed Section of Cable Trench and Route

Activity	Dust Soiling Impacts		Health Effects of PM_{10}	
	Sensitivity Assigned	Justification	Sensitivity Assigned	Justification
Demolition	n/a	No demolition activities.	n/a	No demolition activities.
Earthworks	Medium	For the considered 100m section of the proposed cable route, there are seven residential properties within 20m of the Planning Application Boundary.	Low	Based on the number of receptors in proximity of the assessed section of the proposed cable route and the background PM_{10} concentration applied (see Table 7.2) the sensitivity of the area for human health impacts is categorised as low.
Construction	Medium		Low	
Trackout	Medium	There are eight residential properties within 20m of the proposed construction access route used by construction vehicles on the public highway, up to 200m from the likely work site exit(s).	Low	

At the considered section of proposed cable route (and indeed the entire cable route length), there are no designated ecological receptors within 50m of the Planning Application Boundary, nor within 50m of the carriageway, up to 200m from the likely works site exit(s). Therefore, as per the IAQM Guidance, an assessment of ecological impacts is not required.

Using the dust emission magnitudes for the various activities outlined in Table 7.3, and the sensitivity of the area provided in Table 7.4, the risks associated with the excavation of the proposed cable trench and construction of the proposed cable route are provided in Table 7.5 for dust soiling and human health impacts. Full details of the methodology are provided in Appendix A7.1 in Volume 3 of this EIAR.

Table 7.5: Summary of the Dust Risk from the Assessed Section of Cable Trench and Route

Risk	Demolition	Earthworks	Construction	Trackout
Dust soiling	n/a	Low risk	Low risk	Medium risk
Health effects	n/a	Negligible risk	Negligible risk	Low risk

The results presented in Table 7.5 indicate that, for potential dust soiling impacts, a *low risk* from demolition, earthworks and construction activities is anticipated, and a *medium risk* from trackout activities associated with the construction of the assessed section of the proposed cable route is anticipated. For potential human health impacts, there is a *negligible* to *low* risk for all activities is anticipated.

It will therefore be necessary to adopt an appropriate level of good practice mitigation measures for all of the dust risks identified (see Section 7.5 of this Chapter and the CEMP (included as a standalone document in this planning application pack)) to reduce the risks of causing impacts to amenity or human health. This will also prevent or reduce potential dust or PM_{10} (and $PM_{2.5}$) emissions, which are associated with health impacts, such as exacerbating existing health conditions, including asthma and other lung conditions.

7.4.2.1.2 Formation of a Temporary Construction Compound

Seven TCCs providing offices, welfare facilities and storage for construction materials, will be utilised at different locations along the Proposed Development. The maximum area of individual TCCs will be approximately 1.6ha. The TCC selected for assessment (i.e., TCC3) will be located at Chainage 21,600, which is approximately 0.3km north-east of Hollystown Golf Club. It is one of the two largest compounds (1.6ha) and has the highest number of human receptors within the study area, and so the sensitivity of the area is categorised as the highest of all TCCs. Therefore, TCC3 was selected as the TCC for assessment based on a precautionary approach (details of this selection process are provided in Section 7.4.2.1). Compounds required for HDD have not been assessed separately as these are less than half the size of the TCC assessed and will not be used for the storage of material for the wider route. Therefore, the risk of dust impacts associated with HDD Compounds would be less than those associated with TCCs.

Table 7.6 presents a summary of the dust emission magnitude assigned to each construction activity associated with TCC3.

Table 7.6: Dust Emission Magnitudes for the Construction of TCC3

Activity	Dust emission magnitude	Justification
Demolition	n/a	No demolition activities are anticipated.
Earthworks	Small	For the considered TCC, the total site area is less than 18,000m^2 (i.e. 15,600m^2) and there are likely to be <5 heavy earth moving vehicles active at any one time.
Construction	Small	For the considered TCC, the total volume of construction is anticipated to be <12,000m^3.
Trackout	Medium	For the considered TCC, the maximum number of outward HDV movements is expected to be between 20 and 50 in any one day.

The assessed TCC will be located on the periphery of the village of Hollywood, County Dublin. The majority of remaining TCCs will be located in more rural settings, adjacent to small settlements.

Image 7.3 presents the construction dust assessment buffers used for determining the sensitivity of the area to dust soiling effects and human health impacts, as per the IAQM Guidance (IAQM 2023).

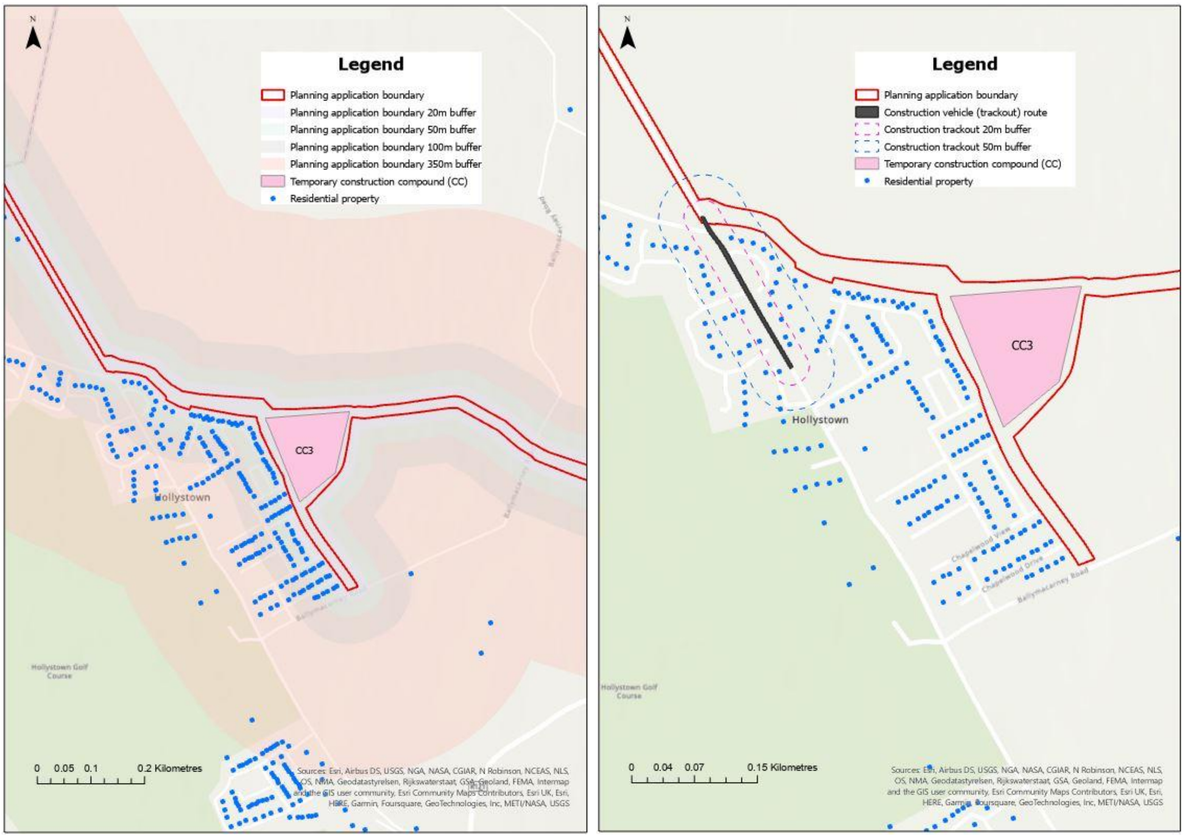

Image 7.3: TCC3 Study Areas (Earthworks and Construction Activities Study Area on the Left; Trackout Study Area on the Right)

Table 7.7 presents the sensitivity of the area to effects caused by construction activities associated with TCC3.

Table 7.7: Sensitivity of the Area for the Construction of TCC3

Activity	Dust Soiling Impacts		Health Effects of PM_{10}	
	Sensitivity Assigned	Justification	Sensitivity Assigned	Justification
Demolition	n/a	Minimal demolition activities are anticipated.	n/a	Minimal demolition activities are anticipated.
Earthworks	High	Based on the assessed TCC, there are approximately 18 residential properties within 20m of the Planning Application Boundary.	Low	Based on the number of receptors in proximity of the assessed TCC and the background PM_{10} concentration applied (see Table 7.2) the sensitivity of the area for human health impacts is categorised as low.
Construction	High		Low	
Trackout	Medium	There are approximately eight residential properties within 20m of the proposed construction access route used by construction vehicles on the public highway, up to 200m from the likely works site exit(s).	Low	

At the assessed TCC3, there are no ecological receptors within 50m of the Planning Application Boundary nor within 50m of the carriageway up to 200m from the likely works site exit(s). Therefore, as per IAQM Guidance, an assessment of ecological impacts is not required.

Using the dust emission magnitudes for the various activities outlined in Table 7.6, and the sensitivity of the area provided in Table 7.7, the risks associated with the formation of the assessed TCC3 are provided in Table 7.8 for dust soiling and human health impacts. Full details of the methodology are provided in Appendix A7.1 in Volume 3 of this EIAR.

Table 7.8: Summary of the Dust Risk from the Construction of TCC3

Risk	Demolition	Earthworks	Construction	Trackout
Dust soiling	n/a[1]	Low risk	Low risk	Medium risk
Health effects		Negligible risk	Negligible risk	Low risk

Note 1: Minimal demolition activities are anticipated

The results presented in Table 7.8 indicate that, for potential dust soiling impacts, a *low risk* from earthworks and construction activities and a *medium risk* from trackout activities are anticipated. For potential human health impacts, a *negligible* to *low risk* for all relevant stages is anticipated.

It will therefore be necessary to adopt an appropriate level of good practice mitigation measures for all of the dust risks identified (refer to Section 7.5 of this Chapter and the CEMP (included as a standalone document in this planning application pack)) to reduce the risk of causing impacts to amenity and human health. This will also prevent or reduce potential dust or PM_{10} (and $PM_{2.5}$) emissions which are associated with health impacts, such as exacerbating existing health conditions, including asthma and other lung conditions.

7.4.2.1.3 Belcamp Substation Upgrade

It is proposed to upgrade the existing Belcamp Substation to include a new 400 kilovolt (kV) Gas Insulated Switchgear (GIS) building, power transformer and additional electrical equipment and apparatus, similar to the existing Air Insulated Switchgear (AIS) equipment and apparatus.

The development will include all ancillary site development works including site preparation works, site clearance, hardstanding, internal access tracks and a TCC (TCC6); underground cabling and earthgrid, surface water drainage connections to the substation network, foul water drainage connection to the substation foul system and lightning protection.

The dust emission magnitudes derived for demolition, earthworks, construction and trackout during the works associated with the Belcamp Substation upgrades, are presented in Table 7.9.

Table 7.9: Dust Emission Magnitude – Belcamp Substation Upgrades

Activity	Dust emission magnitude	Justification
Demolition	Small	For Belcamp Substation, the only demolition will be associated with site clearance and deconstruction of the existing equipment at the substation.
Earthworks	Medium	For Belcamp Substation, the total site area will be between 18,000m^2 and 110,000m^2. Earthworks activities will include site preparation and excavation for required foundations.
Construction	Small	For Belcamp Substation, the total building volume is proposed to be <12,000m^3.
Trackout	Medium	For Belcamp Substation, the maximum number of outward HDV movements is predicted to be between 20 and 50 in any one day.

Belcamp Substation is located on the periphery of the townland of Belcamp in Fingal, County Dublin. The existing substation is bordered by agricultural fields with the Craobh Chiaráin GAA Club sports complex approximately 60m to the east of the Planning Application Boundary at its closest point. The R139 Regional Road runs adjacent to the southern boundary of the existing Belcamp Substation with residential properties beyond.

Image 7.4 presents the construction dust assessment buffers used for determining the sensitivity of the area to dust soiling effects and human health impacts, as per the IAQM Guidance (IAQM 2023).

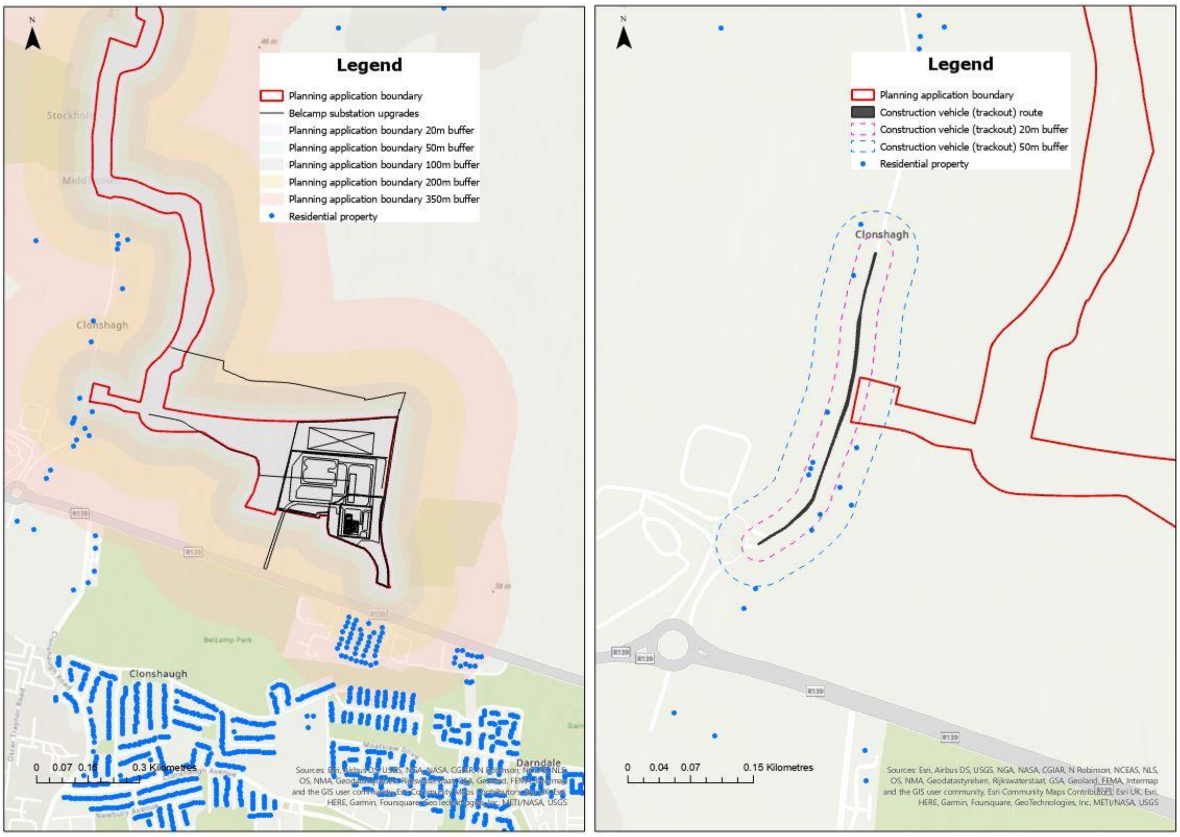

Image 7.4: Belcamp Substation Upgrade Study Areas (Demolition, Earthworks and Construction Activities Study Area on the Left; Trackout Study Area on the Right)

Table 7.10 presents the sensitivity of the area to effects caused by construction activities associated with the Belcamp Substation upgrades.

Table 7.10: Sensitivity of the Area Associated with the Belcamp Substation Upgrades

Activity	Dust Soiling Impacts		Health Effects of PM_{10}	
	Sensitivity Assigned	Justification	Sensitivity Assigned	Justification
Demolition	Low	For Belcamp Substation, there are two residential properties between 20m and 50m of the Planning Application Boundary. Craobh Chiaráin GAA Club sports complex is within 100m of the Planning Application Boundary.	Low	Based on the number of receptors in proximity of the Belcamp Substation and the background PM_{10} concentration applied (see Table 7.2) the sensitivity of the area for human health impacts is categorised as low.
Earthworks	Low		Low	
Construction	Low		Low	
Trackout	Medium	For the Belcamp Substation, there are six residential properties within 20m of the proposed construction access routes used by construction vehicles on the public road, up to 200m from the site exit(s).	Low	

At the existing Belcamp Substation, there are no ecological receptors within 50m of the Planning Application Boundary, nor within 50m of the carriageway up to 200m from the likely works site exit(s). Therefore, as per IAQM Guidance, an assessment of ecological impacts is not required.

Using the dust emission magnitudes for the various activities outlined in Table 7.9, and the sensitivity of the area provided in Table 7.10, the risks associated with the Belcamp Substation upgrades are provided in Table 7.11 for dust soiling and human health impacts. Full details of the methodology are provided in Appendix A7.1 in Volume 3 of this EIAR.

Table 7.11: Summary of the Dust Risk from the Belcamp Substation Upgrades

Risk	Demolition	Earthworks	Construction	Trackout
Dust soiling	Negligible risk	Low risk	Negligible risk	Medium risk
Health effects	Negligible risk	Low risk	Negligible risk	Low risk

The results presented in Table 7.11 indicate that, for potential dust soiling impacts, a *negligible risk* from demolition and construction activities, a *low risk* from earthworks, and a *medium risk* from trackout activities are anticipated. For potential human health impacts, a *negligible risk* from demolition and construction activities and a *low risk* from earthworks and trackout activities are anticipated.

It will therefore be necessary to adopt an appropriate level of good practice mitigation measures for all of the dust risks identified (refer to Section 7.5 in this Chapter and the CEMP (included as a standalone document in this planning application pack)) to reduce the risks of causing impacts to amenity or human health. This will also prevent or reduce potential dust or PM_{10} (and $PM_{2.5}$) emissions which are associated with health impacts, such as exacerbating existing health conditions, including asthma and other lung conditions.

7.4.2.1.4 Woodland Substation Upgrade

The Woodland Substation upgrades will consist of the provision of new electricity transmission infrastructure, comprising additional electrical equipment and apparatus, which is similar to the existing infrastructure. The Proposed Development will take place within the existing substation. Proposed construction activities include installation of a 400kV feeder bay and associated electrical shunt reactor, insulators, instrument transformers, overhead conductors, disconnectors, circuit breakers, surge arrestors (12.6m in height) in order to connect the bay to the busbar. All ancillary site development works including site preparation works, TCC, underground cabling, and earthgrid, are required to facilitate the Proposed Development.

The dust emission magnitudes derived for demolition, earthworks, construction and trackout during the works associated with the Woodland Substation upgrade, are presented in Table 7.12.

Table 7.12 : Dust Emission Magnitude – Woodland Substation Upgrade

Activity	Dust Emission Magnitude	Justification
Demolition	n/a	No demolition works are anticipated.
Earthworks	Large	As the total site area is >110,000m^2, a large magnitude has been assigned.
Construction	Medium	The total volume of construction is expected to be between 12,000m^3 and 75,000m^3.
Trackout	Medium	The total number of outward HDV movements is expected to be between 20 and 50 per day.

The area surrounding the proposed Woodland Substation upgrade is primarily agricultural in nature with the existing Portan converter station adjacent to the southern planning application boundary.

Image 7.5 presents the construction dust assessment buffers used for determining the sensitivity of the area to dust soiling effects and human health impacts, as per the IAQM Guidance (IAQM 2023). Image 7.5 indicates that there are no residential properties within the study area but the Portan Converter Station and Substation carpark is within the trackout buffer and has been included accordingly.

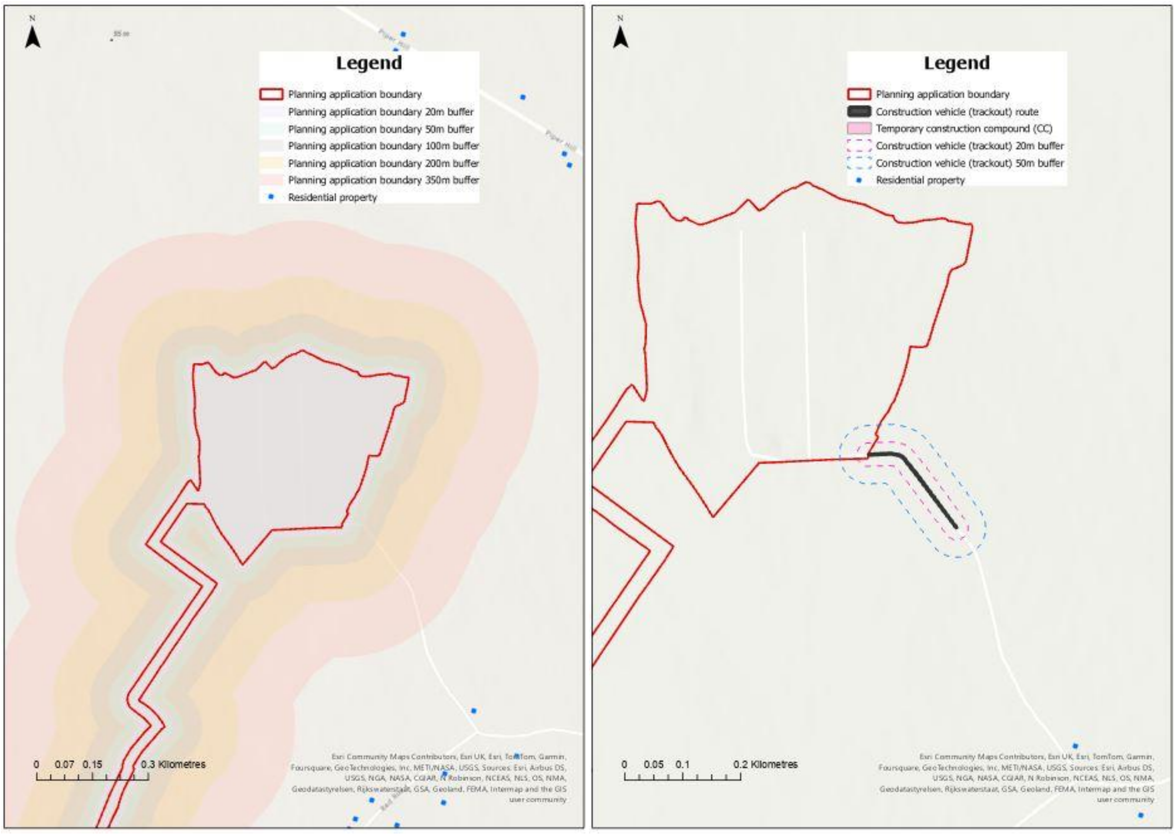

Image 7.5: Woodland Substation Upgrade Study Areas (Earthworks and Construction Activities Study Area on the Left; Trackout Study Area on the Right)

Table 7.13 presents the sensitivity of the area to effects caused by construction activities associated with the Woodland Substation upgrade.

Table 7.13: Sensitivity of the Area Associated with the Woodland Substation Upgrade

Activity	Dust Soiling Impacts		Health Effects of PM_{10}	
	Sensitivity Assigned	Justification	Sensitivity Assigned	Justification
Demolition	n/a	No demolition activities are anticipated.	n/a	No demolition activities are anticipated.
Earthworks	Low	There is one human receptor (representing Portan converter station and substation) between 100m and 200m of the planning application boundary.	Low	Based on the number of receptors in proximity of the Woodland Substation and the background PM_{10} concentration applied (see Table 7.2) the sensitivity of the area for human health impacts is categorised as low.
Construction	Low		Low	
Trackout	Low	There is one human receptor (representing Portan converter station and substation car park) between 20 and 50m of the construction access routes used by construction vehicles on the public highway, up to 200m from the site exit(s).	Low	

At Woodland Substation, there are no ecological receptors within 50m of the Planning Application Boundary, nor within 50m of the carriageway up to 200m from the site exit(s). Therefore, as per the IAQM Guidance, an assessment of ecological impacts is not required.

Using the dust emission magnitudes for the various activities outlined in Table 7.12, and the sensitivity of the area provided in Table 7.13, the risks associated with the Woodland Substation upgrade are provided in Table 7.14 for dust soiling and human health impacts. Full details of the methodology are provided in Appendix A7.1 in Volume 3 of the EIAR.

Table 7.14: Summary of the Dust Risk from the Woodland Substation Upgrade

Risk	Demolition	Earthworks	Construction	Trackout
Dust soiling	n/a	Low risk	Low risk	Low risk
Health effects		Low risk	Low risk	Low risk

The results presented in Table 7.14 indicate that, for potential dust soiling impacts and human health impacts, a *low risk* from earthworks, construction and trackout activities is anticipated.

It will therefore be necessary to adopt an appropriate level of good practice mitigation measures for all of the dust risks identified (refer to Section 7.5 and the CEMP (included as a standalone document in this planning application pack)) to reduce the risks of causing impacts to amenity or human health. This will also prevent or reduce potential dust or PM_{10} (and $PM_{2.5}$) emissions which are associated with health impacts, such as exacerbating existing health conditions, including asthma and other lung conditions.

7.4.2.1.5 Summary

As discussed previously, the IAQM Guidance (IAQM 2023) does not advocate for the determination of significance pre-mitigation and recommends that significance is only assigned to the impact after considering the construction activity with mitigation. The IAQM Guidance states that:

> *"It is, therefore, important that the mitigation measures are defined in a form suitable for implementation by way of a planning condition or legal obligation within a section 106 agreement, and are included in a DMP [Dust Mitigation Plan] or a more general Code of Construction Practice or Construction Environmental Management Plan."*

This is the case for the Proposed Development, where a CEMP (included as standalone document in the planning application pack) is proposed as mitigation (refer to Section 7.5).

To simplify, and for ease of management and control, a single risk level for each construction activity (i.e., demolition, earthworks, construction and trackout) has been used as a basis for the selection of the required mitigation measures. A summary of the overall dust risk to be used for the selection of mitigation measures is provided in Table 7.15.

Table 7.15: Summary of the Highest Dust Risk from Assessment[1]

Risk	Demolition	Earthworks	Construction	Trackout	General [2]
Excavation of the proposed cable trench and laying of a section of underground cable	n/a	Low risk	Low risk	Medium risk	Medium risk
Formation of a TCC (TCC3)	n/a	Low risk	Low risk	Medium risk	Medium risk
Belcamp Substation Upgrade	Negligible risk	Low risk	Negligible risk	Medium risk	Medium risk
Woodland Substation Upgrade	n/a	Low risk	Low risk	Low risk	Low risk
Dust risk for identifying mitigation measure	Negligible risk	Low risk	Low risk	Medium risk	Medium risk

Note 1: Dust risk listed in the table is the highest risk from each assessment for dust soiling and health effects.
Note 2: The general column represents the highest risk level for each assessed construction activity, to be used to determine the selection of general dust management mitigation measures which are not specific to demolition, earthworks, construction or trackout activities.

As shown in Table 7.15, the dust risk used for the selection of the required level of good practice mitigation measures is negligible for demolition activities, low risk for earthwork and construction activities, and medium risk for trackout and the general mitigation measures.

As described in Section 7.2.4.1, it is not possible to define significance without the application of good practice mitigation as no scheme would proceed without the application of a minimum level of dust mitigation. The level of good practice mitigation identified in Section 7.5, is considered to be effective in controlling dust emissions from the construction to prevent any significant impacts occurring.

7.4.2.2 Construction Site Plant and Machinery Emissions

The IAQM Guidance (IAQM 2023) specifies the following in relation to the assessment of emissions to air from construction plant and machinery (i.e., non-road vehicles):

> *"Experience of assessing the exhaust emissions from on-site plant (e.g. excavators) and generators (also known as non-road Mobile Machinery or NRMM) suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed."*

The primary construction activities associated with the Proposed Development will require the use of plant and machinery including tracked excavators, dumper trucks, asphalt pavers, road planers, hydraulic vibratory compacters, dozers and on-site generators. A detailed construction plant list is provided in Table 9.3 of Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR.

The outline construction schedule is set out in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR. The rate of progress of works along the proposed cable route for vegetation clearance is expected to be 200m per day and the excavation and installation of the cable is anticipated at a rate of 50m per day. This means there will be a relatively short duration of construction activities at any one location along the proposed cable route (typically less than one week). A maximum of eight diesel-powered plant and machinery items are likely to be required to operate simultaneously at the same location along the proposed cable route. The works proposed at Woodland Substation are expected to last approximately seven months, while the proposed works at Belcamp Substation are expected to last approximately 17 months with a maximum of four diesel-powered plant and machinery items that are likely to be required to operate. Therefore, given the low number of plant, short duration of activities or the low number of receptors (set out in Section 7.4.2.1), the potential impact on local air quality at sensitive human and ecological receptors in the vicinity of the Proposed Development is considered to be negligible, and therefore assessed as a Not Significant impact. As a result, emissions from construction plant and machinery are not considered further from an air quality perspective.

7.4.2.3 Road Traffic Emissions

During the Construction Phase, the maximum daily change in HDV flows at any location is estimated to be 191. At this location, the maximum number of vehicles would only last for two days (refer to Table 14.20 in Chapter 14 (Traffic and Transport) in Volume 2 of the EIAR). Therefore, as an AADT, the increase in HDVs, would be less than the threshold defined in the TII Air Guidance (i.e., 200 AADT) (TII 2022) for requiring an air quality assessment, as set out in Section 7.2.1.3. The total estimated number of workers across the Proposed Development at any one time is unlikely to exceed 215 (refer to Table 14.17 in Chapter 14 (Traffic and Transport)) and the maximum daily total change in vehicle numbers at any one location is 369 (refer to Table 14.20 in Chapter 14 (Traffic and Transport)). Represented as an AADT, this would be less than the peak of 369 and below the threshold of 1,000. Therefore, as per the methodology set out in Section 7.2.4.3, the associated change in the concentrations of pollutants at sensitive human and ecological receptors will be Negligible, and therefore, assessed as a Not Significant impact, and no further assessment is required.

7.4.3 Operational Phase

7.4.3.1 Road Traffic Emissions

Apart from occasional maintenance visits, typically for the monitoring of the cable at the link boxes next to the Joint Bays, which is expected to generate (on average) less than two light duty vehicles (LDV) movements a day, there will be very few road traffic movements associated with the Operational Phase of the Proposed Development. The increase of less than two additional traffic movements per day associated with the Operational Phase is therefore less than the threshold defined in the TII Air Guidance (TII 2022) for requiring an air quality assessment, as set out in Section 7.2.1.3. Therefore, the change in the concentrations of pollutants at sensitive human and ecological receptors will be Negligible and therefore, is assessed as a Not Significant impact.

7.5 Mitigation and Monitoring Measures

7.5.1 Construction Phase

Good practice dust mitigation measures to manage the generation of dust at source will be implemented. The proposed mitigation measures, as per the IAQM Guidance (IAQM 2023), are presented below. These mitigation measures, which, as shown in Table 7.15, are based on low risk for earthwork and construction activities, and medium risk for trackout and general mitigation measures, are ‘highly recommended’.

As discussed previously, the mitigation measures will be included in the CEMP (included as a standalone document in the planning application pack). If there are any further measures attached to conditions in any grant of planning permission, these will be included in an updated CEMP with the agreement of the local authority by the appointed contractor.

It should be noted that the measures taken forward from this assessment will be reviewed on a regular basis during construction to ensure that they are appropriate for the works taking place, and any complaints received.

- **Communication:**
  - A stakeholder communication plan will be developed and implemented and will include community engagement before work commences on-site;
  - The name and contact details of the person(s) accountable for air quality and dust issues on the TCC and HDD Compound site boundary will be displayed. This may be the environment manager / engineer or the site manager; and
  - The head or regional office contact information for the developer and appointed contractor will be displayed.
- **Site Management:**
  - All dust and air quality complaints will be recorded, cause(s) will be identified, appropriate measures to reduce emissions in a timely manner will be undertaken, and the measures taken will be recorded;
  - The complaints log will be made available to the local authority when asked; and
  - Any exceptional incidents that cause dust and / or air emissions, either on-site or off site, will be recorded in a log book, along with the action taken to resolve the situation.
- **Monitoring:**
  - Regular site inspections to monitor compliance with the CEMP or equivalent management plan will be carried out, with inspection results recorded. The inspection log will be made available to the local authority when asked; and
  - The frequency of site inspections by the person accountable for air quality and dust issues on-site will be increased, when activities with a high potential to produce dust are being carried out, and during prolonged dry or windy conditions. Regular site inspections to monitor compliance with the CEMP will be carried out and inspection results will be recorded.
- **Preparing and maintaining the site**
  - The site layout will be planned so that machinery and dust causing activities are located away from receptors, as far as is possible;
  - Solid screens or barriers will be erected around dusty activities that are at least as high as any stockpiles on-site;
  - Specific operations will be fully enclosed where there is a high potential for dust production and impacts on nearby receptors;
  - Site runoff of water or mud will be avoided;
  - Materials that have a potential to produce dust will be removed from site as soon as possible, unless being reused on-site. If they are being reused on-site, they will be covered as described below; and
  - Stockpiles will be covered or fenced to prevent wind whipping.
- **Operating vehicles / machinery and sustainable travel:**
  - All vehicle operators will be required to switch off engines when vehicles are stationary (i.e. no idling vehicles); and
  - The use of diesel, or petrol-powered generators will be avoided. Mains electricity or battery powered equipment will be used, where practicable.
- **Operations:**
  - Site personnel will 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);

  - An adequate water supply will be made available for dust / particulate matter suppression, where required;
  - Covered skips will be used;
  - Drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment will be minimised, and fine water sprays will be used on such equipment, wherever appropriate; and
  - The appointed contractor will ensure that equipment is readily available on-site to clean any dry spillages. Spillages will be cleaned up as soon as reasonably practicable after the event using wet cleaning methods.
- **Waste management:**
  - Bonfires and burning of waste materials will be avoided.
- **Measures specific to trackout:**
  - Water-assisted dust sweeper(s) will be used on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
  - Dry sweeping of large areas will be avoided;
  - It will be required to ensure that vehicles entering and leaving sites containing friable materials are covered to prevent escape of materials during transport;
  - On-site haul routes will be inspected for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
  - All inspections of haul routes and any subsequent action will be recorded in a site log book;
  - A surfaced haul route to the TCCs and HDD Compounds will be installed, which will be regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and will be regularly cleaned, if required;
  - A wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable) will be implemented;
  - It will be required to ensure that there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
  - Access gates will be located at least 10m from receptors, where possible.

7.5.2 Operational Phase

Based on the findings of the assessment, as outlined in Section 7.4.3, it is not considered necessary to implement additional mitigation measures for the Operational Phase, as impacts are assessed to be Negligible and therefore a Not Significant impact.

7.6 Residual Impacts

A precautionary approach has been adopted throughout this assessment, such as assessing that the activities take place at the site boundary, reducing the distance between construction activities and receptors. Therefore, this allows flexibility of where construction activities take place within the Planning Application Boundary. In addition, the suite of mitigation measures set out in Section 7.5 and in the CEMP would remain appropriate for any flexibility being applied for.

7.6.1 Construction Phase

Following the implementation of the dust mitigation measures outlined in Section 7.5, the dust impact associated with the Construction Phase of the Proposed Development are assessed as Not Significant at nearby receptors. It should be noted that the measures taken forward from this assessment will be reviewed on a regular basis during construction to ensure that they are appropriate for the works taking place, and any complaints received.

Based on the findings of the assessment for emissions from construction plant and machinery and associated road traffic movements, there will be no significant residual air quality impacts associated with the Construction Phase of the Proposed Development.

Table 7.16 summarises the residual impacts of the Proposed Development during the Construction Phase.

Table 7.16: Summary of Residual Impacts Before and Following Mitigation

Assessment Topic	Impacts / Effects	Significance	Mitigation Measures	Significance of Residual Impact
Construction dust emissions	Construction dust emissions affecting human health and or causing annoyance through deposition.	Negligible to Medium risk of dust impacts [1]	Implementation of the measures outlined in Section 7.5 through the implementation of the CEMP (included as standalone documents in the planning application pack).	Not Significant
Construction site plant and machinery emissions	Emissions affecting human health and sensitive habitats.	Not Significant	None required	Not Significant
Road traffic emissions	Emissions affecting human health and sensitive habitats.	Not Significant	None required	Not Significant

Note 1: As described in Section 7.2.4.1, the IAQM Guidance (IAQM 2023) does not advocate determination of significance pre-mitigation, and recommends that significance is only assigned to the impact after considering the construction activity with the appropriate level of good practice mitigation in place.

7.6.2 Operational Phase

Based on the findings of the assessment, there will be no significant residual air quality impacts associated with the operation of the Proposed Development, without the need for additional mitigation measures.

7.7 Conclusion

This Chapter provides an assessment of the potential impacts on air quality arising from the construction and operation of the Proposed Development.

The potential impact on local air quality, at sensitive human and ecological locations in the vicinity of the Proposed Development, associated with emissions from plant and machinery and construction and operational-related road traffic, is anticipated to be Negligible, and therefore, Not Significant.

A qualitative assessment of construction dust effects has been undertaken for the different construction activities associated with the Proposed Development. These construction activities were selected to represent those activities which have the greatest potential for dust generation at source. Likewise, the locations chosen for assessment purposes represent those locations with the highest number of sensitive receptors in close proximity to the Planning Application Boundary. There are no designated ecological receptors within the study area for construction dust effects.

Based on the matrix of relationships between the sensitivity of the area and the dust emission magnitudes for various activities set out in the IAQM Guidance (IAQM 2023), it is considered that in the absence of appropriate mitigation, there is a low risk of dust impacts for earthwork and construction activities, and a medium risk for trackout at human receptors. There is therefore the potential for infrequent, short-term episodes when baseline dust deposition rates could be increased by an amount that residents could perceive. With regard to human health, there is a negligible to low risk as there is limited potential for emissions of

PM_{10} and $PM_{2.5}$ to increase baseline concentrations to a value that is above the Limit Values set for the protection for human health.

The IAQM Guidance notes, that with the application of good practice mitigation measures of the type available for use on the Proposed Development, construction dust emissions should not lead to significant impacts at any off site receptor. The IAQM Guidance also notes that, even with a rigorous package of mitigation measures in place, such as those taken forward from this assessment and included in the air quality management strategies set out in the CEMP (included as a standalone document in the planning application pack), occasional impacts may occur. The CEMP will provide a framework by which the level of mitigation is adapted to respond proactively to the changing risk of dust emissions, so that significant effects are prevented. Beyond the good practice mitigation measures set out in Section 7.5 and the CEMP, no additional mitigation measures are required.

As discussed previously, the changes in the concentrations of pollutants at sensitive receptors from emissions from plant and machinery and associated road traffic is considered to be Negligible. Therefore, this would represent a Not Significant impact on air quality.

As the air quality impacts associated with the Proposed Development are Not Significant and ambient pollutant concentrations will be well below the relevant Limit Value, and no exceedances of relevant Limit Values are anticipated.

7.8 References

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<u>Directives and Legislation</u>

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 8 – Climate

EirGrid

March 2024

Contents

8. Climate

8.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) has considered the likely potential climate impacts associated with the Construction and Operational Phases of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). It describes the relevant legislation, guidance and methodology applied, identifies the likely potential impacts on receptors, discusses the effects of the impacts and provides details of mitigation. Predicted residual impacts have also been described, where relevant.

The assessment includes the consideration of:

- The vulnerability of the Proposed Development to climate change; and
- The likely potential impact of the Proposed Development on climate.

A glossary of terms relating to this Chapter is provided in Appendix A8.1 in Volume 3 of this EIAR.

8.2 Methodology

8.2.1 Study Area

The Proposed Development will cover a route of approximately 37.5 kilometres (km) in County Meath, and Fingal in north County Dublin (refer to Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR for a full description of the Proposed Development). Unlike the majority of other environmental factors, the consideration of greenhouse gas (GHG) emissions is not determined by a pre-defined geographical area. Different study areas are required to be defined for each aspect of a climate impact assessment.

8.2.1.1 Vulnerability to Changes in Climate

The study area for assessing the vulnerability of the Proposed Development to changes in climate comprises the assets associated with the Proposed Development within the Planning Application Boundary. This area is approximately 142 hectares (ha).

8.2.1.2 Greenhouse Gas Assessment

The study area for the GHG assessment, hereafter referred to as the GHG study area, comprises the construction and operational areas within the Planning Application Boundary. However, the GHG study area also incorporates the transport of construction materials from the supplier within Ireland and the transport of materials off site for waste processing within Ireland. The GHG study area is therefore defined by the largest extent of these activities / elements (i.e., including the transport distances of materials on a national scale) within Ireland.

8.2.2 Relevant Guidelines, Policy and Legislation

8.2.2.1 European Policy Context

There are a range of key International and European Union (EU) level agreements and policy frameworks that have contributed towards shaping Ireland’s approach to energy transmission, distribution and storage. These include:

- European Green Deal 2019 (European Commission 2019) - Proposes stricter EU emissions reduction targets for 2030 to at least 50% and towards 55% compared with 1990 levels;
- European Union 'Fit for 55' legislative package (European Commission 2021b) – Aims to make all sectors of the EU's economy fit to meet the 55% reduction target;
- The Paris Agreement (United Nations Framework Convention on Climate Change 2015), which is an agreement to strengthen climate change resilience efforts through increased financing, while curbing GHG emissions via an agreed 'Paris Agreement rulebook' setting out how countries are held accountable for delivering on their climate action promises;
- Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 (hereafter referred to as the Recast Renewable Energy Directive (RED III)), which established a binding target of at least 42.5% of renewable energy for the EU by 2030;
- Europe 2030 Climate and Energy Framework (European Commission 2014), which established a binding domestic target to reduce GHG emissions by 40% below 1990 levels by 2030; and
- Energy Roadmap 2050 (European Commission 2011), which developed scenarios demonstrating that decarbonising the energy system is technically and economically feasible.

A detailed policy summary is provided in Appendix A8.2 in Volume 3 of this EIAR.

8.2.2.2 National, Regional and Local Planning Policy Context

It is recognised at a national and regional level that, International, European, and national climate change commitments mean that power generation, transport and heat all increasingly have to derive power from sustainably produced electricity. Therefore, national and regional policy places a strong emphasis on the need for new energy systems and transmission grids.

8.2.2.2.1 National Policy Context

The following are those national-level plans, policies, and strategies relevant to the Proposed Development:

- Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the 2021 Climate Act), and the Climate Action Plan 2023 (hereafter referred to as the CAP23) (Government of Ireland 2022a) and the Climate Action Plan 2024 (hereafter referred to as the CAP24) (Government of Ireland 2023) all commit Ireland to achieving a 51% reduction in overall GHG emissions by 2030, relative to 2018 levels, and setting Ireland on a path to reach net-zero by no later than 2050. The CAP24 also reaffirms the commitment from previous climate action plans (including CAP23) to increase the proportion of renewable electricity (i.e., wind and solar) up to 80% by 2030. These documents state that in order to do so there is a need for transformational policies, measures and actions, including strengthening the grid;
- Project Ireland 2040 - National Planning Framework (hereafter referred to as the NPF) (Government of Ireland 2018) sets out key policy principles via National Strategic Outcomes (NSOs), which include supporting and strengthening the economy and a transition to a low carbon, climate resilient society (NSO 3, 6 and 8), providing access to quality services (NSO 4, 7, and 10) and achieving sustainable growth and better environmental resource management (NSO 1 and 9). It states that Ireland's National Energy Policy is focused on three pillars (i.e., sustainability, security of supply, and competitiveness);
- Project Ireland 2040 - National Development Plan 2021-2030 (hereafter referred to as the NDP) (Government of Ireland 2021) represents the national capital investment strategy plan for delivering the NSOs of the NPF, achieved via Strategic Investment Priorities to the year 2030. A core strategic investment priority is a focus on decarbonising energy, in order to, "*create greater links between different energy carriers (such as electricity and hydrogen);*

infrastructures; and consumption sectors (such as transport and heating)." Doing so requires a coordinated programme of investment in, among other things, "*an expanded and strengthened electricity transmission and distribution network*", to support an increase in both renewable and conventional electricity generation;

- The National Energy and Climate Plan 2021-2030 (hereafter referred to as the NECP) (Department of Communications, Climate Action and Environment 2021) is a 10-year plan mandated by the EU to each of its Member States, in order for the EU to meet its overall GHG emissions targets. The NECP establishes key measures to address the five dimensions of the EU (i.e., decarbonisation, energy efficiency, energy security, internal energy markets and research, innovation and competitiveness); and
- The White Paper – Ireland's Transition to a Low Carbon Energy Future 2015-2030 (Department of Communications, Energy and Natural Resources 2021) sets out a framework to guide Ireland's energy policy development. The Proposed Development is considered to be an 'enhanced and extended energy infrastructure' development, which will be critical for economic development, regional development and the secure provision of energy and other services for the Irish society and economy.

Further details on these policies are provided in Appendix A8.2 in Volume 3 of this EIAR.

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*". It defines the carbon budget as "*the total amount of greenhouse gas emissions that are permitted during the budget period*". The first carbon budget programme proposed by the Climate Change Advisory Council was approved by the Government and adopted by both Houses of the Oireachtas in April 2022 (Government of Ireland 2022b). The carbon budgets (expressed as carbon dioxide equivalent (abbreviated as CO_2e) which is a metric used to compare the emissions of various GHGs, based on their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of CO_2 with the same GWP) comprise three successive five-year budgets. The total emissions allowed under each budget are set out below in Table 8.1, as well as the average annual reduction for each five-year period.

Table 8.1: Ireland's Carbon Budgets 2021-2035

Period	Carbon Budgets (Mt CO_2e)	Emissions Reduction Target
2021-2025	295	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151	Reduction in emissions of 3.5% per annum for the third provisional budget.

CAP24, approved in December 2023, is the third annual update to Ireland's Climate Action Plan. The previous update, CAP23, outlined 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. CAP24 builds upon CAP23 to refine the measures and actions required to deliver the carbon budgets and sectoral emissions ceilings. The sectoral emissions ceilings for each sector are shown in Table 8.2, as reported in CAP24 and the Sectoral Emissions Ceiling Summary Report (Government of Ireland 2022c). The sectoral emissions ceilings for the electricity sector require a 75% abatement to emissions from the 2018 baseline (i.e., 3 $MtCO_2e$ (megatonnes of CO_2 equivalent) per annum by 2030). Further details on CAP24 are provided in Appendix A8.2 in Volume 3 of this EIAR.

Table 8.2: Sectoral Emissions Ceilings

Sector	2018 Baseline Emissions ($MtCO_2e$)	Sectoral Emissions Ceilings for each 5-year Carbon Budget Period ($MtCO_2e$) up to 2030		2030 Emissions Ceiling ($MtCO_2e$)	Reduction in Emissions by 2030 Compared to 2018
		2021-2025 Emissions Ceiling	2026-2030 Emissions Ceiling		
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, petroleum refining and waste)	2	9	8	1	~50%
LULUCF	5	CAP24 puts activity targets in place for the LULUCF Sector reflecting an EU-type approach			
TOTAL	68				
Annual unallocated emissions savings in 2030 (NOTE 1)	-	-	5.25	5.25	-
Unallocated Savings 2026-2030	-	-	26		-
Legally binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	34	51%

NOTE 1: 5.25 $MtCO_2e$ of annual emissions reductions are currently unallocated on an economy-wide basis for the second carbon budget period (2026-2030). CAP24 sets out an approach to deal with unallocated savings no later than 2025 and proposes that this may be achieved by focussing on exploring emerging technologies and on the deployment of carbon removal technologies.

8.2.2.2.2 Regional Policy Context

In terms of the regional context, the Proposed Development will be located in the Eastern and Midlands Region of Ireland, and therefore, the relevant regional policy is the Eastern and Midland Regional Assembly (EMRA) Regional Spatial and Economic Strategy 2019-2031 (hereafter referred to as the RSES) (EMRA 2019). The RSES locates the majority of the Proposed Development within the Dublin Metropolitan Area. Key points from the RSES are as follows:

- Climate action is one of three key principles underpinning the RSES vision to create a sustainable and competitive region, to be achieved by securing the transition to a low carbon economy. The RSES expresses support for NSO 8 of the NPF (Government of Ireland 2018), seeking 'Alignment of growth with enabling infrastructure' to ensure quality infrastructure provision and capacity improvement is provided in tandem with new development;
- The RSES states, in relation to the Dublin Metropolitan Area, that the "*Development of the energy distribution and transmission network in the region will enable distribution of more renewable sources of energy to facilitate future energy demand in strategic development areas*". The RSES specifically identifies the need for the "*expansion and upgrading of the grid with the aim of increasing the share of variable renewable electricity that the all-island system can accommodate*"; and
- The RSES expresses support for EirGrid's Grid Implementation Plan 2017 – 2022 (EirGrid 2017) and Transmission Development Plan 2016 - 2026 (hereafter referred to as the TDP) (EirGrid 2016) and any subsequent plans prepared during the lifetime of the RSES, while Objective RPO 10.23 states that the RSES supports:

> "*reinforcement of the Greater Dublin Area between Dunnstown and Woodland 400 kV substations to increase the capacity of the often congested and highly loaded Dublin transmission network to enable the transmission system to safely accommodate more diverse power flows and also facilitate future load growth in the area*".

8.2.2.2.3 Local Policy Context

The Proposed Development will be located within the administrative boundaries of Meath County Council (MCC) and Fingal County Council (FCC). This sub-section provides a summary of the relevant local policies and strategies on climate change.

8.2.2.2.3.1 Meath County Council

The MCC Climate Action Strategy 2019-2024 was published in September 2019 (hereafter referred to as the Meath Climate Strategy) (MCC 2019). The Meath Climate Strategy sets several actions on the subject on clean energy, with the primary action (C1) being to "*Build on and support national renewable energy targets and strategy*".

The Local Authority Climate Action Charter (Department of the Environment, Climate and Communications 2019) was signed by MCC in October 2019 and represents a commitment by local authorities to deliver effective climate action on the local and national scale. The Local Authority Climate Action Charter commits local authorities to several actions, including a requirement to deliver on a target of 30% reduction in carbon emissions by 2030 and to ensure that all suppliers provide information on their carbon footprint and steps they plan to take to reduce its impact. Delivering Effective Climate Action 2030 (County and City Management Association 2021) is the local government strategy on climate action published in April 2021. The Meath Climate Strategy provides a stated roadmap at the sectorial level for local authorities to deliver the necessary decarbonisation and adaptation measures required by the Local Authority Climate Action Charter and Climate Action Plans.

MCC adopted the Meath County Development Plan 2021 – 2027 in November 2021 (hereafter referred to as the Meath Development Plan) (MCC 2021), followed by a two-year progress report in December 2023. The Meath Development Plan includes several objectives relating to the promotion of renewable energy alternatives, as summarised in Table 8.3.

Table 8.3: Relevant Mitigation Strategies and Associated Objectives in the Meath Development Plan

Mitigation Strategy / Policy	Associated Objectives
Infrastructure: Renewable Energy	
The Council will endeavour: • To promote the rational uses of energy; • To promote renewable energy; • To promote and disseminate energy information; • To protect the environment; • To reduce energy waste in all sectors of society, and; • To encourage the replacement of imported fossil fuels with regionally generated renewable energy in an effort to ensure security of energy supply, where it is feasible.	INF OBJ 39 To support Ireland's renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the county where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.
	INF OBJ 41 To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the county and the built environment.
	INF OBJ 47 To investigate the preparation of a Renewable Energy Strategy promoting technologies which are most viable in the county.
	INF OBJ 46 To support the implementation of the actions of the Meath Climate Action Strategy 2019-2024 and review and update the Energy Management Action Plan 2011-2012, 'Think Globally Act Locally'.

Mitigation Strategy / Policy	Associated Objectives
Infrastructure: Energy Networks Infrastructure	
To support and facilitate the development of enhanced electricity and gas supplies, and associated networks…including linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner (INF POL 46).	INF OBJ 50 To seek the delivery of the necessary integration of transmission network requirements to facilitate linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner.
Climate change: residential	
Promote the use of lower carbon fuels in the home.	INF OBJ 41 To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the County and the built environment.
Climate change: industry and services	
Promote and facilitate energy efficient building design, operations, environmentally sustainable layout and locations.	INF OBJ 39 To support Ireland’s renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the County where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.
Climate change: energy	
Encourage the uptake of more renewable energy sources.	INF POL 34 To promote sustainable energy sources, locally based renewable energy alternatives, where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity, natural and built heritage, residential or local amenities.
	INF POL 35 To seek a reduce greenhouse gas emissions through energy efficiency and the development of renewable energy sources utilising the natural resources of the County in an environmentally acceptable manner consistent with best practice and planning principles.
	INF POL 41 To encourage the development of wind energy, in accordance with Government policy and having regard to the Landscape Character Assessment of the County and the Wind Energy Development Guidelines (2006) or any revisions thereof.
	INF OBJ 39 To support Ireland’s renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the County where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.
	INF OBJ 41 To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the County and the built environment.

MCC has prepared its Climate Action Plan 2024 – 2029 (MCC 2024) with the overarching Vision for Meath to “*be a climate resilient, biodiverse rich, environmentally sustainable and climate neutral economy that supports healthy lifestyles and jobs growth*”. Objective 2.1 on the theme of Built Environment and Transport is to “*minimise the Council’s contribution to climate change by increasing energy efficiency, reducing carbon emissions and encouraging sustainable opportunities for the broader Meath Community*”. In working towards this, the MCC Climate Action Plan 2024 – 2029 states that securing renewable energy infrastructure to contribute to national grid decarbonisation will need to be prioritised, and Action BET17 within the MCC Climate Action Plan 2024 – 2029 states the action to *“explore the feasibility of sustainable energy and heating solutions in County Meath”*.

The Proposed Development will not be located within any boundaries in County Meath that are subject to Local Plans.

8.2.2.2.3.2 Fingal County Council

The FCC Climate Change Action Plan 2019-2024 was approved in May 2019 (FCC 2019). The Climate Change Action Plan 2019-2024 recognises the uptake of renewable energy as a contributor to climate change mitigation, and the focus area on 'Energy and Buildings' includes objectives to prepare a Local Authority Renewable Energy Strategy (Objective E3) and to "*study potential for viable renewable energy projects on a temporary/permanent basis, on Council controlled lands*" (Objective E23). The 2022 annual progress report for the climate change action plan (FCC 2022) indicates that preparation of the Renewable Energy Strategy is ongoing. The FCC Climate Action Plan 2024-2029 (FCC 2024) states that "developing enabling electricity infrastructure should be supported to maximise Dublin's potential to generate renewable energy". The Draft FCC Climate Change Action Plan 2024 -2029 includes the relevant objectives listed in Table 8.4.

Table 8.4: Relevant Objectives in the FCC Climate Action Plan 2024 – 2029 (FCC 2024)

Policy / Objective Number	Policy / Objective
Energy Planning & Renewables	
E26	Assess potential for viable renewable energy projects on a temporary/permanent basis, on council-controlled lands.
Land Use & Acquisition	
R21	Assess Council lands & buildings for potential for renewable energy, biodiversity; green infrastructure, sustainable agriculture & other sustainable projects.
R22	Develop renewable energy, green infrastructure, biodiversity, sustainable agriculture & other sustainable projects on Council lands & buildings
R23	Identify opportunities for the acquisition of land and buildings by agreement/ CPO for renewable energy/ regeneration/active travel/greenway/green infrastructure projects etc.

Like MCC, FCC is also a signatory to the Local Authority Climate Action Charter (Department of the Environment, Climate and Communications 2019) and therefore committed to deliver on its commitments, including the commitment to deliver on a 30% carbon emissions reduction target by 2030. FCC is also led by the Delivering Effective Climate Action 2030 Strategy (County and City Management Association 2021) for local authorities.

FCC published the latest Fingal Development Plan 2023-2029 in April 2023 (FCC 2023). The Fingal Development Plan 2023-2029 objectives that are relevant to the Proposed Development in the context of climate change are summarised in Table 8.5.

Table 8.5: Relevant Policies, Objectives and Actions in the Fingal Development Plan 2023 – 2029 (FCC 2023)

Policy / Objective Number	Policy / Objective
Climate Action	
Policy CAP10	Climate Mitigation Actions in the Built Environment Promote low carbon development within the County which will seek to reduce carbon dioxide emissions and which will meet the highest feasible environmental standards during construction and occupation. New development should generally demonstrate/provide for: • Building layout and design which maximises daylight, natural ventilation, active transport and public transport use; • Sustainable building/services/site design to maximise energy efficiency; • Sensitive energy efficiency improvements to existing buildings; • Energy efficiency, energy conservation, and the increased use of renewable energy in existing and new developments; • On-site renewable energy infrastructure and renewable energy; • Minimising the generation of site and construction waste and maximising reuse or recycling; and • The use of construction materials that have low to zero embodied energy and CO_2 emissions.
Policy CAP11	Climate Adaptation Actions in the Built Environment Development proposals should demonstrate sustainable design principles for new buildings/ services/site. The Council will promote and support development which is resilient to climate change. This would include: • Measures such as green roofs and green walls to reduce internal overheating and the urban heat island effect; • Ensuring the efficient use of natural resources (including water) and making the most of natural systems both within and around buildings; • Minimising pollution by reducing surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems (SuDS); • Reducing flood risk, damage to property from extreme events– residential, public and commercial; • Reducing risks from temperature extremes and extreme weather events to critical infrastructure such as roads, communication networks, the water/drainage network, and energy supply; and • Promoting and protecting biodiversity and green infrastructure.
Policy CAP13	Energy from Renewable Sources Actively support the production of energy from renewable sources and associated electricity grid infrastructure, such as from solar energy, hydro energy, wave/tidal energy, geothermal, wind energy, combined heat and power (CHP), heat energy distribution such as district heating/cooling systems, and any other renewable energy sources, subject to normal planning and environmental considerations.
Policy CAP16	Offshore Wind Energy Production Support the implementation of the 2014 Offshore Renewable Energy Development Plan (OREDP) and any successor thereof, and to facilitate infrastructure such as grid facilities on the land side of any renewable energy proposals of the offshore wind resource, where appropriate and having regard to the principles set out in the National Marine Planning Framework.
Policy CAP21	Decarbonising Zones Support the designation and implementation of a Decarbonisation Zone or zones within the County in order to address local low carbon energy, greenhouse gas emissions and climate needs.
Policy CAP22	Strategic Energy Zones Support the designation of potential Strategic Energy Zones within the County in conjunction with the Eastern and Midland Regional Authority.
Policy CAP23	Strategic Energy Communities Support the ongoing efforts and future development of Sustainable Energy Communities in Fingal through the SEAI 'Sustainable Energy Communities' Initiative.
Policy CAP24	Dublin Regional Energy Masterplan Support the preparation of the Dublin Regional Energy Masterplan by Codema and to support its implementation in conjunction with neighbouring Dublin Local Authorities, Dublin Metropolitan CARO and other relevant stakeholders.
Employment and Economy	
Objective EE070	Renewable and Alternative Energy Facilitate and encourage the development of the alternative energy sector, in line with a Local Renewable Energy Strategy, and work with the relevant agencies to support the development of alternative forms of energy where such developments do not negatively impact upon the environmental quality, and visual, residential or rural amenity of the area.

Policy / Objective Number	Policy / Objective
Infrastructure and Utilities	
Policy IUP27	Energy Networks and ICT Infrastructure Facilitate and promote the development of energy networks and ICT infrastructure where necessary to facilitate sustainable growth and economic development and support the provision of critical energy utilities and the transition to alternative, renewable, decarbonised, and decentralised energy sources, technologies, and infrastructure.
Policy IUP29	Enhancement And Upgrading Of Existing Infrastructure And Networks Work in partnership with existing service providers, businesses and local community groups to facilitate required enhancement and upgrading of existing infrastructure and networks and support the development of new energy systems, local community sustainable energy generation projects and transmission grids, which will be necessary for a more distributed, renewables-focused energy generation system, harnessing both the considerable on-shore and off-shore potential from energy sources such as wind, wave, and solar energy.
Policy IUP30	Promote Low Carbon Energy Development Promote more energy-efficient development through the location of housing and employment along district heating hubs, or potential renewable energy locations, where people can connect buildings to energy efficient, low-carbon alternatives.
Policy IUP31	Enhancement and Upgrading Of Existing Infrastructure And Networks Support EirGrid's Grid Development Strategy – Your Grid, Your Tomorrow 2017, Implementation Plan 2017–2022, Shaping our Electricity Future-A Roadmap to achieve our Renewable Ambition 2021 and Transmission Development Plan (TDP) 2020-2029, and the Government's Policy Statement on Security of Electricity Supply November 2021 and any subsequent plans prepared during the lifetime of this Plan, to provide for the safe, secure, and reliable supply of electricity.
Policy IUP32	East Meath-North Dublin Grid Upgrade Support the development of the East Meath-North Dublin Grid Upgrade to strengthen the electricity supply network in anticipation of the future development of renewable energy, onshore and offshore.
Policy IUP33	Renewable Energy Continue to develop and implement climate action and energy related initiatives in Fingal and continue to support the recording and monitoring of renewable energy potential in Fingal in partnership with other stakeholders including the East Midlands Regional Assembly EMRA, the Dublin Energy Agency (Codema) and the Climate Action Regional Office (CARO).
Objective IUO44	Energy Utilities Support the development of enhanced electricity and gas supplies, and associated transmission and distribution networks, to serve the existing and future needs of the County, and to facilitate new transmission infrastructure projects and technologies.
Development Management Standards	
Objective DMSO257	Waste Heat, District Heating and Decentralised Energy Actively encourage the development of low carbon and highly efficient district heating and decentralised energy systems across the County utilising low carbon heat sources such as renewable energy and waste heat recovery and to promote the connection of new developments to district heating networks where such systems exist/can be developed in a given area.

The Proposed Development will pass through the boundary of the Dublin Airport Local Area Plan 2020 (FCC 2020). The policies / objectives in the Dublin Airport Local Area Plan 2020 that relate to climate are listed in Table 8.6.

Table 8.6: Dublin Airport Local Area Plan (FCC 2020)

Policy / Objective Number	Policy / Objective
Climate Action	
CA01	Require that all new developments at the Airport incorporate design solutions aimed at reducing carbon emissions, including the incorporation of renewable energy and energy saving technologies where practicable, including the use of district heating/cooling system.
CA03	Require that all new developments at the Airport incorporate design solutions aimed at reducing carbon emissions, including the incorporation of renewable energy and energy saving technologies where practicable, including the use of district heating/cooling systems.
CA03	Facilitate, where appropriate, sustainable energy development proposals and projects at Dublin Airport.

8.2.2.3 Guidance

The assessment methodology has been derived with reference to the most appropriate guidance documents, which are as follows:

- Institute of Environmental Management and Assessment (IEMA) Guide to Climate Change Resilience and Adaptation (IEMA 2020);
- Technical guidance on the climate proofing of infrastructure in the period 2021 to 2027 (European Commission 2021a);
- Royal Institution of Chartered Surveyors (RICS). Whole Life Carbon Assessment for the Built Environment, 2nd edition. November (RICS 2023);
- Institution of Civil Engineers (ICE). PAS 2080:2023 Carbon Management in Buildings and Infrastructure (ICE 2023);
- Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA 2022); and
- Transport Infrastructure Ireland (TII) Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document. PE-ENV-01104 (TII 2022).

All of the guidance applied is considered current best practice either in the UK, in Ireland or Internationally, and is therefore considered appropriate for application in Ireland in the absence of Irish-specific guidance.

8.2.3 Data Collection and Collation

As the climate impact assessment is desk-based, research data and relevant publications from the following organisations have been reviewed:

- Open-source observed climate average datasets for Dublin Airport, available from Met Éireann (Met Éireann 2023);
- Open-source climate projection datasets for County Meath, available from the World Bank Group Climate Change Knowledge Portal (World Bank Group 2024);
- Baseline county level GHG emissions datasets from the MCC Climate Action Plan 2024 – 2029 (MCC 2024) and the FCC Climate Action Plan 2024-2029 (FCC 2024);
- Baseline national level GHG emissions totals and projections published by Ireland’s Environmental Protection Agency (EPA), including the report on Ireland’s Greenhouse Gas Emissions Projections 2022 – 2040 (EPA 2023a), Ireland’s National Inventory Report (EPA 2023b) and the EPA website (EPA 2023c);
- Material quantities associated with the construction of the Proposed Development based on the calculations in Chapter 4 (Proposed Development Description) and Chapter 16 (Waste) in Volume 2 of this EIAR;
- Carbon emission factors from the Inventory of Carbon and Energy Version 3 database (Circular Ecology 2019) and Life cycle assessment of the transmission network in Great Britain (Harrison et al. 2010);
- Typical GHG emissions associated with the embodied carbon of a three-bedroom house using traditional construction methods, from An embodied carbon and energy analysis of modern methods of construction in housing: A case study using a lifecycle assessment framework (Monahan 2011); and
- Equivalent carbon dioxide emissions per capita from the Central Statistics Office (CSO) (CSO 2023).

8.2.4 Appraisal Method for the Assessment of Impacts

8.2.4.1 Vulnerability to Changes in Climate

A qualitative methodology has been undertaken to identify the vulnerability of the Proposed Development to changes in climate. The methodology has complied with the Guide to: Climate Change Resilience and Adaptation (2020) (IEMA 2020).

Regarding the vulnerability of the Proposed Development to climate change during the Construction Phase, this has been scoped out of the assessment as there are likely to be negligible changes in climate prior to the end of the Construction Phase. The indicative preliminary construction programme for the Proposed Development runs from Q2 2026 to Q4 2029 (refer to Table 4.7 in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR). The future climate projections for 2020 to 2039 in Table 8.12 show a less than 5% change in seasonal accumulated precipitation and a less than 1^{o}c (degree Celsius) change in seasonal maximum / minimum temperature from the 1995 to 2014 baseline. Any construction within this 20 year scenario (i.e., 2020 to 2039) would be subject to the same projected changes in climate.

The vulnerability of the Proposed Development to climate change has been assessed for the Operational Phase. However, the substation upgrade and extension works will be located within the existing substation sites at the time of construction, which have been sited to be resilient to the main risks associated with climate change (mainly flooding). Substations have therefore not been considered further in this vulnerability assessment. The IEMA (2020) guidance represents international best practice for undertaking climate change risk assessments. In compliance with a Guide to: Climate Change Resilience and Adaptation (2020), risks to the Proposed Development associated with the future climate baseline have been identified (refer to Section 8.4) and a significance rating has been determined based on professional judgement (risk is defined as the risk that a weather or climate event occurs and results in an adverse impact). The risk assessment and the determination of significance takes account of embedded design measures that will be in place. The significance rating considers both the perceived likelihood and severity of each risk.

This assessment applies the likelihood criteria defined in Table 4 of the Guide to: Climate Change Resilience and Adaptation (2020). The likelihood of each risk has been determined based on the future climate baseline and professional judgement, as defined in Table 8.7 (the likelihood of each risk occurring relates to the likelihood that a specified risk resulting from climate change should occur).

Table 8.7: Definitions of Likelihood Categories

Likelihood Category	Description (Probability and Frequency of Occurrence)
Very High	The event occurs multiple times during the lifetime of a project (e.g. approximately annually).
High	The event occurs several times during the lifetime of a project (e.g. approximately once every five years).
Medium	The event occurs limited times during the lifetime of a project (e.g. approximately once every 15 years).
Low	The event occurs during the lifetime of a project.
Very Low	The event may occur during the lifetime of a project.

The magnitude of impact ratings (severity refers to the magnitude of a risk upon an asset) for each risk have been assigned in a similar manner, according to the categories in Table 8.8. The best practice Guide to: Climate Change Resilience and Adaptation (2020) states that “definitions of likelihood and magnitude will vary from scheme to scheme, and should be tailored to a specific project”. The magnitude of impact ratings are therefore based on the example criteria provided in Table 4 of the Guide to: Climate Change Resilience and Adaptation (2020), with tailoring of the likely impacts to the Proposed Development based on experience and professional judgement.

Table 8.8: Definitions for Magnitude of Impact Categories

Magnitude of Impact	Definition
Very large adverse	Continuous disruption as a result of severe damage to the asset, lasting more than 1 week; OR A severe reduction in asset lifespan.
Large adverse	Intermittent disruption as a result of moderate to severe damage to the asset, lasting more than 1 week; OR A moderate reduction in asset lifespan
Moderate adverse	Intermittent disruption as a result of moderate damage to the asset, lasting less than 1 week; OR A measurable increase in necessary maintenance frequency and costs.
Minor adverse	A small reduction in asset performance or lifespan.
Negligible	Undetectable change in asset performance or lifespan.

The significance of each risk has subsequently been determined based on the likelihood and severity ratings according to the significance matrix in Table 8.9. The significance matrix is aligned with Table 4 of the Guide to: Climate Change Resilience and Adaptation (2020).

Table 8.9: Significance Matrix

	Magnitude of Impact					
		Very large adverse	**Large adverse**	**Moderate adverse**	**Minor adverse**	**Negligible**
Likelihood	**Very High**	Significant	Significant	Significant	Significant	Not Significant
	High	Significant	Significant	Significant	Significant	Not Significant
	Medium	Significant	Significant	Significant	Not Significant	Not Significant
	Low	Significant	Significant	Not Significant	Not Significant	Not Significant
	Very Low	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

8.2.4.2 GHG Assessment

The main sources of GHG emissions during the Construction Phase will consist of the embodied carbon within the construction materials used, the transport and road haulage of materials from the supplier to the construction areas, and construction activities, including waste treatment and transport. For a full description of the Construction Phase activities, please refer to Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.

The methodology for the GHG assessment is in accordance with technical guidance on the climate proofing of infrastructure in the period 2021 to 2027 (European Commission 2021a), as per the scoping consultation responses received (refer to Appendix A1.1 (Summary of Scoping Consultation Responses) in Volume 3 of this EIAR).

The embodied construction emissions for the Construction Phase materials (PAS 2080:2023 Whole Life Cycle (WLC) modules A1-A3) have been calculated using emission factors from the Inventory of Carbon and Energy Version 3 database (Circular Ecology 2019) and Life cycle assessment of the transmission network in Great Britain (Harrison et al. 2010). The Inventory of Carbon and Energy is a leading embodied carbon database for building materials, that is applied in several best practice carbon calculators, including the TII carbon tool for road and light rail projects. The application of carbon factors from peer reviewed literature, such as Life cycle assessment of the transmission network in Great Britain (Harrison et al.2010), is also compliant with scientific best practice. The carbon emissions are calculated, in units of tonnes of CO_2e, by multiplying the emission factor by the quantity of the material that will be used over the entire Construction Phase.

The Construction Phase will require the importation of materials for the Proposed Development works. Table 16.13 in Chapter 16 (Waste) in Volume 2 of this EIAR provides estimated quantities of the major materials required to complete the Construction Phase of the Proposed Development. This GHG assessment has considered the major materials defined in Table 16.13 in Chapter 16 (Waste) and is therefore subject to the same assumptions and limitations as the waste assessment outlined in Chapter 16 (Waste). The major materials and their quantities are as follows:

- 578m^3 (metres cubed) of asphalt, 31,560m^3 of engineered fill and 3,083m^3 of subsoil associated with the Passing Bays, construction platforms and compounds (including Temporary Construction Compounds and Horizontal Directional Drilling (HDD) Compounds) (enabling works);
- 3,666m^3 of asphalt, 42,071m^3 of engineered fill and 31,631m^3 of cement bound granular material associated with the in-road and off-road proposed cable route (permanent works);
- 4,788m^3 of engineered fill associated with the permanent access tracks (permanent works);
- 796m^3 of pre-cast concrete associated with Joint Bays (permanent works);
- 120m^3 of engineered fill, 1,964m^3 of concrete and 127 tonnes of steel associated with Belcamp Substation (permanent works); and
- 107m^3 of concrete associated with Woodland Substation (permanent works).

Additionally, this GHG assessment has accounted for the materials associated with the proposed high - voltage 400 kilovolt (kV) cables. Based on the cable specifications, the total materials associated with the three proposed 400kV cables, for the Proposed Development approximate length of 37.5 kilometres (km), are estimated to be:

- 3,218 tonnes of copper cables;
- 890 tonnes of polyethylene insulation;
- 307 tonnes of aluminium concentric wires;
- 26 tonnes of aluminium sheath; and
- 260 tonnes of polyethylene jackets.

The carbon emissions associated with the transport of the materials from the supplier to the site (PAS 2080:2023 WLC module A4 emissions) have been calculated applying 2023 GHG emission factors from the Greenhouse gas reporting: conversion factors 2023: full set dataset (UK Government 2023)), for average laden and 0% laden HGVs (heavy goods vehicles) (under Freighting Goods). The UK Government-published GHG factors are applied in several best practice tools, including the TII carbon tool for roads and light rail projects. An average vehicle load of 7.5 tonnes was applied to estimate the number of vehicle movements, where required.

The suppliers for the construction materials have not yet been confirmed. Therefore, in accordance with the Whole Life Carbon Assessment (WLCA) for the Built Environment standard (RICS 2023), which represents International best practice guidance for GHG assessments, this GHG assessment has assumed a one-way default transport distance of 20km for cement, 50km for other locally sourced materials (asphalt, cement based granular material (CBGM)) and 120km for nationally sourced materials (precast concrete). The proposed 400kV cables will be sourced from outside of Ireland. However, at this stage, the geographical origin of the proposed cable components cannot be defined, and therefore, this GHG assessment assesses the transport of the proposed cables within Ireland, applying a one-way transport distance of 120km. The transport emissions for each material includes a one-way transport by laden HGV from the supplier to the location of the Proposed Development and a return journey by unladen HGV.

The embodied carbon emissions associated with the construction materials, and the transport of the materials to the location of the Proposed Development, are likely to be the main contributors to the Construction Phase carbon for the Proposed Development. The construction of the Proposed Development is described in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. At this stage of the

Proposed Development, a contractor has not been appointed, and therefore, the details of construction and installation process (e.g., vehicle types and fuel mix) are not currently available. The carbon emissions associated with the construction and installation processes (PAS 2080:2023 WLC module A5) have therefore been scoped out of this GHG assessment.

On the basis that waste material will be minimised, as far as possible, through best good practice construction methods (see Chapter 16 (Waste) in Volume 2 of this EIAR), the estimation of GHG emissions associated with waste treatment and transport have not been considered further in this assessment.

A 15% uplift has been applied to the total material amounts prior to calculating the embodied carbon and transport emissions.

The Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document. PE-ENV-01104 (TII 2022) states:

> "*the Climate Practitioner should use their professional judgement to determine how best to contextualise and assess the significance of a project's GHG impact. The assessment is not solely based on whether a project emits GHG emissions alone, but how it makes a relative contribution towards achieving a science based 1.5°C aligned transition towards net zero (IEMA, 2022). In the climate assessment, the Climate Practitioner must give regard to two major considerations when assessing the significance of a project's GHG emissions: alignment to Ireland's trajectory towards net zero by 2050; and mitigation of GHG emissions.*"

In relation to determining significance, the Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA 2022) states:

> "*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 life time, 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.*
>
> *Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered*".

The Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance acknowledges that there will be continuing GHG emissions over time but these should be reduced and compatible with national climate change commitments. The Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance also states:

> "*The crux of significance therefore 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*".

In considering the emissions of GHGs, professional judgement, following a proportionate approach, has been used to provide a qualitative description of the nature of the impacts and determine the significance of the impact on climate. This is directly in compliance with the significance principles and examples of criteria set out in the Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance. The assessment included contextualising the predicted GHG emissions against the relevant legislated carbon budgets.

The significance criteria are set out in Table 8.10.

Table 8.10: Significance Criteria for GHG Emissions

Significance	Magnitude	Magnitude Criteria
Significant	Major Adverse	A project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to Ireland's trajectory towards net zero.
	Moderate Adverse	A project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to Ireland's trajectory towards net zero.
Not Significant	Minor Adverse	A project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve Ireland's trajectory towards net zero.
	Negligible	A project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.

The EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) describe the quality of impacts in terms of Positive, Neutral and Negative, where Neutral is defined as impacts that are Imperceptible, within normal bounds of variation.

As part of the assessment of significance outlined in Table 8.10, comparison of the GHG emissions associated with the Proposed Development have been compared to the 2030 electricity sectoral emissions ceiling (3 Mt CO_2e). For further context, the GHG emissions have also been compared to the typical GHG emissions associated with the embodied carbon of a three-bedroom house using traditional construction methods, which was found to be around 50 tonnes CO_2e by a study in 2011 (Monahan 2011). The GHG emissions have also been compared to the CO_2e per capita, where each person in Ireland is currently responsible for a carbon footprint of 12.3 tonnes CO_2e per year, based on 2021 data (CSO 2023).

In the Operational Phase, GHGs associated with the maintenance of the Proposed Development (i.e., PAS 2080:2023 Whole Life Cycle emissions: modules B2-B4) (embodied carbon of the raw materials required for routine operational maintenance)) have been considered but scoped out on the basis that the proposed cables will be located underground and GHG generating activities associated with maintenance will be very low even over the Whole Life Cycle period. Details of the maintenance activities in the Operational Phase are described in Section 4.6 of Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR.

One of the primary objectives of the Proposed Development is to facilitate decarbonisation of the energy supply, by enabling the distribution of electricity obtained from renewable sources. The extent of the renewable electricity distribution that will be facilitated by the Proposed Development is still to be determined. However, over time, this is expected to partially offset the GHGs associated with the transmission losses. On this basis, the GHG emissions associated with operational energy use (i.e., PAS 2080:2023 Whole Life Cycle emissions: module B6), have been considered but scoped out of any further assessment.

8.2.4.3 Limitations and Assumptions

There have been no significant limitations in the preparation of this Chapter. However, please note as stated in Section 8.2.4.2, details relating to the construction activities (e.g., vehicle type and fuel mix, and construction material suppliers) are not available. Default transport distances have therefore been applied in the GHG assessment, as described in Section 8.2.4.2. Construction activities have been scoped out of the GHG assessment as described in Section 8.2.4.2.

8.3 Baseline Environment

8.3.1 Current Climate Baseline

The current climate in Ireland is best described by the 1991 to 2020 climate averages, compiled by Met Éireann (Met Éireann 2023) based on their observation network for a number of parameters, including air temperature, precipitation, sunshine and wind. Climate averages are defined as the mean values of a climate variable over a standard reference period. The Met Éireann weather station at Dublin Airport in North County Dublin, is the nearest weather and climate monitoring station to the Proposed Development.

Table 8.11 describes the Met Éireann 1991 to 2020 climate averages for Dublin Airport. The climate averages show the region of the Proposed Development has a temperate climate, resulting in mild winters and cool summers.

Table 8.11: Dublin Airport 1991 to 2020 Climate Averages

Climate Metrics	Annual	Summer	Winter
Temperature (°C)			
Mean temperature	9.7	14.6	5.3
Mean daily maximum	13.3	18.8	8.3
Mean daily minimum	6.1	10.5	2.4
Rainfall (millimetres (mm))			
Mean accumulated total	772.5	198.4	186.3
Relative humidity (%)			
Mean at 1500 UTC	73.9	68.8	80.8
Sunshine (hours)			
Mean daily duration	4.0	5.3	2.2
Wind (knots)			
Mean monthly speed	10.5	9.2	12.0
Weather (mean accumulated total no. of days with…)			
Snow or sleet	12.5	0.0	8.7
Hail	9.2	0.4	3.3
Thunder	5.0	2.5	0.6
Fog	32.3	7.3	8.2

8.3.2 Future Climate Baseline

The majority of the Proposed Development will be located within the administrative boundary of County Meath, with the remainder of the Proposed Development being located within the administrative boundary of Fingal in North County Dublin. Projected climate changes for County Meath, in terms of temperature and precipitation, are therefore presented in Table 8.12 and, based on professional judgement, are deemed to be representative of both regions. These data utilise the 0.25 (25km) spatial resolution probabilistic dataset from the Sixth Phase of the Coupled Model Inter-Comparison Projects (CMIP6), accessed via the Word Bank Group Climate Change Knowledge Portal (Word Bank Group 2023). The current climate conditions (i.e., observed baseline) refer to the most recent historic climate dataset of 1995 to 2014. The future climate conditions refer to projections made under the high emissions scenario (i.e., SSP5-8.5, where SSP stands for Socio-Economic Pathway) with a 50% probability of occurrence for 2020 to 2039, 2040 to 2059, 2060 to 2079 and 2080 to 2099. These 20-year periods cover the lifespan of the Proposed Development. There is inherent uncertainty associated with all model-based projections. However, the CMIP6 multi-model ensemble, from which these projections derive, represent the latest global state of knowledge on climate change and are therefore appropriate for use in this assessment.

Table 8.12: Range of SSP5-8.5 Climate Projections for County Meath

Climate Metrics	Baseline 1995-2014	Projected Anomaly Change (SSP5-8.5, 50th percentile)			
		2020-2039	2040-2059	2060-2079	2080-2099
Annual mean accumulated precipitation (% change)	852.6mm	1.0	-0.4	0.7	1.4
Winter mean accumulated precipitation (% change)	215.5mm	3.9	5.5	14.4	19.3
Summer mean accumulated precipitation (% change)	209.8mm	-3.2	-7.4	-15.5	-21.1
Annual mean temperature (°c change)	10.0	0.6	1.1	2.1	2.9
Mean winter minimum temperature (°c change)	3.2	0.4	0.9	1.6	2.4
Mean summer maximum temperature (°c change)	18.5	0.7	1.4	2.2	4.0

The climate projections indicate that annual mean accumulated precipitation totals in County Meath (and therefore also in neighbouring Fingal in North County Dublin) are likely to remain similar over the next century. However, seasonal variability in rainfall will become larger, with wetter winters and drier summers anticipated. Local annual mean temperatures are projected to increase by as much as 3°C by 2100, with increases in temperature across all seasons. Mean summer maximum temperatures in the region are projected to increase by up to 4.1°C by the end of the century.

8.3.3 Climate Pollutants

Climate is defined 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 recent years human activities, through the release of GHGs, have impacted on the climate (Intergovernmental Panel on Climate Change (IPCC) 2015). 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 40 years. The release of CO_2 as a result of burning fossil fuels, has been one of the leading factors in the creation of this 'Greenhouse Effect'. The most significant GHGs are CO_2, methane (CH_4) and nitrous oxide (N_2O).

For the purpose of this assessment, the definition outlined in RED III, for GHGs has been used. In Annex V, B. 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 60.4% of total GHG emissions in Ireland in 2022 while CH_4 and N_2O combined accounted for 38.4% (EPA 2023c). GHGs have different efficiencies in retaining solar energy in the atmosphere and different lifetimes in the atmosphere. To compare different GHGs, emissions are calculated on the basis of their Global Warming Potential (GWP) over a 100-year period, giving a measure of their relative heating effect in the atmosphere. The IPCC AR5 Synthesis Report: Climate Change 2014 of the Fifth Assessment Report (AR5) (IPCC 2014), 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 28 units of CO_2 and N_2O has a GWP100 of 265.

8.3.4 Existing GHG Emissions Baseline

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 Regulation (EU)2023/857 amending 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 Regulation (EU) 2018/1999 (hereafter referred to as the GHG Effort Sharing Regulation (ESR)), changes in GHG emissions, either beneficially or adversely, are of more significance than previously viewed prior to these declarations. Thus, the baseline climatic environment is considered a highly sensitive environment for the assessment of impacts.

The sectoral Baseline Emissions Inventories for County Meath and Fingal have been quantified by their respective county councils for a baseline year of 2018 and 2016, respectively, in support of the MCC Climate Action Plan 2024-2029 (MCC 2024) and FCC Climate Action Plan 2024-2029 (FCC 2024), respectively. As shown in Table 8.13, the total GHG emissions in 2018 for County Meath were 4,254 ktCO_2e (kilotonnes carbon dioxide equivalent), equivalent to approximately 6% of the national total in 2018 (~69,998 ktCO_2e, as reported in Ireland's National Inventory Report (EPA 2023b)). The total GHG emissions for Fingal in 2018 were 1,641 ktCO_2e, which is equivalent to approximately 2% of the national total in 2018 .

Table 8.13: Baseline GHG Emissions' Inventory for County Meath and Fingal

Emissions Category	2018 County Meath Emissions (ktCO_2e)	2018 Fingal Emissions (ktCO_2e)
Industrial Processes	1,230 (28%)	-
Transport	419 (10%)	739 (45%)
Residential	353 (8%)	328 (20%)
Manufacturing and Commercial Services	556 (13%)	509 (31%)
Agriculture	1,054 (25%)	16 (1%)
Waste	378 (9%)	16 (1%)
LULUCF	264 (6%)	-
Public Services[a]	8 (<1%)	49 (3%)
F-gases	0.0004 (<1%)	-
Total[b]	**4,254**	**1,641**

a. (e.g. municipal, social housing and wastewater)
b. Apparent discrepancies may arise due to the rounding of totals, subtotals and percentages

Data published in 2023 (EPA 2023c) showed that Ireland's 2022 GHG emissions were estimated to be 60.8 MtCO_2e. Ireland's provisional 2022 GHG ESR emissions were 46.08 Mt CO_2e, and therefore, exceeded its 2022 ESR Annual Emissions Allocation of 42.36 Mt CO_2e. This indicates that Ireland is not in compliance with its 2022 ESR annual limit. The sector with the highest emissions is agriculture at 38.4% of the total, followed by transport at 19.1%. The energy industries contribute 16.6% of the total. It is predicted that Ireland will exceed both its new 2030 target under the ESR, to limit its GHG emissions by at least 42% by 2030 (EPA 2023c), and its national target to achieve a reduction of 51% in total GHG emissions by 2030 (EPA 2023a).

8.4 Potential Impacts

8.4.1 'Do Nothing' Scenario

In a Do Nothing scenario, it is anticipated that climate conditions experienced at the location of the Proposed Development will be the same as the existing baseline described in Section 8.3.1.

In a Do Nothing scenario, the Proposed Development would not be constructed and there would therefore be no surplus materials, construction activities or operational maintenance required. It is therefore assumed that no GHG emissions are associated with the Do Nothing scenario, and the impact in the absence of the Proposed Development is assessed as Neutral.

8.4.2 Construction Phase

8.4.2.1 Greenhouse Gas Assessment

During the Construction Phase, the Proposed Development has the potential to affect Earth's climate by causing (either directly or indirectly) the emission of GHGs, such as CO_2, into the atmosphere. Construction activities will include the excavation of cable trenches and associated Joint Bays, temporary construction activities, including the requirement for Passing Bays, site works and ancillary staff facilities and parking will also be required. All activities have the potential to impact on GHG emissions generation.

The total estimated embodied carbon and material transport emissions for the Proposed Development are equivalent to 27,161 tonnes of CO_2e. These emissions are presented for different aspects of the Construction Phase in Table 8.14. The majority of the emissions are associated with the embodied carbon in the proposed 400kV cables, due to the relatively high embodied carbon associated with producing the copper conductor and aluminium sheath. However, as aluminium and polyethylene associated with the proposed cables are relatively lightweight, the transport emissions associated with the proposed cables are lower than those for the enabling works and other permanent works.

Table 8.14: Full Construction Phase Embodied Carbon GHG Emissions

Emission Type	GHG Emission (tonnes CO_2e)
Enabling Works	
Embodied Material Carbon	627
Materials Transport Carbon	688
Enabling Works: Total Carbon	1,315
Permanent Works	
Embodied Material Carbon	4,835
Materials Transport Carbon	1,791
Permanent Works: Total	6,626
Cables	
Embodied Material Carbon	15,773
Materials Transport Carbon	103
Cables: Total	15,876
Total	
Total Emissions (PAS 2080:2023 WLC Modules A1-A4)	**23,818**
Total (with 15% uplift)	**27,390**

As shown in Table 8.14, the estimated total GHG emissions associated with the construction of the Proposed Development is 27,390tCO_2e. These construction emissions would occur over the anticipated 42-month Construction Phase (between 2026 and 2029 as outlined in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR). This equates to average annual emissions of 7,826 tonnes CO_2e per year. The associated construction emissions, therefore, represent a very small percentage (i.e., 0.3%) of the 2030 electricity sectoral emissions ceiling (i.e., the 2030 electricity sectoral emissions ceiling is 3MtCO_2e). The annual Construction Phase GHG emissions associated with the Proposed Development are equivalent to the GHG emissions arising from the construction of 157 three-bedroom houses using traditional construction methods and to the annual carbon footprint for 636 people in Ireland. All Construction Phase emissions will occur within the 2026-2030 carbon budget period for Ireland, from which the 2030 electricity sectoral emissions are derived.

With respect to the 2030 electricity sectoral emissions ceiling, the relatively minor contribution to existing GHG emissions and the fact that the Proposed Development will support the transmission of energy from renewable sources, the magnitude of impact is classed as Minor Adverse and the potential impact is assessed as Not Significant.

8.4.3 Operational Phase

8.4.3.1 Vulnerability to Changes in Climate

A full description of potential risks that may impact the Proposed Development and their associated vulnerability rating are presented in Table 8.15. The information in Table 8.15 and the significance rating is based on experience of similar schemes and professional judgement, according to the criteria outlined in Table 8.7, Table 8.8 and Table 8.9. The criteria are in compliance with the Guide to: Climate Change Resilience and Adaptation (2020) (IEMA 2020).

Table 8.15: Projected Climate Change Risks

Risk ID	Climate Aspect	Potential Risk	Design Mitigations / Adaptations	Likelihood	Magnitude of Impact	Significance of Impact Rating
R1	High Temperatures	Inability to perform maintenance activities in high temperatures (>32°C) due to increased level of discomfort for staff.	The proposed cable route will not require specific or routine maintenance activities along the cable trench or Joint Bay locations. Routine maintenance will be required for link boxes and communication chambers. However, this will be at a frequency of once per annum and so is not likely to be affected by high temperatures.	Medium	Minor adverse	Not Significant
R2	High Temperatures	Increase in temperature could result in increased risk of structural failure from thermal expansion of trenches. This may lead to increased maintenance costs and disruption to operations.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Low	Moderate adverse	Not Significant
R3	High Temperatures	Increase in temperature could result in increased risk of structural failure from thermal expansion of metallic features and on concrete structures, resulting in need for repair. This may lead to increased risk of damage to underground cables during road repair activities.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Low	Moderate adverse	Not Significant
R4	High Temperatures	Increase in temperature could result in increased risk of surface failure from thermal expansion, melting and deformation of road crossing sections. This may lead to increased maintenance costs and disruption to operations.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Low	Moderate adverse	Not Significant
R5	High temperatures, freeze-thaw	Rising temperatures will reduce risk of freeze-thaw events which lead to erosion, cracking and spalling of metallic features and	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Low	Moderate adverse	Not Significant

Risk ID	Climate Aspect	Potential Risk	Design Mitigations / Adaptations	Likelihood	Magnitude of Impact	Significance of Impact Rating
		concrete structures. However, the risk will still occur.				
R6	Precipitation	Increases in winter precipitation could increase groundwater levels with the potential to cause ground movements. This may damage buried cables.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Medium	Minor adverse	Not Significant
R7	Precipitation	Increase in winter precipitation could lead to accumulation of water within open trenches, reducing access for repairs, maintenance and emergency events.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Medium	Minor adverse	Not Significant
R8	Precipitation	Increase in winter precipitation, in particular, extreme precipitation events, may increase the rate of soil erosion, exposing and damaging cables.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions. Proposed cables will be protected as they will be buried underground within a cement bound granular material surround.	Low	Moderate adverse	Not Significant
R9	Precipitation	Increase in winter precipitation could result in flooding, reducing access to cable structures, communication equipment and link boxes for maintenance.	The proposed cable route will not require specific or routine maintenance activities along the cable trench or Joint Bay locations. Routine maintenance will be required for link boxes and communication chambers. However, this will be at a frequency of once per annum and so is not likely to be affected by flooding.	Low	Minor adverse	Not Significant
R10	High temperatures and drought	Increase in temperature and drought may cause soil creep and instability of earthwork slopes (where cables are buried in sloped verge / sloped field edge) if soils dry out. This may damage buried cables.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions. Proposed cables will be protected as they will be buried underground within a cement bound granular material surround.	Low	Moderate adverse	Not Significant
R11	Precipitation and temperature	Cyclic wetting and drying may result in soil shrink-swell action, increasing the risk of ground movement including landslip or subsidence. This may damage buried cables.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions. Proposed cables will be protected as they will be buried underground within a cement bound granular material surround.	Low	Moderate adverse	Not Significant

Based on the qualitative review of risks to the Proposed Development associated with a changing climate, no further assessment of climate vulnerability in the Operational Phase is considered necessary.

8.4.3.2 Greenhouse Gas Assessment

As stated in Section 8.2.4.2, the assessment of GHGs for the Operational Phase has been scoped out, although it is acknowledged that this phase of the Proposed Development will facilitate processes that result in the emission of GHGs (e.g. transmission losses). However, the Proposed Development is essential to meeting the CAP24 (Government of Ireland 2023) target of up to 80% renewable energy generation by 2030, which requires the transportation of electricity from offshore renewable sources (refer to the Step 4B – Route Options and Evaluation Report which is included in Volume 5 (Supporting Documents) of this EIAR).

It is therefore concluded that the net impact of the Proposed Development over its life cycle will be consistent with national policy requirements and will support Ireland's national commitment to achieving net zero.

8.5 Mitigation and Monitoring Measures

8.5.1 Construction Phase

8.5.1.1 Vulnerability to Changes in Climate

The vulnerability of the Proposed Development to climate change during the Construction Phase has been scoped out of this assessment.

8.5.1.2 Greenhouse Gas Assessment

Given the sensitivity of the global atmosphere to GHG emissions, and the importance of reducing GHG emissions to meet GHG reduction targets on a trajectory towards net zero, mitigation measures are proposed to reduce emissions, as far as practicable.

EirGrid has developed the 'Shaping Our Electricity Future' Roadmap (EirGrid 2023), which was updated in July 2023 to align with previous CAP23 (Government of Ireland 2022) and the carbon budget programme. CAP24 (Government of Ireland 2023) has subsequently been published and shares the same key targets for renewable energy generation as CAP23. EirGrid has committed to and will publicly report on their sustainability performance in relation to the following targets:

- Reduce absolute Scope 1 (emissions from sources that EirGrid owns or controls directly) and Scope 2 (emissions caused indirectly by EirGrid based on the energy it uses) GHG emissions by 50%;
- Reduce Scope 3 (emissions that EirGrid is indirectly responsible for up and down its value chain. They exclude emissions produced by EirGrid itself or resulting from activities or assets controlled by EirGrid) GHG emissions related to dispatch of electricity generation by 35% per megawatt hour within the same timeframe; and
- Reduce all other absolute Scope 3 GHG emissions by 30% by 2030, using 2019 as a base year.

The following good practice measures will be implemented to reduce GHG emissions during the Construction Phase of the Proposed Development:

- Investigating and implementing sustainable reuse of any materials won from excavation;
- The reuse, where possible of materials and waste generated from construction works;
- Procuring locally sourced materials where reasonably practicable to reduce transportation emissions;
- Careful consideration of material quantity requirements to avoid over-ordering and generation of waste materials, while also reducing transportation-related emissions; and

- The appointed contractor will develop and implement a plan to reduce energy consumption and GHG emissions throughout construction, including, for example:
  - Monitoring of fuel and mains electricity use on site (site accommodation to have motion activated lighting and use lower power lighting techniques such as light-emitting diodes (LEDs));
  - Training of plant operatives in fuel efficient driving techniques or use of appropriate technology on construction vehicles (e.g. stop – start); and
  - Consideration of renewable / and or low carbon energy sources to power Temporary Construction Compounds and HDD Compounds.

8.5.2 Operational Phase

8.5.2.1 Vulnerability to Changes in Climate

The vulnerability of the Proposed Development to changes in climate was assessed in Section 8.4.3.1. Table 8.15 describes the embedded design measures included in the design of the Proposed Development which will assist in mitigating potential impacts, such that no significant risks were identified. Therefore, no further mitigation measures to improve the Proposed Development's resilience to climate change are required for the Operational Phase.

8.5.2.2 Greenhouse Gas Assessment

The party responsible for maintenance of the assets (the Electricity Supply Board (ESB) and its appointed contractor(s)) will ensure that the following mitigation measures are implemented to reduce GHG emissions during the Operational Phase of the Proposed Development:

- Locally sourced, low carbon materials will be used, where technically feasible for asset replacements; and
- Regular planned preventative maintenance checks will be implemented to optimise operational efficiency.

In addition, the compensation of unavoidable residual emissions will be considered during the detailed design stage of the Proposed Development.

One of the objectives of the Proposed Development is to facilitate the transmission of energy derived from renewable sources. The extent of the renewable electricity distribution that will be facilitated by the Proposed Development is still to be determined. However, EirGrid are committed to increasing the distribution of energy from renewable sources, and through facilitating this, GHG emissions owing to the Proposed Development will be offset over time.

8.6 Residual Impacts

There are no residual impacts associated with climate vulnerability. Where GHG emissions cannot be avoided, the goal of the EIA process is to reduce a project's residual emissions at all stages. According to IEMA, GHG emissions from projects will contribute to climate change and may be considered significant (IEMA 2022). The Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA 2022) suggests that the level of significance is not only based on GHG emissions of a project, but how this project contributes, or not, towards achieving science-based targets and net-zero.

8.6.1 Construction Phase

Opportunities for carbon reduction (through the implementation of mitigation measures) have been identified in Section 8.5. However, the effects of the mitigation are not quantifiable at this stage of the

Proposed Development. Therefore, there will be residual GHG emissions owing to the construction of the Proposed Development, as calculated in Section 8.4.2, the magnitude of which have been deemed to be Minor adverse and the predicted residual impact will be Not Significant.

8.6.2 Operational Phase

Estimating the net impact of GHGs from the Proposed Development on system-wide GHG emissions is beyond the scope of this assessment. However, the integration of renewable electricity generation from areas outside of Dublin is a key driver underpinning the need for the Proposed Development, as stated in Chapter 2 (Need for the Proposed Development) in Volume 2 of this EIAR. Considering the need to transition to net zero by 2050, it follows that the Proposed Development can be considered as supportive of system-wide decarbonisation.

With the application of the mitigation measures, as outlined in Section 8.5, it is likely that the GHG emissions from the construction and operation of the Proposed Development will be reduced. However, the magnitude of emissions will remain as Minor adverse, and the predicted residual impact will be Not Significant.

8.7 Conclusion

An assessment of the effects of climate change on the Proposed Development and of the effect of the Proposed Development on the climate has been undertaken. The Proposed Development has been designed so that it will not be susceptible to the effects of climate change. Although, the Proposed Development is expected to result in some direct GHG emissions during the Construction Phase (and to a very small extent during the Operational Phase), the magnitude of the direct GHG emissions have been estimated for the Construction Phase and are considered to be Minor Adverse, and therefore, the impact is assessed as Not Significant. As outlined in Chapter 2 (Need for the Proposed Development) in Volume 2 of this EIAR, the Proposed Development will help to meet the CAP24 (Government of Ireland 2023) target of up to 80% renewable energy generation by 2030. This includes the transmission of electricity from offshore and onshore renewable sources thus allowing for a sustainable growth in energy demand, while also supporting the uptake of renewably sourced electricity in other sectors. It is anticipated that the Proposed Development's role in providing a low-carbon electricity grid will, over time, partially offset the direct emissions resulting from the Construction and Operational Phases.

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 9 – Noise and Vibration

EirGrid

March 2024

Contents

9. Noise and Vibration

9.1 Introduction

This Chapter presents the assessment of the potential impacts of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) as a result of noise and vibration arising from the Construction and Operational Phases, and the corresponding effects on noise and vibration sensitive receptors. This assessment is based on information presented in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

This assessment considers the potential for the construction and operational activities to give rise to noise and vibration impacts, including the following:

- Construction activity within the Planning Application Boundary (PAB), including open cut trenching, Joint Bays and Passing Bays, cable pulling and jointing, reinstatement, Horizontal Directional Drilling (HDD), construction access routes, Temporary Construction Compounds (TCCs) and upgrades to the existing Woodland and Belcamp Substations;
- Construction vehicle movements on public roads and construction access routes; and
- Operational aspects of the Proposed Development, including the operation of the Woodland and Belcamp Substations.

The likely potential impacts associated with the above activities on human receptors (i.e., dwellings, schools, medical facilities, nursing homes, vibration sensitive commercial premises and other noise and vibration sensitive locations) are considered within this Chapter.

The main sources of noise and vibration will be during the Construction Phase of the Proposed Development. The construction noise and vibration assessment has been undertaken based on the impacts of the construction activities that are proposed, based on experience of construction of these types of electricity and civil infrastructure developments.

9.2 Methodology

9.2.1 Study Area

The study area for the assessment of construction noise is 300 metres (m) from the proposed cable route or any other area within the PAB used for construction including the HDD Compounds, TCCs and works to the substations.

The study area for the construction vibration assessment is 100m from the proposed cable route or any other potential vibration source within the PAB, as vibration effects due to the proposed types of construction activities are not considered likely to occur beyond this distance.

The study area of 300m for construction noise and 100m for construction vibration is taken from the United Kingdom Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) Sustainability and Environmental Appraisal - LA 111 Noise and Vibration, Revision 2 (hereafter referred to as LA 111) (UKHA 2020).

The construction traffic noise study area is defined in LA 111 as 50m from the carriageway edge of any public roads where there is the potential for an increase in Basic Noise Level (BNL) of 1dB(A) or more (the decibel (dB) is a logarithmic unit used to measure sound levels and ‘A’ refers to A-weighted which is a weighting applied to reflect how sound is perceived by the human ear). BNL calculations are undertaken using traffic flow, speed and percentage of Heavy Goods Vehicles (HGVs) to calculate a reference noise emission for each road link. The procedure for calculating a BNL is set out by The Calculation of Road Traffic Noise document (hereafter referred to as CRTN) (Department of Transport Welsh Office 1988).

The diversion route study area has been defined in accordance with LA 111 for where the Proposed Development requires full carriageway closures during the night (23:00hrs-07:00hrs) to enable construction works to take place. The diversion route study area has been defined to include a 25m width from the kerb line of the diversion route.

A study area for the operational noise and vibration assessment has not been defined as the approach has been to assess the impacts at the closest sensitive receptor in accordance with the relevant guidelines.

9.2.2 Relevant Guidelines, Policy and Legislation

The guidance documents used in this assessment are:

- British Standards Institution (BSI), British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (hereafter referred to as BS 5228-1) (BSI 2014a). BS 5228-1 is used for all construction noise calculations and assessment;
- BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration (hereafter referred to as BS 5228-2) (BSI 2014b). An assessment of the likelihood of significant impacts as a result of ground-borne vibration has been carried out using the guidance contained within BS 5228-2;
- Environmental Protection Agency (EPA) Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (hereafter referred to as the NG4 Guidance Note for Noise) (EPA 2016);
- EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) – used to determine environmental impact assessment (EIA) significance;
- BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (hereafter referred to as BS 4142) (BSI 2019);
- National Roads Authority (NRA) Guidelines for Treatment of Noise and Vibration in National Road Schemes (hereafter referred to as NRA Road Noise Guidelines) (NRA 2004);
- National Roads Authority (NRA) Good Practice Guidance for Treatment of Noise during the Planning of National Road Schemes (hereafter referred to as NRA Good Practice Road Noise Guidelines) (NRA 2014);
- United Kingdom Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration (UKHA 2020); and
- EN 14388:2015 Road Traffic Noise Reducing Devices – Specifications (EN, 2015).

S.I. No. 549/2018 - European Communities (Environmental Noise) Regulations 2018 (as amended) transposes Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise (as amended) (commonly referred to the Environmental Noise Directive (END)) for the strategic control of environmental noise in Ireland. The relevant local authorities are required to prepare noise action plans based on strategic noise mapping to identify how noise will be managed and to deliver their obligations under the END.

Nuisance due to noise is dealt with by Number 7 of 1992 - Environmental Protection Agency Act, 1992 (as amended), and S.I. No. 179/1994 - Environmental Protection Agency Act, 1992 (Noise) Regulations, 1994 (as amended), and Number 27 of 2003 - Protection of the Environmental Act 2003 (as amended). The legislation requires the use of Best Available Techniques to control noise because of human activity "*which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment.*"

Other policy documents relevant to the assessment include:

- Meath County Council (MCC) County Meath Noise Action Plan 2019 (MCC 2019); and
- Dublin Local Authorities including Dublin City Council (DCC), Fingal County Council (FCC), South Dublin County Council (SDCC) and Dún Laoghaire Rathdown County Council (DLRCC) Dublin Agglomeration Third Environmental Noise Action Plan December 2018 – July 2023 (hereafter referred to as the Dublin Agglomeration NAP 2018 – 2023) (DCC; FCC; SDCC; DLRCC 2018).

9.2.3 Data Collection and Collation

Baseline noise monitoring has not been carried out at noise sensitive receptors, as the application of the most stringent noise thresholds for construction and operational noise have ensured that a conservative and proportionate assessment has been achieved. This is a best practice approach used to capture all potential noise impacts. The baseline noise and vibration environment has been characterised through a desk-based study of publicly available published data sources, which are outlined in Section 9.3.

9.2.4 Appraisal Method for the Assessment of Impacts

9.2.4.1 Construction Noise

The potential construction noise impacts from the Proposed Development have been assessed according to BS 5228-1 (BSI 2014a).

A detailed plant list for each construction activity has been developed in conjunction with the project team, including the likely duration of the various activities (see Table 9.3).

Noise levels have been predicted for each noise sensitive receptor in the study area for each construction activity. Where activities vary over time, or move geographically, this has been taken into account by predicting a series of daily noise levels in order for the variation in noise levels to be characterised.

Baseline noise monitoring has not been carried out at noise sensitive receptors since the most stringent thresholds from BS 5228-1 have been used in the assessment. The most stringent BS 5228-1 thresholds are known as Category A and are set out in Table 9.1.

Table 9.1: Construction Noise Thresholds – Category A (BSI 2014a)

Assessment Category and Threshold Value Period	Threshold Value in Decibels (dB) $L_{Aeq,T}$
	Category A
Daytime (07:00hrs to 19:00hrs) and Saturdays (07:00hrs to 13:00hrs)	65
Evenings and weekends (19:00hrs to 23:00hrs weekdays, 13:00hrs to 23:00hrs Saturdays and 07:00hrs to 23:00hrs Sundays)	55
Night-time (23:00hrs to 07:00)	45
Note: dB $L_{Aeq,T}$ is the 'A' weighted equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period, T.	

Table 9.2 presents the magnitude of impact scale for construction noise based on guidance from LA 111 (UKHA 2020) which has been developed from assessment criteria set out in BS 5228-1. In accordance with LA 111, construction noise impacts shall constitute a significant impact where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- A period of 10 or more days or nights of working in any 15 consecutive days or nights; or
- A total number of days exceeding 40 in any six consecutive months.

Table 9.2 also presents the EPA Guidelines (EPA 2022) for the determination of significance based on the magnitude and duration of impact.

Table 9.2: Construction Noise Magnitude Scale and EPA Guidelines Determination of Significance

Magnitude of Impact	Construction Noise Level	Duration	EPA Guidelines Determination of Significance
Major	Above or equal to BS 5228-1 Category A threshold +5dB	> 10 days/nights over 15 consecutive days/nights; or > 40 days over six consecutive months	Significant
Moderate	Above or equal to BS 5228-1 Category A threshold and below BS 5228-1 Category A +5dB		Moderate to Significant
Minor/ Negligible	Below BS 5228-1 Category A threshold		Not Significant

The indicative construction programme is presented in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. Construction is due to begin, subject to obtaining planning permission, in Quarter 3 (Q3) of 2026 and is due to finish in Quarter 4 (Q4) 2029.

Working hours during construction are typically expected to be:

- Weekdays 07:00hrs to 19:00hrs; and
- Weekends and bank holidays 08:00hrs to 14:00hrs.

There may be localised instances where construction work is required outside of normal working hours to facilitate traffic management, and this will only be undertaken with prior agreement with Meath and Fingal County Councils. For the purposes of the noise and vibration assessment, the construction activities have been divided into two categories:

- Those that remain in a fixed location, for example a HDD Compound or a Joint Bay; and
- Those where the activities move geographically, for example the advanced works or the excavation and ducting activities.

The construction activities will be phased, and full details of the phasing works are presented in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. The basic elements of the Construction Phase are as follows:

- Phase 0: Site Establishment and Advanced Works;
- Phase 1: Installation of Passing Bays and Joint Bay structures;
- Phase 2: Excavation and installation of ducts; and
- Phase 3: Installation of cables.

Based on the programme information presented in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR, the following durations are set out in terms of assessing the construction noise impact from fixed work locations:

- The duration of the installation of each Joint Bay and each Passing Bay (Phase 1 of the works) will be approximately six days. Installation and reinstatement of the Joint Bays and Passing Bays is expected to start in Q4 2026 and last until Q3 2029;
- The duration of the construction of each TCC will be approximately 20 days, though they will be in operation for the full duration of the Construction Phase. Construction of the TCCs is likely to begin in Q3 2026;
- The duration of each HDD construction works will be approximately 54 days and will be undertaken during Phase 2 of the works. Construction works in relation to HDD works including the HDD compounds is likely to begin in Q3 2026 and be completed in Q3 2027;
- Construction of installation and jointing of cables (Phase 3 of the works) is likely to begin in Q4 2026 and last until Q3 2029; and

- Construction works at the substations is proposed to begin Q2 2027 and last until Q2 2029. The works at the Woodland Substation are expected to last approximately seven months, while the works at Belcamp Substation are expected to last approximately 17 months.

Based on the programme information presented in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR, the following rates of progress are anticipated for construction activities which will move geographically:

- Devegetation works are expected to progress at a rate of 200m per day. These activities are provisionally programmed for Q3 2026; and
- Excavation and installation of ducts (Phase 2 of the works) are expected to progress at a rate of 50m per day. These activities are likely to begin in Q3 2026 and be completed in Q4 2027.

Construction noise levels have been predicted using the CadnaA noise prediction software (DataKustik 2023). Two separate noise models have been constructed, one for the fixed works and another for the works which will move geographically.

For the fixed works model, noise sources have been positioned in the approximate centre of the works areas to represent the plant and equipment operating during each construction activity. The distances between the sensitive receptors and the construction areas have been calculated based upon supplied Ordnance Survey Ireland (OSI) Prime 2 data (OSI 2023). Construction area locations have been identified using the planning drawings for the Proposed Development, which are included as standalone drawings in the planning application pack. The sensitivity of the receptor has been identified using the OSI Prime 2 data. Contour data was obtained from the Earth Data website (NASA 2023) and all buildings have been assumed to be 6m high. Free field predictions have been made, which have been converted to facade levels (+3 dB) through post-processing of the results. Receiver points have been positioned 1.5m above ground to represent ground floor noise levels. First floor predictions have been made at 4m above ground. A ground absorption layer has been added to the model with acoustically hard areas (e.g. roads and water bodies) set to G=0; mixed areas set to G=0.5 and greenfield areas set to G=1.

For the moving works model, flat terrain between noise sources and receiver points has been assumed and no screening objects have been included within the noise model. Ground cover between noise sources and receivers has been assumed as acoustically hard with G=0. All noise sources are assumed to be operating at a height of 2m above ground level, and noise predictions at receiver points have been made at 1.5m (ground level) and 4m (first-floor level). The predicted noise levels from the noise model have been included within an analysis tool that calculates noise levels at each sensitive receptor, due to works at the closest of each construction activity. The tool assesses whether a receptor is likely to exceed the BS 5228-1 (BSI 2014a) Category A threshold noise levels (65dB on weekdays and Saturday mornings) for a period of 10 or more days in any 15 consecutive days, or a total number of days exceeding 40 in any six consecutive months.

A list of proposed construction activities and plant / equipment has been developed using the information in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR, along with additional information gathered from the project team and experience of similar projects. Table 9.3 presents a list of the proposed construction activities and plant items along with the percentage on-time and sound level taken from BS 5228-1.

Table 9.3: Proposed Construction Activities and Items of Plant

Activity	Item of Plant (BS 5228-1 Ref) (BSI 2014a)	% On-Time	Sound Power (L_w dB)
Phase 0 – Site Establishment and Advanced Works	Tracked Excavator (C.2.14)	40	107
	Circular Bench Saw (C.4.71)	20	113
Phase 1 – Passing Bays	Tracked Excavator (C.2.14)	50	107
	Dumper (C.4.3)	50	104
	Asphalt Paver (& tipper lorry) (C.5.31)	25	105
	Hydraulic vibratory compacter (C.2.42)	20	106
	Vibratory Roller (C.5.25)	20	103
Phase 1 – Joint Bays	Tracked Excavator (C.2.14)	50	107
	Dumper (C.4.3)	50	104
	Asphalt Paver (& tipper lorry) (C.5.31)	25	105
Phase 2 – Trenching and Ducting	Road Planer (C.5.7)	40	110
	Tracked Excavator (C.2.14)	50	107
	Dumper (C.4.3)	50	104
	Asphalt Paver (& tipper lorry) (C.5.31)	25	105
	Lorry (C.2.34)	50	108
	Hydraulic vibratory compacter (C.2.42)	50	106
	Vibratory Roller (C.5.25)	50	103
Phase 3 – Installation and jointing of cables	Wheeled Loader (C.4.13)	50	99
	Lorry (C.2.34)	30	108
	Telescopic Handler (C.4.54)	30	107
HDD	Tracked Drilling Rig (C.3.15)	100	110
	Directional Drill (Generator) (C.2.44)	100	105
	Wheeled Backhoe Loader (C.4.66)	30	97
	Tracked Excavator (C.2.14)	30	107
	Vibratory Roller (C.5.25)	30	103
Construction Access Route	Lorry (C.2.34)	50	108
	Dozer (C.2.11)	50	107
TCCs	Tracked Excavator (C.2.14)	40	107
	Diesel Generator (C.4.76)	100	89
	Telescopic Handler (C.4.54)	30	107
	Dozer (C.2.11)	40	107
	Vibratory Roller (C.5.25)	30	103
Substation Works	Tracked Excavator (C.2.14)	40	107
	Diesel Generator (C.4.76)	100	89
	Vibratory Roller (C.5.25)	25	103
	Telescopic Handler (C.4.54)	30	107

9.2.4.2 Construction Vibration

The potential vibration impacts from the Proposed Development have been assessed according to BS 5228-2 (BSI 2014b).

For the vibration calculations, ground compaction has been considered as a possibility everywhere within the PAB, and vibratory piling as a possibility at all HDD Compounds, which represents a precautionary approach as these have the potential to result in the greatest levels of vibration. Vibration levels experienced during construction will be influenced by factors including the number of surface layers, the thickness, density and stiffness of surface layers, the depth of the water table, the topography of the site and the operating frequency of the plant.

Table 9.4 presents the magnitude of construction vibration impacts for human perception at residential receptors which have been reproduced from LA 111 (UKHA 2020) and BS 5228-2. In accordance with LA 111, construction vibration impacts shall constitute a significant impact where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- A period of 10 or more days of working in any 15 consecutive days; or
- A total number of days exceeding 40 in any six consecutive months.

Table 9.4 also presents the EPA Guidelines (EPA 2022) for the determination of significance based on the magnitude and duration of the impact.

Table 9.4: Construction Vibration Magnitude Scale and Determination of Significance for Human Perception at Residential Receptors

Magnitude of Impact	Construction Vibration Level	Duration	EPA Guidelines Determination of Significance
Major	Above or equal to 10.0mm/s PPV	> 10 days/nights over 15 consecutive days/nights; or > 40 days over six consecutive months	Significant
Moderate	Above or equal to 1.0mm/s PPV and below 10.0 mm/s PPV		Moderate to Significant
Minor	Above or equal to 0.3mm/s PPV and below 1.0mm/s PPV		Not Significant
Negligible	Below 0.3mm/s PPV		Not Significant
Note: mm/s = millimetres per second, PPV = Peak Particle Velocity			

BS 5228-2 states that vibration levels of 1.0 mm/s PPV can be tolerated if prior warning and explanation has been given to residents.

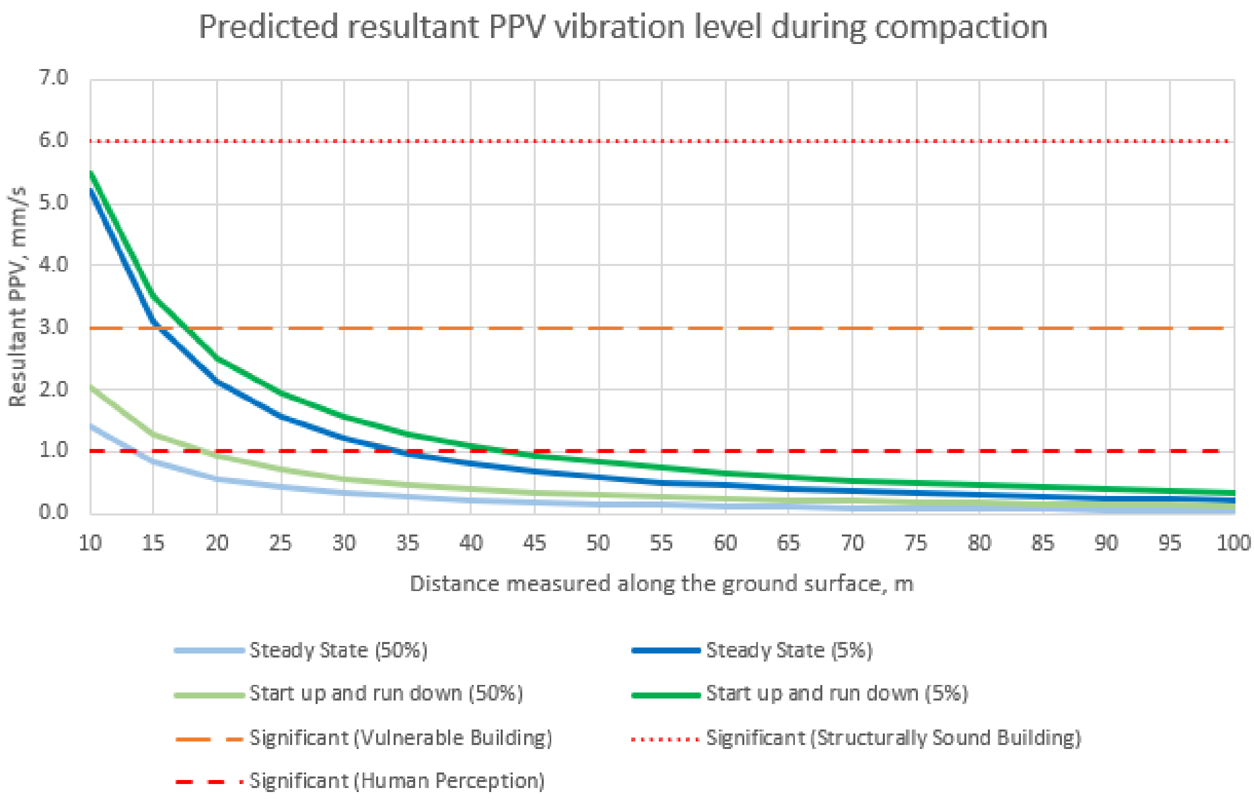
LA 111 recommends that the risk of structural damage due to construction vibration is also considered by reference to the criteria set out in BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration (hereafter referred to as BS 7385-2) (BSI 1993). Based upon this, BS 5228-2 and the professional experience of the assessment team, the criteria presented in Table 9.5 have been adopted.

Table 9.5: Construction Vibration Criteria to Prevent Cosmetic Damage to Buildings

Time Period	Potentially Vulnerable Building	Structurally Sound Building
All time periods	3.0mm/s PPV	6.0mm/s PPV

Vibration predictions during vibratory compaction have been made using the prediction formulae presented in Table E.1 of BS 5228-2. This Section presents the data inputs, assumptions and predictions. Predictions of vibration levels during compaction have been undertaken using technical data from a BOMAG BW211 Soil Compactor. This is a large single drum compactor with an operating weight of 13 tonnes, gross power of 98kW (kilowatts) and a compaction width of 2.1m.

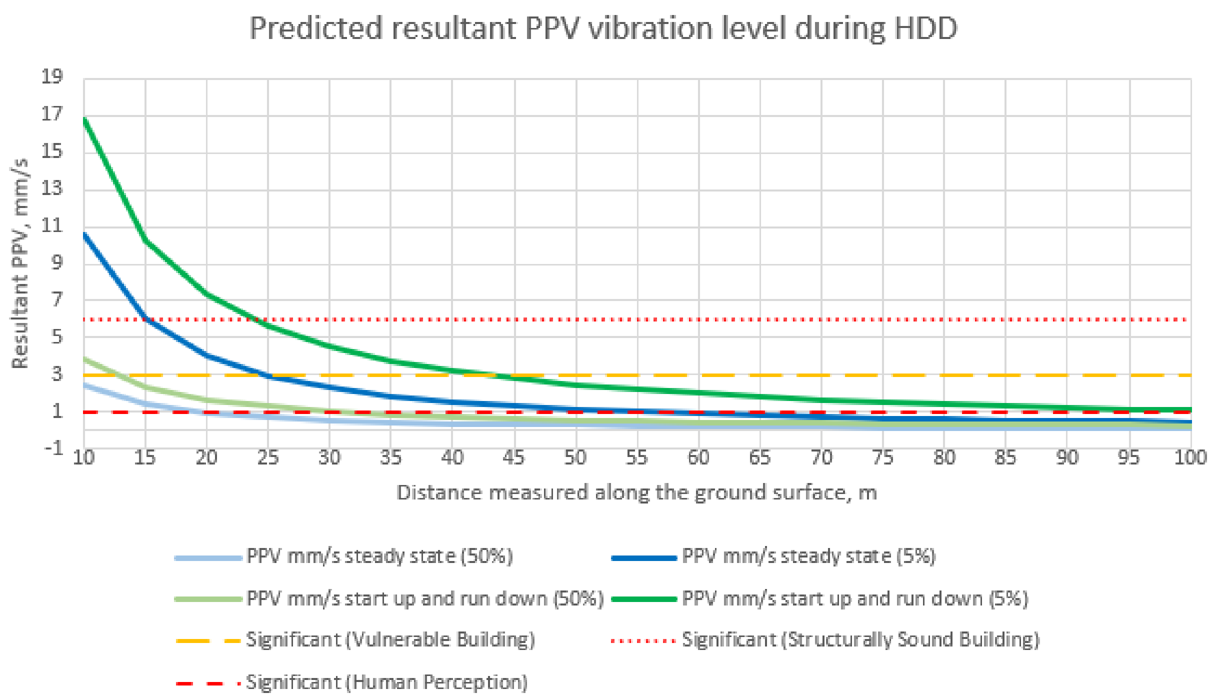
Graph 9.1 shows the resultant Peak Particle Velocity (PPV) vibration levels predicted for steady state and start up / run down (transient) compaction with 50% and 5% scaling factors, denoting the probability of the predicted value being exceeded.



Graph 9.1: Predicted Resultant PPV Vibration Level During Compaction

As Graph 9.1 shows, during steady state working, and at a distance of approximately 14m, there is a 50% probability of 1.0mm/s PPV being exceeded, with a 5% probability of 1.0mm/s PPV being exceeded at a distance of approximately 35m. During the transient start up and run down conditions, the distances at which 1.0mm/s PPV is predicted to be exceeded are approximately 20m (50% probability) and 45m (5% probability).

Graph 9.2 presents the resultant PPV vibration levels predicted for steady state and start up / run down (transient) during HDD works with 50% and 5% scaling factors, denoting the probability of the predicted value being exceeded. The only input parameter for the prediction method adopted (Table E.1 of BS 5228-2) was the distance measured along the ground surface. All other conditions are included in the constants and scaling factors within the empirical calculation.



Graph 9.2: Predicted Resultant PPV Vibration Level During HDD

During steady state working, and at a distance of approximately 18m, there is a 50% probability of 1.0 mm/s PPV being exceeded, with a 5% probability of 1.0mm/s PPV being exceeded at a distance of approximately 55m. During the transient start up and run down conditions, the distances at which 1.0 mm/s PPV is predicted to be exceeded are approximately 30m (50% probability) and 100m (5% probability).

9.2.4.3 Construction Traffic Noise and Vibration and Diversion Routes

Construction traffic noise predictions have been undertaken using the CRTN methodology (Department for Transport Welsh Office 1988) to predict the BNL at each road on the day with the largest number of construction vehicles to ensure the peak impacts are assessed. All construction traffic flow data are presented in Chapter 14 (Traffic and Transport) in Volume 2 of the EIAR.

The calculations included the following standard assumptions:

- Speed of 88km/hr (kilometres per hour) (in accordance with the CRTN for a single carriageway road, more than 9m wide);
- Impervious road surface; and
- No correction for road gradient.

An assessment of the proposed diversion routes has been undertaken using the methodology from LA 111 (UKHA 2020).

Table 9.6 presents the magnitude of impact for construction traffic noise and diversion routes based on guidance from LA 111 and the determination of significance based on the EPA Guidelines (EPA 2022). In accordance with LA 111, construction traffic noise and diversion impacts shall constitute a significant impact where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- A period of 10 or more days of working in any 15 consecutive days; or
- A total number of days exceeding 40 in any six consecutive months.

Table 9.6: Magnitude of Impact and Determination of Significance for Construction Traffic Noise and Diversion Routes

Magnitude of Impact	Change in BNL Resulting from Construction Traffic Noise (dB)	Duration	EPA Guidelines Determination of Significance (EPA 2022)
Major	Greater than or equal to 5.0	> 10 days/nights over 15 consecutive days/nights; or > 40 days over six consecutive months	Significant
Moderate	Greater than or equal to 3.0 and less than 5.0		Moderate to Significant
Minor	Greater than or equal to 1.0 and less than 3.0		Not Significant
Negligible	Less than 1.0		Not Significant

9.2.4.4 Operational Noise and Vibration

Underground cables are not considered to be a noise source because soil covering the cables acts as an insulator preventing any significant noise emission above the ground. Therefore, operational noise impacts are not expected as a result of the underground cabling element of the Proposed Development. However, there is the potential for a permanent increase in environmental noise at local receptors close to upgraded / extended substations during the operation of the Proposed Development. At both Woodland and Belcamp Substations, compensation reactors will be installed as part of the Proposed Development, which have the potential to produce audible levels of noise. An assessment has been carried out using the NG4 Guidance Note for Noise (EPA 2016) to predict whether the reactors are likely to result in permanent noise impacts at receptors close to the substations. As a precautionary approach, the area around Woodland Substation has been considered as an area of 'low background noise' due to the rural location of the substation. Due to the proximity of road and air noise sources, Belcamp Substation has been considered as an 'all other areas' with corresponding noise limits shown in Table 9.7.

Table 9.7: Noise Limit Criteria (Reproduced from NG4 Guidance Note for Noise (EPA 2016))

Scenario	Daytime Noise Criterion, dB L_{ar}, T (07:00 to 19:00 hrs)	Evening Noise Criterion, dB L_{ar}, T (19:00 to 23:00 hrs)	Night-time Noise Criterion, dB L_{ar}, T (23:00 to 07:00 hrs)
Areas of low background noise	45dB	40dB	35dB
All other areas	55dB	50dB	45dB

Where noise limits outlined in Table 9.7 are exceeded as a result of operational noise from the Proposed Development, the impact is considered Significant. However, where operational noise levels are equal to or below the limits outlined in Table 9.7, the impact is considered Not Significant.

Operational vibration impacts due to the Proposed Development are considered unlikely because the type of plant to be installed at the substations will not generate any vibration during operation. In addition, the underground cables are not likely to generate any vibration during the Operational Phase.

9.2.4.5 Sensitive Receptors

Receptors that are particularly sensitive to noise and / or vibration have been identified using guidance from the NRA Road Noise Guidelines (NRA 2004) and LA 111 (UKHA 2020). Examples of such receptors are dwellings, schools, hospitals, places of worship, heritage buildings, special habitats, amenity areas in common use and designated quiet areas. Counts of noise and vibration sensitive receptors within 300m of the Proposed Development have been made using guidance from the NRA Road Noise Guidelines.

Both the NRA Road Noise Guidelines and LA 111 note that receptors may have various sensitivities to noise, but do not specifically define a sensitivity scale. All sensitive receptors have been categorised as residential or 'other' sensitive receptors. Commercial and industrial receptors have not been assessed as they are generally considered less sensitive to noise and / or vibration.

9.2.4.6 Limitations of the Assessment

Baseline noise surveys have not been carried out for this assessment as the approach has been to use the most stringent noise limits from BS 5228-1, (BSI 2014a) known as Category A, to determine the magnitude of impact and the significance of impact.

9.3 Baseline Environment

9.3.1.1 Introduction

Baseline noise levels are likely to vary along the Proposed Development, with higher noise levels closer to transport infrastructure and during peak periods of transport activity. The main noise sources are likely to be from road traffic noise and airport noise. The proposed cable route will cross the M3, M2 and M1 Motorways, as well as regional roads including the R156, R157, R147, R121, R135, R122, R108 and R132 Regional Roads. Noise associated with Dublin Airport is also present in the baseline environment, particularly close to Belcamp Substation. Other noise sources in the baseline environment include rail noise, particularly where the Dublin to M3 Parkway railway line runs close to the M3 Motorway.

No baseline noise surveys have been undertaken for this assessment, as the approach for the assessment has been to use the most stringent noise limits from BS 5228-1, (BSI 2014a) known as Category A, to assess the construction and operational noise impacts from the Proposed Development.

9.3.1.2 Strategic Noise Maps

Round 4 strategic noise maps (EPA 2023) have been produced under the requirements of the END by the EPA for road, rail, airport and industrial noise. The road noise maps show the strategic noise mapping of all roads in the form of noise contours for the L_{den} (day, evening, night) period and the L_{night} (night) period for the Dublin, Limerick and Cork agglomerations, and the major roads outside of the agglomerations. Major roads were identified as those roads exceeding the flow threshold of three million passages per year. The rail noise maps show the strategic noise mapping of rail in the form of noise contours for the L_{den} (day, evening and night) and L_{night} (night) periods for the Dublin, Limerick and Cork agglomerations, and the major railway lines outside of the agglomerations. Major railway lines were identified as those railway lines exceeding the flow threshold of 30,000 train passages per year. The airport noise maps show the strategic noise mapping of airports, in the form of noise contours for the L_{den} (day, evening and night) and L_{night} (night) periods for Dublin, Limerick and Cork agglomerations airports and major airports outside the agglomerations. Major airports were identified as those airports exceeding the threshold of 50,000 aircraft movements per year. The industry noise maps show the strategic noise mapping for industrial areas in the form of noise contours for the L_{den} (day, evening and night) and L_{night} (night) periods for Dublin, Limerick and Cork agglomerations.

The strategic noise mapping shows road traffic noise levels are high at receptors in the following parts of the study area and are likely to be exposed to noise levels exceeding the BS 5228-1 (BSI 2014a) Category A thresholds:

- Where the proposed cable route will cross the M3 Motorway (e.g. in Paceland and Piercetown);
- Where the proposed cable route will follow the R121 Regional Road;
- Where the proposed cable route will cross the M2 Motorway;
- Where the proposed cable route will cross the R135 Regional Road;
- Where the proposed cable route will follow the R122 Regional Road;
- Where the proposed cable route will follow the R108 Regional Road;
- Where the proposed cable route will cross the R132 Regional Road; and
- Where the proposed cable route will cross the M1 Motorway.

The study area does not contain any strategic noise mapping for rail noise or industrial noise.

The strategic noise maps show that noise from Dublin Airport is likely to be audible throughout the study area with airport noise exceeding 60dB L_{den} close to Dublin Airport.

9.3.1.3 Woodland Substation

Woodland Substation is located in a rural area approximately 2km from the village of Batterstown in County Meath. The closest sensitive receptor (a dwelling) is located over 600m from the substation. The main noise sources in the baseline noise environment are likely to be from road traffic noise and transformer noise at the substation.

9.3.1.4 Belcamp Substation

Belcamp Substation is located approximately 1km east of Junction 3 of the M1 Motorway and approximately 200m north of the R139 Regional Road. The closest sensitive receptor is the Craobh Chiaráin GAA pitches which are located around 250m from the substation while the closest residential receptors are located in Cara Park approximately 300m from the substation. The main noise sources in the baseline noise environment are likely to be from road traffic noise and airport noise.

9.3.1.5 Temporary Construction Compounds

There are a total of seven proposed TCCs associated with the Proposed Development:

- Temporary Construction Compound 0 (TCC0) will be located at Chainage 0 within the existing Woodland Substation off the Redbog Road. The main noise source in the baseline noise environment is likely to be road traffic noise and noise from the existing Woodland substation. The closest sensitive receptor (a dwelling) is located over 600m from TCC0;
- Temporary Construction Compound 1 (TCC1) will be located at Chainage 3,550 just off the R156 Regional Road and the main noise source in the baseline noise environment of the proposed compound area is likely to be road traffic noise. The closest sensitive receptor is located approximately 75m from TCC1;
- Temporary Construction Compound 2 (TCC2) will be located at Chainage 10,600 just off the R156 Regional Road and the main noise source in the baseline noise environment of the proposed compound area is likely to be road traffic noise. The closest sensitive receptor is located approximately 65m from TCC2;
- Temporary Construction Compound 3 (TCC3) will be located at Chainage 21,600 in Hollystown where road traffic noise is likely to be the main noise source in the baseline noise environment of the proposed compound area. The closest sensitive receptor is located approximately 80m from TCC3;
- Temporary Construction Compound 4 (TCC4) will be located at Chainage 26,850 just off the R121 Regional Road. Road traffic noise is likely to be the main noise source in the baseline noise environment of the proposed compound area with occasional noise from agricultural activities. The closest sensitive receptor is located approximately 140m from TCC4;
- Temporary Construction Compound 5 (TCC5) will be located at Chainage 34,700 just off Stockhole Lane approximately 260m from the M1 Motorway. The baseline noise environment in the proposed compound area is likely to be dominated by road traffic noise and airport noise is also likely to be present. The closest sensitive receptor is located approximately 175m from TCC5; and
- Temporary Construction Compound 6 (TCC6) will be located at Chainage 37,500 just off Stockhole Lane adjacent to Belcamp Substation. The baseline noise environment in the

proposed compound area is likely to be dominated by road traffic noise and airport noise. The closest sensitive receptor is located approximately 460m from TCC6.

9.3.1.6 HDD Compounds

There will be three HDD crossings along the proposed cable route (with six HDD Compounds in total):

- HDD1 – M3 Motorway and adjacent Railway crossing (HDD1a and HDD1b Compounds). The baseline noise environment in the compound location is likely to be dominated by road traffic noise with rail noise also present. The closest sensitive receptor is located approximately 60m away;
- HDD2 – M2 Motorway crossing (HDD 2a and HDD 2b Compounds). The baseline noise environment in the compound location is likely dominated by road traffic noise with airport noise also present. The closest sensitive receptor is located approximately 40m away; and
- HDD3 – M1 Motorway crossing (HDD 3a and HDD 3b Compounds). The baseline noise environment in the compound location is likely to be dominated by road traffic noise and airport noise. The closest sensitive receptor is located approximately 280m away.

9.3.1.7 Joint Bays

Joint Bays are anticipated to be located every 750m along the proposed cable route and there will be 49 Joint Bays in total. The baseline noise environment in the Joint Bay locations is expected to be dominated by road traffic noise particularly in the in-road sections.

9.3.1.8 Passing Bays

Passing Bays are temporary traffic mitigation measures and will be located at 14 of the in-road Joint Bays. The baseline noise environment at the Passing Bay locations is likely to be dominated by road traffic noise.

9.3.1.9 Sensitive Receptor Counts

Table 9.8 shows the noise and vibration sensitive receptor counts within the 300m study area associated with the Proposed Development. Sensitive receptors have been identified using desktop information including OSI Prime 2 data (accessed September 2023) (OSI 2023) and Google Maps (accessed January 2024). There are a total of 763 receptors within 300m, made up mainly of dwellings but also other sensitive receptors including a school and three nursing homes.

Table 9.8: Sensitive Receptor Counts from the Proposed Development

Buffer Distance (m)	Number of Dwellings	Number of Other Sensitive Receptors	Total Number of Receptors
0 – 20	28	0	28
20 – 50	205	2	207
50 – 100	110	3	113
100 – 200	196	3	199
200 – 300	214	2	216
Total	**753**	**10**	**763**

9.3.1.10 Vibration Baseline

There are no significant sources of vibration within the PAB for the Proposed Development. Road traffic, in particular HGVs, may produce vibration, but the levels are likely to be negligible and not perceptible by humans at sensitive receptors.

9.4 Potential Impacts

9.4.1 'Do Nothing' Scenario

In the absence of the Proposed Development itself, the impact would be Neutral for noise and vibration. However, if the Proposed Development does not go ahead, noise levels are expected to increase through natural traffic growth and an increase in airport noise due to the expected expansion of Dublin Airport.

9.4.2 Construction Phase

9.4.2.1 Noise

Construction noise levels from the fixed works have been predicted at each receptor in the study area using CadnaA noise modelling software (DataKustik 2023). Table 9.9 presents a summary of the receptors which meet or exceed the 65dB threshold for each construction activity, the magnitude of impact, the corresponding duration of the works and the determination of significance. Some activities close to each other may run concurrently and, where this is the case, this has been taken into account. There are no receptors within 300m of Woodland Substation, and therefore, no noise predictions have been undertaken at this location.

Table 9.9: Summary of Receptors Exceeding 65dB Threshold for Weekdays and Saturday Mornings Without Mitigation for Fixed Construction Activities

No. of Receptors Meeting or Exceeding 65 dB Threshold	Construction Activity	Highest Predicted Noise Level (dB LAeq,T)	LA 111 Magnitude of Impact	Duration of Impact at Sensitive Receptor	LA 111 Determination of Significance	Significance of Impact
3	HDD2 (M2 Motorway crossing)	74	Major	54 days	Potentially significant as impact is Major, and duration of works will exceed 10 days in any 15-day period.	Adverse, Significant and Temporary in the absence of mitigation measures.
5	HDD1 (M3 Motorway crossing)	73	Major	54 days	Potentially significant as impact is Major, and duration of works will exceed 10 days in any 15-day period.	Adverse, Significant and Temporary in the absence of mitigation measures.
39	Phase 1 (Installation of Joint Bays and Passing Bays)	83	Major	6 days	Not Significant as duration will not exceed 10 days in any 15-day period.	Adverse, Not Significant and Temporary in the absence of mitigation measures.
28	Phase 3	81	Major	6 days	Not Significant as duration does will not exceed 10 days in any 15-day period.	Adverse, Not Significant and Temporary in the absence of mitigation measures.

Table 9.9 shows that noise levels will exceed the 65dB threshold at construction activities associated with HDD works across the M2 and the M3 Motorways. At both locations, the duration of the HDD works will exceed 10 days in any 15-day period. Therefore, the potential impact is assessed as Adverse, Significant and Temporary in the absence of mitigation measures. It is expected that certain activities within the HDD works will begin during daytime but may extend into the evening and night-time. For example, the pullback element of the HDD works is likely to take place during night-time hours but will only last around 24 to 48 hours. Therefore, the evening and night-time impacts are assessed as Adverse, Moderate and Temporary in the absence of mitigation measures. Image 9.1 and Image 9.2 show the location of the receptors expected to experience significant adverse impacts during construction works at HDD2 and HDD1, respectively.

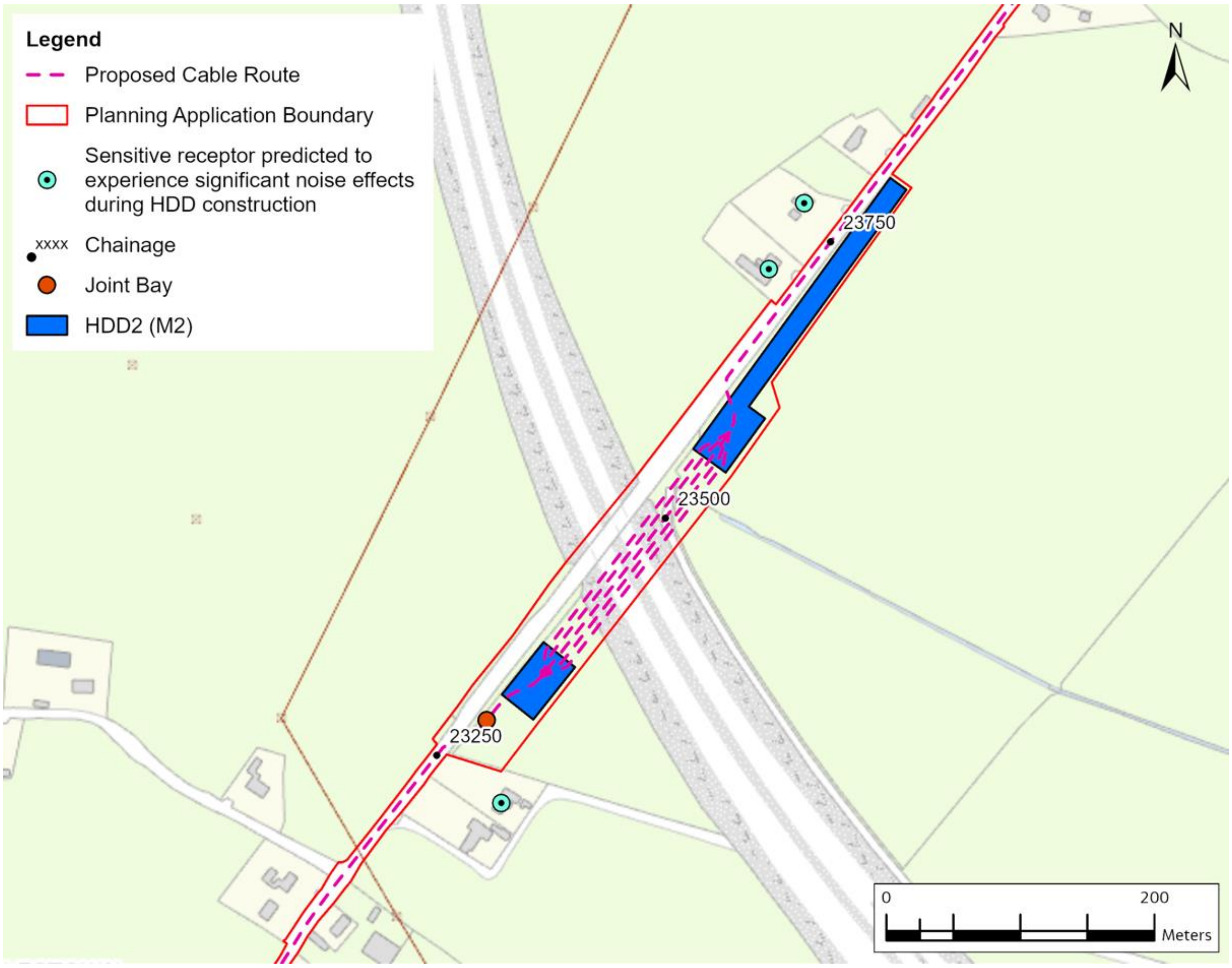


Image 9.1: Noise-Sensitive Receptors Predicted to Experience Adverse, Significant and Temporary Impacts during Construction Works at HDD2 Crossing

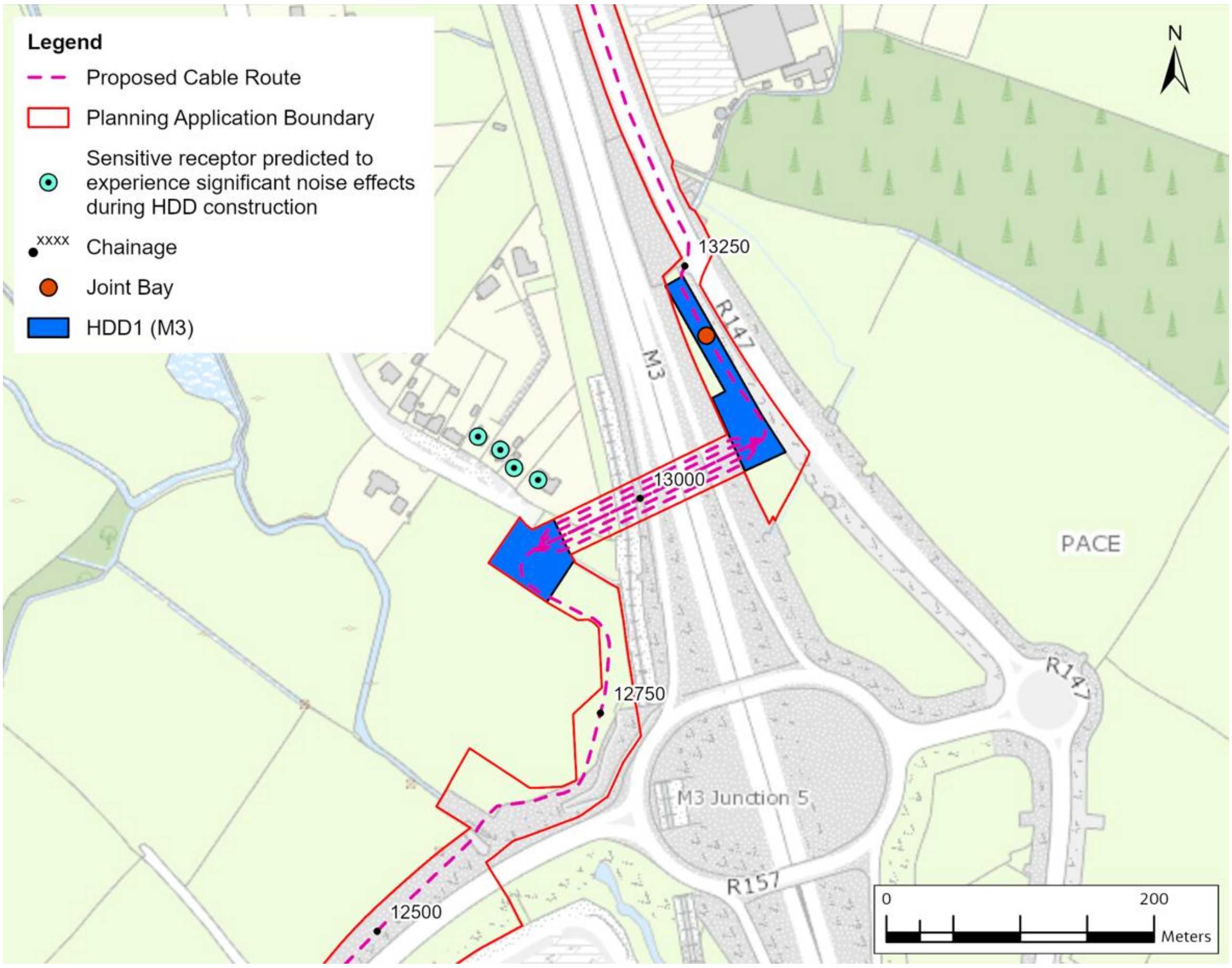


Image 9.2: Noise-Sensitive Receptors Predicted to Experience Adverse, Significant and Temporary Impacts during Construction Works at HDD1 Crossing

Construction activities associated with Phases 1 and 3 of the works will exceed the 65dB threshold but are not considered significant because the duration of the works at each Joint Bay and Passing Bay is not expected to exceed 10 days in any 15-day period. The potential impacts are assessed as Adverse, Not Significant and Temporary. Construction works at the TCCs and at the two substations are not predicted to exceed the 65dB threshold. Therefore, the potential impacts are assessed as Adverse, Not Significant and Temporary.

Construction noise levels for the works which progress at a daily rate have been calculated for Phase 0 (Devegetation Works), Phase 2 (Excavation and Installation of Cable Ducts) and works to the proposed access roads. The highest noise level predicted during Phase 0 was 72dB, while the highest noise level predicted during Phase 2 was 80dB. Both levels are above the weekday and Saturday morning threshold and will result in a major impact. However, as the works are proposed to progress at a rate of 200m a day for Phase 0 and 50m a day for Phase 2, the 10 days in any 15-day period criteria are not likely to be exceeded. Therefore, the potential impacts are assessed as Adverse, Not Significant and Temporary. Works to access roads are not expected to exceed the 65dB threshold, and therefore, the potential impact is assessed as Adverse, Not Significant and Temporary.

9.4.2.2 Vibration

During the Construction Phase of the Proposed Development, the main activities likely to result in perceptible vibration levels are vibratory compaction and HDD. Table 9.10 outlines the potential impacts from vibratory compaction using the information presented in Graph 9.1. The results are based upon a 5% probability of the relevant thresholds being exceeded.

Table 9.10: Potential Impacts from Vibratory Compaction

Vibratory Compaction	Threshold (mm/s PPV)	Distance from Work Site (m)	Number of Receptors Potentially Affected	LA111 Magnitude and Significance	Determination of Significance
Human Perception at Residential Receptors					
Steady State	0.3	35-80	142	Minor - Not Significant	Neutral, Not Significant and Temporary
	1	6-35	168	Moderate - Not Significant as works will not exceed 10 days in any 15-day period	Adverse, Not Significant and Temporary
	10	<6	0	Major - Not Significant as works will not exceed 10 days in any 15-day period	Neutral, Not Significant and Temporary as no receptors affected
Transient (start up and run down)	0.3	45-115	158	Minor – Not Significant	Neutral, Not Significant and Temporary
	1	6-45	211	Moderate – Not Significant as works will not exceed 10 days in any 15-day period	Adverse, Not Significant and Temporary
	10	<6	0	Major – Not Significant as works will not exceed 10 days in any 15-day period	Neutral, Not Significant and Temporary as no receptors affected
Cosmetic Damage for Buildings					
Steady State	3	10-16	0	-	-
	6	<10	0	-	-
Transient (start up and run down)	3	10-18	0	-	-
	6	<10	0	-	-

Table 9.10 shows that vibratory compaction impacts relating to human perception at residential receptors are not considered to be significant. This is because, although moderate impacts are predicted in some instances, the receptors will experience the effects for less than 10 days. Therefore, the potential impacts is assessed as Adverse, Not Significant and Temporary. Minor impacts are assessed as Neutral and Not Significant and there are no major impacts. In terms of cosmetic damage, there are no buildings anticipated to experience cosmetic damage as a result of vibratory compaction.

Table 9.11 shows the potential impacts from vibratory piling at HDD works using the information presented in Graph 9.2. The results are based upon a 5% probability of the relevant thresholds being exceeded, which is in accordance with BS 5228-2 (BSI 2014b).

Table 9.11: Potential Impacts from HDD Works

HDD Works	Threshold (mm/s PPV)	Distance from Work Site (m)	Number of Receptors Potentially Affected	LA111 Magnitude and Significance	Determination of Significance
Human Perception at Residential Receptors					
Steady State	0.3	55-115	7	Minor - Not Significant	Neutral, Not Significant and Temporary
	1	11-55	1	Moderate – Potentially significant as works will take around 54 days to complete	Adverse, Moderate to Significant and Temporary
	10	<11	0	Major – No receptors affected therefore not significant	Neutral, Not Significant and Temporary
Transient (start up and run down)	0.3	105-255	16	Minor - Not Significant	Neutral, Not Significant and Temporary
	1	16-105	7	Moderate Potentially significant as works will take around 54 days to complete	Adverse, Moderate to Significant and Temporary
	10	<16	0	Major - No receptors affected therefore not significant	Neutral, Not Significant and Temporary
Cosmetic Damage for Buildings					
Steady State	3	15-25	0	-	-
	6	<15	0	-	-
Transient (start up and run down)	3	24-42	0	-	-
	6	<24	0	-	-

Table 9.11 shows that vibration impacts from HDD works at HDD1 (M3 Motorway) and HDD2 (M2 Motorway) related to human perception at residential receptors are assessed as Adverse, Moderate to Significant and Temporary, given that the works are proposed to take 54 days to complete, and therefore mitigation measures are required. Minor impacts are assessed as Neutral and Not Significant and there are no major impacts. HDD vibration impacts related to cosmetic damage to buildings are not likely to occur as a result of the construction works.

9.4.2.3 Construction Traffic and Proposed Diversions

The traffic data, BNLs and the expected construction traffic noise change are presented in Table 9.12. The calculations show that the highest traffic noise increase will be 1.7dB which is a minor magnitude of impact, and the potential impact is assessed as Not Significant according to LA 111 (UKHA 2020). Therefore, the potential impacts in relation to construction traffic on surrounding roads are assessed as Neutral and Not Significant.

Table 9.12: Construction Traffic Data

Road Link	Construction Phase 2026: Base			Construction Phase 2026: Base + Construction Traffic			Construction Traffic Noise Change (dB)
	AADT	% HGV	BNL	AADT	% HGV	BNL	
R125 Regional Road, between R154 and R156 Regional Roads	1482	11.9	64.4	1,643	15.5	65.4	1.0
R156 Regional Road, east of R125 Regional Road	3934	14.4	69.0	4,107	15.7	69.4	0.4
The Red Road, south of R154 Regional Road	223	11.2	56.1	315	8.6	57.2	1.1
R154 Regional Road, east of Batterstown	5816	11.0	70.2	5,856	11.0	70.2	0.0
R156 Regional Road, east of L2215 Local Road	4462	13.0	69.4	4,666	14.9	69.8	0.4
M3 Parkway	1942	6.3	64.7	1,942	6.3	64.7	0.0
R155 Regional Road, at Fairyhouse Racecourse	8549	9.2	71.6	8,549	9.2	71.6	0.0
L1007 Local Road, at Fidorfe Solar Farm	2378	8.7	66.0	2,378	8.7	66.0	0.0
Nuttstown Road, west of Belgree Court	1789	11.4	65.2	1,899	16.0	66.0	0.8
L1007 Local Road, at Forge Cross	3899	7.8	68.0	3,919	7.8	68.0	0.0
L1007 Local Road, south of Kilbride Lane	3635	8.6	67.8	3,706	10.3	68.2	0.4
Kilbride Lane, south of Sutton Farm Road	1031	11.0	62.7	1,102	16.7	63.8	1.1
R135 Regional Road, north of L2023 Local Road	5948	14.2	70.8	6,019	15.2	71.0	0.2
R130 Regional Road, south of R125 Regional Road	1388	15.9	64.7	1,388	15.9	64.7	0.0
R125 Regional Road, between R122 and R130 Regional Roads	6130	11.8	70.6	6,130	11.8	70.6	0.0
R122 Regional Road, south of Kilcoskan	1526	18.2	65.4	1,526	18.2	65.4	0.0
R121 Regional Road, west of R122 Regional Road	2458	12.2	66.7	2,656	15.6	67.5	0.8
R122 Regional Road, south of St. Margaret's Golf and Country Club	3013	9.1	67.1	3,121	11.9	67.6	0.5
Kilreesk Lane	2217	8.7	65.7	2,319	12.5	66.4	0.7
R122 Regional Road, north of Kilreesk Lane	1156	10.6	63.1	1,254	17.5	64.4	1.3
R122 Regional Road, west of L3132 Local Road	4462	13.0	69.4	4,560	14.8	69.7	0.3
R108 Regional Road, south of R125 Regional Road	5136	12.7	69.9	5,136	12.7	69.9	0.0
R125 Regional Road, east of Rowlestown	6596	10.6	70.7	6,596	10.6	70.7	0.0
R125 Regional Road, west of New Dairy Lane	7743	9.4	71.2	7,743	9.4	71.2	0.0
R132 Regional Road, north of R106 Regional Road	31278	10.4	77.4	31,278	10.4	77.4	0.0
R106 Regional Road, east of M1 Motorway	17717	5.2	74.1	17,717	5.2	74.1	0.0
R107 Regional Road, north of Feltrim Road	10278	6.4	71.9	10,278	6.4	71.9	0.0
R107 Regional Road, south of Feltrim Road	15769	6.6	73.8	15,769	6.6	73.8	0.0
Baskin Lane, west of Rahulk Lane	7736	7.9	71.0	7,791	8.5	71.1	0.1
Stockhole Lane, north of Baskin Lane	9294	7.0	71.6	9,465	7.7	71.8	0.2
Stockhole Lane, north of R139 Regional Road	9778	6.9	71.8	9,946	7.5	72.0	0.2
R139 Regional Road, east of Clonshaugh Road	39371	10.4	78.4	39,412	10.5	78.4	0.0

Road Link	Construction Phase 2026: Base			Construction Phase 2026: Base + Construction Traffic			Construction Traffic Noise Change (dB)
	AADT	% HGV	BNL	AADT	% HGV	BNL	
Hollywood, west of Chapelwood Drive	887	8.8	61.7	1,097	14.0	63.4	1.7
R135, south of Broughan Lane	6462	22.5	72.1	6,573	23.9	72.4	0.3
R122, north of R108	12439	16.3	74.3	12,550	17.1	74.4	0.1
R108, north of Harristown Road	8525	21.2	73.2	8,525	21.2	73.2	0.0
R132, north of Old Airport Road	24679	14.7	77.0	24,679	14.7	77.0	0.0
Drumree Road (N)	753	7.2	60.7	753	7.2	60.7	0.0
R154 Regional Road (NW)	9634	7.5	71.8	9,795	8.2	72.0	0.2
R154 Regional Road (SE)	5622	7.2	69.4	5,662	7.2	69.5	0.1
R125 Regional Road (NE)	6934	6.2	70.2	7,095	7.1	70.4	0.2
R154 Regional Road (NW)	8240	7.6	71.2	8,240	7.6	71.2	0.0
R125 Regional Road (SW)	2126	7.1	65.2	2,287	9.9	66.0	0.8
R154 Regional Road (SE)	9683	7.5	71.9	9,844	8.1	72.0	0.1
R156 Regional Road (NW)	3545	7.8	67.6	3,545	7.8	67.6	0.0
R125 Regional Road (SW)	982	7.5	61.9	982	7.5	61.9	0.0
R156 Regional Road (SE)	4093	7.0	68.0	4,254	8.6	68.5	0.5
R156 Regional Road (NE)	1523	5.4	63.5	1,684	9.5	64.6	1.1
R157 Regional Road (NE)	14337	6.7	73.4	14,619	7.3	73.6	0.2
R156 Regional Road (NW)	5463	7.1	69.3	5,721	8.9	69.8	0.5
R157 Regional Road (SW)	8872	5.4	71.1	8,872	5.4	71.1	0.0
L2228 Local Road (E)	5932	6.3	69.5	5,932	6.3	69.5	0.0
M3 Motorway On/Off Slip (N)	2414	5.2	65.4	2,724	10.4	66.8	1.4
R157 Regional Road (W)	15212	5.2	73.4	15,512	6.1	73.7	0.3
M3 Motorway On/Off Slip (S)	20578	7.5	75.1	20,888	8.1	75.3	0.2
R157 Regional Road (E)	18592	7.6	74.7	18,691	8.0	74.8	0.1
R147 Regional Road (N)	21469	6.6	75.2	21,579	7.1	75.3	0.1
R157 Regional Road (W)	18504	7.6	74.7	18,603	8.1	74.8	0.1
R147 Regional Road (S)	6850	8.2	70.5	6,949	9.5	70.8	0.3
R147 Regional Road (N)	19562	6.0	74.6	19,602	6.0	74.7	0.1
R147 Regional Road (S)	21435	6.6	75.2	21,534	7.1	75.3	0.1
L5026 Local Road Piercetown (E)	3213	10.2	67.5	3,312	12.9	68.0	0.5
R147 Regional Road (NW)	8910	5.7	71.2	8,910	5.7	71.2	0.0
R154 Regional Road (W)	5927	7.0	69.6	5,967	7.0	69.7	0.1
R147 Regional Road (SE)	18754	6.1	74.5	18,794	6.1	74.5	0.0
R155 Regional Road (NE)	7531	5.4	70.4	7,531	5.4	70.4	0.0
Woodland Road (NW)	5269	3.3	68.4	5,269	3.3	68.4	0.0
Somerville (SW)	1599	1.9	62.9	1,599	1.9	62.9	0.0
R155 Regional Road (S)	9020	2.6	70.6	9,020	2.6	70.6	0.0
R155 Regional Road (NE)	4590	2.0	67.5	4,590	2.0	67.5	0.0
R125 Regional Road (W)	8134	2.4	70.1	8,134	2.4	70.1	0.0
R155 Regional Road (S)	4559	2.0	67.5	4,559	2.0	67.5	0.0
R125 Regional Road (E)	10677	2.1	71.2	10,677	2.1	71.2	0.0
Skryne Road (NW)	5299	4.5	68.7	5,299	4.5	68.7	0.0
R125 Regional Road (W)	8900	2.2	70.5	8,900	2.2	70.5	0.0
R125 Regional Road (S)	13038	3.2	72.3	13,038	3.2	72.3	0.0
Glebe Lane (NE)	106	15.1	53.4	106	15.1	53.4	0.0
Main Street (NW)	13495	3.2	72.5	13,495	3.2	72.5	0.0
The Avenue (SW)	7787	2.7	70.0	7,787	2.7	70.0	0.0
Ratoath Childcare Access (SE)	353	1.1	56.2	353	1.1	56.2	0.0
R125 Regional Road (E)	17682	3.5	73.7	17,682	3.5	73.7	0.0
R125 Regional Road (W)	11686	3.2	71.9	11,686	3.2	71.9	0.0
Kilbride Road (E)	2703	2.3	65.3	2,703	2.3	65.3	0.0
Main Street (S)	9498	3.6	71.0	9,498	3.6	71.0	0.0
R135 Regional Road (N)	6627	9.4	70.5	6,627	9.4	70.5	0.0
R135 Regional Road (S)	7683	9.9	71.3	7,683	9.9	71.3	0.0
R130 Regional Road (NE)	3416	7.1	67.3	3,416	7.1	67.3	0.0
R135 Regional Road (N)	7632	9.9	71.2	7,632	9.9	71.2	0.0
R121 Regional Road (W)	3104	5.4	66.6	3,247	9.4	67.4	0.8
R135 Regional Road (S)	6359	12.5	70.8	6,569	14.2	71.2	0.4
R121 Regional Road (E)	2948	7.0	66.6	3,142	10.2	67.4	0.8
R121 Regional Road (N)	2835	5.6	66.2	3,092	7.6	66.9	0.7

Road Link	Construction Phase 2026: Base			Construction Phase 2026: Base + Construction Traffic			Construction Traffic Noise Change (dB)
	AADT	% HGV	BNL	AADT	% HGV	BNL	
Kilbride Road (W)	6496	3.1	69.3	6,687	5.9	70.0	0.7
R121 Regional Road (S)	3337	5.4	66.8	3,535	6.2	67.3	0.5
Kilbride Road (E)	5510	5.2	69.0	5,711	8.3	69.7	0.7
Kilbride Road (NW)	5895	4.8	69.2	6,244	7.6	70.0	0.8
Roundabout Link Road (W)	5971	7.1	69.7	5,971	7.1	69.7	0.0
Corduff Road (S)	13743	15.0	74.5	13,743	15.0	74.5	0.0
Roundabout Link Road (NE)	13514	16.3	74.6	13,863	17.3	74.8	0.2
N2 National Road On/Off Slip (NW)	6001	16.7	71.1	6,370	18.7	71.7	0.6
Roundabout Link Road (SW)	14884	17.3	75.2	15,233	18.1	75.4	0.2
N2 National Road On/Off Slip (SE)	11122	17.2	73.9	11,491	18.3	74.2	0.3
Roundabout Link Road (NE)	6454	17.7	71.6	6,664	19.2	71.9	0.3
R135 Regional Road (N)	6069	12.6	70.6	6,279	14.4	71.0	0.4
Roundabout Link Road (W)	6465	17.8	71.6	6,675	19.3	71.9	0.3
R135 Regional Road (S)	6387	17.0	71.5	6,387	17.0	71.5	0.0
R108 Regional Road (N)	14083	10.5	74.0	14,205	11.1	74.1	0.1
Kilreesk Road (W)	3448	6.9	67.3	3,559	9.8	67.9	0.6
L3132 Local Road (S)	12991	11.0	73.7	13,102	11.7	73.9	0.2
R108 Regional Road (E)	1098	7.5	62.4	1,098	7.5	62.4	0.0
R108 Regional Road (N)	11456	6.6	72.4	11,456	6.6	72.4	0.0
R108 Regional Road (SW)	14317	9.4	73.9	14,439	10.1	74.0	0.1
Naul Road (E)	11600	9.9	73.0	11,728	10.8	73.2	0.2
R132 Regional Road (NE)	23964	5.7	75.5	23,964	5.7	75.5	0.0
Naul Road (NW)	15676	10.1	74.4	15,804	10.8	74.5	0.1
N132 National Road (S)	29543	7.4	76.7	29,822	7.9	76.8	0.1
Stockhole Lane (SE)	10059	2.6	71.1	10,232	3.4	71.3	0.2
R836 Regional Road (N)	13245	2.9	72.3	13,245	2.9	72.3	0.0
R132 Regional Road (SW)	19080	5.1	74.4	19,080	5.1	74.4	0.0
R125 Regional Road (S)	18225	2.4	73.6	18,225	2.4	73.6	0.0
R132 Regional Road (E)	27509	4.0	75.7	27,509	4.0	75.7	0.0
R125 Regional Road (N)	7443	2.6	69.8	7,443	2.6	69.8	0.0
R125 Regional Road (W)	15121	3.0	72.9	15,121	3.0	72.9	0.0
Rathbeale Road (E)	11923	2.8	71.9	11,923	2.8	71.9	0.0
Balheary Road (N)	16841	3.4	73.5	16,841	3.4	73.5	0.0
Castlegrange Green (W)	985	3.1	61.1	985	3.1	61.1	0.0
R125 Regional Road (S)	8011	4.2	70.4	8,011	4.2	70.4	0.0
R125 Regional Road (E)	18680	4.5	74.2	18,680	4.5	74.2	0.0
R132 Regional Road (N)	36170	4.9	77.1	36,170	4.9	77.1	0.0
R125 Regional Road (W)	23593	4.7	75.2	23,593	4.7	75.2	0.0
R132 Regional Road (S)	32900	5.0	76.7	32,900	5.0	76.7	0.0
Local Road (E)	4178	1.8	67.1	4,178	1.8	67.1	0.0
R132 Regional Road (N)	32838	4.9	76.7	32,838	4.9	76.7	0.0
Seatown Road (W)	8914	1.4	70.3	8,914	1.4	70.3	0.0
R132 Regional Road (S)	31953	4.4	76.5	31,953	4.4	76.5	0.0
Seatown Road (E)	9985	7.5	72.0	9,985	7.5	72.0	0.0
R132 Regional Road (N)	31971	4.4	76.5	31,971	4.4	76.5	0.0
R106 Regional Road (W)	14992	3.4	73.0	14,992	3.4	73.0	0.0
R132 Regional Road (SW)	26880	3.9	75.6	26,880	3.9	75.6	0.0
Drynam Road (S)	4396	2.2	67.4	4,396	2.2	67.4	0.0
R106 Regional Road (E)	18798	3.9	74.1	18,798	3.9	74.1	0.0
Applegreen Access (N)	4215	1.9	67.1	4,215	1.9	67.1	0.0
R106 Regional Road (W)	18608	4.1	74.1	18,608	4.1	74.1	0.0
Mountgorry Way (S)	17173	4.2	73.7	17,173	4.2	73.7	0.0
R106 Regional Road (E)	18969	2.9	73.9	18,969	2.9	73.9	0.0
R106 Regional Road (N)	11556	3.5	71.9	11,556	3.5	71.9	0.0
R106 Regional Road (W)	13403	3.4	72.5	13,403	3.4	72.5	0.0
R107 Regional Road (S)	11620	3.0	71.8	11,620	3.0	71.8	0.0
Clonshaugh Road (N)	13265	6.5	73.1	13,429	7.0	73.2	0.1
R139 Regional Road (W)	54782	5.9	79.1	54,984	6.1	79.1	0.0
Unused Arm (S)	8	0.0	39.5	8	0.0	39.5	0.0

Road Link	Construction Phase 2026: Base			Construction Phase 2026: Base + Construction Traffic			Construction Traffic Noise Change (dB)
	AADT	% HGV	BNL	AADT	% HGV	BNL	
R139 Regional Road (E)	54702	5.1	78.9	54,743	5.2	79.0	0.1
R147(N)	5853	10.3	70.1	5,952	11.8	70.4	0.3
R147(S)	4855	5.8	68.6	4,855	5.8	68.6	0.0
Bracetown Business Park	3003	16.0	68.0	3,102	18.7	68.5	0.5
R135 (N)	6209	18.2	71.5	6,209	18.2	71.5	0.0
L3120 (W)	9082	20.2	73.4	9,082	20.2	73.4	0.0
R135 (S)	8083	25.5	73.4	8,194	26.5	73.6	0.2
L3120 (E)	10803	15.8	73.6	10,914	16.7	73.7	0.1
R122	12728	11.5	73.7	12,839	12.3	73.8	0.1
L3120	10433	15.3	73.4	10,544	16.2	73.5	0.1
R108 (S)	11391	10.1	73.0	11,391	10.1	73.0	0.0
R108 (E)	857	12.1	62.1	857	12.1	62.1	0.0
R108 (N)	11350	10.1	73.0	11,350	10.1	73.0	0.0
R122	8328	11.8	71.9	8,328	11.8	71.9	0.0
R108 (E)	6249	19.0	71.6	6,249	19.0	71.6	0.0
R108	7182	18.2	72.1	7,182	18.2	72.1	0.0
Harristown Road	4727	32.6	71.8	4,727	32.6	71.8	0.0
R108	15445	14.0	74.9	15,445	14.0	74.9	0.0
Old Airport Road	13458	11.7	74.0	13,458	11.7	74.0	0.0
R132	20011	8.9	75.2	20,011	8.9	75.2	0.0
Old Airport Road	13581	11.6	74.0	13,581	11.6	74.0	0.0
Swords Road	15769	13.2	74.9	15,769	13.2	74.9	0.0
Cemetery	921	1.1	60.4	921	1.1	60.4	0.0
R132 (N)	17759	8.0	74.6	17,759	8.0	74.6	0.0
Corballis Road S	11617	14.2	73.7	11,617	14.2	73.7	0.0
R132(S)	19995	8.9	75.2	19,995	8.9	75.2	0.0
Eastland's Road	8287	6.5	71.0	8,287	6.5	71.0	0.0
R132 (N)	25849	8.1	76.2	26,128	8.7	76.4	0.2
Airport Exit	18725	5.1	74.3	18,725	5.1	74.3	0.0
Airport Access	16757	4.5	73.7	16,757	4.5	73.7	0.0
R132 (S)	18600	7.9	74.8	18,600	7.9	74.8	0.0
M1 Link Road	44733	6.4	78.3	45,012	6.7	78.4	0.1

Table 9.13 shows the likely impact and significance of the 14 proposed diversion routes required to facilitate full road closures during construction of the Proposed Development. The locations of the proposed diversion routes are shown in the Construction Traffic Management Plan (Appendix B of the CEMP, which is included as a standalone document in the planning application pack), and in Figure 14.3 in Volume 4 of the EIAR.

Table 9.13: Proposed Diversion Routes and Determination of Noise Significance

Diversion Route	Noise Change dB	LA 111 Magnitude of Impact	Approximate Duration of Diversion Phase 1 / Phase 3 (days)	Approximate Duration of Diversion During Phase 2 (days)	LA 111 Significance of Impact	Determination of Significance
Route 1.2	6.0dB	Major	18 / 8	134	Significant during Phase 1 and Phase 2 only	Adverse, Significant and Temporary
Route 1.6	3.2dB	Moderate	n/a / 8	50	Significant during Phase 2 only	Adverse, Moderate to Significant and Temporary
Route 1.7	2.4dB	Minor	n/a / 10	19	Not Significant	Adverse, Not Significant and Temporary
Route 1.9	2.4dB	Minor	n/a / 10	11	Not Significant	Adverse, Not Significant and Temporary
Route 1.10	2.4dB	Minor	n/a / 10	42	Not Significant	Adverse, Not Significant and Temporary
Route 1.12	2.4dB	Minor	8 / 8	26	Not Significant	Adverse, Not Significant and Temporary
Route 1.14	6.8dB	Major	7 / 16	34	Significant Phase 2 and Phase 3 only	Adverse, Significant and Temporary
Route 1.16	6.8dB	Major	10 / 18	20	Significant during all three phases	Adverse, Significant and Temporary
Route 1.18	3.8dB	Moderate	n/a	20	Significant during Phase 2 only	Adverse, Moderate to Significant and Temporary
Route 1.20	3.8dB	Moderate	n/a / 10	36	Significant Phase 2 and Phase 3 only	Adverse, Moderate to Significant and Temporary
Route 1.21	4.9dB	Moderate	8 / 8	50	Significant during Phase 2 only	Adverse, Moderate to Significant and Temporary
Route 1.23	4.9dB	Moderate	8 / 8	24	Significant during Phase 2 only	Adverse, Moderate to Significant and Temporary
Route 1.24	5.6dB	Major	7 / 5	37	Significant during Phase 2 only	Adverse, Significant and Temporary
Route 1.25	4.7dB	Moderate	n/a	2	Not Significant	Adverse, Not Significant and Temporary

Table 9.13 shows that the LA 111 magnitude of impact at diversion routes 1.2, 1.14, 1.16 and 1.24 is Major and the duration thresholds are exceeded (UKHA 2020) . Therefore, potential significant adverse impacts are expected at sensitive receptors within 25m of these routes. The magnitude of impact for Routes 1.6, 1.18, 1.20, 1.21 and 1.23 is Moderate and the duration thresholds are exceeded therefore potential significant

impacts are expected at receptors within 25m of these routes. Significant impacts are not expected for Route 1.25 as this diversion is not expected to exceed the duration criteria of 10 days in any 15-day period even though the potential impact is Moderate. Significant impacts are not anticipated at Routes 1.7, 1.9, 1.10 and 1.12 as the magnitude of impact is Minor. It should be noted that individual diversion routes will be in place for a maximum of nine months so any noise impact will be Temporary.

Construction traffic is not anticipated to give rise to perceptible ground borne vibration at receptors within the PAB. For example, a HGV over an irregular road surface is likely to result in PPV levels below 0.3 mm/s, for which the potential impact is assessed as Neutral impact and Not Significant.

9.4.3 Operational Phase

Once constructed, the majority of the Proposed Development will result in no noise or vibration. However, a transformer and a compensation reactor will be installed as part of the works at Belcamp Substation. Noise data for the transformer and compensation reactor are shown in Table 9.14.

Table 9.14: Operational Noise Data

Noise Source	Frequency (Hertz (Hz))								
	31.5	63	125	250	500	1000	2000	4000	8000
Transformer	94	100	102	97	97	91	86	81	74
Compensation Reactor	85	91	93	88	88	82	77	72	65

There are residential receptors approximately 300m to the south of Belcamp Substation and Craobh Chiaráin GAA pitches approximately 250m to the east of the substation. A CadnaA noise model has been used to calculate the operational noise levels from the Proposed Development at the closest receptors (DataKustik 2023). Table 9.15 shows the results of the predicted operational noise level at the closest receptors along with night-time noise criterion taken from the NG4 Guidance Note for Noise (EPA 2016).

Table 9.15: Operational Noise Assessment at Belcamp Substation

Distance to Receptor	Noise Level Predicted at Closest Sensitive Receptor	Night-Time Noise Criterion (23:00hrs to 07:00hrs)
300m (Residential receptors in Cara Park)	42dB(A)	45dB(A)
250m (Craobh Chiaráin GAA pitches)	39dB(A)	45dB(A)
* Taken from NG4 Guidance Note for Noise Table 1 for 'All Other Areas' (EPA 2016)		

Table 9.15 shows that the predicted noise levels at the closest receptors will be below the 45dB night-time noise criterion, and therefore, no operational noise impacts are anticipated. The potential impact is assessed as Neutral and Not Significant.

Additional electrical equipment will be installed at Woodland Substation, including a shunt reactor and transformers. However, there are no sensitive receptors within 300m of Woodland Substation, and therefore, no adverse Operational Phase noise impacts are anticipated at Woodland Substation.

The equipment to be installed as part of the Proposed Development will not produce high levels of vibration and, as a result, vibration impacts during the Operational Phase are not likely.

In terms of the Environmental Noise Regulations 2018, future noise action plans by the relevant competent authorities are not likely to be affected as they deal with managing the operational impacts from road, rail, air and industry noise sources. The Proposed Development is not likely to result in any significant increase in operational noise which would require noise management by the relevant authorities in the future.

9.5 Mitigation and Monitoring Measures

9.5.1 Construction Phase

9.5.1.1 Construction Works

This assessment has shown that there is the potential for significant construction noise and vibration impacts at the nearest sensitive receptors associated with the HDD works at the M2 and the M3 Motorway crossings. Construction activities will comply with BS 5228-1 (BSI 2014a) and BS 5228-2 (BSI 2014b) and the following measures will be implemented during construction:

- The appointed contractor will comply with local authority controls on noise and vibration during construction;
- Noise barriers will be installed around the following HDD Compounds, and acoustic enclosures will be placed around the HDD plant:
  - HDD2 M2 Motorway (Chainage 23,550). Noise barriers will be placed on the perimeter of both launch and receiver HDD Compounds (HDD Compound 2a and 2b) to screen noise at the nearest sensitive receptors;
  - HDD1 M3 Motorway (Chainage 12,800). Noise barriers will be placed on the perimeter of both launch and receiver HDD Compounds (HDD 1a and 1b) to screen noise at the nearest sensitive receptors;
  - The noise barriers will be within the PAB. The requirement for the noise barriers will be confirmed pre-construction through confirmatory assessment following detailed design for the HDD (within the parameters assessed in this EIAR). The location of the noise barrier will be set out and agreed with the local planning authority in advance of the works designed to keep noise levels within the specified limits. If it can be demonstrated to the local authorities that the barriers are not required, in accordance with the limits in this assessment, then they will not be provided, subject to agreement with the local planning authority;
  - BS 5228-1 states that a noise barrier which blocks the line of sight between the source and the receptor would result in an approximate attenuation of 10dB. Therefore, the noise barriers will be designed to block the line of sight between the noise source and the affected receptors;
  - Noise barriers will comply with the standard BS EN 14388:2015 – Road traffic noise reducing devices. Specifications (BSI 2015);
  - Portable acoustic enclosures will be placed around the HDD plant in HDD2 and HDD1 including the drilling rig and the generator. Acoustic enclosures will surround the noise source in order to reduce noise levels at nearby receptors;
  - Local residents will be kept informed of any HDD works taking place outside normal working hours;
  - All valid complaints will be dealt with expeditiously and appropriate action will be taken;
  - The routing, depth, locations, and drilling types of the proposed HDD works will be carefully selected to avoid effects. Confirmatory structural surveys will be completed pre-construction at all structures that will be crossed or that are within 50m of the HDD locations. Monitoring by the appointed contractor of these locations will occur during the HDD works, and the surveys will be repeated post-construction. In the extremely unlikely event of repairs being required, these will be immediately undertaken in agreement with the structure owner; and
  - During the HDD works, constant monitoring by the specialist drilling team will be carried out. The volume of cuttings produced will also be monitored to ensure that no over cutting takes place and that hole cleaning is maintained. The nature of the cuttings will

also be monitored to understand the ground conditions as the drilling progresses. The CEMP (included as a standalone document in the planning application pack) will be updated pre-construction with further information of HDD monitoring, when the appointed contractor is appointed, and will be agreed with stakeholders including the local authorities, Transport Infrastructure Ireland, Waterways Ireland, and Irish Rail.

- The appointed contractor will develop and implement a Stakeholder Communications Plan which will facilitate community engagement prior to the commencement of construction;
- Only plant conforming with or better than relevant national or international standards (including BS 5228-1 and BS 5228-2), directives or recommendations on noise or vibration emissions will be selected and used. Construction plant will be maintained in good condition with regards to minimising noise and vibration emissions;
- Plant will be operated and maintained appropriately, with due regard for manufacturer recommendations. All vehicles, plant and equipment will be switched off when not in use;
- Where practicable, gates (to TCCs, HDD Compounds and construction areas) will not be located opposite noise sensitive receptors;
- Routes and programming for the transport of construction materials, spoil and personnel will be carefully selected to reduce the risk of increased noise and vibration impacts during construction;
- Vehicle and mechanical plant / equipment used for the purpose of the works will be fitted with effective exhaust silencers, to be maintained in good working order and operated in such a manner to minimise noise emissions;
- Construction plant and activities will be positioned appropriately to minimise noise at sensitive locations;
- Equipment that breaks concrete by pulverising or similar, rather than by percussion, will be used close to noise sensitive locations;
- Mufflers will be used on pneumatic tools;
- Works will be programmed to minimise the requirement for working outside normal working hours;
- Unnecessary revving of engines and idling will be avoided;
- Plant and vehicles will be started-up sequentially rather than all together;
- Drop height of materials will be minimised;
- Rubber linings will be used in, for example, chutes and dumpers to reduce impact noise;
- Any plant, such as generators, which are required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen;
- Low vibratory or non-vibratory plant will be used when working in close proximity to a vibration sensitive receptor;
- Vibratory equipment will be started-up or turned off as far away from sensitive receptors as possible; and
- All site access roads will be kept even to reduce vibration.

9.5.1.2 Diversion Routes

There is the potential for significant impacts in association with some diversion routes. As a result, the following mitigation measures have been identified and will be implemented:

- Road closures and diversion routes will be minimised; and
- Suitable advanced warning of road closures will be provided to residents within 25m of the affected diversion routes.

9.5.2 Operational Phase

The assessment has shown that during the Operational Phase, the potential impacts will be Neutral and Not Significant, and therefore, no mitigation measures are required.

9.6 Residual Impacts

9.6.1 Construction Phase

9.6.1.1 Noise

Table 9.16 outlines the construction activities that have the potential to experience significant noise impacts, without the application of appropriate mitigation measures, and the significance of impact with the application of appropriate mitigation, as outlined in Section 9.5.

Table 9.16: Construction Activities with Potential Significant Noise Impacts (Pre-Mitigation) and the Predicted Impacts (Post-Mitigation)

Construction Activity	Potential Significance of Impact (Pre-Mitigation)	Predicted Significance of Impact (Post-Mitigation)
HDD2 (M2 Motorway)	Adverse, Significant and Temporary in the absence of mitigation measures	Adverse, Not Significant and Temporary with mitigation measures in place
HDD1 (M3 Motorway)	Adverse, Significant and Temporary in the absence of mitigation measures	Adverse, Not Significant and Temporary with mitigation measures in place

Following the implementation of mitigation measures, there are no predicted significant residual noise impacts as a result of HDD works. Residual impacts in relation to all other construction noise activities are assessed as Adverse, Not Significant and Temporary.

9.6.1.2 Vibration

Table 9.17 outlines the potential vibration impacts associated with some of the HDD works in relation to human perception at residential receptors are assessed as Adverse, Moderate to Significant and Temporary in the absence of mitigation measures. With the implementation of the mitigation measures outlined in Section 9.5, including giving prior warning to affected residents, the predicted impacts are assessed as Adverse, Not Significant and Temporary.

Table 9.17: Construction Activities with Potential Significant Vibration Impacts (Pre-Mitigation) and the Predicted Impacts (Post-Mitigation)

Construction Activity	Potential Significance of Impact (Pre-Mitigation)	Predicted Significance of Impact (Post-Mitigation)
HDD2 (M2 Motorway)	Adverse, Moderate to Significant and Temporary in the absence of mitigation measures	Adverse, Not Significant and Temporary with mitigation measures in place
HDD1 (M3 Motorway)	Adverse, Moderate to Significant and Temporary in the absence of mitigation measures	Adverse, Not Significant and Temporary with mitigation measures in place

Following the implementation of mitigation measures, there are no predicted significant residual vibration impacts as a result of HDD works. Residual impacts in relation to all other construction vibration activities are assessed as Adverse, Not Significant and Temporary.

9.6.1.3 Construction Traffic and Proposed Diversions

Table 9.18 outlines the potential impacts for diversion routes predicted to experience significant adverse impacts, in the absence of mitigation. There are no appropriate measures to mitigate impacts resulting from diversion routes, so the impact will remain as Adverse, Significant and Temporary at the diversion routes shown in Table 9.18.

Table 9.18 Diversion Routes with Significant Effects Pre-Mitigation and the Impact Post-Mitigation

Construction Activity	Potential Significance of Impact (Pre-Mitigation)	Predicted Significance of Impact (Post-Mitigation)
Diversion Route 1.2	Adverse, Significant and Temporary in the absence of mitigation measures	Adverse, Significant and Temporary
Diversion Route 1.6	Adverse, Moderate to Significant and Temporary in the absence of mitigation measures	Adverse, Moderate to Significant and Temporary
Diversion Route 1.14	Adverse, Significant and Temporary in the absence of mitigation measures	Adverse, Significant and Temporary
Diversion Route 1.16	Adverse, Significant and Temporary in the absence of mitigation measures	Adverse, Significant and Temporary
Diversion Route 1.18	Adverse, Moderate to Significant and Temporary in the absence of mitigation measures	Adverse, Moderate to Significant and Temporary
Diversion Route 1.20	Adverse, Moderate to Significant and Temporary in the absence of mitigation measures	Adverse, Moderate to Significant and Temporary
Diversion Route 1.21	Adverse, Moderate to Significant and Temporary in the absence of mitigation measures	Adverse, Moderate to Significant and Temporary
Diversion Route 1.23	Adverse, Moderate to Significant and Temporary in the absence of mitigation measures	Adverse, Moderate to Significant and Temporary
Diversion Route 1.24	Adverse, Significant and Temporary in the absence of mitigation measures	Adverse, Significant and Temporary

9.6.2 Operational Phase

No significant noise or vibration impacts are considered likely during the Operational Phase. Therefore, the residual impact is assessed as Neutral and Not Significant.

9.7 Conclusion

A noise and vibration impact assessment has been carried out on the Proposed Development, in line with relevant guidelines, policies and standards. Potential significant adverse noise and vibration impacts have been identified, associated with HDD works at the M2 and the M3 Motorway crossings. However, the impacts will be temporary, and with the application of the mitigation measures outlined in Section 9.5, including the installation of temporary noise barriers and acoustic enclosures, it is considered that no significant residual adverse noise or vibration impacts will occur as a result of the HDD works. In addition, no noise impacts are anticipated as a result of construction traffic on surrounding roads. This is because the magnitude of impact is minor at all roads to be used during the Construction Phase.

Diversion routes to be used during road closures have the potential to result in Adverse, Significant and Temporary noise impacts. There are no suitable measures to mitigate these impacts at diversion routes, and as a result, the residual impact remains as Adverse, Significant and Temporary in relation to the diversion routes identified in Table 9.18. It should be noted that these impacts will be temporary and are expected to last less than one year.

The operational noise assessment concluded that no significant noise and / or vibration impacts will occur as a result of the Operational Phase of the Proposed Development.

9.8 References

BSI (1993). BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration

BSI (2014a). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise

BSI (2014b). BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration

BSI (2019). BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

DataKustik (2023). CadnaA noise prediction software

DCC; FCC; SDCC; DLRCC (2018). Dublin Agglomeration Third Environmental Noise Action Plan December 2018 – July 2023

Department of Transport Welsh Office (1988). The Calculation of Road Traffic Noise

EPA (2016). Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)

EPA (2023). Round 4 Strategic Noise Mapping [Online] Available from https://gis.epa.ie/EPAMaps/. Accessed December 2023.

Meath County Council (MCC) County Meath Noise Action Plan 2019 (MCC 2019)

NASA (2023). Contour data. [Online] Available from https://www.earthdata.nasa.gov/. Accessed September 2023.

NRA (2004). Guidelines for Treatment of Noise and Vibration in National Road Schemes

OSI (2023). Prime 2 data. Accessed September 2023.

UKHA (2020). Design Manual for Roads and Bridges (DMRB) Sustainability and Environmental Appraisal - LA 111 Noise and Vibration, Revision 2

EN, 2015. EN 14388:2015 Road Traffic Noise Reducing Devices – Specifications.

<u>Directives and Legislation</u>

Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise. Commission Directive 2020/367/EC amends Annex III of Directive 2002/49/EC as regards the establishment of assessment methods for harmful effects of environmental noise

Number 7 of 1992 - Environmental Protection Agency Act, 1992 (as amended)

Number 27 of 2003 - Protection of the Environment Act 2003 (as amended)

S.I. No. 179/1994 - Environmental Protection Agency Act, 1992 (Noise) Regulations, 1994

S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018 (as amended) by S.I. No. 663/2021 - European Communities (Environmental Noise) (Amendment) Regulations 2021.

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 10 - Biodiversity

EirGrid

March 2024

Contents

10. Biodiversity

10.1 Introduction

This Chapter presents the assessment of the likely potential biodiversity impacts of the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) during the Construction and Operational Phases. A full description of the Proposed Development is provided in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

The assessment identifies, describes and assesses the potential direct and indirect significant impacts. The assessment is in accordance with the requirements of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the EIA Directive). Particular attention is afforded to species and habitats protected under Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (hereafter referred to as the Habitats Directive) and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (hereafter referred to as the Birds Directives), and species protected pursuant to Number 39 of 1976 - Wildlife Act, 1976 (as amended) (hereafter referred to as the Wildlife Acts).

The EIA Directive does not provide a definition of biodiversity. The Convention on Biological Diversity (1993), however, gives the following formal definition of biodiversity in its article 2:

> "*biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems*".

Alongside the term 'biodiversity', the terms 'ecology' and 'ecological' are also used throughout this Chapter as a broader term to consider the relationships of biodiversity receptors to one another and to their environment.

This Chapter includes the following:

- Section 10.2 presents the methodology and includes the underpinning legislation and guidance and Section 10.2.3.2.3 describes the difficulties encountered in compiling information);
- Section 10.3 describes the existing baseline environment;
- Section 10.4 summarises the main characteristics of the Proposed Development which are of relevance for biodiversity, and evaluates the likely potential impacts of the Proposed Development on biodiversity;
- Section 10.5 describes the measures proposed to mitigate and monitor the likely potential impacts;
- Section 10.6 describes the residual impacts and proposed compensatory measures; and
- Section 10.7 presents the conclusion.

10.2 Methodology

An ecological impact assessment was carried out to determine the likelihood of significant negative impacts on ecological habitats and species of interest as a result of the Proposed Development. This Chapter of the EIAR provides a description of the existing ecological environment, the likely potential impacts likely to occur as a result of the Proposed Development, as well as an assessment of the significance of such impacts from an ecological perspective.

A separate Appropriate Assessment (AA) Screening Report and Natura Impact Statement (NIS) have been prepared for the Proposed Development (both are included as standalone documents in the planning application pack) and focus on the European designated sites and the Qualifying Interests (QIs) / Special Conservation Interests (SCIs) for which such sites are designated. The NIS concluded that, with mitigation measures adopted, there will be no adverse effects on the integrity of any European sites, either alone or in-combination with other plans or projects. Mitigation for the potential impacts of the Proposed Development on biodiversity is provided in Section 10.5 and residual impacts after mitigation are provided in Section 10.6.

10.2.1 Study Area

The study area was determined following best practice guidance (refer to Section 10.2.2.3) and by professional judgement, taking into account the likely significant impacts along the Proposed Development on the receiving environment during construction and / or operation. Table 10.1 details the study areas adopted for each of the biodiversity (ecological) receptors within the study area specified to assess the potential impacts within the Zone of Influence (ZoI) of the Proposed Development. The ZoI is the area over which ecological features may be affected by biophysical changes caused by the Proposed Development and associated activities (Chartered Institute of Ecology and Environmental Management (CIEEM) 2018). When determining the ZoI, the 'source-pathway-receptor' model has been applied taking consideration of all potential impact pathways connecting elements of the Proposed Development to the ecological receptor in view of their conservation objectives (where available).

Note that in this EIAR, and throughout this Chapter, 'water body' is used generically to refer to a watercourse, river, drainage ditch or pond, although it is most frequently used to refer to a river or watercourse with flowing water. Sometimes the specific terms drainage ditch or pond are used to avoid confusion, for instance to describe habitat characteristics associated with particular species/species groups or relevant mitigation options.

Table 10.1: Study Areas for Ecological Receptors within the ZoI of the Proposed Development

Ecological Receptor	Study Area Description NOTE 1
Terrestrial Habitats (Including rare and / or protected flora, and non-native invasive plant species)	A corridor along the Proposed Development where works are proposed and habitats that could be directly or indirectly affected during the Construction or Operational Phases. Habitats within a minimum of 150m (metres) of the Proposed Development (i.e. from the Planning Application Boundary (PAB)) were mapped using a combination of survey and aerial photographs. All hedgerows / treelines at proposed Joint Bays were inspected and where vegetation is likely to be impacted / lost (e.g., narrow roads). Habitats have been classified using A Guide to Habitats in Ireland (referred to as Fossitt 2000) (reprinted in 2007) (The Heritage Council 2000).
Wintering birds	Wintering bird surveys were carried out for all the route options as a preferred route was not available at the time of survey. Each of the four options in Step 4B (see Chapter 3 (Consideration of Reasonable Alternatives) in Volume 3 of the EIAR for further details) were surveyed to 800m on either side of the route option from Vantage Points and drive-bys, which was considered the distance in which birds could be directly or indirectly affected by construction / operation. The survey focused on areas of suitable habitat for foraging / roosting winter birds, including water bodies and wetlands.
Breeding birds (including kingfisher)	A corridor along the Proposed Development where works are proposed, and in locations where breeding birds could be directly or indirectly affected during the Construction or Operational Phases . Transect surveys (nine out of a planned 11 were completed) undertaken within a 250m survey corridor, however, extended outside of the 250m corridor on occasions at transects 4, 7 and 10. The surveys were carried out according to relevant guidance and the study areas are shown on Figure 10.5 in Volume 4 of the EIAR. The surveys focused on areas of suitable bird nesting habitat.
Bats	Only trees / structures potentially directly impacted by the Proposed Development during the Construction or Operational Phases were surveyed for potential bat roosts. Trees with identified bat roost potential were subject to emergence surveys. Static detectors were also deployed at key locations for a minimum of five days for each deployment.
Fauna species (other than bats (i.e. otter, badger, other small mammals, amphibians, reptiles, terrestrial invertebrates and fish))	A corridor of 100m from the PAB was surveyed for fauna species that are likely to be directly or indirectly affected during the Construction or Operational Phases of the Proposed Development. The study area extended to at least 150m from the PAB (i.e. along watercourses hydrologically linked to the PAB. The locations of these surveys are shown on Figure 10.7 in Volume 4 of the EIAR (Otter and Small Mammals and on Figure 10.8 in Volume 4 of the EIAR (eDNA sampling locations)

Ecological Receptor	Study Area Description NOTE 1
Aquatic habitats assessment	Watercourse crossing points, and a minimum of 100m to either side of the Proposed Development PAB, were visually assessed for their potential to support fish of conservation interest (i.e. brook lamprey, river lamprey, European eel, trout), and the invertebrates, white-clawed crayfish and freshwater pearl mussel (subject to access and safe working conditions). Where access and / or health and safety constraints prevented the full 100m extent of survey, data was collected from the nearest safe point of access to inform the overall assessment. Assessments identified sites that had appropriate habitat to support different age classes of fish and in particular for spawning and juvenile nursery areas. White-clawed crayfish habitat was assessed for features that provide suitable refuge such as substrates large enough to provide cover and not armored.
eDNA sampling	Following the aquatic habitats assessment, eDNA sampling was identified as suitable for 16 watercourses (rivers / tributaries / ditches) at 18 sampling points. However, only 14 could be accessed. These were considered to have the potential to support the following species of conservation interest (DNA for other vertebrate species will also be recorded): • Atlantic salmon (*Salmo salar*); • Lamprey (*Petromyzontiformes sp*.); • European eel (*Anguilla anguilla*); • Smooth newt (*Lissotriton vulgaris*); and • White-clawed crayfish (*Austropotamobius pallipes*).

NOTE 1: This column refers to minimum specified study areas. The study area was widened further than these areas in instances where potential or confirmed ecological features of interest were noted beyond that should be incorporated into the baseline and subsequent impact assessment.

10.2.2 Relevant Guidelines, Policy and Legislation

The assessment of the potential impacts of the Proposed Development on ecological resources has been carried out in accordance with legislation and policy documents listed below, for the purposes of preparing this Chapter.

10.2.2.1 International and National Legislation

The following International legislation was adhered to in the preparation of this Chapter:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended); hereafter the 'Habitats Directive';
- Council Directive 2009/147/EC on the Conservation of Wild Birds (as amended); hereafter the 'Birds Directive'; and
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy (hereafter referred to as the Water Framework Directive (WFD)).

The following National legislation was adhered to in the preparation of this Chapter:

- Number 39 of 1976 - Wildlife Act, 1976 (as amended) (hereinafter referred to as the Wildlife Act). At a National level, the Wildlife Act is the principal piece of legislation for the protection and control of activities that may harm wildlife;
- Number 30 of 2000 - Planning and Development Act, 2000 (as amended) (hereafter referred to as the Planning and Development Act). The Planning and Development Act is the basis for land use planning in Ireland. Under this legislation, mandatory objectives for the conservation of natural heritage and for the conservation of European sites must be included in development plans (usually implemented at a local authority level);
- S.I. No. 600/2001 - Planning and Development Regulations, 2001(as amended) (hereafter referred to as the Planning Regulations);
- S.I. No. 477/2011 (as amended) - The Birds and Habitats Regulations. The transposition of the Habitats Directive and the Birds Directive into Irish law is through this legislation. Regulations

(49 and 50) that deal with invasive species (those included within the Third Schedule) are also included;

- S.I. No. 235/2022 - Flora (Protection) Order 2022 (hereafter referred to as the FPO). Species of plant which receive protection under Section 21 of the Wildlife Act are listed in the FPO; and
- European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) (hereafter referred to as the Birds and Habitats Regulations); and
- Number 14 of 1959 - Fisheries (Consolidation) Act, 1959 (as amended) (hereafter referred to as the Fisheries Act).

10.2.2.2 Policy and Planning Documents

The following national and local authority plans and policies are considered relevant to the Proposed Development:

- Project Ireland 2040 - National Planning Framework (hereafter referred to as the NPF) (Government of Ireland 2018);
- Project Ireland 2040 - National Development Plan 2021-2030 (hereafter referred to as the NDP) (Government of Ireland 2021);
- Ireland's 4th National Biodiversity Action Plan 2023-2030 (National Parks and Wildlife Service (NPWS) 2023a);
- Ireland Pollinator Plan 2021-2025 (hereafter referred to as AIPP) (National Biodiversity Database 2021);
- Meath County Council (MCC) Meath County Development Plan 2021-2027 (MCC 2021), noting the key policies of HER POL 37 (to encourage the retention of hedgerows), HER39 (to recognise the importance of hedgerows), HER POL40 (woodland management);
- Fingal County Council (FCC) Fingal Development Plan 2023-2029 (FCC 2023a, noting the key policies of GINHP21 (protection of trees and hedgerows) GINHP22 (tree planting) GINHO44 (setback of new surface water drainage outfalls);
- Dublin City Council (DCC) Dublin City Development Plan 2022-2028 (DCC 2022);
- County Meath Biodiversity Action Plan 2015-2020 (hereafter referred to as the Meath BAP) (MCC 2015);
- Fingal Biodiversity Action Plan 2018-2023 (hereafter referred to as the Fingal BAP) (FCC 2018); and
- Forest of Fingal - A Tree Strategy (FCC 2023b).

EirGrid's Biodiversity Policies are as follows (as outlined in the Draft Grid Implementation Plan 2023-2088 (EirGrid 2023) (this Draft Grid Implementation Plan will be adopted, and an associated Strategic Environmental Assessment (SEA) Environmental Report and Statement will be published in due course):

- "*BIODP1: To protect flora, fauna and habitats, and sites designated in the Habitats Directive, the Birds Directive, the Wildlife Act 1976 (as amended), the Flora Protection Order (S.I. No. 235 of 2022), and the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended)*";
- "*BIODP2: To minimise the impact of grid development on existing trees and hedgerows, and all semi-natural habitats*";
- "*BIODP3: To protect and wherever possible enhance wooded, wetland and other habitats which function as wildlife corridors, in accordance with Article 10 of the EU Habitats Directive*"; and
- "*BIODP4 To design habitat creation, restoration and enhancement into project scopes wherever possible, in collaboration with ESB for onshore assets, while complying with relevant technical and safety standards*".

EirGrid's Climate Change Policies are as follows (as outlined in the Draft Grid Implementation Plan 2023-2088 (EirGrid 2023) (this Draft Grid Implementation Plan will be adopted, and an associated Strategic Environmental Assessment (SEA) Environmental Report and Statement will be published in due course):

- "*CLIMP1: To integrate measures to address climate change into grid development, through effective mitigation and adaptation responses, in accordance with available guidance and best practice*";
- "*CLIMP2 : To support, through all activities, and in particular connection of low-carbon and renewable energy generation onshore and offshore, delivery of the Government's target of up to 80% electricity consumption generated from renewable energy sources by the year 2030*"; and
- "*CLIMP3: That there is no increase in flood risk as a result of grid development, and to ensure any flood risk to the development is appropriately managed*".

10.2.2.3 Relevant Guidelines

Key guidance used in the assessment included the following:

- Ecological Guidelines for Electricity Transmission Projects. A Standard Approach to Ecological Impact Assessment of High Voltage Transmission Projects (EirGrid 2020);
- A Guide to Habitats in Ireland (referred to as Fossitt 2000) (reprinted in 2007) (The Heritage Council 2000);
- Bat Mitigation Guidelines for Ireland – V2 (Marnell, Kelleher and Mullen 2022);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition) (Collins 2023);
- The Bat Workers' Manual, 3rd Edition (Mitchell-Jones and McLeish 2004);
- National Roads Authority (NRA) Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA 2006a);
- Bird Monitoring Methods (Gilbert *et al.* 1998);
- Ecology of the White-clawed Crayfish. Conserving Natura 2000 Rivers Ecology Series No. 1. (Holdich 2003);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA 2008a);
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Environmental Protection Agency, 2022).
- Hedgerow Appraisal System – Best Practice Guidance on Hedgerow Survey, Data Collation and Appraisal (Foulkes *et al.* 2013);
- Scottish Environment Protection Agency (SEPA) Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (SEPA 2017);
- Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine (hereafter referred to as the CIEEM Guidance) (CIEEM, 2019);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009);
- Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2008b);
- Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA 2006b);
- Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA 2010);
- The Irish Bat Monitoring Programme 2015-2017. Irish Wildlife Manuals, No. 103 (Aughney *et al.* 2018);

- National Parks and Wildlife Service (NPWS) The Status of EU Protected Habitats and Species in Ireland. Volume 1. Summary Overview. (NPWS 2019a);
- The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments. Volume 2. (NPWS 2019b);
- The Status of EU Protected Habitats and Species in Ireland. Species Assessments. Volume 3. (NPWS 2019c);
- The Irish Vegetation Classification (Perrin *et al.* 2018);
- The Irish Semi-natural Grasslands Survey 2007-2012. Irish Wildlife Manuals No. 78 (O'Neill *et al.* 2013);
- The Monitoring and Assessment of Three EU Habitats Directive Annex I Grassland Habitats. Irish Wildlife Manuals 102 (Martin *et al.* 2018);
- Monitoring Guidelines for the Assessment of Petrifying Springs in Ireland. Irish Wildlife Manuals No. 94 (Lyons and Kelly 2016);
- Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland (NPWS 2021);
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022 ;
- Aerial imagery (Bing 2023; Google Earth 2023; ESRI 2023);
- National Tree Map (Bluesky 2023); and
- National Land Cover Map (Ordnance Survey Ireland 2023).

10.2.3 Data Collection and Collation

The ecological impact assessment comprised a desk-based study and field surveys which are set out in Section 10.2.3.1 and Section 0, respectively. The ZoI for the Proposed Development varied according to the ecological receptor and the ZoIs are described in Section 10.2.1. The methodologies used to collate information on the baseline biodiversity environment are presented in Appendix A10.2 in Volume 3 of this EIAR.

10.2.3.1 Desk Study

A desk-based study was carried out between September and October 2022 to inform the initial scope of the ecological surveys required to inform the assessment. The desk-based study involved collection and review of relevant published and unpublished sources of data, collation of existing information on the ecological environment and consultation with relevant statutory bodies. Details of the data sources and search distances used to inform the desk-based study and subsequent ecological assessment are presented in Table 10.2.

Table 10.2: Desk Study Data Sources

Receptor	Search Distances	Data Source
Statutory designated sites of European and national value	Source-receptor-pathway model	• NPWS Mapping of European site boundaries (NPWS 2023); • Malahide Estuary Special Area of Conservation (SAC) 000205. Conservation Objectives (NPWS 2013a); • Baldoyle Bay SAC 000199. Conservation Objectives (NPWS 2012a); • Malahide Estuary Special Protection Area (SPA) 004025. Conservation Objectives (NPWS 2013b); • Baldoyle Bay SPA 004016. Conservation Objectives (NPWS 2013c); • North Bull Island SPA 004006. Conservation Objectives (NPWS 2015a); • South Dublin Bay and River Tolka Estuary SPA 004024. Conservation Objectives (NPWS 2015b); • Rogerstown Estuary SPA 004015. Conservation Objectives (NPWS 2013d); • Ireland's Eye SPA 004117. Conservation Objectives (NPWS 2022a); • Lambay Island SPA 004069. Conservation Objectives (NPWS 2022b); • Skerries Islands SPA 004122. Conservation Objectives (NPWS 2022c); • North-West Irish Sea SPA 004236. Conservation Objectives (NPWS 2023); • River Nanny Estuary and Shore SPA 004158. Conservation Objectives (NPWS 2012b); • Boyne Estuary SPA 004080. Conservation Objectives (NPWS 2013f); and • Dundalk Bay SPA 004026. Conservation Objectives (NPWS 2011).
WFD water bodies	2km	• EPA rivers and water quality data WFD status online at EPA Maps (2023)
Protected and notable species (excluding plants and fungi – see below for reduced search area)	2km	• Protected and invasive species data from the National Biodiversity Data Centre (NBDC) 2023; • The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill (NPWS 2019a); • The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill (NPWS 2019b); and • The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill (NPWS 2019c).
Plants and fungi, and invasive species	200m	• Protected and invasive species data from the NBDC online (NBDC 2023).

10.2.3.2 Field Surveys

Field surveys were undertaken by Jacobs between October 2022 and October 2023 to inform the EIAR. A summary of the field surveys, including dates these were undertaken, is presented in Table 10.3.

Table 10.3 Ecological Surveys Informing the EIAR

Ecological Receptor	Survey Type/ Target Species	Survey Date(s)
Habitat	Walkover surveys including habitat classification	January 2023 to August 2023 (weeks commencing: 23.01.2023, 30.01.2023, 20.02.2023, 20.03.2023. 02.03.2023, 03.05.2023, 08.05.2023, 12.06.2023, 19.06.2023, 31.07.2023, 23.10.2023).
Habitat	Habitat suitability assessment/ reptile and amphibian	January 2023 to August 2023 (weeks commencing: 23.01.2023, 30.01.2023, 20.02.2023, 20.03.2023. 02.03.2023, 03.05.2023, 08.05.2023, 12.06.2023, 19.06.2023, 31.07.2023)
	Habitat suitability assessment/ terrestrial invertebrate (marsh fritillary)	
	Habitat suitability assessment/ fish, white-clawed crayfish	
Birds	Winter bird surveys	October 2022 to March 2023 (weeks commencing: 24.10.2022, 21.11.2022, 12.12.2022, 23.01.2023, 20.02.2023, 20.03.2023)
	Breeding bird surveys (including kingfisher)	April 2023 to June 2023 (Breeding birds: weeks commencing: 03.04.2023, 03/08.05.2023, 22.05.2023, 12.06.2023 kingfisher: 16.06.2023)
Bats	Identification of potential roost features (PRFs) in trees / buildings	January 2023 to April 2023 (weeks commencing 23.01.23, 30.01.23, 04.04.23, 17.04.2023, 08.05.2023)
	Static detector surveys	May 2023 to July 2023 (weeks commencing: Deployed 22.5.2023 – Collected 29.05.2023, Deployed 29.05.2023 – Collected 07.06.2023, Deployed 19.06.2023 – Collected 26.06.2023, Deployed 03.07.2023 – collected 11.07.2023)
	Emergence (trees)	May 2023 to July 2023 (weeks commencing: 22/29.05.2023, 19.06.2023, 03.07.2023
Mammal species	Mammal species other than bats (i.e. otter, badger, red squirrel, etc.).	October 2022 to August 2023 (Checks for fauna species were carried out during habitat, bird, bat and aquatic surveys)
Smooth newt	eDNA sampling for smooth newt	August 2023 (9 August 2023 and 10 August 2023)
Freshwater fish	eDNA sampling for Atlantic salmon, lamprey and European eel	August 2023 (9 August 2023 and 10 August 2023)
White-clawed crayfish	eDNA sampling for white-clawed crayfish	August 2023 (9 August 2023 and 10 August 2023)

10.2.3.2.1 Scoped Out Surveys

The following surveys were scoped out:

- **Amphibians and Reptiles:** Amphibian and reptile presence / likely absence surveys were scoped out. Habitat suitability was used as a proxy for species presence with the exception of smooth newt (*Lissotriton vulgaris*) for which eDNA surveys were undertaken at all suitable water bodies;

- **Bats:** Structures / trees outside of the Planning Application Boundary (PAB) were not subject to survey as these will not be directly impacted. Only structures / trees to be directly impacted were subject to survey, and as there are no structures within the PAB, none were surveyed;
- **Kingfisher:** Survey for kingfisher (*Alcedo atthis*) was limited to one river reach (i.e., the River Tolka – WB05). The remaining watercourses afforded limited habitat suitability and were therefore scoped out from further survey;
- **Aquatic Receptors:** An aquatic habitat assessment was undertaken to identify the presence of suitable habitat for aquatic species. No electrofishing, invertebrate or macrophytes surveys were carried out. A combination of existing WFD publicly available data along with data record searches and eDNA results was used to inform this EIAR;
- **Marsh Fritillary**: Surveys for marsh fritillary (*Euphydryas aurinia*) were not undertaken as no suitable habitat (i.e., grassland areas containing devil's bit scabious *(Succisa pratensis*) which is the caterpillar's preferred foodplant) were identified during the habitat surveys;
- **Irish Vegetation Classification (IVC):** No habitat condition assessment surveys were carried out as no Annex I habitat was recorded during Fossitt habitat mapping surveys; and
- **Aquatic macrophyte surveys**: No surveys were undertaken for aquatic macrophytes. However, species of conservation interest and / or invasive species, if present, were noted.

10.2.3.2.2 Consultation

Relevant stakeholders were contacted as part of the Scoping Process for the Environmental Impact Assessment (EIA) Report for the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). The stakeholders were contacted in November 2023 and were provided with an electronic copy of the EIA Scoping Memo for the Proposed Development. The stakeholders were invited to review the EIA Scoping Memo and make a submission related to its content or additional information or topics which they considered relevant to the development of the EIAR. A non-statutory consultation period of four weeks was provided for comment. However, responses were accepted post this consultation period.

A summary of scoping consultation responses is provided in Appendix A1.1 in Volume 3 of this EIAR.

10.2.3.2.3 Difficulties Encountered in Compiling Information

Ecological surveys are limited by a variety of factors which affect the presence of flora and fauna (for example, climatic variation, season and species behaviour). Evidence of protected species is not always present during a survey. This does not mean that a species is absent, and hence, the surveys also record and assess the suitability of habitats to support species, and (where appropriate, for species with dynamic distributions) further pre-construction confirmatory surveys are proposed to verify any locations requiring additional mitigation. Ecological surveys provide evidence of ecological activity for a snapshot of time. No major limitations were encountered in gathering data. It is considered that the baseline data collected is sufficient to inform a robust and thorough assessment of potential impacts.

The following provides further information:

- General: Surveys were limited at times due to access constraints. Lack of access to certain land holdings (5.57% of the total study area) may have limited the selection of trees with bat roost potential, identification of mammal signs such as badger setts, and required habitat surveys to be undertaken via binoculars and desk-based reviews. This is not considered to be a significant limitation that could have otherwise compromised the integrity of the results as the majority of the proposed cable route will be within the road and the immediate vicinity of the route was surveyed;
- Bat survey limitation: Weather conditions during the third survey of trees with high potential (T06, T07, T08, T09, T10, T11, T12, T15) were sub-optimal (light rain). However, this is not considered a significant limitation as bat activity was recorded throughout the course of the

surveys; Wintering birds limitation: Surveys were caried out using a combination of drive-by assessment and Vantage Points, both standard methodologies for wintering bird surveys. Where surveys were carried out from inside cars driving along busy roads, some birds may well have been missed due to reduced visibility on the day. However, given that the surveys were repeated monthly over a six-month period and in the same locations, any aggregations of birds not fully seen in one month would be counted in subsequent visits. Therefore, it is considered that there is no limitation to the data collected during drive-by survey. There were no limitations due to site access or weather;

- Breeding birds limitation: Transects 6 and 8 were not surveyed for breeding birds or any other ecological surveys due to land access issues. A desk-based survey was used to classify the habitat as improved agricultural grassland and scrub. Therefore, at these locations there is the potential that breeding waders and red-listed farm birds could have been missed. However, taking the habitat into account, it is unlikely to host breeding waders. Transects 4, 7 and 11 were not surveyed in April due to land access issues but were surveyed in May and June. The habitats present at Transects 4 (improved grassland with tight sward and managed rushes), 7 (arable crops and tilled land) and 11 (arable crops, dry calcareous and improved grassland) were suitable for both breeding waders and red-listed farm land birds, so therefore, species could have been missed. However, it was considered likely that two visits would determine presence or absence of these birds of concern;
- Watercourses: Watercourses surveyed during summer 2023 were initially found to be dry due to the persistent heatwave across Ireland. These surveys were postponed and carried in August 2023. Sixteen watercourses were identified for eDNA sampling with 18 sampling locations visited and 14 samples taken due to access issues. eDNA could not be carried out at one watercourse (WB08) and two ditches (DD25 and DD35) due to dense vegetation growth preventing access for sampling. Watercourse characterisation was carried out when vegetation was much lower and the watercourses appeared suitable to support species of conservation interest at that point in time. However, given the highly shaded nature of the watercourses, it is unlikely that any species of conservation interest would be present, and therefore, no eDNA for these sites was not considered a limitation;
- Tree value: The classification of mature and veteran trees to assist in the determination of the level of residual impact was carried out by desk-based inspection of freely available aerial and street view imagery, in addition to incidental records found on other field-based surveys; and
- Habitat survey: Not all of the habitats within the study area were visited during field surveys. Where there were gaps, these were addressed using desk-based aerial imagery (Google Maps, accessed December 2023) . Presence of invasive species at such locations will be addressed through pre-construction surveys.

10.2.4 Appraisal Method for the Assessment of Impacts

The criteria used to assess the ecological value and significance of the study area for habitats and species present follows the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009) and the Guidelines for Ecological Impact Assessment in the CIEEM Guidance (CIEEM 2018).

10.2.4.1 Valuing the Ecological Receptors

The value of an ecological feature is considered within a defined geographic context (e.g. International / National, Regional / Local). Habitats are assessed as a whole with the highest valuation provided. For example, the overall valuation of drainage ditches (FW4) is considered of Local Importance (Higher Level), although there are many ditches that are individually considered of Local Importance (Lower Level).

Impact assessment is only undertaken for Important Ecological Receptors (IERs) that are within the ZoI of the Proposed Development and are "*both of sufficient value to be material in decision making*" and "*likely to be* *affected significantly*" (NRA 2009). To qualify as IERs, features must be of Local Ecological Importance (Higher Value) or higher, as per the criteria from the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009). Features valued at Local Ecological Importance (Lower Value) are not subject to impact assessment.

10.2.4.2 Impact Assessment Process

The impact assessment process (CIEEM 2018) involves:

- Identifying and characterising impacts and their effects;
- Incorporating measures to avoid and mitigate (reduce) these impacts and effects;
- Assessing the significance of any residual impacts, after mitigation;
- Identifying appropriate compensation measures to offset significant residual impacts; and
- Identifying opportunities for ecological enhancement.

The hierarchical process of avoiding, mitigating and compensating for ecological impacts is explained in Section 10.2.4.7.

In Ecological Impact Assessment (EcIA), it is only essential to assess and report significant residual impacts (i.e. those that remain after mitigation measures have been taken into account). However, it is considered good practice for the EcIA to make clear, both the potential significant impacts without mitigation, and the residual significant impacts, following mitigation. Alternatively, it should demonstrate the importance of securing the measures proposed through planning conditions or obligations (CIEEM 2018).

Positive and negative impacts / effects are determined according to whether the change is in accordance with nature conservation objectives and policy (if no significant impacts / effects are foreseen, the impact is considered neutral):

- Positive impact – a change that improves the quality of the environment (e.g., by increasing species diversity, extending habitat or improving water quality). Positive impacts may also include halting or slowing an existing decline in the quality of the environment; and
- Negative impact – a change which reduces the quality of the environment (e.g. destruction of habitat, removal of species foraging habitat, habitat fragmentation, pollution).

Positive and negative impacts and effect on ecological features are characterised based on predicted changes as a result of the proposed activities. In order to characterise the impacts and effects on each feature, the following parameters are considered:

- The magnitude of the impact. This refers to size, amount, intensity and volume;
- The spatial extent or geographical area over which the impact / effect would occur;
- The temporal duration of the impact and whether it relates to the Construction or Operational Phase of the Proposed Development. Impacts and effects may be short, medium, or long-term and permanent or temporary;
- The timing and frequency of the impact; and
- Whether the impact is reversible and over what time frame.

10.2.4.3 Conservation Status

Consideration of conservation status is important for evaluating the effect of impacts on individual habitats and species and assessing their significance:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure, and function as well as its typical pieces within a given geographical range; and
- Species: conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area (CIEEM 2018).

Favourable condition is the satisfactory condition of an ecological feature. In some cases, favourable condition is specifically defined (e.g., for some designated sites).

10.2.4.4 Impact Significance

In accordance with the EPA Guidelines (EPA 2022) and with CIEEM Guidance (CIEEM 2018), all impacts are either significant or not significant. Significant impacts encompass impacts on structure and function of defined sites, habitats, or ecosystems and the conservation status of habitats and species within a given geographical area. The ecological value of a feature (i.e. Local, County, National, International) is related to the level of impact.

10.2.4.5 Cumulative Impacts and Effects

Consideration is also given to the potential for the Proposed Development to have significant impacts and effects, in-combination with other proposed developments in the local area. All mitigation measures for the Proposed Development are included in Section 10.5 of this Chapter and are also included in the Construction Environmental Management Plan (CEMP) which is included as a standalone document in the planning application pack.

10.2.4.6 Overall Assessment

An overall assessment of value and impact is provided. This is based upon the highest level or value of any of the features or species present, or likely to be present on the site. Similarly, the overall assessment of impact is the impact of greatest significance.

10.2.4.7 Mitigation Hierarchy

The following principles underpin EcIA and have been followed, where applicable, in this assessment:

- Avoidance - Seek options that avoid harm to ecological features (for example, by locating the Proposed Development on an alternative site or safeguarding on-site features within the site layout design);
- Mitigation - Negative impacts should be avoided or minimised through mitigation measures, either through the design of the Proposed Development or subsequent measures that can be guaranteed (e.g., through a condition or planning obligation);
- Compensation - Where there are significant residual negative ecological impacts despite the mitigation proposed, these should be offset by appropriate compensatory measures; and
- Enhancement - Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

10.3 Baseline Environment

This Section describes the existing ecological environment within the ZoI of the Proposed Development. Data on the ecological baseline was obtained from a combination of desk-based review and field surveys. The ZoI varied according to the ecological receptor as shown in Table 10.1. The methodologies used to collate information on the ecological baseline are described in Appendix A10.2 in Volume 3 of this EIAR.

10.3.1 Desk-Based Study

10.3.1.1 European Designated Sites

Applying the source-pathway-receptor model, 19 European sites that were potentially within the ZoI of the Proposed Development due to their connectivity (proximity / ecological / hydrological etc.) were assessed. These sites, SPAs and SACs are shown in Figure 10.1 in Volume 4 of this EIAR and are listed below using SAC and SPA as the first level of list order, then by increasing direct distance from the Proposed Development:

1. Malahide Estuary SAC (000205) – approximately 3.6km;
2. Baldoyle Bay SAC (000199) - approximately 4km;
3. Rockabill to Dalkey Island SAC (003000) - approximately 8.8km;
4. Lambay Island SAC (000204) - approximately 13.4km;
5. Malahide Estuary SPA (004025) - approximately 3.6km;
6. Baldoyle Bay SPA (004016) - approximately 4km;
7. North-West Irish Sea SPA (004236) - approximately 4.5km;
8. North Bull Island SPA (004006) - approximately 4.6km;
9. South Dublin Bay and River Tolka Estuary SPA (004024) - approximately 5.5km;
10. Rogerstown Estuary SPA (004015) - approximately 7.8km;
11. Ireland's Eye SPA (004117) - approximately 8.6km;
12. Howth Head Coast SPA (004113) - approximately 10km;
13. Lambay Island SPA (004069) - approximately 13.4km;
14. Dalkey Islands SPA (004172) - approximately 17.5km;
15. Skerries Islands SPA (004122) - approximately 18.5km;
16. Rockabill SPA (004014) - approximately 19km;
17. River Nanny Estuary and Shore SPA (004158) - approximately 26km;
18. Boyne Estuary SPA (004080) - approximately 33km; and
19. Dundalk Bay SPA (004026) - approximately 50km.

The 19 European designated sites within the ZoI and the QI habitats and species for which these sites are designated are shown in Table 10.4 (note that this Chapter uses the term QI for European sites rather than Species of Conservation Interest). *European sites are considered of International Importance.*

Seven additional European sites were considered to be within the vicinity of the Proposed Development but outside the ZoI due to there being no hydrological connection, or there was a hydrological connection but there was a weak link only, and as such, no direct or indirect impacts are anticipated. The seven sites outside the ZoI are Rye Water Valley / Carton SAC (001398), North Dublin Bay SAC (000206), South Dublin Bay SAC (000210), Rogerstown Estuary SAC (000208), Howth Head SAC (00202), Ireland’s Eye SAC (002193) and Wicklow Mountains SPA (004040).

Table 10.4: European Designated Sites (19 sites) and their Qualifying Interest Habitats and Species Within the ZoI of the Proposed Development (sites with connectivity are coloured grey)

Site Name	Qualifying Interest Habitats and Species	Location (Direct and Hydrological Distance)	Within the ZoI?
SAC			
Malahide Estuary SAC (000205)	Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Direct distance: 3.6km north-east Hydrological distance: 8.7km downstream via River Ward (Ward_030, Watercourse 16, WB19), 6.8km downstream via River Ward (Ward_030, Watercourse 17, WB20), and 6 km via River Ward (Ward_030, Watercourse 18, WB21)	Yes, hydrological connection via the Ward030
Baldoyle Bay SAC (000199)	Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	Direct distance: 4km east Hydrological distance: 5.1km downstream via the River Mayne and the River Sluice (Mayne_010, Watercourse 20, WB23)	Yes, hydrological connection via River Mayne 010 and River Sluice 010
Rockabill to Dalkey Island SAC (003000)	Reefs [1170] *Phocoena phocoena* (Harbour Porpoise) [1351]	Direct distance: 8.8km east Hydrological distance: 10.5km downstream via the River Mayne (Mayne_010, Watercourse 20, WB23) Baldoyle Estuary, and Irish Sea	Yes, hydrological connection via Irish Sea
Lambay Island SAC (000204)	Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] *Halichoerus grypus* (Grey Seal) [1364] *Phoca vitulina* (Harbour Seal) [1365]	Direct distance: 13.4km Hydrological distance: 20km via the Irish Sea	Yes, hydrological connection via Irish Sea
SPA			
Malahide Estuary SPA (004025)	Great Crested Grebe (*Podiceps cristatus*) [A005] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Pintail (*Anas acuta*) [A054] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]	Direct distance: 3.6km north-east Hydrological distance: 8.7km via River Ward	Yes, hydrological connection via Ward 030 and functional habitats for QI species as the Proposed Development is within the foraging range for multiple species.
Baldoyle Bay SPA (004016)	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	Direct distance: 4km east	Yes, hydrological connection via the Mayne 010 and the

Site Name	Qualifying Interest Habitats and Species	Location (Direct and Hydrological Distance)	Within the ZoI?
	Shelduck (*Tadorna tadorna*) [A048] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Bar-tailed Godwit (*Limosa lapponica*) [A157] Wetland and Waterbirds [A999]	Hydrological distance: 5.7km via River Mayne	Sluice 010. The Proposed Development is also within foraging range for multiple species and so may cause disturbance to QI species in functional habitat.
North-West Irish Sea SPA (004236)	Common Scoter (*Melanitta nigra*) [A065] Red-throated Diver (*Gavia stellata*) [A001] Great Northern Diver (*Gavia immer*) [A003] Fulmar (*Fulmarus glacialis*) [A009] Manx Shearwater (*Puffinus puffinus*) [A013] Shag (*Phalacrocorax aristotelis*) [A018] Cormorant (*Phalacrocorax carbo*) [A017] Little Gull (*Larus minutus*) [A177] Kittiwake (*Rissa tridactyla*) [A188] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Herring Gull (*Larus argentatus*) [A184] Great Black-backed Gull (*Larus marinus*) [A] Little Tern (*Sterna albifrons*) [A195] Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Puffin (*Fratercula arctica*) [A204] Razorbill (*Alca torda*) [A200] Guillemot (*Uria aalge*) [A199]	Direct distance: 4.5km east Hydrological distance: 6.2km via Irish Sea	Yes, hydrological link via coastal waters of the Irish Sea. The Proposed Development is also within foraging range for multiple species and so may cause disturbance to QI species in functional habitat
North Bull Island SPA (004006)	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Wetland and Waterbirds [A999]	Direct distance: 4.6km south-east Hydrological distance: 23km via Irish Sea and River Tolka	Yes. The Proposed Development is also within foraging range for multiple species and so may cause disturbance or habitat degradation through pollution to QI species in functional habitat
South Dublin Bay and River Tolka Estuary SPA (004024)	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Oystercatcher (*Haematopus ostralegus*) [A130] Ringed Plover (*Charadrius hiaticula*) [A137] Grey Plover (*Pluvialis squatarola*) [A141]	Direct distance: 5.5km south-east Hydrological distance: 20.8km via Irish Sea and River Tolka	Yes. The Proposed Development is also within foraging range for multiple species and so may cause disturbance or habitat

Site Name	Qualifying Interest Habitats and Species	Location (Direct and Hydrological Distance)	Within the ZoI?
	Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (Calidris alpina) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157] Redshank (*Tringa totanus*) [A162] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Wetland and Waterbirds [A999]		degradation through pollution to QI species in functional habitat
Rogerstown Estuary SPA (004015)	Greylag Goose (*Anser anser*) [A043] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Shoveler (*Anas clypeata*) [A056] Oystercatcher (*Haematopus ostralegus*) [A130] Ringed Plover (*Charadrius hiaticula*) [A137] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]	Direct distance: 7.8km north-east	Yes. The Proposed Development is also within foraging range for multiple species and so may cause disturbance or habitat degradation to QI species in functional habitat
Ireland's Eye SPA (004117)	Cormorant (*Phalacrocorax carbo*) [A017] Herring Gull (*Larus argentatus*) [A184] Kittiwake (*Rissa tridactyla*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200]	Direct distance: 8.6km east Hydrological distance: 10.5km via Irish Sea	Yes, via Irish Sea. The Proposed Development is also within foraging range for multiple species and so may cause disturbance or habitat degradation through pollution to QI species in functional habitat
Howth Head Coast SPA (004113)	Kittiwake (*Rissa tridactyla*) [A188]	Direct distance: 10km south-east Hydrological distance: 13km via Irish Sea	Yes, via Irish Sea
Lambay Island SPA (004069)	Fulmar (*Fulmarus glacialis*) [A009] Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Greylag Goose (*Anser anser*) [A043] Lesser Black-backed Gull (*Larus fuscus*) [A183] Herring Gull (*Larus argentatus*) [A184] Kittiwake (Rissa tridactyla) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]	Direct distance: 13.4km north-east Hydrological distance: 22.1km via Irish Sea	Yes, via Irish Sea. The Proposed Development is also within foraging range for multiple species and so may cause disturbance or habitat degradation to QI species in functional habitat
Dalkey Islands SPA (004172)	Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194]	Direct distance: 17.5km Hydrological distance: 23km	Yes, via Irish Sea
Skerries Islands SPA (004122)	Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	Direct distance: 18.5km Hydrological distance: 29km Hydrological distance to impacted supporting	Yes, via Irish Sea. The Proposed Development is also within foraging range for multiple species and so may

Site Name	Qualifying Interest Habitats and Species	Location (Direct and Hydrological Distance)	Within the ZoI?
	Purple Sandpiper (*Calidris maritima*) [A148] Turnstone (*Arenaria interpres*) [A169] Herring Gull (*Larus argentatus*) [A184]	habitat from the Proposed Development: Baldoyle SPA: 4.8km Malahide SPA: 8.7km	cause disturbance or habitat degradation to QI species in functional habitat
Rockabill SPA (004014)	Purple Sandpiper (*Calidris maritima*) [A148] Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194]	Direct distance: 19km Hydrological distance: 30km	Yes, via Irish Sea. The Proposed Development is also within foraging range for multiple species and so may cause disturbance or habitat degradation to QI species in functional habitat
River Nanny and shoreline SPA (004158)	Oystercatcher (*Haematopus ostralegus*) [A130] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Herring Gull (*Larus argentatus*) [A184] Wetland and Waterbirds [A999]	Direct distance: 26km Hydrological distance: 43km Hydrological distance to impacted supporting habitat from the Proposed Development: Baldoyle SPA: 4.8km Malahide Bay SPA: 8.7km	No. There is a hydrological link to the SPA via other SPAs, but it is considered *de minimus* due to the intervening distance of and dilution rates. The distance of 43km means a pollution event is unlikely to reach this European site to cause significant impacts. However, there are hydrological links to the supporting habitat of Malahide Estuary and Baldoyle SPA of which there is overlapping QIs with this SPA.
Boyne Estuary SPA (004080)	Shelduck (*Tadorna tadorna*) [A048] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Black-tailed Godwit (*Limosa limosa*) [A156] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Little Tern (*Sterna albifrons*) [A195] Wetland and Waterbirds [A999]	Direct distance: 33km Hydrological distance: 52km Hydrological distance to impacted supporting habitat from the Proposed Development: Baldoyle SPA: 4.8km Malahide Bay SPA: 8.7km	No. There is a hydrological link to the SPA via other SPAs, but it is considered de minimus due to the intervening distance of and dilution rates. The distance of 52km means a pollution event is unlikely to reach this European site to cause significant impacts. However, there are hydrological links to the supporting habitat of Malahide Estuary and Baldoyle SPA of which there is overlapping QIs with this SPA.
Dundalk Bay SPA (004026)	Great Crested Grebe (*Podiceps cristatus*) [A005] Greylag Goose (*Anser anser*) [A043] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Teal (*Anas crecca*) [A052]	Direct distance: 50km Hydrological distance: 78km Hydrological distance to impacted supporting	No. There is a hydrological link to the SPA via other SPAs, but it is considered de minimus due to the intervening distance of and dilution rates. The

Site Name	Qualifying Interest Habitats and Species	Location (Direct and Hydrological Distance)	Within the ZoI?
	Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Common Scoter (*Melanitta nigra*) [A065] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Herring Gull (*Larus argentatus*) [A184] Wetland and Waterbirds [A999]	habitat from the Proposed Development: Baldoyle SPA: 4.8km Malahide Bay SPA: 8.7km	distance of 78km means a pollution event is unlikely to reach this European site to cause significant impacts. However, there are hydrological links to the supporting habitat of Malahide Estuary and Baldoyle SPA of which there is overlapping QIs with this SPA.

10.3.1.2 Nationally Designated Sites

Natural Heritage Areas (NHAs) are designated under Section 18 of Number 38 of 2000 - Wildlife (Amendment) Act, 2000 and encompass nationally important semi-natural and natural habitats, landforms and geomorphological features. NHAs are legally protected from damage from the date they are formally proposed for designation. In addition to NHAs, there are proposed NHAs (pNHAs). These are also sites of significance for wildlife and habitats and were published on a non-statutory basis in 1995 but have not since been statutorily confirmed or designated. Prior to statutory designation, pNHAs are subject to limited protection, in the form of:

- Agri-environmental farm planning schemes such as Rural Environment Protection Scheme (REPS 3 and 4) and Agri Environmental Options Scheme (AEOS) supported the objective of maintaining and enhancing the conservation status of pNHAs up until 2014. These were then replaced with the Green Low-Carbon Agri-Environment Scheme (GLAS) which operated from 2014-2023 and then the Agri-Climate Rural Environment Scheme (ACRES) which commenced in 2023;
- Forest Service requirement for NPWS approval before they will pay afforestation grants on pNHA lands; and
- Recognition of the ecological value of pNHAs by Planning and Licensing Authorities (NPWS 2019a).

No NHAs were identified within the ZoI of the Proposed Development. Four pNHAs were identified within the potential ZoI of the Proposed Development on the basis of hydrological connectivity. A further two pNHAs were considered to be in the vicinity of the Proposed Development, but outside the ZoI due to there being a weak hydrological link. Therefore, no direct or indirect impacts are anticipated to these pNHAs. Further information in relation to the pNHAs and their distance from the Proposed Development is provided in Table 10.5. Detailed site synopses are not available for pNHAs that overlap European designated sites. *The pNHAs are considered of National Importance.*

Table 10.5: pNHAs within the Study Area (those within the zone of influence are coloured grey)

Site Name	Site Summary	Location	Within the ZoI?
Malahide Estuary pNHA (000205)	Site synopsis not available. pNHA boundary overlaps Malahide Estuary SAC/SPA.	3.5km north-east	Yes, hydrological connection via Ward_030
Sluice River Marsh pNHA (001763)	The site is comprised of freshwater marsh, wet grassland and willow scrub and is known to support wildfowl and other bird species.	3.6km east	Yes, hydrological connection via the Mayne_010 and the Sluice_010.
Baldoyle Bay pNHA (000199)	Site synopsis not available. pNHA boundary overlaps Baldoyle Bay SAC/SPA.	4km east	Yes, hydrological connection via the Mayne_010 and the Sluice_010.
North Dublin Bay pNHA (000206)	Site synopsis not available. pNHA boundary overlaps North Dublin Bay SAC/ North Bull Island SPA.	4.4km south-east	No
Howth Head pNHA (000202)	Site synopsis not available. pNHA boundary overlaps Howth Head SPA.	8.4km east	Yes, via Irish Sea
Ireland's Eye pNHA (000203)	Site synopsis not available. pNHA boundary overlaps Ireland's Eye SPA.	8.7km east	No

10.3.1.3 Annex I Habitats

No Annex I habitats other than those associated with European sites (see Table 10.4 and nationally designated sites were identified from the desk study.

10.3.1.4 Aquatic Environment

The main river catchments that will be interacted with by the Proposed Development are shown in Table 10.6. Table 10.6 shows all water bodies in the study area according to the EPA maps and the river water body WFD status for the 2016 to 2021 monitoring period, and the risk rating, where available (EPA 2022). The risk rating does not affect the assessment as the assessment takes cognisance only of the 2016 to 2021 status and is provided for completeness only.

Table 10.6: WFD Water Bodies in the Proposed Development Study Area (Rivers are Listed from West to East)

Water Body Name	No. River Interactions and their Locations According to the EPA	No. River Interactions After the Site Visit	WFD Status 2016-2021	Risk Rating
TOLKA_020 (IE_EA_ 09T010600)	2 crossings: WB04: O 01119 43261 WB05: O 01655 43968	2 crossings	Moderate	At risk
	Additional adjacent river WB01: N 94742 47221 (closest to route)	1 adjacent source.		
DUNBOYNE STREAM_010 (IE_EA_ 09D040500)	2 crossings: WB02: N 94483 46404 WB03: O 00537 42674	2 crossings	Poor	At risk
PINKEEN_010 (IE_EA_ 09P020500)	1 crossing: WB07: O 04094 44965	1 crossing	Moderate	At risk
	1 tributary source adjacent to cable: WB06: O 03952 45039	1 adjacent source.		
WARD_020 (IE_EA_ 08W010070)	1 tributary source adjacent to cable: WB08: O 05260 45264	No interaction in-road crossing.	Moderate	At risk
	3 crossings: WB12: O 07317 44650 WB13: O 07378 44541 WB14: O 07489 44351	3 crossings.		
WARD_010 (IE_EA_ 08W010050)	3 mapped crossings: WB09: O 05634 45422 WB10: O 05654 45457 WB11: O 06599 45597	2 actual crossings.	Poor	At risk
WARD_030 (IE_EA_ 08W010300)	7 tributary sources adjacent to cable: WB15: O 09528 44520 WB16: O 10245 45153 WB17: O 10370 45217 WB18: O 10840 45522	4 crossings.	Moderate	At risk
	3 crossings: WB19: O 11650 45815 WB20: O 13141 44724 WB21: O 14066 44606	3 crossings.		
SLUICE_010 (IE_EA_ 09S071100)	1 crossing: WB22: O 16415 44423	1 crossing.	Poor	At risk
MAYNE_010 (IE_EA_ 09M030500)	1 crossing: WB23: O 19003 42112	1 crossing.	Poor	At risk
NOTE 1: River interactions means both points where the cable transects a watercourse or where the cable passes in close proximity (<5m) from a watercourse				

10.3.1.5 Protected and Rare Species

Records of legally protected, rare and / or notable species within 2km of the Proposed Development PAB are listed in Table 10.7. Records of legally protected, rare and / or notable species within 150m of the Proposed Development PAB are listed in Table 10.8.

Table 10.7: Records of Protected, Rare and Other Notable Fauna Within 2km of the Proposed Development (NBDC 2023) (Species in Bold are Designated Under European Sites within ZoI)

Species Name	Scientific Name	Record Count	Date of Last Record	Closest Record to Site	Title of Dataset	Designation
Common frog	*Rana temporaria*	7	23/02/2023	20m	Amphibians and reptiles of Ireland	Wildlife Act
Smooth newt	*Lissotriton vulgaris*	2	01/06/2010	315m	Reptiles and Amphibians Distribution Atlas 1978 (An Foras Forbartha) Newt Survey 2010-2014	Protected Species: Wildlife Act
Arctic tern	***Sterna paradisaea***	1	14/05/2001	600m	Birds of Ireland	EU Birds Directive: Annex I Bird Species; Wildlife Act
Barn swallow	*Hirundo rustica*	3	31/12/2011	240m	Bird Atlas 2007 – 2011	Wildlife Acts
Bar-tailed godwit	***Limosa lapponica***	3	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex I Bird Species; Wildlife Act
Black guillemot	*Cepphus grylle*	1	04/01/2003	625m	Birds of Ireland	Wildlife Act
Black-headed gull	***Larus ridibundus***	5	31/12/2011	0m	Bird Atlas 2007 – 2011	Wildlife Act
Black-legged kittiwake	***Rissa tridactyla***	2	03/01/2003	625m	Birds of Ireland	Wildlife Act
Black-tailed godwit	***Limosa limosa***	3	04/01/2003	625m	Birds of Ireland	Wildlife Act
Brent goose	***Branta bernicla***	4	04/01/2003	625m	Birds of Ireland	Wildlife Act
Common coot	*Fulica atra*	2	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex II: Section I , Annex III: Section II Bird Species; Wildlife Act
Common goldeneye	***Bucephala clangula***	3	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex II: Section II Bird Species; Wildlife Act
Common greenshank	*Tringa nebularia*	3	04/01/2003	625m	Birds of Ireland	Wildlife Act;
Common guillemot	***Uria aalge***	2	03/01/2003	625m	Birds of Ireland	Wildlife Act
Common kestrel	*Falco tinnunculus*	5	31/12/2011	0m	Bird Atlas 2007 – 2011	Wildlife Act
Common linnet	*Carduelis cannabina*	2	25/08/2011	625m	Birds of Ireland	Wildlife Act
Common pochard	*Aythya ferina*	2	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex II: Section I, Annex III: Section II Bird Species; Wildlife Act

Species Name	Scientific Name	Record Count	Date of Last Record	Closest Record to Site	Title of Dataset	Designation
Common redshank	***Tringa totanus***	3	03/01/2003	625m	Birds of Ireland	Wildlife Act
Common scoter	***Melanitta nigra***	1	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex II: Section II & Annex III: Section III Bird Species; Wildlife Act
Common shelduck	***Tadorna tadorna***	6	04/01/2003	625m	Birds of Ireland	Wildlife Act
Common snipe	*Gallinago gallinago*	2	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex II: Section I & Annex III: Section III Bird Species; Wildlife Act
Common starling	*Sturnus vulgaris*	9	18/05/2012	0m	Birds of Ireland Bird Atlas 2007 – 2011	Wildlife Act
Common wood pigeon	*Columba palumbus*	9	21/02/2017	625m	Birds of Ireland	EU Birds Directive: Annex II: Section I & Annex III: Section I Bird Species; Wildlife Act
Dunlin	***Calidris alpina***	3	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex I Bird Species; Wildlife Act
Eurasian curlew	***Numenius arquata***	4	31/12/2011	0m	Bird Atlas 2007 – 2011	EU Birds Directive: Annex II, Section II Bird Species; Wildlife Act
Eurasian oystercatcher	***Haematopus ostralegus***	3	03/01/2003	625m	Birds of Ireland	Wildlife Act
Eurasian teal	***Anas crecca***	4	04/01/2003		Birds of Ireland	EU Birds Directive: Annex II: Section I & Annex III: Section II Bird Species; Wildlife Act
Eurasian tree sparrow	*Passer montanus*	1	31/12/2011	0m	Bird Atlas 2007 – 2011	Wildlife Act
Eurasian wigeon	*Anas penelope*	4	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex II: Section I & Annex III: Section II Bird Species; Wildlife Act
European golden plover	***Pluvialis apricaria***	2	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex I, Annex II: Section II & Annex III: Section III Bird Species
European shag	***Phalacrocorax aristotelis***	3	04/01/2003	625m	Birds of Ireland	Wildlife Act
Great black-backed gull	***Larus marinus***	3	03/01/2003	625m	Birds of Ireland	Wildlife Act
Great cormorant	***Phalacrocorax carbo***	5	04/01/2003	625m	Birds of Ireland	Wildlife Act
Great crested grebe	***Podiceps cristatus***	4	04/01/2003	625m	Birds of Ireland	Wildlife Act
Great northern diver	***Gavia immer***	1	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex I Bird Species; Wildlife Act
Grey partridge	*Perdix perdix*	1	31/12/2011	0m	Bird Atlas 2007 – 2011	EU Birds Directive: Annex II: Section I & Annex III: Section I Bird Species; Wildlife Act
Grey plover	***Pluvialis squatarola***	2	04/01/2003	625m	Birds of Ireland	Wildlife Act

Species Name	Scientific Name	Record Count	Date of Last Record	Closest Record to Site	Title of Dataset	Designation
Herring gull	***Larus argentatus***	5	18/01/2011	625m	Birds of Ireland	Wildlife Act
House martin	*Delichon urbicum*	2	31/12/2011	0m	Bird Atlas 2007 – 2011	Wildlife Act
House sparrow	*Passer domesticus*	7	12/06/2018	625m	Birds of Ireland	Wildlife Act
Lesser black-backed gull	***Larus fuscus***	2	01/01/2003	0m	Birds of Ireland Bird Atlas 2007 – 2011	Wildlife Act
Little egret	*Egretta garzetta*	2	16/02/2016	0m	Birds of Ireland Bird Atlas 2007 – 2011	EU Birds Directive: Annex I Bird Species; Wildlife Act
Little grebe	*Tachybaptus ruficollis*	2	04/01/2003	625m	Birds of Ireland	Wildlife Act
Mallard	***Anas platyrhynchos***	6	14/04/2012	270m	Birds of Ireland	EU Birds Directive: Annex II: Section I & Annex III: Section I Bird Species; Wildlife Act
Mediterranean gull	*Larus melanocephalus*	2	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex I Bird Species; Wildlife Act
Merlin	*Falco columbarius*	2	31/12/2011	625m	Birds of Ireland Bird Atlas 2007 – 2011	EU Birds Directive: Annex I Bird Species; Wildlife Act
Mew gull	*Larus canus*	3	03/01/2003	185m	Birds of Ireland Bird Atlas 2007 – 2011	Wildlife Act
Mute swan	*Cygnus olor*	4	04/01/2003	0m	Birds of Ireland Bird Atlas 2007 – 2011	Wildlife Act
Northern lapwing	***Vanellus vanellus***	4	31/12/2011	0m	Bird Atlas 2007 – 2011 Bird Atlas 2007 – 2011	EU Birds Directive: Annex II: Section II Bird Species; Wildlife Act
Northern pintail	***Anas acuta***	2	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex II: Section I B& Annex III: Section II Bird Species; Wildlife Act
Northern shoveler	***Anas clypeata***	1	01/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex II: Section I B& Annex III: Section II Bird Species; Wildlife Act
Razorbill	***Alca torda***	2	03/01/2003	625m	Birds of Ireland	Wildlife Act
Red kite	*Milvus milvus*	2	01/02/2023	490m	Birds of Ireland	Wildlife Act
Red knot	***Calidris canutus***	1	06/01/2001	625m	Birds of Ireland	Wildlife Act
Red-breasted merganser	***Mergus serrator***	2	03/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex II: Section II Bird Species; Wildlife Act
Red-throated diver	***Gavia stellata***	1	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex I Bird Species; Wildlife Act

Species Name	Scientific Name	Record Count	Date of Last Record	Closest Record to Site	Title of Dataset	Designation
Ringed plover	***Charadrius hiaticula***	2	04/01/2003	625m	Birds of Ireland	Wildlife Act
Short-eared owl	*Asio flammeus*	1	31/12/2011	0m	Bird Atlas 2007 – 2011	EU Birds Directive: Annex I Bird Species; Wildlife Act
Sky lark	*Alauda arvensis*	3	31/12/2011	0m	Bird Atlas 2007 – 2011	Wildlife Act
Stock pigeon	*Columba oenas*	2	31/12/2011	0m	Bird Atlas 2007 – 2011	Wildlife Act
Tufted duck	*Aythya fuligula*	2	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex II: Section I & Annex III: Section II Bird Species; Wildlife Act
Water rail	*Rallus aquaticus*	1	04/01/2003	625m	Birds of Ireland	Wildlife Act
Whooper swan	*Cygnus cygnus*	1	04/01/2003	625m	Birds of Ireland	EU Birds Directive: Annex I Bird Species; Wildlife Act
Yellowhammer	*Emberiza citrinella*	3	02/05/2021	0m	Birds of Ireland Bird Atlas 2007 – 2011	Wildlife Act
Brown long-eared bat	*Plecotus auritus*	4	09/07/2004	470m	National Bat Database of Ireland	EU Habitats Directive: Annex IV; Wildlife Act
Eurasian badger	*Meles meles*	9	31/12/2016	0m	Atlas of Mammals in Ireland 2010-2015 Badger Setts of Ireland Database	Protected Species: Wildlife Act
Eurasian pygmy shrew	*Sorex minutus*	2	06/06/2018	795m	Mammals of Ireland 2016-2025	Protected Species: Wildlife Act
European otter	*Lutra lutra*	6	16/09/2004	35m	Otter Survey of Ireland 1982 Otter survey of Ireland 2004 & 2005	Protected Species: EU Habitats Directive: Annex II & Annex IV; Wildlife Act
Lesser noctule	*Nyctalus leisleri*	18	09/08/2012	0m	National Bat Database of Ireland	EU Habitats Directive: Annex IV; Wildlife Act
Natterer's bat	*Myotis nattereri*	6	31/12/2007	1315m	National Bat Database of Ireland	EU Habitats Directive: Annex IV; Wildlife Act
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	42	13/08/2014	0m	National Bat Database of Ireland	EU Habitats Directive: Annex IV; Wildlife Act
Soprano pipistrelle	*Pipistrellus pygmaeus*	10	15/07/2014	0m	National Bat Database of Ireland	EU Habitats Directive: Annex IV; Wildlife Act
West European hedgehog	*Erinaceus europaeus*	30	28/06/2022	0m	Hedgehogs of Ireland	Protected Species: Wildlife Act
Whiskered bat	*Myotis mystacinus*	1	18/07/1999	1280m	National Bat Database of Ireland	EU Habitats Directive: Annex IV; Wildlife Act

Table 10.8: Records of Protected, Rare and Other Notable Flora and Fauna Within 200m of the Proposed Development (data from Meath BAP (2015) NPWS and the NBDC (2023))

Species Group	Common Name	Scientific Name	Protection NOTE 1	Conservation Status
Lower Plants	N/A	N/A	No notable or protected species found within 200m of Proposed Development PAB.	N/A
Higher Plants	N/A	N/A	No notable or protected species found within 200m of Proposed Development PAB.	N/A
Invertebrates	N/A	*Andrena (Melandrena) nigroaenea*	Found 200m from the Proposed Development	Vulnerable
Invertebrates	Large Red Tailed Bumble Bee	*Bombus (Melanobombus) lapidarius*	N/A -Notable	Near threatened
Fish	N/A	N/A	No notable or protected species found within 200m of Proposed Development PAB.	N/A
Amphibians	Common frog	*Rana temporaria*	WA	Least concern
Reptiles	N/A	N/A	No notable or protected species found within 200m of Proposed Development PAB.	N/A
Birds	Little egret	*Egretta garzetta*	BDI, WA	Least concern
Birds	Yellowhammer	*Emberiza citrinella*	WA	Birds of Conservation Concern – Red List
Terrestrial mammals	Lesser noctule	*Nyctalus leisleri*	WA	Least concern
Terrestrial mammals	Natterer's Bat	*Myotis nattereri*	WA	Least concern
Terrestrial mammals	Eurasian badger	*Meles meles*	WA	Least concern
Terrestrial mammals	West European hedgehog	*Erinaceus europaeus*	WA	Least concern

Note 1: WA = Wildlife Act, BD = Birds Directive Annex I

10.3.1.6 Fish and Aquatic Invertebrates

No records for fish or aquatic invertebrates were returned in the NBDC desk-based search (NBDC 2023).

The study area is hydrologically linked to three main river catchments. These are the River Tolka located to the west and centre of the Proposed Development, the River Broadmeadow located to the centre and east, and the River Mayne located to the eastern extent of the Proposed Development.

Atlantic salmon, lamprey species, three-spined stickleback (*Gasterosteus aculeatus*), nine-spined stickleback (*Pungitius pungitius*), European eel (*Anguilla anguilla*), stone loach (*Barbatula barbatula*), brown trout (*Salmo trutta*) and minnow (*Phoxinus phoxinus*) are known to be present in the River Tolka and Pinkeen (Kelly *et al*. 2012; Matson *et al*. 2018a). Brown trout, eel, flounder *(Platichthys flesus)*, minnow, nine-spined stickleback, sea trout, stone loach and three-spined stickleback are known to be present in the River Ward (Matson *et al*. 2018b). Three-spined stickleback and eel are known to be present in the River Mayne catchment (including Sluice_010) (Kelly *et al*. 2012).

White-clawed crayfish are not present in the River Tolka, River Mayne and River Ward (no known records).

The NWPS freshwater pearl mussel sensitive areas dataset (Department of Housing, Local Government and Heritage 2017) indicates the likely absence of the species from all of the river catchments in the vicinity of the Proposed Development.

10.3.1.7 Invasive Species

Records of floral invasive species within 5km of the Proposed Development PAB are shown in Table 10.9 (NBDC 2023). To note, exact locations are not provided in data returns for invasive species desk-based searches of NBDC.

Table 10.9: Records of Invasive Flora Species Within 2km of the Proposed Development Boundary (NBDC 2023) (Species in Bold are Designated as Third Schedule Invasive Species)

Species Group	Species Name	Scientific Name	Record Count	Date of Last Record	Designation
Flowering plant	**Giant-rhubarb**	***Gunnera tinctoria***	**1**	**24/09/2013**	**Invasive Species: High Impact Invasive Species**
Flowering plant	Butterfly-bush	*Buddleja davidii*	4	28/06/2019	Invasive Species: Medium Impact Invasive Species
Flowering plant	Himalayan honeysuckle	*Leycesteria formosa*	1	21/09/2022	Invasive Species: Medium Impact Invasive Species
Flowering plant	Ragweed	*Ambrosia artemisiifolia*	1	24/09/2013	Invasive Species: Medium Impact Invasive Species
Flowering plant	Sycamore	*Acer pseudoplatanus*	6	29/11/2021	Invasive Species: Medium Impact Invasive Species

10.3.2 Results of the Site Visit

10.3.2.1 Habitats

The study area is largely characterised by farmland (arable and pasture) intersected by hedgerows, treelines, river catchments, and roads. Habitats recorded across the study area are summarised in and shown in Figure 10.2 in Volume 4 of this EIAR. No Annex I habitats were recorded within the study area.

Table 10.10: Fossitt Habitats Recorded within the Study Area

Broad Habitat Group	Fossitt Habitat Code	Fossitt Habitat Name	Annex 1 Habitat On-Site
Water features	FL8	Other artificial lakes and ponds	No
	FW2	Depositing lowland rivers	No
	FW4	Drainage ditches	No
Cultivated and built land	BC1	Arable crops	No
	BC2	Horticultural land	No
	BC3	Tilled land	No
	BC4	Flower beds and borders	No
	BL2	Earth banks	No
	BL3	Building or Artificial	No
Exposed rock / disturbed ground	ED2	Spoil and bare ground	No
	ED3	Re-colonising bare ground	No
Grassland and marsh	GA1	Improved agricultural grassland	No
	GA2	Amenity grassland	No
	GM1	Marsh	No
	GS1	Dry calcareous and neutral grassland	No
	GS2	Dry meadows and grassy verges	No
	GS4	Wet grassland	No
Woodland and scrub	WD1	(Mixed) broadleaved woodland	No
	WD2	Mixed broadleaved / conifer woodland	No
	WD4	Conifer plantation	No
	WD5	Scattered trees and parkland	No
	WL1	Hedgerows	No
	WL2	Treeline	No
	WN5	Riparian woodland	No
	WS1	Scrub	No
	WS2	Immature woodland	No
	WS3	Ornamental / non-native shrub	No
	WS5	Recently felled woodland	No

10.3.2.1.1 Arable crops (BC1)

Arable cropland was prevalent in the centre and towards the eastern extent of the study area. The habitat is regularly crossed by the Proposed Development within the off-road sections. The dominant crops encountered during the survey included wheat, barley and rapeseed. *The habitat is considered of Less than Local Importance.*

10.3.2.1.2 Horticultural land (BC2)

Horticultural land was infrequent throughout the study area and confined to an area south of St Margaret's Golf Course, immediately adjacent to the Proposed Development. *The habitat is considered of Less than Local Importance.*

10.3.2.1.3 Tilled land (BC3)

Tiled land was occasionally encountered in the central and eastern areas of the study area which is characterised by an arable farmscape. This habitat is found where land has been prepared for planting, but the type of crop or future land use cannot be determined. The habitat is located immediately adjacent to the Proposed Development at the closest point. *The habitat is considered of Less than Local Importance.*

10.3.2.1.4 Flower beds and borders (BC4)

A small community garden was recorded within the study area to the immediate east of the Proposed Development, to the north of Hollystown Golf Course alongside Kilbride Road. *The habitat is considered of Less than Local Importance.*

10.3.2.1.5 Earth banks (BL2)

Earth banks were infrequent within the study area and confined to two areas north-east and north-west of Barstown, at the western extent of the Proposed Development. Both areas were characterised by linear spoil heaps that were partially vegetated with a mixture of ruderals, grasses, and broadleaved forbs. The habitat is located c.110m from the Proposed Development at the closest point. *The habitat is considered of Less than Local Importance.*

10.3.2.1.6 Building or artificial surfaces (BL3)

This habitat classification includes all domestic, agricultural, industrial and community buildings and areas covered by artificial surfaces such as roads. The habitat is prevalent within the Proposed Development as much of the route is in-road. It is also commonly encountered near and within built up urban areas such as Dunboyne and is present at both Belcamp and Woodland Substations. *The habitat is considered to be of Less than Local Importance.*

10.3.2.1.7 Spoil and bare ground (ED2)

Spoil and bare ground was infrequent within the study area and confined to four areas, south of the M3 Junction 5 roundabout, west of Stokestown, west of Ballymacarney, and north of Forrest Great. The habitat includes heaps of spoil and rubble, and other areas of bare ground that are either very transient in nature or persist for longer periods of time because of ongoing disturbance. The habitat is located c.95m from the Proposed Development at the closest point. *The habitat is considered of Local Importance (Lower Value).*

10.3.2.1.8 Recolonising bare ground (ED3)

Recolonising bare ground was scattered throughout the study area, with larger concentrations of the habitat surrounding Woodland Substation and to the immediate south of Forrest Little Golf Club. This habitat type includes areas of bare or disturbed ground, often in derelict sites, with over 50% vegetation cover. Vegetation was mainly formed from ruderal, ephemeral, and short perennial species, and to a lesser extent grasses, such as nettle (*Urtica dioica*), willowherb (*Epilobium* sp.), creeping buttercup (*Ranunculus repens*), white clover (*Trifolium repens*), false oat grass (*Arrhenatherum elatius*) and Yorkshire fog (*Holcus lanatus*). *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.9 Other artificial lakes and ponds (FL8)

Artificial ponds were infrequent throughout the study area. The closest instances of this habitat in relation to the Proposed Development include a small pond that overlaps a Horizontal Directional Drilling (HDD) site to the west of the M1 Road, which was not accessible due to its location directly under the M1 Motorway. There was an attenuation pond located to the immediate west of the Proposed Development, c.130m north of the HDD site that crosses the M3 Road. *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.10 Depositing / lowland rivers (FW2)

Several watercourses within the study area fall within this habitat category including the Dunboyne Stream, River Tolka, River Pinkeen, River Ward, River Mayne and River Sluice. Water Framework Directive water bodies in the vicinity of the proposed development are listed in Table 2.6. The table includes the water body (WB) name, EU code, grid reference of the crossing location, WB reference number, WFD status and risk ratings are included in the table. *The habitat is considered of Local Importance (Higher Value)*.

10.3.2.1.10.1 Dunboyne Stream Catchment

The Proposed Development will cross the Dunboyne Stream_010 at two locations (at WB02 and WB03). The river was approximately 2m and 3m wide respectively with slow flow upstream and moderate flow at the second crossing point. The river was between15cm and 50cm deep at the crossing points and was shaded by vegetation along more than 75% of the river. The presence of erosion and undercutting, along with the variation of substrate sizes suggest habitat suitability for white-clawed crayfish and small fish. There was also potential for commuting otter to be present in this area. The riparian vegetation present was bramble, canary reed grass, hawthorn, thistle, ash and nettles and emergent vegetation of water cress also present.

10.3.2.1.10.2 River Tolka Catchment

The Proposed Development will cross the Tolka_020 at two tributaries (WB04 and WB05). At the first crossing point (WB04) the river was approximately 2m wide, 10cm deep with minimal undercutting present. It was shaded by vegetation along more than 75% of this stretch and had low flow. Substrate was mostly fine sediment and flow types were a mix of glide, run and pool. The second crossing point (WB05) was 4m wide, 50cm deep with some undercutting present. It was shaded by vegetation over more than 75% of this stretch but open in sections. The substrate was composed mostly of fine sediment with some larger cobbles. This crossing point was deemed to have low fish potential due to the heavy shading of the watercourse.

10.3.2.1.10.3 River Pinkeen Catchment

The Proposed Development will cross the Pinkeen_010 at one location (WB07). The river was approximately 2.5m wide, 30cm deep, with minimal undercutting present. It was shaded by vegetation along more than 75% of this stretch. The substrate was composed of mostly fine sediment with some larger gravel, pebble and cobble sized stones were present in low abundance, although with some artificial substrate. Otter spraint was recorded here during surveys.

10.3.2.1.10.4 River Ward Catchment

The Proposed Development will cross three tributaries to the River Ward (i.e., Ward_010, Ward_020 and Ward_030). These water bodies will be crossed at seven different locations and will also be in close proximity to the Proposed Development at a further six locations.

The Ward_010 will be crossed at three locations (WB09, WB10 and WB11) and was approximately 2m to 3m wide, 25cm deep, heavily shaded by vegetation, had moderate flow with a mix of riffles, runs and glides and some pooling present, minimal erosion seen, and substrate was mainly a mix of silt and pebble with some gravel, cobble and artificial sediment present as well.

The Ward_020 will be crossed at two locations (WB12 and WB13) and was described as being slow flowing, approximately 2m to 3m wide and 10cm and 40cm deep at the respective crossing points. Both sections of the river were shaded by vegetation along more than 75% of the stretches surveyed. The substrate was composed of mostly silt with some gravel, sand and pebble in low abundance. Flow types were mainly pool and some glide. The river was deemed unsuitable for amphibians due to the flow and shading present.

Ward_030 will be crossed at three locations (WB19, WB20 and WB21). River descriptions at each differ. At WB19 the river had a moderate flow, and was approximately 150cm wide and 15cm deep. The flow characteristics were a mix of run, riffle, glide, pool and cascade, and there was minimal undercutting present.

The substrate composition consisted of pebble, cobble, silt, gravel, overlying silt and artificial and hair algae was observed anchored to the ground. The river was shaded by vegetation along more than 75% of this stretch. WB20 was described as being 1.5m wide and approximately 15cm deep with moderate flow. The river was largely unshaded as the banks were lined by grasses and some scrub. WB21 more closely resembled a ditch. It was heavily vegetated and shaded by scrub. The water depth was low (approximately 5cm).

10.3.2.1.10.5 River Sluice Catchment

The Proposed Development will cross the Sluice_010 at one point (WB22). At the proposed crossing point, WB22 is culverted under the road so assessment was carried out downstream. It was approximately 50cm wide and 0.5m deep with a slow flow and signs of moderate pollution as it passes through a golf course. The river was shaded by vegetation along more than 75% of the stretch. The substrate composition was a mix of sand, gravel and pebble with cobble also present in low abundance. An artificial pond was also present which featured several steps to hold the water, which would impede fish movement. Some small sticklebacks were recorded in the river.

10.3.2.1.10.6 River Mayne Catchment

The Proposed Development will cross the Mayne_010 at one point (WB23). The river was described as approximately 1.75m wide, 20cm deep and fast flowing. The substrate was composed of predominantly sand, silt and pebble substrate. There was some undercutting and erosion recorded. The flow was mainly glide with some pools and runs. The river was shaded by vegetation along more than 75% of the stretch and the riverbanks were vegetated by herbaceous species and scrub.

10.3.2.1.11 Drainage ditches (FW4)

Drainage ditches both wet and dry were recorded throughout the study area (DD01-DD35), many of which will be intersected by the Proposed Development. Several ephemeral ditches were not on the EPA mapping tool application (EPA 2023) and were mostly associated with areas flowing alongside roads and housing developments or farmland drains. Many were heavily modified, artificial, straightened, narrow and dredged for flood prevention. Habitat features recorded included stagnant water, shallow water depths and had vegetation and detritus covering the substrates. Several were culverted under roads and fields and although hydrologically linked to larger downstream tributaries, many were dry when surveyed and unsuitable for fish or invertebrates. Species recorded within the ditches included common reed, reed canary grass (*Phalaris arundinacea*), great willowherb *Epibolium hirsutumn*, rosebay willowherb *Chamerion angustifolium*, duckweed *Lemna sp.*, starwort *Stellaria graminea*, reedmace *Typha latifolia*, water cress *Rorippa nasturtium-aquatium*, water mint *Mentha aquatica* and *Juncus* sp. *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.12 Improved agricultural grassland (GA1)

Improved agricultural grassland managed for hay production or grazed intensively by sheep and cattle was prevalent across the study area. The habitat is regularly crossed by the Proposed Development within the off-road sections. The species-poor sward was dominated by a few fast-growing grasses on fertile, neutral soils. *The habitat is considered to be of Less than Local Importance.*

10.3.2.1.13 Amenity grassland (GA2)

Amenity grassland, characterised by an intensively managed and regularly mown grassland sward, was common and widespread throughout the study area within playing fields, residential gardens and green spaces. The sward was generally species poor and characterised by an abundance of rye-grasses (*Lolium* spp.), white clover (*Trifolium repens*), daisy (*Bellis perennis*), greater plantain (*Plantago major*), and common dandelion (*Taraxacum officinale*). *The habitat is considered to be of Less than Local Importance.*

10.3.2.1.14 Marsh (GM1)

A small area of marsh habitat was recorded next to a commercial area in Killamonan, c. 50m from the Proposed Development at the closest point. The species composition included rushes (*Juncus* spp.), sedges (*Carex* spp.), meadowsweet (*Filipendula ulmaria*), and common broadleaved forbs. *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.15 Dry calcareous and neutral grassland (GS1)

A moderate occurrence of dry calcareous and neutral grassland was recorded within the study area, with the habitat recorded at both Woodland and Belcamp Substations and along roadside verges within the central areas of the Proposed Development. The species composition of the sward was predominantly associated with neutral conditions, such as meadow foxtail (*Alopecurus pratensis*), cock's foot (*Dactylis glomerata*), meadow buttercup (*Ranunculus acris*), common knapweed (*Centaurea nigra*), and ribwort plantain (*Plantago lanceolata*). However, species commonly associated with neutral to slightly alkaline conditions such as false-oat grass and sweet vernal grass (*Anthoxanthum odoratum*) were also recorded as the land throughout the study area is largely characterised by a fine loamy drift with limestone. *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.16 Dry meadows and grassy verges (GS2)

The habitat was common and widespread throughout the study area along the roadside verges. The habitat regularly lies immediately adjacent to the Proposed Development. The species composition was defined by a higher proportion of tall, coarse, and tussocky grasses such false oat grass and cock's foot and tall broadleaved herbs such as hogweed (*Heracleum mantegazzianum*), nettle, and cow parsley (*Anthriscus sylvestris*), due to the corresponding management, which typically comprises an annual or biannual cutting regime with no grazing or fertiliser application. *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.17 Wet grassland (GS4)

The study areas feature several connecting fields of wet grassland to the south of Woodland Substation, which is crossed by the Proposed Development. Smaller, isolated areas of wet grassland were also recorded elsewhere within the study area, mostly located away from the Proposed Development route except for a small area beside Ward River. The species composition recorded was largely characterised by an abundance soft rush (*Juncus effusus*), meadow sweet (*Filipendula ulmaria*), Yorkshire fog, creeping bent (*Agrostis stolonifera*) and marsh thistle (*Cirsium palustre*). Further species recorded included meadow foxtail, meadow buttercup, creeping buttercup, cuckoo flower (*Cardamine pratensis*), white clover, and round-fruited rush (*Juncus compressus*). Hairy sedge (*Carex hirta*) was very common in the sward at Woodland substation.

The habitat is considered of Local Importance (Higher Value).

10.3.2.1.18 (Mixed) broadleaved woodland (WD1)

Broadleaved plantation woodland was widespread throughout the study area. The main stands were located along the motorways (M1, M2, and M3), R132 Road and Naul Road (west of the M1), and to the south of Belcamp Substation, with smaller pockets of plantation woodland spread evenly across the study area. The stands primarily consisted of ash (*Fraxinus excelsior*), sessile oak (*Quercus petraea*), silver birch *(Betula pendula*), beech (*Fagus sylvatica*), hazel (*Corylus avellana*), sycamore (*Acer pseudoplatanus*), plum (*Prunus* sp.), hawthorn (*Crataegus monogyna*), alder (*Alnus glutinosa*), and poplar (*Populus* sp.). The habitat is crossed by the Proposed Development near to the opencut crossing of Ward_010 River, and along Naul Road to the west of the M1 Road. However, most stands lie immediately adjacent to or away from the Proposed Development. *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.19 Mixed broadleaved / conifer woodland (WD2)

Mixed broadleaved/conifer woodland was infrequent throughout the study area with five small stands confined to the north-west of Dunboyne, east of the M3, south of Nuttstown, north-west of Belgree, and north of Belcamp Substation. All stands within the centre of the study area lie immediately adjacent to the Proposed Development. The stands were mostly formed from ash, Leyland cypress (*Cupressus × leylandii*), Scot's pine (*Pinus sylvestris*), sycamore, poplar, beech, oak and Sitka spruce (*Picea sitchensis*). *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.20 Conifer plantation (WD4)

Conifer plantations were infrequent within the study area. The main stands were located to the north-east of Kilcorne and north-west of Dunboyne, with smaller stands to the north of M3 Junction 5 and north of the Pinkeen River. The stands were made up of over 75% conifer species for commercial use and were planted with pines (*Pinus* sp.) and spruce species such as Sitka and Norwegian spruce (*Picea abies*). The habitat is located c.20m from the Proposed Development at the closest point (north of M3 Junction 5), although most stands are typically sited further afield. *The habitat is considered of Local Importance (Lower Value).*

10.3.2.1.21 Scattered trees and parkland (WD5)

Scattered trees and parkland habitat, which is characterised by areas where trees cover less than 30% of the total area but remain a prominent feature, was represented on golf courses and gardens featuring within the centre and towards the east of the study area. The largest areas of this habitat type were found within St Margaret's Golf Course and Forrest Little Golf Course, both of which lie immediately adjacent to the Proposed Development. *The habitat is considered of Local Importance (Lower Value).*

10.3.2.1.22 Hedgerows (WL1)

Hedgerows were common and widespread throughout the study area along roadside verges and field boundaries. The habitat is regularly crossed by the Proposed Development within the off-road sections and lies immediately adjacent to the Proposed Development within the on-road sections. Hedgerows were primarily in good condition and were dominated by hawthorn, blackthorn (*Prunus spinosa*), ash, bramble (*Rubus fructicosus*), dog rose (*Rosa canina*), ivy (*Hedera helix*), elder (*Sambucus nigra*), willow (*Salix* sp.) and sycamore. Although all hedgerows are classified under Fossitt (2020) as WL1, in this survey hedgerows were divided into species rich and species poor categories. Species rich hedgerows are defined as having at least five woody species making up a 30m stretch of hedgerow (DEFRA, 2007). The lengths of species rich and species poor hedgerows are shown in Table 10.25. *Species-rich hedgerows are considered of County importance, whereas species-poor hedgerows are considered of Local Importance (Higher Value).*

10.3.2.1.23 Treeline (WL2)

Treelines were common and widespread throughout the study area along roadside verges and field boundaries. The habitat is regularly crossed by the Proposed Development within the off-road sections and lies immediately adjacent to the Proposed Development within the on-road sections. Species commonly encountered included ash, hazel, hawthorn, beech, holly, cypress sp., lime (*Tilia* sp.), pine sp., oak sp., sycamore and horse chestnut (*Aesculus hippocastanum*). Treelines along road edges typically had a hedgerow understory. *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.24 Riparian woodland (WN5)

A 10m wide strip of riparian woodland was recorded along the Ward River in the centre of the study area, which is crossed by the Proposed Development to the west of the M3 Road. The canopy and understorey layers were largely formed from alder, willow sp., hawthorn, ash, bramble, ivy, blackthorn and elder. Species within the field layer included meadowsweet, willowherb, hogweed, nettle, reed canary grass, wood dock (*Rumex sanguineus*), lesser celandine (*Ficaria verna*), bittercress sp. (*Cardamine sp)*, garlic mustard (*Alliaria* *petiolate*), cow parsley and horsetail (*Equisetum arvense*). It lies adjacent to the Ward River, as is likely to be seasonally flooded. However, as it is not part of low-lying wetland and not part of a successional series of habitats that includes fen and swamp, so does not meet the criteria for an Annex 1 Alluvial forest. *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.25 Scrub (WS1)

The habitat was common and widespread throughout the study area. Recorded species included bramble, ivy, hawthorn, blackthorn, elder, dogrose (*Rosa canina*), ash, and sycamore. *The habitat is considered of Local Importance (Higher Value).*

10.3.2.1.26 Immature woodland (WS2)

Immature woodland was infrequent within the study area and was mainly confined to roadside verges such as the R157 Road to the north and west of Dunboyne, the R121 (west of St Margaret's Golf Course), Naul Road to the south of Forrest Little Golf Club, and the M1 Road north of Junction 2 Roundabout. This habitat includes areas that are dominated by young or sapling trees that have not yet reached the threshold heights. Species recorded in this habitat included birch, hawthorn and poplar. *The habitat is considered of Local Importance (Lower Value).*

10.3.2.1.27 Ornamental / non-native shrub (WS3)

Ornamental/non-native shrub was infrequent within the study area and mainly confined to the west of M3 Junction 5 Roundabout (which is crossed by the Proposed Development) and along the settlement edge of Hollystown off from Kilbridge Road. Typical species recorded included fuchsia (*Fuchsia magellanica*), willow sp., beech and cherry laurel (*Prunus laurocerasus*). *The habitat is considered of Less than Local Importance.*

10.3.2.1.28 Recently-felled woodland (WS5)

At the time of survey, a small stand named Wesley's Woods, located within the centre of the study area to the east of Ward River and north-east of Nuttstown, had been recently felled. The habitat is located approximately 10m from the Proposed Development at the closest point. *The habitat is considered of Local Importance (Lower Value).*

10.3.2.2 Ground Water Dependent Terrestrial Ecosystems (GWDTE)

Marsh (GM1), wet grassland (GS4), and riparian woodland (WN5) can be considered Ground Water Dependent Terrestrial Ecosystems (GWDTE) when groundwater significantly influences soil moisture levels and helps sustain the unique flora and fauna associated with these habitats. For the purpose of this Chapter, these habitats are considered potential GWDTE although the dependence on groundwater may vary depending on the hydrological conditions, water sources, geographical location and seasonal variation. For riparian woodland habitat, it is also important to note surface water flow may dominate, especially in regions with highly permeable soils and rapid groundwater recharge.

Those areas supporting marsh (GM1), wet grassland (GS4) and riparian woodland (WN5) that are considered potential GWDTE within the study area are summarised in Table 10.11 and shown in Figure 10.2 in Volume 4 of this EIAR. Further information on groundwater receptors is presented in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of the EIAR. No further GWDTE habitats were identified within the study area.

Table 10.11: Potential GWDTE Within the Study Area

GWDTE Site No.	Fossitt Habitat	Location
1	Wet grassland (GS4)	The proposed cable route will pass off-road through approximately 580m of wet grassland at the western extent of the Proposed Development, approximately 1.55km south of Woodland Substation at the closest point (N 94487 46397). Note the GWDTE incorporates a number of adjacent fields in this location (mapped as four separate polygons) which are considered part of the same ecosystem virtue of proximity. Dunboyne Stream (WB02) and Rye Water_030 lie adjacent to the GWDTE.
2	Wet grassland (GS4)	Field corner is located approximately 15m south of the proposed cable route [in-road] (N 94599 45038) within Lynaghstown. The potential GWDTE lies adjacent to the southern side of the R156 Regional Road.
3	Riparian woodland (WN5)	The proposed cable route will pass off-road through approximately 35m of riparian woodland (O 01641 43994), to the immediate east of the River Tolka (WB05), west of the M3 Motorway Junction 5 Roundabout.
4	Marsh (GM1)	Small area of marsh beside a commercial area, approximately 50m east of the proposed cable route (O 09046 43764). The habitat is located approximately 90m from an unnamed ditch (no reference) that is connected to the Ward_030 water body at the closest point.
5	Wet grassland (GS4)	The proposed cable route will pass off-road through approximately 35m of wet grassland (O 04115 45120), to the immediate east of the Pinkeen_010 water body (WB07).
6	Wet grassland (GS4)	Small island of wet grassland within the centre of an arable field, approximately 120m north of the proposed cable route (O 13669 44786), which will pass off road to the east of Kilreesk. There are no water bodies in proximity of this habitat, with the closest being the Ward_030 water body (WB21, approximately 375m south-east).

10.3.2.3 Aquatic Environment

Fifty-eight water bodies were identified within the study area and assessed using professional judgement, and in accordance with best practice guidance, in terms of the stream width and depth, the substrate type, the flow type, the presence / absence of instream and bankside vegetation, and the level of shading.

In this EIAR, and throughout this Chapter, 'water body' is often used generically to refer to a watercourse, river, drainage ditch or pond. Although it is most frequently used to refer to a river / watercourse. Sometimes the specific terms drainage ditch or pond are used, to avoid confusion.

Most of the water bodies within the study area (33 in total) were typified by low-energy river typologies with substrate siltation. These are WB01 / WB02 / DD01 / DD03 / DD04 / WB04 / WB05 / DD06 / DD08 / DD09 / DD10 / DD12 / DD17 / WB08 / DD24 / WB11 / WB12 / WB13 / DD25 / DD26 / DD27 / WB15 / WB17 / WB18 / DD28 / WB19 / DD29 / WB20 / DD32 / WB22 / DD33 / DD34 / DD35.

Six water bodies conversely supported more habitat diversity (relative to those water bodies included within the survey) in terms of water depth, flow characteristics, substrate composition, water clarity, and in-stream vegetation. These are WB03 / WB06 / WB07 / WB10 / WB16 / WB23.

The remaining 19 water bodies were recorded as dry / ephemeral at the time of survey, and these are DD02 / DD05 / DD07 / DD11 / DD13 / DD14 / DD15 / DD16 / DD18 / DD19 / DD20 / DD21 / DD22 / DD23 / WB09 / WB14 / DD30 / WB21 / DD31.

It is important to note that WFD water bodies are referenced as 'WB', whereas all non-WFD water bodies are referenced as Drainage Ditch ('DD'). Further details relating to the assessment of each water body is presented in Appendix A10.3 in Volume 3 of this EIAR. The eDNA sample location of the water bodies and their WFD status is shown in Figure 10.8 in Volume 4 of this EIAR.

10.3.2.4 Plants and Fungi

No records were returned for protected or notable plant or fungi species within 200m of the Proposed Development and none were recorded during the site survey. Protected and notable plants and fungi are therefore considered to likely be absent from the ZoI and are not considered further within this Chapter.

10.3.2.5 Wintering Birds

The results of the winter bird survey results (peak counts, distribution, and conservation importance) are summarised in Table 10.12 (the peak month is highlighted in grey) and shown in Figure 10.4 in Volume 4 of this EIAR.

The majority of species observed were observed in a range of habitats across the length of the Proposed Development. However, black-tailed godwit, Brent goose, coot, little grebe, mute swan and oystercatcher were observed exclusively in Darndale Park which is located approximately 38m to the south-east of Belcamp Substation.

SCI species are considered of International importance. All other Red, Amber and Green listed bird species (non-SCI breeding populations) are considered of Local Importance (Higher Value).

Table 10.12: Winter Bird Survey Results with Peak Count Month Highlighted Grey, Distribution, Conservation Importance and Distance to Nearest SPA Where Applicable.

Common Name	Scientific Name	BTO Code	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Distribution in the Study Area	Within the ZoI (Yes/ No)	Conservation Interest		
											BoCCI	Annex I	Nearest SPA Designated for SCI Species
Black-headed gull	*Larus ridibundus*	BH	197	394	172	52	114	3	Recorded in 47 locations across the Proposed Development in each survey month. They were observed in a range of aggregation sizes from individuals to 100 individuals in public parks, residential areas, agricultural fields and flying overhead.	Yes	Red List	No	North Bull Island SPA (4.6km)
Black-tailed godwit	*Limosa limosa*	BW	23	0	0	0	0	1	Recorded twice in the same location in both October and March. They were found in the playing fields in Darndale Park.	Yes	Amber List	No	Malahide Estuary SPA (3.6km)
Brent goose	*Branta bernicla*	BG	0	240	231	200	0	0	Recorded in four locations from November to January. They were found in the playing fields in Darndale Park and surrounding amenity grasslands in aggregations ranging from 80 – 240 individuals.	Yes	Amber List	No	Malahide Estuary SPA (3.6km)
Buzzard	*Buteo buteo*	BZ	0	0	0	0	9	2	Recorded in 10 locations in February and March across the Proposed Development. They were mostly seen alone, with one instance where two birds were observed at once. They were recorded, in a range of agricultural habitats.	No	N/A	No	N/A
Common gull	*Larus canus*	CM	2	33	7	5	3	0	Recorded in 15 locations from October to February across the Proposed Development. They were seen in small aggregations of 1-4 individuals with only one group of 27 individuals observed. They were seen in agricultural habitats and Darndale Park.	Yes	Amber List	No	North-West Irish Sea SPA (~6km)
Coot	*Fulica atra*	CO	0	2	0	2	0	0	Recorded twice in the same location in November and January. They were recorded in two separate instances of two birds present within the pond in Darndale Park.	No	Amber List	No	Lough Ennell SPA (52.8km – outside ZoI)
Fieldfare	*Turdus pilaris*	FF	0	0	65	0	212	68	Recorded in 14 locations across the Proposed Development in December, February and March. They were observed in small to medium sized aggregations of 1-48 individuals with one large group of 120 individuals observed.	No	N/A	No	N/A
Golden plover	*Pluvialis apricaria*	GP	0	0	137	0	2	0	Recorded in seven locations across the Proposed Development in December and February. They were observed in small to medium aggregations of 1-66 individuals in agricultural habitats.	yes	Red List	Yes	Malahide Estuary SPA (c.3.6km)

Common Name	Scientific Name	BTO Code	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Distribution in the Study Area	Within the ZoI (Yes/No)	Conservation Interest		
											BoCCI	Annex I	Nearest SPA Designated for SCI Species
Great black-backed gull	*Larus marinus*	GB	0	2	2	0	0	0	Recorded in three locations in the middle and east of the Proposed Development in November and December. Two separate instances of two individuals were observed in both arable fields and Darndale Park.	Yes	N/A	No	North-West Irish Sea SPA (c.6km)
Herring gull	*Larus argentatus*	HG	113	192	74	96	91	154	Recorded in 88 locations across the Proposed Development in each survey month. They were observed in a range of aggregation sizes from individuals to 70 individuals in public parks, residential areas, agricultural fields and flying overhead.	Yes	Red List	No	Ireland's Eye SPA (c.8.6km)
Lapwing	*Vanellus vanellus*	L	0	0	99	0	0	0	Recorded in 10 locations across the Proposed Development in December. They were seen in aggregations of 1-26 individuals flying over and foraging in agricultural fields.	Yes	Red List	No	Boyne Estuary SPA (c.29.7km)
Lesser black-backed gull	*Larus fuscus*	LB	0	0	7	21	7	7	Recorded in 11 locations across the Proposed Development from December to March. They were aggregation of 1-20 individuals in public parks, residential areas, agricultural fields and flying overhead.	Yes	Amber List	No	Lambay Island SPA (c.13.4km)
Little Egret	*Egretta garzetta*	ET	1	2	1	1	0	0	Recorded four times in one location in a flooded field adjacent to the Tolka_020 river. All records here were of single birds apart from December when two birds were recorded together.	No	N/A	Yes	N/A
Little Grebe	*Tachybaptus ruficollis*	LG	0	0	0	1	1	0	Recorded twice in one location in January and February. Observed as an individual in the Darndale Park pond.	No	N/A	No	N/A
Mallard	*Anas platyrhynchos*	MA	0	8	2	2	1	0	Recorded in a public park/playing fields 1km south-east of Belcamp Substation	No	Amber List	No	N/A
Mediterranean gull	*Larus melanocephalus*	MU	0	2	0	0	0	0	Recorded once in November in a residential area south of Belcamp Substation, where two individuals were recorded together.	No	Amber List	No	N/A
Moorhen	*Gallinula chloropus*	MH	0	0	0	1	0	0	Recorded once in January, this species was observed as an individual in a pond in a golf course.	No	N/A	No	N/A
Mute Swan	*Cygnus olor*	MS	0	2	1	1	0	0	Recorded three times in the same location from November to January. Two individuals were recorded in separate dates, while two were observed together in the pond in Darndale Park.	No	Amber List	No	N/A

Common Name	Scientific Name	BTO Code	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Distribution in the Study Area	Within the ZoI (Yes/No)	Conservation Interest		
											BoCCI	Annex I	Nearest SPA Designated for SCI Species
Oystercatcher	*Haematopus ostralegus*	OC	37	18	3	0	0	0	Recorded five times one location from October to December. They were observed in aggregations of 1-20 individuals in Darndale Park.	Yes	Red List	No	Malahide Estuary SPA (c.3.6km)
Red Kite	*Milvus milvus*	KT	0	0	3	0	1		Recorded four times in roughly the same location in December and February. One individual was observed resting and flying in agricultural habitats by The Ward Cross and N2 road.	No	Red List	Yes	N/A
Redwing	*Turdus iliacus*	RE	0	0	720	0	13	84	Recorded in 32 locations across the Proposed Development from December, February and March. They were observed in a range of aggregation sizes from individuals to 150 individuals in agricultural habitats.	No	Red List	No	N/A
Reed Bunting	*Emberiza schoeniclus*	RB	0	0	0	0	0	1	Recorded once in March in a hedgerow east of the Woodlands Substation.	No	N/A	No	N/A
Rook	*Corvus frugilegus*	RO	0	0	0	0	5	0	Recorded in one location in a rookery west of the Dublin Airport with five individuals using the rookery.	No	N/A	No	N/A
Snipe	*Gallinago gallinago*	SN	0	2	8	0	7	0	Recorded in seven locations between the Woodland Substation and the M3 motorway in November, December and February. They were observed in aggregations of 1-5 individuals in agricultural habitats.	No	Red List	No	N/A
Starling	*Sturnus vulgaris*	SG	0	0	0	350	0	0	Recorded once in January in a large aggregation of 350 individuals using an arable field for foraging.	No	Amber List	No	N/A
Teal	*Anas crecca*	T	0	4	0	0	0	0	Recorded once in a flooded field adjacent to the Tolka_020 river. They were seen here in a group of four individuals.	Yes	Amber List	No	North Bull Island SPA (c.4.6km)
Yellowhammer	*Emberiza citrinella*	Y	0	0	2	0	2	2	Recorded four times between the Woodland Substation and Kilbride in December, February and March. They were observed in hedgerows adjacent to agricultural habitats.	No	Red List	No	N/A

10.3.2.6 Breeding Birds

Three visits for breeding bird surveys were carried out across nine transects. Eighteen SCIs were recorded in total, comprising 10 Red List species (including two SCI species listed in nearby SPAs), six Amber List species, and two Green List species listed as SCIs from nearby SPAs. No Annex I species were recorded during the course of surveys. The survey results are tabulated in Table 10.13 and shown in Figure 10.5 in Volume 4 of this EIAR.

Red, Amber and Green listed bird species (non-SCI breeding populations) are considered of Local Importance (Higher Value).

Table 10.13: Breeding Bird Survey Results, Species of Conservation Importance and Distance to Nearest SPA Where Applicable

Common Name	Scientific Name	BTO Code	Total recorded across all visits	Estimated Minimum number of territories across all visits *	BTO Breeding Evidence	Conservation Importance		
						BoCCI	Annex I	Nearest SPA Designated for SCI Species
House martin	*Delichon urbicum*	HM	3	3	Possible	Amber	No	N/A
House sparrow	*Passer domesticus*	HS	25	14	Probable	Amber	No	N/A
Skylark	*Alauda arvensis*	S	29	22	Probable	Amber	No	N/A
Starling	*Sturnus vulgaris*	SG	152	50	Confirmed	Amber	No	N/A
Swallow	*Hirundo rustica*	SL	53	28	Possible	Amber	No	N/A
Willow warbler	*Phylloscopus trochilus*	WW	6	6	Possible	Amber	No	N/A
Cormorant	*Phalacrocorax carbo*	CA	3	0	Non-breeding	Amber	No	Irelands Eye SPA (breeding population), 8.6km
Lesser black back gull	*Larus fuscus*	LB	59	0	Non-breeding	Amber	No	Lambay Island SPA (breeding population),13.4km
Curlew	*Numenius arquata*	CU	1	0	Non-breeding	Red	No	North Bull Island SPA (wintering population), 4.6km
Great black-backed gull	*Larus marinus*	GB	9	0	Non-breeding	Green	No	North-West Irish Sea SPA (breeding population), 4.5km
Greenfinch	*Carduelis chloris*	GR	8	7	Probable	Amber	No	N/A
Herring gull	*Larus argentatus*	HG	112	0	Non-breeding	Amber	No	Irelands Eye SPA (breeding population), 8.6km
Kestrel	*Falco tinnunculus*	K	1	0	Non-breeding	Red	No	N/A
Mallard	*Anas platyrhynchos*	MA	13	2	Breeding	Amber	No	Dundalk SPA (wintering population), 50km
Meadow pipit	*Anthus pratensis*	MP	10	9	Probable	Red	No	N/A
Snipe	*Gallinago gallinago*	SN	16	1	Possible	Red	No	N/A

Common Name	Scientific Name	BTO Code	Total recorded across all visits	Estimated Minimum number of territories across all visits *	BTO Breeding Evidence	Conservation Importance		
						BoCCI	Annex I	Nearest SPA Designated for SCI Species
Stock dove	*Columba oenas*	SD	3	3	Probable	Red	No	N/A
Swift	*Apus apus*	SI	2	0	Non-breeding	Red	No	N/A
Yellowhammer	*Emberiza citrinella*	Y	44	39	Probable	Red	No	N/A

* Confirmed, probable and possible breeding behaviours (as per BTO categories) were used to determine minimum breeding territories across all visits.

10.3.2.7 Bats

10.3.2.7.1 Ground-Level Tree Assessment

Nineteen trees were identified with moderate or high bat roost potential during the ground-level tree assessment (GLTA). A summary of the results is presented in Table 10.14. The location of the trees with moderate or high bat potential are shown in Figure 10.6 in Volume 4 of this EIAR. For ease of surveying and recording, trees with low potential were not given a tree reference and are not shown on the map as they did not require further surveying to rule out bat roosting.

Bats are considered of Local Importance (Higher Value).

Table 10.14: Ground Level Tree Assessment (GLTA) Results

Potential	Bat Conservation Trust Description (Collins, 2023)	No. of Trees	Tree Reference
Confirmed roost	A tree with a known roost.	0	N/A
High potential	A tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	8	T06 / T07 / T08 / T09 / T10 / T11 / T12 / T15
Moderate potential	A tree with one or more potential roost sites that could by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status	11	T01 / T02 / T03 / T04 / T05 / T13 / T14 / T16 / T17 / T18 / T19
Low potential	A tree of sufficient size and age to contain Potential Roost Features but none seen from the ground or features seen with only very limited roosting potential.	38	N/A

10.3.2.7.2 Emergence Surveys

Emergence surveys were carried out on all 19 trees with moderate or high bat roost potential during the GLTA. In accordance with practice guidance (Collins 2016; Collins 2023; Andrews and Gardener 2016), two emergence surveys were carried out on trees of moderate potential, and three emergence survey for trees of high potential. No bat roosts were recorded during those surveys. Table 10.15 presents the dates on which these surveys were conducted and the corresponding weather conditions during the surveys.

Table 10.15: Emergence Surveys Dates and Weather Conditions

Tree Reference	Survey Number	Date	Weather
T01	1	22/05/2023	12°C. Mild, slightly cloudy, light breeze
	2	19/06/2023	15°C. Clear sky, no wind
T02	1	22/05/2023	12°C. Mild, slightly cloudy, light breeze
	2	19/06/2023	15°C. Clear sky, no wind
T03	1	22/05/2023	12°C. Mild, slightly cloudy, light breeze
	2	19/06/2023	15°C. Clear sky, no wind
T04	1	22/05/2023	12°C. Mild, slightly cloudy, light breeze
	2	19/06/2023	15°C. Clear sky, no wind
T05	1	23/05/2023	13°C. Mild, clear sky, no wind
	2	19/06/2023	15°C. Clear sky, no wind
T06	1	23/05/2023	13°C. Mild, clear sky, no wind
	2	19/06/2023	15°C. Clear sky, no wind
	3	26/06/2023	12°C. Moderate cloud cover, moderate wind, light rain on and off
T07	1	23/05/2023	13°C. Mild, clear sky, no wind
	2	20/06/2023	15°C. Clear sky, no wind
	3	27/06/2023	14°C. Light cloud cover, light wind
T08	1	23/05/2023	13°C. Mild, clear sky, no wind
	2	20/06/2023	15°C. Clear sky, no wind
	3	27/06/2023	14°C. Light cloud cover, light wind
T09	1	23/05/2023	13°C. Mild, clear sky, no wind
	2	20/06/2023	15°C. Clear sky, no wind
	3	27/06/2023	14°C. Light cloud cover, light wind
T10	1	24/05/2023	11°C. Mild, slightly cloudy, light breeze
	2	20/06/2023	15°C. Clear sky, no wind
	3	28/06/2023	15°C. Light cloud cover, light wind, light rain on and off
T11	1	24/05/2023	11°C. Mild, slightly cloudy, light breeze
	2	20/06/2023	15°C. Clear sky, no wind
	3	28/06/2023	15°C. Light cloud cover, light wind, light rain on and off
T12	1	24/05/2023	11°C. Mild, slightly cloudy, light breeze
	2	20/06/2023	15°C. Clear sky, no wind
	3	28/06/2023	15°C. Light cloud cover, light wind, light rain on and off
T13	1	24/05/2023	11°C. Mild, slightly cloudy, light breeze
	2	21/06/2023	12°C. Clear sky, light wind, no rain
T14	1	24/05/2023	11°C. Mild, slightly cloudy, light breeze
	2	21/06/2023	12°C. Clear sky, light wind, no rain
T15	1	25/05/2023	12°C. Moderate cloud cover, light breeze
	2	21/06/2023	12°C. Clear sky, light wind, no rain
	3	29/06/2023	10°C. High cloud cover, light wind, brief showers
T16	1	22/05/2023	12°C. Mild, slightly cloudy, light breeze
	2	22/06/2023	11°C. Clear sky, light wind, no rain
T17	1	25/05/2023	12°C. Moderate cloud cover, light breeze
	2	22/06/2023	11°C. Clear sky, light wind, no rain
T18	1	25/05/2023	12°C. Moderate cloud cover, light breeze
	2	22/06/2023	11°C. Clear sky, light wind, no rain

Tree Reference	Survey Number	Date	Weather
T19	1	25/05/2023	12°C. Moderate cloud cover, light breeze
	2	22/06/2023	11°C. Clear sky, light wind, no rain

It is important to highlight that despite the Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition (Collins 2023) recommending the use of night vision aids during surveys, unique operational constraints were encountered. Specifically, all the trees were situated along a road. Due to safety concerns and the impracticality of relocating infrared cameras each time a vehicle approached, night vision aids were not utilised.

Additionally, as the trees were located along the road, traditional tree climbing methods were unfeasible due to the inherent danger posed by passing cars. This safety concern further emphasised the need to adapt survey methodologies.

In alignment with the most current guidance available at the time that the surveys were undertaken (surveys undertaken May 2023 to June 2023), it was determined that dawn surveys were no longer recommended, and therefore, dusk surveys were deemed the most practical approach under the given circumstances. The decision to conduct surveys during this time was not only based on the guidance but also took into account the constraints imposed by the setting of the Proposed Development.

Despite the absence of night vision aids, the impact on survey accuracy was mitigated by the fact that the trees were situated along a road, providing some ambient lighting. These circumstances allowed for continuous visibility of features throughout the surveys, minimising the significance of not employing night vision aids in this particular context to the extent that they are reliable in accordance with best practice guidance. As the night vision aids are employed in best practice guidance to aid in seeing emergences in low light levels, the ambient lighting present renders the impact of not using night vision aids *de minimus*

The Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition states that potential roosting features in trees must be recorded with their occupancy levels using a new system of PRF-I for individual or low numbers of bats and PRF-M for multiple bats or a maternity. However, the Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition was published in October 2023, while the bat surveys were conducted between May 2023 and June 2023. For this reason, the surveys were undertaken using the latest available guidance at the time (i.e. the Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition (Collins 2016)). Therefore, the potential roosting features were not measured according to the Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition, as it was not yet in place. The methodology employed took into consideration factors such as lighting levels and safety constraints, ensuring that the surveys adhered to the best practices applicable to the circumstances.

10.3.2.7.3 Bat Activity

Eight static detectors were deployed across the study area to establish bat species richness, and to provide a measure of relative species abundance. Each detector recorded for a period of six days, and each detector was deployed twice providing 96 recording days in total. A summary of the logistics of the static detector deployment is presented in Table 10.16 and shown in Graph 10.1. Bat data from the statics were analysed using Kaleidoscope Analysing Software.

Table 10.16: Static Bat Detector Deployment Logistic Information

Static Detector No.	Recording Height (from Ground Level)	Recording Duration	Location and Habitat	Dates Deployed	Weather
SD1	1.5m	6 days; 7.5 hours recording per night	Hedgerow along R156 Road in Waynestown (N 96989 44036) bordered by grassland	22/05/2023 – 29/05/2023	Varied between 6°C and 20°C. Mostly dry, very little rain
				19/06/2023 – 26/06/2023	Varied between 10°C and 24°C. Mostly dry, only one night of occasional light rain
SD2	2m	6 days; 7.5 hours recording per night	Hedgerow along L5026 Road, east of the N3 Road (O 02515 44606), beside farm	23/05/2023 – 30/05/2023	Varied between 6°C and 20°C. Mostly dry, very little rain
				19/06/2023 – 26/06/2023	Varied between 10°C and 24°C. Mostly dry, only one night of occasional light rain
SD3	1.5m	6 days; 7.5 hours recording per night	Hedgerow along L1010 Road in Stokestown (O 03600 44769), west of the Pinkeen River, bordered by arable fields	23/05/2023 – 30/05/2023	Varied between 6°C and 20°C. Mostly dry, very little rain
				20/06/2023 – 27/06/2023	Varied between 10°C and 24°C. Mostly dry, only one night of occasional light rain
SD4	2m	6 days; 7.5 hours recording per night	Hedgerow along L1010 Road (O 04954 44996), in-between the Pinkeen River and Ward River, bordered by arable fields	29/05/2023 – 05/06/2023	Varied between 5°C and 18°C. Dry with clear skies
				20/06/2023 – 26/06/2023	Varied between 10°C and 24°C. Mostly dry, only one night of occasional light rain
SD5	1.5m	6 days; 7.5 hours recording per night	Treeline along L1010 Road (O 05199 45268), west of Ward River, bordered by grassland	30/05/2023 – 06/06/2023	Varied between 5°C and 18°C. Dry with clear skies
				26/06/2023 - 03/07/2023	Varied between 9°C and 22°C. One night of moderate rain and one of light rain
SD6	1.5m	6 days; 7.5 hours recording per night	Field gate along R121 Road, west of the M2 Road (O 09262 44172), bordered by grassland	30/05/2023 – 06/06/2023	Varied between 5°C and 18°C. Dry with clear skies
				26/06/2023 – 03/07/2023	Varied between 9°C and 22°C. One night of moderate rain and one of light rain
SD7	2m	6 days; 7.5 hours recording per night	Treeline along R121 Road, east of the M2 Road (O 10053 45007), bordered by houses	22/05/2023 – 29/05/2023	Varied between 6°C and 20°C. Mostly dry, very little rain
				26/06/2023 – 03/07/2023	Varied between 9°C and 22°C. One night of moderate rain and one of light rain
SD8	2m	6 days; 7.5 hours recording per night	Large tree on field boundary, east of Ward River (O 11789 45755)	29/05/2023 – 05/06/2023	Varied between 5°C and 18°C. Dry with clear skies
				26/06/2023 – 03/07/2023	Varied between 9°C and 22°C. One night of moderate rain and one of light rain

Five species were recorded in total during the activity surveys. A summary of the species recorded, along with details relating to abundance, distribution and conservation status at a regional and national level is presented in Table 10.17.

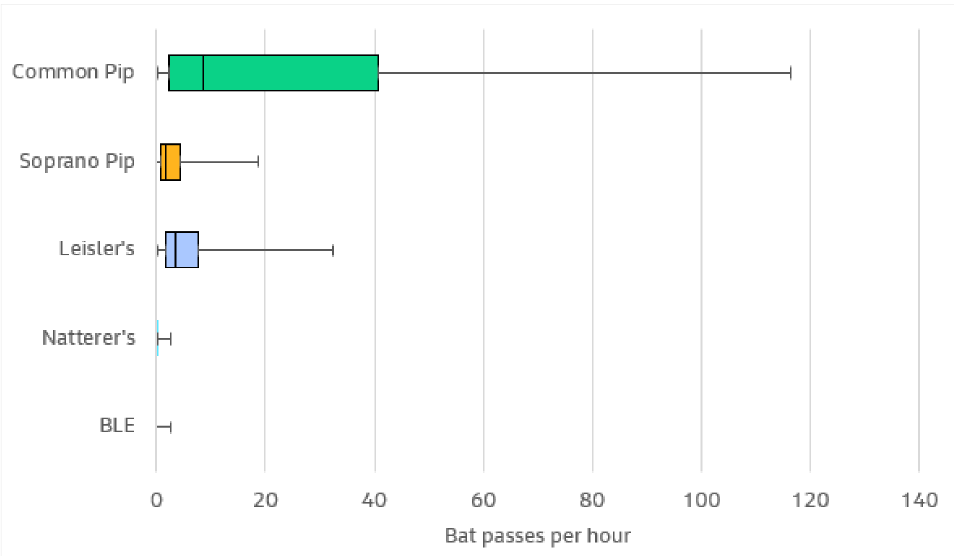
Table 10.17: Bat Species Recorded from Activity Surveys, determined using Kaleidoscope Analysing Software

Common Name	Scientific Name	Regional Abundance and Distribution (Collins, 2023)	Conservation Status
Common pipistrelle	*Pipistrellus pipistrellus*	Widespread and abundant	Least Concern
Soprano pipistrelle	*Pipistrellus pygmaeus*	Widespread and abundant	Least Concern
Leisler's	*Nyctalus leisleri*	Widespread and frequent	Near Threatened (assigned this status due to importance of Irish population)
Natterer's	*Myotis nattereri*	Widespread and uncommon	Least Concern
Brown long eared (BLE)	*Plecotus auritus*	Widespread and frequent	Least Concern

The proportion of bat activity recorded for each bat species for all of the static locations based on their average number of passes per night is shown in Table 10.18. In summary, common pipistrelle had a higher median (central tendency) and a wider interquartile range (IQR) than all other recorded species, indicating a higher level of recorded activity within the study area and greater variability in the dispersion of data values. Outliers were identified for common pipistrelles, soprano pipistrelles and Leisler's (values that are significantly higher than the typical level of species activity recorded per hour), although this might be reflective of a smaller sample size (six days recording per detector).

Table 10.18: Summary Statistics for Remote Detectors (Bat Pass Rate Per Hour)

Data Measurement	Common Pipistrelle	Soprano Pipistrelle	Leisler's	Natterer's	Brown Long Eared (BLE)
Minimum	0.13	0	0.13	0	0
First quartile (Q1)	2.3	0.8	1.73	0	0
Mean	22.68	3.79	5.99	0.17	0.06
Median	8.53	1.6	3.6	0	0
Third quartile (Q3)	40.6	4.33	7.67	0.13	0
Maximum	116.40	18.80	32.27	2.53	2.53
Standard deviation	26.87	4.90	6.88	0.43	0.37

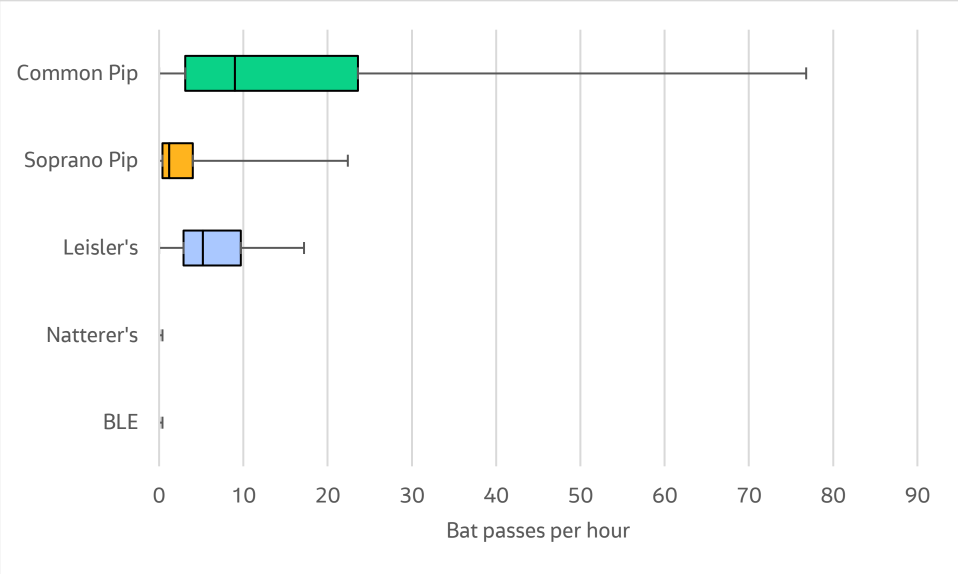


Graph 10.1: Box Plot Showing Bat Data Recorded from Remote Detectors

Bat activity was also recorded as incidental data during the emergence surveys as shown in Table 10.19. The summary statistics demonstrate a similar pattern to the remote detector survey results, with a higher central tendency and greater IQR for common pipistrelle, and lower values for Natterer's and Brown Long Eared (BLE). Outliers were also recorded for common and soprano pipistrelle, which are likely to reflect the small sample size. A box plot showing incidental bat activity data recorded from the emergence surveys is shown in Graph 10.2.

Table 10.19: Summary Statistics for Incidental Data (Bat Pass Rate Per hour)

Data Measurement	Common Pipistrelle	Soprano Pipistrelle	Leisler's	Natterer's	Brown Long Eared (BLE)
Minimum	0.00	0.00	0.00	0.00	0.00
First quartile (Q1)	3.10	0.40	2.90	0.00	0.00
Mean	16.80	2.94	6.24	0.04	0.04
Median	9.00	1.20	5.20	0.00	0.00
Third quartile (Q3)	23.60	4.00	9.70	0.00	0.00
Maximum	76.80	22.40	17.20	0.40	0.40
Standard deviation	20.47	4.81	4.11	0.12	0.12



Graph 10.2: Box Plot Showing Incidental Bat Activity Data Recorded from the Emergence Surveys

10.3.2.8 Otter

The water bodies that intersect the study area can provide suitable riparian habitat for otter. Otters are considered widespread at a regional and national level and of Least Concern conservation status. The species can be found wherever there is suitable aquatic prey and nearby terrestrial habitat for resting undisturbed. However, no holts or resting sites were recorded during the surveys within proximity of the proposed water crossings for the proposed cable route. One potential holt, one slide and one spraint were recorded away from the proposed water crossings at the following locations (refer also to Figure 10.7 in Volume 4 of this EIAR):

- One potential holt was discovered along watercourse Ward_030 (WB19, west of Dublin Airport), approximately 145m south of the PAB with a slide recorded next to a torn-out tree root. No spraints were recorded within or surrounding this feature;

- A slide and prints were recorded along the watercourse Dunboyne Stream_010 (WB03, north-west of Dunboyne), approximately 173m north of the PAB; and
- Otter spraint (droppings) was recorded on a boulder within watercourse Pinkeen_010 (WB07, south-east of Nuttstown), approximately 33m east of the PAB.

Results from the eDNA analysis returned positive results for otter at WB06 (location of eDNA samples at water bodies is shown in Figure 10.8 in Volume 4 of this EIAR).

10.3.2.9 Badger

Sensitive information relating to the location of badger setts is provided in a confidential appendix (Appendix A10.1 and Figure 10.10), which are provided to An Bord Pleanála and the NPWS separately.

The mosaic of pasture grasslands, woodland, scrub, treelines and hedgerows provide suitable habitat within the study area for sett excavation, foraging and dispersal. Badgers are considered widespread at a national and regional level and of Least Concern conservation status.

During the surveys, 10 badger setts were recorded in total alongside signs of badger activity (i.e. latrines, pathways, prints, and snuffle holes), as outlined in Table 10.20, and Figure 10.10 in Appendix A10.1 (confidential appendix). Badger is considered of Local Importance (Higher Value).

Table 10.20: Summary of Badger Setts

Sett No.	Sett Type	Description	Location
S1	Inactive outlier	Single entrance was covered with vegetation at the time of survey.	CONFIDENTIAL
S2	Main sett	The sett comprises three active entrances (one main and two working holes with large spoil heaps) along a hedgerow field boundary that features a dry ditch. A second active sett (single entrance) was recorded along the same hedgerow. Due to the proximity of this entrance, it is considered part of the main sett. A single latrine was also discovered in-between the entrances.	CONFIDENTIAL
S3	Inactive outlier	The sett was formed from a single collapsed entrance.	CONFIDENTIAL
S4	Inactive outlier	Single inactive entrance filled with debris at the time of survey. One latrine was also discovered nearby to the south of the road.	CONFIDENTIAL
S5	Active outlier	Three prints, one latrine and one snuffle hole were also recorded within proximity of the riparian habitat.	CONFIDENTIAL
S6	Inactive outlier	Single entrance sett. Badger print also recorded in proximity of the sett.	CONFIDENTIAL
S7	Active annex	The sett is formed form multiple entrances (active and inactive) that are connected to a network of trails leading into a woodland. Badger activity: latrines, prints, and pathways were found in proximity of the proposed cable route.	CONFIDENTIAL
S8	Active subsidiary	Two active entrances with fresh bedding present outside one.	CONFIDENTIAL
S9	Active outlier	Single active entrance. Badger pathways and prints were noted in proximity of the sett, with further prints and a latrine found fairly evenly distributed in-between S8 and S9.	CONFIDENTIAL
S10	Active outlier	Single active entrance. No further signs of activity noted in proximity of the sett although a latrine and prints were recorded further afield c.1km north of the sett at the closet point.	CONFIDENTIAL

10.3.2.10 Other Protected Mammals

The study area supports suitable habitat for other protected mammals as outlined in Table 10.21. All these species are considered likely present from habitat suitability alone. Detailed surveys were not required to inform the impact assessment of the Proposed Development.

Other protected mammal species are considered of Local Importance (Higher Value).

Table 10.21: Other Protected Mammals – Habitat Suitability

Species	Habitat Preference, Distribution, and Conservation Status	Incidental Sightings and/or Fields Signs Recorded
Red squirrel (*Sciurus vulgaris*)	Typically prefers coniferous woodland, although can also inhabit broadleaved woodland. The species is highly arboreal and dependent on a moderate-high density of trees. Red squirrels are widespread at a regional and national level and of Least Concern conservation status, although distribution is often patchy due to grey squirrels.	Possible signs of presence (droppings) were recorded to the north of Hollystown golf course, approximately 460m east of the proposed cable route
Hedgehog (*Erinaceous europaeus*)	Edge habitat and pasture – prefers areas bordering deciduous woodland, scrub and open grassland. The species is considered widespread at all geographic levels and of Least Concern conservation status, although populations have suffered from habitat loss.	Two dead hedgehogs found. One 100m south of the proposed cable route adjacent to Belgree Court. One found 90m north of the proposed route along the road in Stokestown. Additionally, three possible signs of presence (two droppings and one potential print) were recorded. The print was recorded 450m west of the route in between Stockhole and Baskin. The droppings were found 180m north of the route near Kilbride Road; and 330m east of the route near Ballymacarney.
Irish stoat (*Mustela erminea hibernica*)	Highly adaptable to different habitats providing there is good vegetative cover. Often associated with lowland farms, hedgerows, woodland, and marshes. The species is considered widespread at a regional and national level and of Least Concern conservation status.	None
Pygmy shrew (*Sorex minutus*)	Hedgerows, grassland, and woodlands with good ground cover. The species is considered widespread at all geographic levels and of Least Concern conservation status, although population have suffered from changes to farming practice (pesticides and herbicides resulting in habitat degradation) and an increase in predation from domestic and feral cats.	None
Red deer (*Cervus elaphus*)	Commonly found in both forested and open landscapes, displaying adaptability to diverse environments. Red deer favour mixed woodlands, coniferous forests, and open grasslands, showcasing a preference for areas that offer a blend of dense vegetation for cover and open spaces for grazing. Additionally, proximity to water sources such as rivers and lakes is crucial for their survival. The species is considered widespread at a regional and national level and of Least Concern conservation status.	Results from eDNA analysis returned positive results for red deer at Dunboyne Stream_010 (WB03) to the north of the Dunboyne roundabout, 10m north of the proposed route. The deer is likely to have used the watercourse further upstream as the area the sample was taken from is urban.

10.3.2.11 Reptiles and Amphibians

The study area supports suitable aquatic and terrestrial habitat for common frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*). Both species are common and widespread at all geographic scales and of Least Concern conservation status. Ponds and ditches provide opportunity for breeding and foraging, whereas damp areas of grassland, scrub and woodland, particularly where these are found in proximity to ponds and ditches, provide suitable conditions for terrestrial foraging and shelter. Three incidental sightings of common frog were recorded during the multi-disciplinary walkover surveys:

- Juvenile frog observed within woodland (O 05666 45456) near watercourse Ward_010 (WB10), approximately 15m north of the proposed cable route;
- Adult frog observed on the far side of the Ward_010 (west of WB11; O 06396 45506), approximately 75m south of the proposed cable route; and
- Adult frog observed along watercourse (WB13; O 07313 44425), approximately 120m south-west of the proposed cable route.

Results from eDNA sampling were negative for smooth newt.

The study area also supports suitable habitat for common lizard (*Zootoca vivipara*), which is considered common and widespread at all geographic scales. Common lizard favour habitats that are sunny, open, undisturbed and south facing. They require a mosaic of habitats such as rough grassland / tall ruderals for foraging, open areas for basking and suitable refugia (e.g. log piles) for winter hibernation (Froglife Advice Sheet 10 1999). Suitable habitat within the study area includes grassy verges, hedgerows, and open woodland. No incidental sightings of common lizard were recorded during the survey. Results from eDNA sampling were negative for common lizard.

Reptiles and amphibians are considered of Local Importance (Higher Value).

10.3.2.12 Fish

A visual assessment was carried out at or near to proposed water body crossings points, or at smaller watercourses, over a 200m stretch to assess the water bodies' potential to support fish of conservation interest (Atlantic salmon, brown trout, sea trout, lampreys, and European eel).

As outlined in Section 10.3.2.3, most of the surveyed water bodies (excluding those that were dry / ephemeral) were low-energy river typologies with substrate siltation. These water bodies were therefore considered largely unsuitable for salmon, trout and lampreys on this basis.

Six water bodies conversely provided more suitable conditions in terms of water depth, flow characteristics, substrate composition, water clarity, and in-stream vegetation. However, due to the absence / limited availability of spawning gravels, and well-stoned beds for alevins (needed to provide shelter and more territory to accommodate fry), these were not considered optimal as spawning or nursery areas for salmon and trout. Lampreys also have similar habitat requirement for spawning as trout. The general lack of sand / silt deposits, a general requirement of lamprey larvae, demonstrate a deficiency of optimal juvenile habitat across the surveyed water bodies.

The freshwater habitat requirements of European eel are less widely known due to their complex life cycles and cryptic behaviour. However, the presence of habitat features such as aquatic plants, submerged root systems, woody debris, undercut banks and channel substrates all provide physical structures that eels could use as refuges or ambush points. Sixteen water bodies within the study area (WB03 / WB06 / WB07 / WB10 / WB16 / WB23 / WB01 / WB02 / WB04 / WB05 / DD06 / WB11 / WB12 / DD25 / WB19 / DD35) support at least one of the aforementioned habitat features that could be used by eel (as presented in Appendix A10.3 in Volume 3 of this EIAR).

Water body assessments are presented in Appendix A10.3 in Volume 3 of this EIAR, and locations of water bodies sampled are shown in Figure 10.8 in Volume 4 of this EIAR.

Sixteen watercourses were identified for eDNA sampling with 18 sampling locations visited and 14 samples taken due to access issues. Results from eDNA analysis returned positive results for lamprey species (*Lampetra* spp.) and brown trout at WB05, and for European eel at WB22. No other species of conservation interest were recorded. Three-spined stickleback was present in all watercourses with the exception of WB23. Minnow was present in watercourses WB03 and WB05. Stone loach was present in WB05. No other fish species were present.

Atlantic salmon are considered of County Importance. Other fish species (including trout) are considered of Local Importance (Higher Value).

10.3.2.13 White-Clawed Crayfish

The study area supports suitable habitat for white-clawed crayfish. The species typically occurs in rivers, streams and lakes with a calcareous influence and good water quality. The results of the eDNA sampling confirmed their likely absence from 14 watercourses, as presented in Table 10.22 and detailed in Appendix A10.3 in Volume 3 of this EIAR. Four watercourses were inaccessible for survey although the risk of presence is considered very low based on habitat conditions present. White-clawed crayfish are therefore considered to be likely absent from the ZoI. However, a negative eDNA result is not proof of absence, and therefore, a precautionary approach is adopted in the mitigation section (refer to Section 10.5). The full results of the white-clawed crayfish eDNA surveys are shown in Appendix A10.3 in Volume 3 of this EIAR.

White-clawed-crayfish are considered of County Importance.

Table 10.22: Summary of White-Clawed Crayfish eDNA Results

eDNA Result	Watercourse Reference number
Positive	None
Negative	WB03 / WB04 / WB05 / WB06 / WB07 / WB10 / WB11 / WB12 / WB13 / WB16 / WB19 / WB22 / WB23 / DD26
Not surveyed (no access)	▪ WB08 (O 05260 45264) – densely vegetated drainage ditch. In road section of the cable route (no works within the roadside verge in proximity to the ditch) ▪ DD25 (O 07758 44011) – densely vegetated drainage ditch. Off road section of the cable route (works within field in proximity to the ditch) ▪ DD35 (O 18860 42755) – densely vegetated drainage ditch, access not permitted. Off road section of the cable route (works within field in proximity to the ditch)

10.3.2.14 Non-Native Invasive Plant Species

Five Third Schedule invasive species were recorded during the surveys, as outlined in Table 10.23. Locations are shown in Figure 10.9 in Volume 4 of this EIAR. A further four invasive species not listed on the Third Schedule were also recorded during the survey and populations of these species are not known to pose risk of impact to protected, notable and rare species of conservation concern and are only reported for completeness.

Table 10.23: Invasive Plant Species

Invasive species	Location	Eastings and Northings (in sequ
Third Schedule invasive species		
Three-cornered leek (*Allium triquetrum*)	Along roadside verge adjacent to Joint Bay 6.	N 95657 44458
Spanish bluebell (*Hyacinthoides hispanica*)	▪ c. 260m from cable route along road ▪ c. 38m from cable route along road	O 01451 44549 O 13454 44629
Giant hogweed (*Heracleum mantegazzianum*)	▪ c. 1m from the cable route ▪ c. 86m from the cable route	O 01639 44009 O 03724 45107
Japanese knotweed (*Reynoutria japonica*)	▪ c90m from the cable route along the road ▪ c. 114m from the cable route along the road ▪ c. 488m from the cable route along the road ▪ c. 92m from the cable route	O 18925 43146 O 18894 43144 O 02051 43691 O 16230 44547
Rhododendron (*Rhododendron ponticum*)	c. 6m from cable route on the banks of a watercourse near the cable crossing point	O 05654 45437
Non-Third schedule species NOTE 1		
Winter heliotrope (*Petasites pyrenaicus*)	On roadside verges all along the cable route	Multiple locations
Buddleia (*Buddleja* sp)	Within multiple hedgerows along the cable route	Multiple locations
Snowberry (*Symphoricarpos albus*)	On roadside hedgerows along the cable route	Multiple locations
Sycamore (*Acer pseudoplatanus*)	Dispersed throughout the Proposed Development	Multiple locations
Cherry laurel (*Prunus laurocerasus*)	Dispersed throughout the Proposed Development often within areas of ornamental/non-native shrub (WS3)	Multiple locations
NOTE 1 – Locations of winter heliotrope and buddleia are included on Figure 10.9 in Volume 4 of this EIAR; however, due to the prevalence of snowberry, sycamore, and cherry laurel these species were not individually mapped.		

10.3.2.15 Non-Native Invasive Animal Species

Results from eDNA analysis of samples taken from water bodies returned positive results for two invasive animal species, neither of which are considered Third Schedule invasive species in the areas sampled. Rabbit (*Oryctolagus cuniculus*) was present in the samples for WB06 and WB12. Brown rat (*Rattus norvegicus*) was present in WB03, WB04, WB05, WB12, WB13, and WB16. It is likely these species are commuting across these water bodies or utilising the surrounding areas leading to their DNA entering these water bodies, for example, through their droppings.

10.3.3 Evaluation

The ecological receptors in this Chapter have been valued within a defined geographical context (International, National, County, Local importance), taking cognisance of the methodology described in the CIEEM Guidance (CIEEM 2018) and the Guidelines for Assessment of Ecological Impacts of National Roads Schemes (NRA 2009). The geographic categories of ecological receptor valuation (i.e., International, National, County and Local) are fully defined in Appendix A10.2 in Volume 3 of this EIAR, as taken from the Guidelines for Assessment of Ecological Impacts of National Roads Schemes. ‘Local importance’ has two categories, ‘higher’ and ‘lower’. The value of the ecological receptors described in this Chapter are shown in Table 10.24. The valuation of ecological receptors shown in this table represents the geographical level which potential impacts are considered significant (e.g. for Section 10.4.2.9 (Otter), “*there is potential for negative effects from mortality, disturbance and pollution at county level*”). Receptors with a value of less than Local importance (lower value), are not considered to be a IER (also termed an ‘Important Ecological Feature’ in the CIEEM Guidance) and are not included in this EIAR. However, it does not mean that they have no ecological value, rather that they are widespread, unthreatened and resilient to impacts from the Proposed Development and will remain viable and sustainable during construction and operation.

All designated areas for nature conservation that lie within the ZoI of the Proposed Development are considered to be IERs, given that they are sites selected specifically for biodiversity conservation and are potentially at risk of impacts from the Proposed Development. Those designated areas for nature conservation that lie beyond the ZoI of the Proposed Development are not considered to be at risk of impact, and are therefore not considered to be IERs.

Non-native invasive plant species are not considered as a IER and are not assigned a value, as they can result in negative effects on biodiversity, but it is in that context that they are included within the impact assessment.

Table 10.24: Ecological Evaluation of IERs (Those Important for the Proposed Development are Highlighted Bold and Shaded Grey)

Ecological Receptor		Ecological Valuation	IER for the Proposed Development?
Designated Sites	**Malahide Estuary SAC (000205)**	**International Importance**	**Yes**
	Baldoyle Bay SAC (000199)	**International Importance**	**Yes**
	Rockabill to Dalkey Island SAC (003000)	International Importance	No, no potential for likely significant effects identified in the NIS
	Lambay Island SAC (000204)	International Importance	No, no potential for likely significant effects identified in the NIS
	Malahide Estuary SPA (004025)	**International Importance**	**Yes**
	Baldoyle Bay SPA (004016)	**International Importance**	**Yes**
	North-West Irish Sea SPA (004236)	**International Importance**	**Yes**
	North Bull Island SPA (004006)	**International Importance**	**Yes**
	South Dublin Bay and River Tolka Estuary SPA (004024)	**International Importance**	**Yes**
	Rogerstown Estuary SPA (004015)	**International Importance**	**Yes**
	Ireland's Eye SPA (004117)	**International Importance**	**Yes**
	Howth Head Coast SPA (004113)	International Importance	No, no potential for likely significant effects identified in the NIS
	Lambay Island SPA (004069)	**International Importance**	**Yes**
	Dalkey Islands SPA (004172)	International Importance	No, no potential for likely significant effects identified in the NIS
	Skerries Islands SPA (004122)	**International Importance**	**Yes**
	Rockabill SPA (004014)	International Importance	No, no potential for likely significant effects identified in the NIS
	River Nanny Estuary and Shore SPA (004158)	**International Importance**	**Yes**
	Boyne Estuary SPA (004080)	**International Importance**	**Yes**
	Dundalk Bay SPA (004026)	**International Importance**	**Yes**
	Malahide Estuary pNHA (000205)	**National Importance**	**Yes**
	Sluice River Marsh pNHA (001763)	**National Importance**	**Yes**

Ecological Receptor		Ecological Valuation	IER for the Proposed Development?
	Baldoyle Bay pNHA (000199)	**National Importance**	**Yes**
	North Dublin Bay pNHA (000206)	**National Importance**	**Yes**
	Howth Head pNHA (000202)	**National Importance**	**Yes**
	Ireland's Eye pNHA (000203)	**National Importance**	**Yes**
Habitats	Arable crops (BC1)	Less than local Importance	No
	Horticultural land (BC2)	Less than local Importance	No
	Tilled land (BC3)	Less than local Importance	No
	Flower beds and borders (BC4)	Less than local Importance	No
	Earth banks (BL2)	Less than local Importance	No
	Building or Artificial (BL3)	Less than local Importance	No
	Spoil and bare ground (ED2)	Local Importance (Lower Value)	No
	Recolonising bare ground (ED3)	**Local Importance (Higher Value)**	**Yes**
	Other artificial lakes and ponds (FL8)	**Local Importance (Higher Value)**	**Yes**
	Depositing lowland rivers (FW2)	**Local Importance (Higher Value)**	**Yes**
	Drainage ditches (FW4)	**Local Importance (Higher Value)**	**Yes**
	Improved agricultural grassland (GA1)	Less than local Importance	No
	Amenity grassland (GA2)	Less than local Importance	No
	Marsh (GM1)	**Local Importance (Higher Value)**	**Yes**
	Dry calcareous grassland (GS1)	**Local Importance (Higher Value)**	**Yes**
	Dry meadows and grassy verges (GS2)	**Local Importance (Higher Value)**	**Yes**
	Wet grassland (GS4)	**Local Importance (Higher Value)**	**Yes**
	(Mixed) broadleaved woodland (WD1)	**Local Importance (Higher Value)**	**Yes**
	Mixed broadleaved / conifer woodland (WD2)	**Local Importance (Higher Value)**	**Yes**
	Conifer plantation (WD4)	Local Importance (Lower Value)	No
	Scattered trees and parkland (WD5)	Local Importance (Lower Value)	No
	Hedgerows (WL1) species rich	**County Importance**	**Yes**
	Hedgerows (WL1) species poor	Local Importance (Higher Value)	Yes
	Treeline (WL2)	**Local Importance (Higher Value)**	**Yes**
	Riparian woodland (WN5)	**Local Importance (Higher Value)**	**Yes**
	Scrub (WS1)	**Local Importance (Higher Value)**	**Yes**
	Immature woodland (WS2)	Local Importance (Lower Value)	No

Ecological Receptor		Ecological Valuation	IER for the Proposed Development?
	Ornamental / non-native shrub (WS3)	Less than local Importance	No
	Recently-felled woodland (WS5)	Local Importance (Lower Value)	No
Protected, Notable and Invasive Species and Species Groups	**SCI bird species**	**International Importance**	**Yes**
	European eel	**County Importance**	**Yes**
	White-clawed crayfish	County Importance	No
	Otter	**County Importance**	**Yes**
	Atlantic salmon	County Importance	No
	Lamprey spp.	**County Importance**	**Yes**
	All other Red, Amber or Green listed bird species (non-SCI breeding populations)	**Local Importance (Higher Value)**	**Yes**
	Bats	**Local Importance (Higher Value)**	**Yes**
	Badger	**Local Importance (Higher Value)**	**Yes**
	Other small mammal species protected under the Wildlife Act	**Local Importance (Higher Value)**	**Yes**
	Smooth newt	**Local Importance (Higher Value)**	**Yes**
	Common frog	**Local Importance (Higher Value)**	**Yes**
	Common lizard	**Local Importance (Higher Value)**	**Yes**
	Other fish species (including trout)	**Local Importance (Lower Value)**	**Yes**
	Non-native invasive plant species	**N/A**	**Yes**

10.4 Potential Impacts

This Section describes the likely potential impacts of the Proposed Development on IERs during the Construction and Operational Phases using the broad categories outlined in Table 10.24. This includes consideration of the 'Do Nothing' impact scenario (i.e., the potential impact on biodiversity in the absence of the Proposed Development). Potential impacts are described in this Section, in the absence of mitigation.

Table 10.25 summarises the likely potential impacts and effects of IERs, and the ZoI in which they occur.

Table 10.25: Potential Impacts and Effects on IERs

Potential Impact and Effect	Potential Receptor	ZoI
Direct habitat loss due to vegetation removal associated with land take including earth banks, removal of mature trees and hedgerows. Habitat loss results in disturbance / displacement / fragmentation / degradation. Effects are temporary or permanent during construction and / or operation.	Terrestrial and aquatic habitats.	Land within the PAB including proposed access tracks, Temporary Construction Compounds and Horizontal Directional Drilling (HDD) Compounds.
Changes in water quality from hydrological impacts. Effects are temporary during construction.	Aquatic plant and animal species.	Changes in surface water quality from the Proposed Development associated with the potential for contaminated water runoff, including bentonite slurry from HDD, are assessed downstream of the Proposed Development / water body crossings, but the potential spatial extent of effects is difficult to quantify due to the significant variables including the varying concentrations / types of contaminants which could be released during construction / operation (e.g. sediment, hydrocarbons etc), the resilience of different receiving water bodies (i.e. assimilative capacity) and the sensitivity of the receiving waters.
Direct mortality. Effects are permanent during construction.	Terrestrial species	Land within PAB, including construction compounds, HDD platforms and access routes.
	Aquatic plant and animal species	Includes all freshwater species within the PAB and downstream of the proposed water body crossings.
Spread of invasive non-native species resulting in habitat degradation. Effects are temporary or permanent during construction and operation.	Protected sites / designated sites; Sensitive habitats; Terrestrial species; and Aquatic plant and animal species	Land within and adjacent to the PAB proposed access tracks, Temporary Construction Compounds.
Disturbance from noise, light and vibration for example impacting foraging / roosting SCI birds. Effects are temporary during construction.	Terrestrial species	Assessed within 500m of the PAB (e.g. for wintering birds) but can be a significantly lower distance (e.g. 150m for otter and or badger resting places).
Human / machinery presence resulting in disturbance to highly sensitive bird species at significant distance from works. Effects are temporary during construction.	Bird species	Assessed within 500m of the PAB (e.g. for wintering birds).

10.4.1 'Do Nothing' Scenario

In the Do Nothing scenario, the Proposed Development would not be implemented. Thus, the existing baseline environment would remain with no immediate significant changes in the terrestrial and aquatic biodiversity (flora and fauna) of the area, as there would be no significant Construction Phase or Operational Phase impacts from the Proposed Development. If the Proposed Development is not constructed, the impact would be Neutral upon biodiversity, solely in its absence.

10.4.2 Construction Phase

10.4.2.1 European Designated Sites

The AA Screening Report (included as a standalone document in the planning application pack) concluded, that of the 19 European designated sites within the ZoI, likely significant effects were excluded on the basis of objective evidence for the following five European sites, as there is considered to be sufficient assimilative capacity of pollution in the water bodies linking the Proposed Development to these European sites:

- Rockabill to Dalkey Island SAC, located approximately 8.8km to the east of the Proposed Development at its nearest location and approximately 10.5km hydrologically downstream;
- Lambay Island SAC, located approximately 13.4km to the north-east of the Proposed Development at its nearest location and approximately 20km hydrologically downstream;
- Rockabill SPA, located approximately 19km to the east of the Proposed Development at its nearest location and approximately 30km hydrologically downstream;
- Howth Head Coast SPA, located approximately 10km to the east of the Proposed Development at its nearest location and approximately 11km hydrologically downstream; and
- Dalkey Islands SPA, located approximately 17.5km to the east of the Proposed Development at its nearest location and 24km hydrologically downstream. There is a hydrological link to the SPA via the Irish Sea, but it is considered de minimum due to the intervening distance and dilution rates.

The AA Screening Report concluded that there is the potential for likely significant effects on 14 European sites, as discussed from Section 10.4.2.1.1 to Section 10.4.2.1.14. For each of these sites, a summary of the number of attributes of the QI feature likely to be impacted by a potential pollution event is provided.

10.4.2.1.1 Malahide Estuary SAC (Approximately 3.6km from the Proposed Development)

The Proposed Development will be hydrologically linked to the Malahide Estuary SAC by the following water bodies:

- Ward_020;
- Ward_010; and
- Ward_030.

The shortest hydrological distance between the Proposed Development and Malahide Estuary SAC will be approximately 8.7km commencing at WB10. The QI features of this SAC are mudflats and sandflats not covered by seawater at low tide (*Salicornia* and other annuals colonising mud and sand; Atlantic salt meadows; Mediterranean salt meadows; shifting dunes along the shoreline with *Ammophila arenaria* and fixed coastal dunes with herbaceous vegetation). There is the potential for impacts to occur on the following, in the absence of mitigation:

- Five out of five attributes of the conservation objectives of mudflats and sandflats that are not covered by seawater at low tide;
- Nine out of 10 attributes of the conservation objectives of *Salicornia* and other annuals colonising mud and sand;
- Nine out of 10 attributes of the conservation objectives of Atlantic salt meadows; and
- Nine out of 10 attributes of the conservation objectives of Mediterranean salt meadows.

The attributes of shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) and of fixed coastal dunes with herbaceous vegetation (grey dunes) are not considered sensitive to hydrological pollution and are therefore not considered further.

Therefore, there is the potential for negative impacts at an International Level on the SAC from a pollution event.

10.4.2.1.2 Baldoyle Bay SAC (Approximately 4km from the Proposed Development)

The Proposed Development will be hydrologically linked to the Baldoyle Bay SAC by the following water body:

- Mayne_010.

The shortest hydrological distance between the Proposed Development and Baldoyle Bay SAC will be approximately 5.1km, commencing at WB23. The QI features of this SAC are mudflats and sandflats not covered by seawater at low tide (*Salicornia* and other annuals colonising mud and sand, Atlantic salt meadows and Mediterranean salt meadows). There is the potential for impacts to occur on the following, in the absence of mitigation:

- Two out of two attributes of the conservation objectives of mudflats and sandflats that are not covered by seawater at low tide;
- Nine out of 10 attributes of the conservation objectives of *Salicornia* and other annuals colonising mud and sand;
- Nine out of 10 attributes of the conservation objectives of Atlantic salt meadows; and
- Nine out of 10 attributes of the conservation objectives of Mediterranean salt meadows.

Therefore, there is the potential for negative impacts at an International Level on the Baldoyle Bay SAC from a pollution event.

10.4.2.1.3 Malahide Estuary SPA (Approximately 3.6km from the Proposed Development)

The Proposed Development will be hydrologically linked to the Malahide Estuary SPA by the following water bodies:

- Ward_020;
- Ward_010; and
- Ward_030.

The shortest hydrological distance between the Proposed Development and Malahide Estuary SPA will be approximately 8.7km, commencing at WB20. The QI features of this SPA are great crested grebe (*Podiceps cristatus*), light-bellied Brent goose (*Branta bernicla hrota*), shelduck (*Tadorna tadorna*), pintail (*Anas acuta*), goldeneye (*Bucephala clangula*), red-breasted merganser (*Mergus serrator*), oystercatcher (*Haematopus ostralegus*), golden plover (*Pluvialis apricaria*), grey plover (*Pluvialis squatarola*), knot (*Calidris canutus*), dunlin (*Calidris alpina*), black-tailed godwit (*Limosa limosa*), bar-tailed godwit (*Limosa lapponica*)redshank (*Tringa totanus*), and wetland and waterbirds. Three QI features of this SPA (i.e., light bellied Brent goose, oystercatcher and golden plover) use large fields, parks and agricultural fields considered supporting habitats for these birds. The Proposed Development will pass through and adjacent to these habitats and are potentially exposed to likely significant effects in the absence of mitigation due to a failure to meet both QI targets:

- Two out of two attributes of the conservation objectives of great crested grebe;
- Two out of two attributes of the conservation objectives of light-bellied Brent goose;
- Two out of two attributes of the conservation objectives of shelduck;
- Two out of two attributes of the conservation objectives of pintail;
- Two out of two attributes of the conservation objectives of goldeneye;
- Two out of two attributes of the conservation objectives of red-breasted merganser;
- Two out of two attributes of the conservation objectives of oystercatcher;
- Two out of two attributes of the conservation objectives of golden plover;
- Two out of two attributes of the conservation objectives of grey plover;
- Two out of two attributes of the conservation objectives of knot;

- Two out of two attributes of the conservation objectives of dunlin;
- Two out of two attributes of the conservation objectives of black-tailed godwit;
- Two out of two attributes of the conservation objectives of bar-tailed godwit; and
- Two out of two attributes of the conservation objectives of redshank.

Therefore, there is the potential for negative impacts at an International Level on the Malahide Estuary SPA from a pollution event, from mortality and from disturbance.

10.4.2.1.4 Baldoyle Bay SPA (Approximately 4km from the Proposed Development)

The Proposed Development will be hydrologically linked to the Baldoyle Bay SPA by the following water body:

- Mayne_010.

The shortest hydrological distance between the Proposed Development and the SPA will be approximately 5.7km, commencing at WB23. The QI features of this SPA are light-bellied Brent goose (*Branta bernicla hrota*), shelduck (*Tadorna tadorna*), ringed plover (*Charadrius hiaticula*), golden plover (*Pluvialis apricaria*), grey plover (*Pluvialis squatarola*) bar-tailed godwit (*Limosa lapponica*)., and wetland and waterbirds.

There is the potential for impacts to occur on the following, in the absence of mitigation:

- Two out of two attributes of the conservation objectives of light-bellied Brent goose;
- Two out of two attributes of the conservation objectives of shelduck;
- Two out of two attributes of the conservation objectives of little ringer plover;
- Two out of two attributes of the conservation objectives of golden plover;
- Two out of two attributes of the conservation objectives of grey plover; and
- Two out of two attributes of the conservation objectives of bar-tailed godwit.

Therefore, there is the potential for negative impacts at an International Level on the Baldoyle Bay SPA from a pollution event, from mortality and from disturbance.

10.4.2.1.5 North-West Irish Sea SPA (Approximately 4.5km from the Proposed Development)

The Proposed Development will be hydrologically linked to the North-West Irish Sea SPA via the following water bodies leading into the Irish Sea:

- Sluice_010 and the Mayne_010 (Baldoyle SPA);
- Tolka_020, Pinkeen_010 and the Dunboyne (North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA); and
- Ward_ 010, 020 and 030 (Malahide Bay SPA).

The shortest distance between the SPA and the Proposed Development will be approximately 6.2km, commencing from WB19.

The QI features of this SPA are common scoter (*Melanitta nigra*), red-throated diver (*Gavia stellata*), great northern diver (*Gavia immer*), fulmar (*Fulmarus glacialis*), manx Shearwater (*Puffinus puffinus*), shag (*Phalacrocorax aristotelis*), cormorant (*Phalacrocorax carbo*), little gull (*Larus minutus*), kittiwake (*Rissa tridactyla*), black-headed gull (*Chroicocephalus ridibundus*), common gull (*Larus canus*), lesser black-backed gull (*Larus fuscus*), herring gull (*Larus argentatus*), great black-backed gull (*Larus marinus*), little tern (*Sterna albifrons*), roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*), arctic tern (*Sterna paradisaea*), puffin (*Fratercula arctica*), razorbill (*Alca torda*), guillemot (*Uria aalge*).

When considering all of the attributes of the species together, there is the potential for impacts to occur on the following, in the absence of mitigation

- Three out of five attributes of the conservation objectives of black-headed gull;

- Three out of five attributes of the conservation objectives of common gull;
- Three out of five attributes of the conservation objectives of lesser black-backed gull;
- Three out of five attributes of the conservation objectives of herring gull;
- Three out of five attributes of the conservation objectives of great black-backed gull; and
- Three out of five attributes of the conservation objectives of little gull.

Therefore, there is the potential for negative impacts at an International Level on the North-West Irish Sea SPA from a pollution event from mortality and from disturbance.

10.4.2.1.6 North Bull Island SPA (Approximately 4.6km from the Proposed Development)

The Proposed Development will be hydrologically linked to the North Bull Island SPA by the following water bodies:

- Dunboyne Stream_010;
- Tolka_020; and
- Pinkeen_010.

The shortest hydrological distance between the Proposed Development and SPA will be approximately 23km, commencing at WB07. The QI features of this SPA are light-bellied Brent goose (*Branta bernicla hrota*), shelduck (*Tadorna tadorna*), teal (*Anas crecca*), pintail (*Anas acuta*), shoveler (*Anas clypeata*), oystercatcher (*Haematopus ostralegus*), golden plover (*Pluvialis apricaria*), grey plover (*Pluvialis squatarola*), knot (*Calidris canutus*), sanderling (*Calidris alba*), dunlin (*Calidris alpina*), black-tailed godwit (*Limosa limosa*), bar-tailed godwit (*Limosa lapponica*), curlew (*Numenius arquata*), redshank (*Tringa totanus*), turnstone (*Arenaria interpres*) black-headed gull (*Chroicocephalus ridibundus*) and wetland and waterbirds. There is the potential for impacts to occur on the following, in the absence of mitigation:

- Two out of two attributes of the conservation objectives of light-bellied Brent goose;
- Two out of two attributes of the conservation objectives of oystercatcher;
- Two out of two attributes of the conservation objectives of pintail;
- Two out of two attributes of the conservation objectives of dunlin;
- Two out of two attributes of the conservation objectives of black-tailed godwit;
- Two out of two attributes of the conservation objectives of knot;
- Two out of two attributes of the conservation objectives of redshank;
- Two out of two attributes of the conservation objectives of black-headed gull;
- Two out of two attributes of the conservation objectives of curlew;
- Two out of two attributes of the conservation objectives of shelduck;
- Two out of two attributes of the conservation objectives of little ringer plover;
- Two out of two attributes of the conservation objectives of golden plover;
- Two out of two attributes of the conservation objectives of grey plover; and
- Two out of two attributes of the conservation objectives of bar-tailed godwit.

Therefore, there is the potential for negative impacts at an International Level on the North Bull Island SPA from a pollution event, from mortality and from disturbance.

10.4.2.1.7 South Dublin Bay and River Tolka Estuary SPA (Approximately 5.5km from the Proposed Development)

The Proposed Development will be hydrologically linked to the South Dublin Bay and River Tolka Estuary SPA by the following water bodies:

- Tolka_020;
- Dunboyne Stream_010; and

- Pinkeen_010.

The shortest hydrological distance between the Proposed Development and SPA will be approximately 20.8km, commencing at WB07. The QI features of this SPA are light-bellied Brent goose (*Branta bernicla hrota*), oystercatcher (*Haematopus ostralegus*), ringed plover (*Charadrius hiaticula*), grey plover (*Pluvialis squatarola*), knot (*Calidris canutus*), sanderling (*Calidris alba*), dunlin (*Calidris alpina*), bar-tailed godwit (*Limosa lapponica*), redshank (*Tringa totanus*), black-headed gull (*Chroicocephalus ridibundus*), roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*)arctic tern (*Sterna paradisaea*) and wetland and waterbirds. There is the potential for impacts to occur on the following, in the absence of mitigation:

- Two out of two attributes of the conservation objectives of light-bellied Brent geese;
- Two out of two attributes of the conservation objectives of oystercatcher;
- Two out of two attributes of the conservation objectives of ringed plover;
- Two out of two attributes of the conservation objectives of grey plover;
- Two out of two attributes of the conservation objectives of knot;
- Two out of two attributes of the conservation objectives of dunlin;
- Two out of two attributes of the conservation objectives of bar-tailed godwit;
- Two out of two attributes of the conservation objectives of redshank; and
- Two out of two attributes of the conservation objectives of black-headed gull.

Therefore, there is the potential for negative impacts at an International Level on the South Dublin Bay and River Tolka Estuary SPA from a pollution event from mortality and from disturbance.

10.4.2.1.8 Rogerstown Estuary SPA (Approximately 7.8km from the Proposed Development)

The Proposed Development will be hydrologically linked to the Rogerstown Estuary SPA via the Irish Sea commencing at:

- Sluice_010 and the Mayne_010 (Baldoyle SPA);
- Tolka_020, Pinkeen_010 and the Dunboyne (North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA); and
- Ward_ 010, 020 and 030 (Malahide Bay SPA).

The shortest hydrological distance between the Proposed Development and SPA will be approximately 7.8km, commencing from WB19. The QI features of this SPA are greylag goose (*Anser anser*), light-bellied Brent goose (*Branta bernicla hrota*), shelduck (*Tadorna tadorna*), shoveler (*Anas clypeata*), oystercatcher (*Haematopus ostralegus*), ringed plover (*Charadrius hiaticula*), grey plover (*Pluvialis squatarola*), knot (*Calidris canutus*), dunlin (*Calidris alpina*), black-tailed godwit (*Limosa limosa*) redshank (*Tringa totanus*). and wetland and waterbirds. There is the potential for impacts to occur on the following, in the absence of mitigation:

- Two out of two attributes of the conservation objectives of light-bellied Brent goose;
- Two out of two attributes of the conservation objectives of shelduck;
- Two out of two attributes of the conservation objectives of ringed plover;
- Two out of two attributes of the conservation objectives of grey plover;
- Two out of two attributes of the conservation objectives of knot;
- Two out of two attributes of the conservation objectives of dunlin;
- Two out of two attributes of the conservation objectives of redshank;
- Two out of two attributes of the conservation objectives of greylag goose;
- Two out of two attributes of the conservation objectives of shoveler;
- Two out of two attributes of the conservation objectives of black-tailed godwit;
- Two out of two attributes of the conservation objectives of light-bellied Brent goose; and

- Two out of two attributes of the conservation objectives of oystercatcher.

Therefore, there is the potential for negative impacts at an International Level on the Rogerstown Estuary SPA from a pollution event, from mortality and from disturbance.

10.4.2.1.9 Ireland's Eye SPA (Approximately 8.6km from the Proposed Development)

The Proposed Development will be hydrologically linked to the Ireland's Eye SPA via the Irish Sea commencing at:

- Sluice_010 and the Mayne_010 (Baldoyle SPA);
- Tolka_020, Pinkeen_010 and the Dunboyne (North Bull Island SPA & South Dublin Bay and River Tolka Estuary SPA); and
- Ward_ 010, 020 and 030 (Malahide Bay SPA).

The shortest hydrological distance between the Proposed Development and SPA will be approximately 10.5km commencing at WB23. The QI features of this SPA are cormorant (*Phalacrocorax carbo*), herring gull (*Larus argentatus*), kittiwake (*Rissa tridactyla*), guillemot (*Uria aalge*), razorbill (*Alca torda*). There is the potential for impacts on the following, in the absence of mitigation:

- Two out of three attributes of the conservation objectives of herring gull.

Therefore, there is the potential for negative impacts at an International Level on the Ireland's Eye SPA from a pollution event.

10.4.2.1.10 Lambay Island SPA (Approximately 13.4km from the Proposed Development)

The Proposed Development will be hydrologically linked to the Lambay Island SPA via the Irish Sea commencing at the following water bodies:

- Sluice_010 and the Mayne_010 (Baldoyle SPA);
- Tolka_020, Pinkeen_010 and the Dunboyne (North Bull Island SPA & South Dublin Bay and River Tolka Estuary SPA); and
- Ward_ 010, 020 and 030 (Malahide Bay SPA).

The shortest hydrological distance between the Proposed Development and SPA will be approximately 22.1km, commencing at WB19. The QI features of this SPA are fulmar (*Fulmarus glacialis*), cormorant (*Phalacrocorax carbo),* shag (*Phalacrocorax aristotelis*), greylag goose (*Anser anser*), lesser black-backed gull (*Larus fuscus*), herring gull (*Larus argentatus*), kittiwake (*Rissa tridactyla*), guillemot (*Uria aalge*), razorbill (*Alca torda*), and puffin (*Fratercula arctica*). There is the potential for impacts to occur on the following, in the absence of mitigation:

- Two out of three attributes of the conservation objectives of greylag goose;
- Two out of three attributes of the conservation objectives of lesser black-backed gull; and
- Two out of three attributes of the conservation objectives of herring gull.

Therefore, there is the potential for negative impacts at an International Level on the Lambay Island SPA from a pollution event, from mortality and from disturbance.

10.4.2.1.11 Skerries Islands SPA (Approximately 18.5km from the Proposed Development)

The Proposed Development will be weakly hydrologically linked to the Skerries Island SPA via the Irish Sea commencing at the below watercourses. However, there are multiple hydrological links to supporting habitat via other SPAs for which there are overlapping QI:

- Sluice_010 and the Mayne_010 (Baldoyle SPA);
- Tolka_020, Pinkeen_010 and the Dunboyne (North Bull Island SPA & South Dublin Bay and River Tolka Estuary SPA); and

- Ward_ 010, 020 and 030 (Malahide Bay SPA).

The shortest hydrological distance between the Proposed Development and SPA will be approximately 29km, commencing at WB19. However, Baldoyle SPA and Malahide SPA have supporting habitat for overlapping QI for which there will be an approximate 4.8km and 8.7km hydrological link, respectively. The QI features of this SPA are cormorant (*Phalacrocorax carbo*), shag (*Phalacrocorax aristotelis*), light-bellied Brent goose (*Branta bernicla hrota*), purple sandpiper (*Calidris maritima*), turnstone (*Arenaria interpres*), and herring gull (*Larus argentatus*). There is the potential for impacts to occur on the following, in the absence of mitigation:

- Two out of three attributes of the conservation objectives of light bellied Brent goose; and
- Two out of three attributes of the conservation objectives of herring gull.

Therefore, there is the potential for negative impacts at an International Level on the Skerries Islands SPA from a pollution event from mortality and from disturbance.

10.4.2.1.12 River Nanny and Shore SPA (Approximately 26km from the Proposed Development)

The Proposed Development will be weakly hydrologically linked to the River Nanny and Shore SPA due to the large hydrological distance. However, there are multiple hydrological links to supporting habitat via other SPAs for which the QI require the same habitat types:

- Sluice_010 and the Mayne_010 (Baldoyle SPA);
- Tolka_020, Pinkeen_010 and the Dunboyne (North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA); and
- Ward_ 010, 020 and 030 (Malahide Bay SPA).

The shortest hydrological distance between the Proposed Development and SPA will be approximately 43km, commencing at WB19. However, Baldoyle SPA and Malahide SPA have supporting habitat for which there will be an approximate 4.8km and 8.7km hydrological link, respectively. The QI features of this SPA are oystercatcher (*Haematopus ostralegus*), ringed plover (*Charadrius hiaticula*), golden plover (*Pluvialis apricaria*), knot (*Calidris canutus*), sanderling (*Calidris alba),* herring gull (*Larus argentatus*), and wetland and waterbirds.

There is the potential for impacts to occur on the following, in the absence of mitigation:

- Two out of two attributes of the conservation objectives of oystercatcher;
- Two out of two attributes of the conservation objectives of ringed plover;
- Two out of two attributes of the conservation objectives of golden plover;
- Two out of two attributes of the conservation objectives of knot; and
- Two out of two attributes of the conservation objectives of herring gull.

Therefore, there is the potential for negative impacts at an International Level on the River Nanny and Shore SPA from a pollution event, from mortality and from disturbance.

10.4.2.1.13 Boyne Estuary SPA (Approximately 33km from the Proposed Development)

The Proposed Development will be weakly hydrologically linked to the Boyne Estuary SPA due to the large hydrological distance. However, there are multiple hydrological links to supporting habitat via other SPAs for which the QI require the same habitat types. The commencing watercourses for this hydrological link are detailed below:

- Sluice_010 and the Mayne_010 (Baldoyle SPA);
- Tolka_020, Pinkeen_010 and the Dunboyne (North Bull Island SPA & South Dublin Bay and River Tolka Estuary SPA); and
- Ward_ 010, 020 and 030 (Malahide Bay SPA).

The shortest hydrological distance between the Proposed Development and SPA will be approximately 52km, commencing at WB19. However, Baldoyle SPA and Malahide SPA have supporting habitat for which there will be an approximate 4.8km and 8.7km hydrological link, respectively. The QI features of this SPA are shelduck (*Tadorna tadorna*), oystercatcher (*Haematopus ostralegus*), golden plover (*Pluvialis apricaria*), grey plover (*Pluvialis squatarola*), lapwing (*Vanellus vanellus*), knot (Calidris canutus), sanderling (Calidris alba), black-tailed godwit (*Limosa limosa*) redshank (*Tringa totanus*), turnstone (*Arenaria interpres*), little tern (*Sterna albifrons*), and wetland and waterbirds.

There is the potential for impacts to occur on the following, in the absence of mitigation::

- Two out of two attributes of the conservation objectives of shelduck;
- Two out of two attributes of the conservation objectives of oystercatcher;
- Two out of two attributes of the conservation objectives of golden plover;
- Two out of two attributes of the conservation objectives of grey plover;
- Two out of two attributes of the conservation objectives of lapwing;
- Two out of two attributes of the conservation objectives of knot;
- Two out of two attributes of the conservation objectives of black-tailed godwit; and
- Two out of two attributes of the conservation objectives of redshank.

Therefore, there is the potential for negative impacts at an International Level on the Boyne Estuary SPA from a pollution event and disturbance.

10.4.2.1.14 Dundalk Bay SPA (Approximately 50km from the Proposed Development)

The Proposed Development will be weakly hydrologically linked to the Dundalk Bay SPA due to the large hydrological distance. However, there are multiple hydrological links to supporting habitat via other SPAs for which the QI require the same habitat types. The watercourses commencing these links are:

- Sluice_010 and the Mayne_010 (Baldoyle SPA);
- Tolka_020, Pinkeen_010 and the Dunboyne (North Bull Island SPA & South Dublin Bay and River Tolka Estuary SPA); and
- Ward_ 010, 020 and 030 (Malahide Bay SPA).

The shortest hydrological distance between the Proposed Development and SPA will be approximately 78km, commencing at WB1. However, Baldoyle SPA and Malahide SPA have supporting habitat for which there will be an approximate 4.8km and 8.7km hydrological link, respectively. The QI features of this SPA are great crested grebe (*Podiceps cristatus),* greylag goose (*Anser anser*), light-bellied Brent goose (*Branta bernicla hrota*), shelduck (*Tadorna tadorna*), teal (*Anas crecca*), mallard (*Anas platyrhynchos*), pintail (*Anas acuta*), common scoter (*Melanitta nigra*), red-breasted merganser (*Mergus serrator*), oystercatcher (*Haematopus ostralegus*), ringed plover (*Charadrius hiaticula*), golden plover (*Pluvialis apricaria*), grey plover (*Pluvialis squatarola*), lapwing (*Vanellus vanellus*), knot (*Calidris canutus*), dunlin (*Calidris alpina*), black-tailed godwit (*Limosa limosa*), bar-tailed godwit (*Limosa lapponica*), curlew (*Numenius arquata*), redshank (*Tringa totanus*), black-headed gull (*Chroicocephalus ridibundus*), common gull (*Larus canus*), herring gull (*Larus argentatus*), and wetland and waterbirds. There is the potential for impacts to occur on the following, in the absence of mitigation:

- Two out of two attributes of the conservation objectives of great crested grebe;
- Two out of two attributes of the conservation objectives of light-bellied Brent goose;
- Two out of two attributes of the conservation objectives of shelduck;
- Two out of two attributes of the conservation objectives of teal;
- Two out of two attributes of the conservation objectives of mallard;
- Two out of two attributes of the conservation objectives of pintail;
- Two out of two attributes of the conservation objectives of common scoter;

- Two out of two attributes of the conservation objectives of red-breasted merganser;
- Two out of two attributes of the conservation objectives of oystercatcher;
- Two out of two attributes of the conservation objectives of ringed plover;
- Three out of six attributes of the conservation objectives of lapwing;
- Two out of two attributes of the conservation objectives of knot;
- Two out of two attributes of the conservation objectives of dunlin;
- Two out of two attributes of the conservation objectives of black-tailed godwit;
- Two out of two attributes of the conservation objectives of bar-tailed godwit;
- Two out of two attributes of the conservation objectives of curlew;
- Two out of two attributes of the conservation objectives of redshank;
- Two out of two attributes of the conservation objectives of common gull; and
- Two out of two attributes of the conservation objectives of herring gull.

Therefore, there is the potential for negative impacts at an International Level on the Dundalk Bay SPA from a pollution event, from mortality and from disturbance.

An NIS has been prepared that addresses the potential for adverse effects on the integrity of the 14 European designated sites, as listed above, and is included as a standalone document in the planning application pack.

10.4.2.2 Water Bodies

As outlined in the baseline conditions, of the 58 water bodies identified within the study area, three WFD water bodies are considered to be of local (lower value) ecological sensitivity: WB09, WB14 and WB21 and 16 drainage ditches are considered to be of local (higher value) ecological sensitivity: DD02, DD05, DD07, DD11, DD13, DD14 DD15, DD16, DD18, DD19, DD20, DD21,DD22, DD23, DD30, DD31 and three water bodies were considered to be of local (higher value) ecological sensitivity: WB09, WB14, WB21. The remaining 19 water bodies were recorded as dry during the survey period and are therefore not considered to be sensitive aquatic receptors.

Details of the proposed Water Framework Directive (WFD) designated water body crossings, and any unnamed non-designated water body crossings are provided in Chapter 12 (Hydrology) in this EIAR.

In summary:

- No watercourse crossings (WFD designated or non-designated) are proposed to be undertaken by HDD;
- Ten watercourse crossings of WFD designated water bodies, are proposed to be undertaken by open cut trench crossing;
- Nine watercourse crossings of WFD designated water bodies, are proposed to be crossed within the road structure;
- Seven crossings of unnamed non-designated water bodies are proposed via open cut trenching;
- 21 in-road crossings of unnamed non-designated water bodies are proposed;
- There are five water bodies for which it is currently unclear if they will be crossed. However, if the water body extends upstream, then the crossing will be in-road;
- There is one water body for which it is currently unclear if it will be crossed, but if the water body extends upstream, it will be crossed off-road;
- One watercourse (WFD designated water body) is predicted to be affected by a Passing Bay; and
- A permanent crossing of one watercourse will be required to maintain access to Joint Bay 1 during the Operational Phase.

In the absence of mitigation, the in-stream trenching and construction works near sensitive water bodies have the potential to result in sedimentation (increased sedimentation concentrations within the water column, and sediment deposition on the riverbed and downstream water bodies), bank erosion, chemical contamination, changes in hydrology and riparian habitat degradation.

Pollution may result in habitat degradation, loss and fragmentation and there is the potential for changes to hydrology, all of which have the potential for negative effects on water bodies at a local level.

10.4.2.3 Nationally Designated Sites

There were no NHAs in the ZoI of the Proposed Development. Four pNHAs are considered to be within the ZoI (Malahide Estuary pNHA, Sluice River Marsh pNHA, Baldoyle Bay pNHA, and Howth Head pNHA) due to hydrological connectivity in-between these designated sites and the Proposed Development (a pollution event arising from the Proposed Development during the Construction Phase has the potential to lead to habitat degradation at a National Level within the designated sites). Conversely, North Dublin Bay pNHA and Ireland's Eye pNHA are considered to be outside of the ZoI as there is no pathway to effects on these designated sites.

10.4.2.4 Habitats

No further Annex I habitats other than those associated with European sites and nationally designated sites were identified within the ZoI from the desk-based study and field surveys.

An assessment of Annex I habitats found within European sites and nationally designated sites is provided in Section 10.4.2.1

The habitats within 150m of the PAB are described in Section 10.3.2.1 and their locations are shown in Figure 10.2 in Volume 4 of this EIAR. Table 10.26 includes data on the area and percentage of habitat lost within the PAB along with the likely significance of the habitat loss (negative impacts) in the absence of mitigation (note that habitats recorded within the study area but outside of the PAB are not included within the table as there are no direct impacts upon these). Temporary and permanent habitat loss for each of the Fossitt habitat types within the PAB (as of 20 March 2023) are also presented on Figure 10.12 and Figure 10.13 in Volume 4 of this EIAR, respectively.

The Proposed Development has the potential to lead to habitat degradation beyond the PAB (i.e. habitats outside of the PAB but within the study area and ZoI) in the event of a pollution event during the Construction Phase. However, this will only result in likely significant effects where a pathway such as hydrological connectivity exists in-between the Proposed Development and the habitat, and the geographical value of the habitat is equal or greater than Local Level. On this basis, habitat degradation has the potential to occur within the following habitats: other artificial lakes and ponds (FL8), depositing lowland rivers (FW2), drainage ditches (FW4), wet grassland (GS4), marsh (note that GM1 is not included within Table 10.27 as the habitat is located within the ZoI but outside of the PAB), and riparian woodland (WN5) (note in the event of a pollution event, habitat degradation could potentially occur within other habitats not included within this list, although the effects are likely to be highly localised and not significant).

Table 10.26: Habitat Areas (with Fossitt Habitat Codes, Fossitt 2000) Within the PAB Showing Areas of Temporary and Permanent Loss and Percentage Habitat Loss in the Absence of Mitigation

Fossitt Habitat Code	Fossitt Habitat	Baseline Habitat Area / Length within PAB		Temporary Habitat Loss			Permanent Habitat Loss			Likely Significant Effect (Yes/No) and Geographic Scale of Impact
		Area (ha)	Length (km)	Area (ha)	Length (km)	Percentage of Habitat Loss within PAB	Area (ha)	Length (km)	Percentage of Habitat Loss within PAB	
BC1	Arable crops	20.45	-	12.21	-	60%	7.89	-	39%	No - Less than local
BC3	Tilled land	2.40	-	2.20	-	92%	0.20	-	8%	No - Less than local
BL3	Buildings and artificial surfaces	46.37	-	32.47	-	70%	11.99	-	26%	No - Less than local
ED3	Recolonising bare ground	1.35	-	1.33	-	98%	0.02	-	2%	Yes – Local Level
FL8	Other artificial lakes and ponds	0.02	-	0.02	-	100%	0.00	-	0%	Yes – Local Level
FW2	Depositing lowland river	-	0.53	-	0.45	86%	-	-	0%	Yes – Local Level
FW4	Drainage ditches	-	10.22	-	5.15	50%	-	0.49	5%	Yes – Local Level
GA1	Improved agricultural grassland	23.62	-	18.11	-	77%	5.30	-	22%	No - Less than local
GA2	Amenity grassland	1.39	-	1.33	-	96%	0.00	-	0%	No - Less than local
GS1	Dry calcareous and neutral grassland	21.34	-	18.48	-	87%	2.85	-	13%	Yes – Local Level
GS2	Dry meadows and grassy verges	5.47	-	5.09	-	93%	0.35	-	6%	Yes – Local Level
GS4	Wet grassland	1.95	-	1.02	-	52%	0.93	-	48%	Yes – Local Level
WD1	(Mixed) broadleaved woodland	8.00	-	7.55	-	94%	0.06	-	1%	Yes – Local Level
WD2	Mixed broadleaved / conifer woodland	0.24	-	0.24	-	100%	0.00	-	0%	Yes – Local Level

Fossitt Habitat Code	Fossitt Habitat	Baseline Habitat Area / Length within PAB		Temporary Habitat Loss			Permanent Habitat Loss			Likely Significant Effect (Yes/No) and Geographic Scale of Impact
		Area (ha)	Length (km)	Area (ha)	Length (km)	Percentage of Habitat Loss within PAB	Area (ha)	Length (km)	Percentage of Habitat Loss within PAB	
WD5	Scattered trees and parkland NOTE 1	0.13	-	0.13	-	100%	0.00	-	0%	Yes – Local Level
Wl1	Hedgerows	0.00	15.76	-	1.32	8%	-	0.67	4%	Yes – Local-County Level
WL2	Treelines	0.00	8.21	-	0.84	10%	-	0.04	<1%	Yes – Local-County Level
WN5	Riparian woodland	0.01	-	0.01	-	100%	0.00	-	0%	Yes – Local Level
WS1	Scrub	3.21	-	2.80	-	87%	0.13	-	4%	Yes – Local Level
WS2	Immature woodland	5.56	-	4.97	-	89%	0.59	-	11%	Yes – Local Level
WS3	Ornamental / non-native shrub	0.16	-	0.15	-	88%	0.02	-	12%	No - Less than local
TOTAL		141.70	34.72	108.12	7.83	76%	30.33	1.72	21%	
NOTE 1 – Scattered parkland and trees mapped as a polygon feature, excludes scattered trees mapped as individual points										

Appendix A18.2 in Volume 3 of this EIAR presents an Arboricultural Assessment. Out of a total of 9,103 trees within the study area for the Arboricultural Assessment (the PAB plus a 30m buffer), 512 will be required to be removed (5% of all the trees). A further 662 trees are at risk in the study area (7% of all trees). Adopting a precautionary principle, where all at risk trees will be required to be removed (i.e., 1,174 trees would be felled), the likely potential impact would represent 12% of the total trees within the study area.

10.4.2.5 Ground Water Dependent Terrestrial Ecosystems (GWDTE)

As outlined in the baseline conditions, marsh (GM1), wet grassland (GS4), and riparian woodland (WN5) were identified as potential GWDTE within the study area. There is a risk of excavation during trenching interfering with groundwater yield, quality or flow direction, where groundwater is required to be abstracted.

The Scottish Environmental Protection Agency (SEPA) Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Ecosystems (SEPA 2017), which has been used in this assessment in the absence of similar Irish guidance, but is considered appropriate and applicable, states that excavations greater than 1m pose a risk to GDWTE up to 250m away, and excavations less than 1m depth pose a risk to GWDTE up to 100m away. There is also a risk where such excavation would also require the abstraction of water. The depth of the proposed excavation for the proposed cable route will be approximately 1.3m to1.8m, and as such, a potential risk to GWDTE sites is assessed. Further information is presented in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of this EIAR which notes that negative impacts to groundwater quality at secondary receptors such as GWDTE are predicted, especially where the receptor is in proximity / adjacent to the proposed cable route. Chapter 11 (Soils, Geology and Hydrogeology) notes that there is a risk of intercepting shallow and / or perched groundwater at approximately 1.3m due to the shallow depths of the trenching (up to 1.8m). There is the potential for small scale, localised dewatering. There is also the potential for a localised impact on the groundwater quality supporting these potential GWDTEs.

There is therefore the potential for negative effects on GWDTE habitats resulting in potential habitat loss or degradation at a Local Level.

10.4.2.6 Wintering Birds

During the winter bird surveys, 10 bird species listed as wintering SCIs for SPAs in the vicinity were recorded in the study area, as shown in Table 10.27. The nearest SPAs designated for these SCI species are as follows:

- Black-headed Gull (North-West Irish Sea SPA, approximately 5.4km east of the Proposed Development; average max flight distance between roost and feeding site is 18.5km (Woodward *et al.* 2019));
- Black-tailed Godwit (Malahide Estuary SPA, approximately 3.6km north-east of the Proposed Development; average max flight distance between roost and feeding site is not available for this species);
- Brent Goose (Malahide Estuary SPA, approximately 3.6km north-east of the Proposed Development; average max flight distance between roost and feeding site is 53km (Clausen *et al.* 2013));
- Common Gull (North-West Irish Sea SPA, approximately 5.4km east of the Proposed Development; average max flight distance between roost and feeding site is 50km (Woodward *et al*. 2019));
- Golden Plover (Malahide Estuary SPA, approximately 3.6km north-east of the Proposed Development; average max flight distance between roost and feeding site is not available for this species);
- Great Black-backed Gull (North-West Irish Sea SPA, approximately 5.4km east of the Proposed Development; average max flight distance between roost and feeding site is 73km (Woodward *et al.* 2019));

- Herring Gull (North-West Irish Sea SPA, approximately 5.4km east of the Proposed Development; average max flight distance between roost and feeding site is 58.8±26.8km (Woodward *et al.* 2019));
- Lesser Black-backed Gull (North-West Irish Sea SPA, approximately 5.4km east of the Proposed Development average max flight distance between roost and feeding site is 127±109km (Woodward *et al.* 2019));
- Oystercatcher (Malahide Estuary SPA, approximately 3.6km north-east of the Proposed Development; average max flight distance between roost and feeding site is not available for this species); and
- Teal (North Bull Island SPA, approximately 4.6km south-east of the Proposed Development; average flight distance between roost and feeding site during winter is between 0.8 and 8.4km (Legagneux *et al.* 2009).

Table 10.27: SCI Birds Recorded During Surveys Within the Vicinity of the Proposed Development and Corresponding SPAs.

Species name	October	November	December	January	February	March	SPA (Approximate Distance)
Black-headed gull	197	394	172	52	114	3	North-West Irish Sea SPA (5.4km)
Black-tailed godwit	23	0	0	0	0	1	Malahide Estuary SPA (3.6km)
Brent Goose	0	240	231	200	0	0	Malahide Estuary SPA (3.6km)
Common gull	2	33	7	5	3	0	North-West Irish Sea SPA (5.4km)
Golden Plover	0	0	137	0	2	0	Malahide Estuary SPA (3.6km)
Great black-backed gull	0	2	2	0	0	0	North-West Irish Sea SPA (5.4km)
Herring gull	113	192	74	96	91	154	North-West Irish Sea SPA (5.4km)
Lesser black-back gull	0	0	7	21	7	7	North-West Irish Sea SPA (5.4km)
Oystercatcher	37	18	3	0	0	0	Malahide Estuary SPA (3.6km)
Teal	0	4	0	0	0	0	North Bull Island SPA (4.6km)

Black-tailed godwit, Brent goose, coot, little grebe, mute swan and oyster catcher were observed exclusively at Darndale Park which is located approximately 850m south-east of the existing Belcamp Substation.

10.4.2.6.1 Disturbance

The works will involve the excavation and laying of a proposed underground cable circuit, and as a result, habitats immediately under the PAB and either side of the proposed cable circuit excavation will be the predominant habitats affected. There will also be temporary disturbance during the Construction Phase. Treelines, hedgerows and scrub, and to lesser extent arable and grassland field margins, will be impacted, particularly at Joint Bay locations. It is predicted that these linear habitats do not support wintering birds.

There is therefore the potential for negative effects on wintering birds from disturbance at both National and International Levels.

10.4.2.6.2 Habitat Degradation

In the absence of mitigation, potential sedimentation and potentially polluting materials from pollution incidents have the potential to enter watercourses that are hydrologically linked to supporting habitat, causing habitat degradation and impacting QI species and their prey. The proximity of the European site to the Proposed Development means that works may be taking place within supporting habitat for QI bird species which are known to travel inland to use agricultural land to forage and roost, namely Brent goose, oystercatcher, golden plover, curlew, black-headed gull, greylag goose, herring gull and lesser black-backed gull.

There is therefore the potential for negative effects on wintering birds from pollution and habitat degradation at both National and International Levels.

10.4.2.6.3 Mortality

The Proposed Development has the potential to result in mortality of QI species associated with indirect impacts to a SPA from pollution leading to a reduction in water quality and a reduction of prey availability.

There is therefore the potential for negative effects on wintering birds at both National and International Level from mortality associated with a reduction in water quality and reduction of prey availability.

10.4.2.7 Breeding Birds

10.4.2.7.1 Habitat Loss

The Proposed Development will result in the loss of nesting and foraging habitat and displacement of breeding birds, particularly due to the temporary and permanent loss of trees and hedgerows (as summarised in Table 10.26).

There is therefore the potential for negative effects on breeding birds at a Local Level due to habitat loss.

10.4.2.7.2 Disturbance

No water body or wetland of ecological importance will be impacted by the Proposed Development. The majority of water bodies are not expected to be significantly impacted by disturbance during the Proposed Development as a result of existing screening through vegetation, infrastructure and topography. Although a temporary decline in overall breeding bird abundance has the potential to occur at a very local level (i.e., within the PAB, this is unlikely to affect the local range of the breeding bird species present in these habitats, nor is it likely to affect the ability of these breeding bird populations to maintain their local populations in the long-term.

Increased levels of noise, vibration, lighting (i.e. temporary lighting installed at Joint Bays, Temporary Construction Compounds and HDD Compounds), construction traffic and human presence during the Construction Phase will likely disturb breeding bird species during the breeding season (March to August, inclusive), resulting in the displacement of breeding birds from habitats within and adjacent to the Proposed Development PAB. Increased noise levels during the Construction Phase have the potential to disturb bird species affecting bird abundance and occurrence in the locality. Although it is not possible to quantify the magnitude of this potential impact, it could potentially extend for several hundreds of metres from the PAB. As the works will be temporary to short-term, disturbance or displacement effects will be temporary to short-term during the Construction Phase, and are therefore not likely to affect the conservation status of red or amber breeding bird species in the long-term.

There is therefore the potential for negative effects to breeding birds at a Local Level in the short-term, but not in the long-term.

10.4.2.7.3 Pollution

A pollution event during the Construction Phase has the potential to change the water quality and reduce the prey availability of waterbird species downstream of the pollution event. The breeding birds survey recorded the waterbirds of grey heron, mallard, great black-backed gull, herring gull and lesser black-backed gull, whose food source has the potential to be negatively affected by water pollution.

There is therefore the potential for negative effects from a pollution event at a Local to National / to International Level.

10.4.2.7.4 Mortality

The Proposed Development poses a mortality risk to breeding birds associated with the potential destruction of nests during vegetation clearance. If site clearance works were to be undertaken during the breeding bird season (i.e., March to August, inclusive), it is likely that nest sites holding eggs or chicks will be destroyed and birds killed.

Five breeding bird SCIs were recorded within the PAB (cormorant, curlew, great black-backed gull, herring gull, lesser black-backed gull). Birds recorded during the 2023 survey are shown in Table 10.13, and in Figure 10.5 in Volume 4 of this EIAR. Mortality of birds during site clearance works is not predicted to affect the conservation status of any of the breeding bird species present within the study area at any geographic scale.

There is therefore the potential for negative effects on breeding birds from vegetation clearance resulting in mortality at a Local to National / International Level.

10.4.2.8 Bats

10.4.2.8.1 Mortality

No bat roosts were recorded within the study area during the course of surveys, and therefore, no direct impacts on known roosts are anticipated. The felling of trees approximately along every 100m of the proposed cable route will potentially be required (see Appendix A18.2 in Volume 3 of this EIAR for the full Arboricultural Assessment). All potential tree roosts identified as moderate or high along the proposed cable route were surveyed and no roosts were found at the time of survey. As bats switch tree roosts regularly, there is a risk that bats might colonise trees within which none were recorded previously in the 2023 survey season. Therefore, without mitigation (i.e., pre-Construction Phase surveys), there is a risk that roosts could be lost and bats killed, injured or disturbed. The precise character of the potential impact would depend on the species, type and conservation status of a roost.

There is therefore the potential for negative effects from vegetation clearance resulting in mortality to bats at a Local Level.

10.4.2.8.2 Habitat Loss / Fragmentation

The overall effect on bats from losses of foraging habitat differs according to species. Generally, larger impacts would be expected for habitat specialists and / or those species with smaller feeding ranges, such as brown long-eared bats (woodland specialists) and *Myotis* bats (bats of woodland and water bodies), or where lost habitat is located near a roost. The felling of trees within the Proposed Development PAB may lead to the loss of foraging opportunities for bats. The removal of trees has the potential to reduce insect availability in the area, which subsequently has the potential to affect the feeding habits and nutritional resources for local bat populations.

The Proposed Development works will result in habitat loss and fragmentation, although the majority of the Proposed Development will be ‘in-road’ (70%) (i.e., the habitat under the construction works footprint is predominantly road surface). For the off-road sections, the land is largely characterised by farmland (arable and pastural fields delimited by hedgerows and treelines). The loss of habitat within the fields is not considered significant as these habitats are common and widespread at all geographic scales. Conversely, the hedgerows and treelines afford flight paths and foraging opportunities which may be important to the viability of local bat populations. However, linear habitat loss has been minimised through design to limit potential fragmentation effects.

As bats have large foraging ranges (with core sustenance zones around roost sites ranging between 2km to 3km for the bats recorded within the study area), the loss of these habitats is unlikely to lead to significant negative effects. Core sustenance zones for the bats recorded during static surveys and the emergence surveys are as follows (Collins, J. (ed.) 2023):

- Common pipistrelle: 2km;
- Soprano pipistrelle: 3km;
- Brown long eared bat: 3km;
- Natterer's bat: 4km; and
- Leisler's bat: 3km.

However, the loss of hedgerow and treelines (both temporary and permanent) has the potential to lead to severance effects, as bats commonly use linear features such as hedgerows, treelines and roads to commute to their foraging area and roost. This has the potential to also cause severance from roosts in buildings which were not surveyed due to a lack of direct impacts. Further, there is the potential for fragmentation of habitat caused by temporary lighting at Temporary Construction Compounds and HDD Compounds.

Bats are known to avoid gaps of open spaces within linear features, the smallest size suggested which bats are known to avoid is 5m (BCI 2022). The range of permanent minimum break width for the loss of hedgerows / treelines along the proposed cable route is 4m, which is not anticipated to cause any fragmentation or alter bat foraging range in the long-term. The range of permanent maximum break width for an easement off-road is 6m, which may alter or sever bat foraging ranges by removing linear features but is not likely to have an impact where no linear features are altered. The range of permanent maximum break for the easement on the approach to Belcamp Substation is approximately 30m, which has the potential to impact bat foraging ranges and potentially sever a commuting / foraging route when removing hedges and other linear features to accommodate the proposed cable route. However, the approach to Belcamp Substation has multiple alternative linear features within the vicinity which are not going to be affected by the proposed cable route, and so, while the removal will likely have a negative effect, it is unlikely to be significant. Impacts from compound lighting will be temporary.

There is therefore the potential for negative effects from habitat loss / fragmentation resulting in severed bat habitats at a Local Level. This includes all bat species recorded within the study area, as all are known to use linear features to commute to foraging areas and roosts. However, the linear features being altered are only susceptible to the local population as the core sustenance zone for all species is 4km or under.

10.4.2.9 Otter

10.4.2.9.1 Mortality, Disturbance and Pollution

Otters are likely to be present within the study area of the Proposed Development, with one suspected holt with slide located approximately 145m from the proposed cable route, one otter slide located approximately 173m from the proposed cable route and one otter spraint located approximately 33m from the proposed cable route identified during the field surveys. There is optimal commuting, foraging and resting habitat for otter throughout the study area. However, the majority of habitat to be impacted by the Construction Phase is considered sub-optimal for otter as it comprises hedgerows, treelines and agricultural land away from watercourses. There is the potential for disturbance or direct mortality to arise to this species from the Construction Phase. Additionally, a pollution event from the works has the potential to impact on water quality and reduce otter prey availability.

There is therefore the potential for significant negative effects from mortality, disturbance and pollution for otter at County Level.

10.4.2.10 Badger

10.4.2.10.1 Mortality, Habitat Loss and Disturbance

Badgers are known to be present within both the study area and within the PAB, as field signs and 10 setts were recorded during field surveys (refer to Table 10.20).

Negative impacts, namely disturbance and mortality are considered likely upon two active setts located within 50m of the PAB (Sett 2 and Sett 10). Sett 2 is a main sett located approximately 32m west of the PAB, and Sett 10 is an outlier in the locality of Belcamp Substation. Therefore, mitigation is required for Sett 2 due to the status and proximity of the sett to the Proposed Development. Mitigation may also be required for Sett 10 depending on whether works are scheduled within 50m of this sett during the badger breeding season (December to June, inclusive).

No impacts are foreseen upon the remaining three inactive setts within 50m of the PAB (Sett 1, Sett 3 and Sett 4), providing that these remain inactive for the duration of the Construction Phase. No impacts are also predicted on the remaining five setts, as they are located more than 50m from the PAB. However, there is the potential for disturbance and direct mortality to still arise on badgers associated with these setts (and further unrecorded setts outside of the study area), as the Construction Phase has the potential to result in disruption to dispersal routes between foraging grounds by creating obstacles and hazards. However, no impact is predicted upon the carrying capacity of the local area in the context of the duration of the Construction Phase and the widespread availability of suitable habitats.

There is therefore the potential for negative effects from mortality and disturbance for badger at a Local Level.

10.4.2.11 Other Protected Mammals

10.4.2.11.1 Mortality

Habitat with the potential to support a variety of small mammal species was recorded or likely to be present within the study area.

area. The Construction Phase is unlikely to result in any significant level of mortality to the larger and more mobile species such as red squirrel, as they can migrate away from the works. Squirrels breed in winter (young born February to April), which is when trees are scheduled to be felled, so breeding squirrels have the potential to be affected by the works. It is also probable that vegetation clearance may result in mortality to the smaller mammals such as pygmy shrew, if present, since small mammals have less ability to disperse. The potential impact would be expected to be greater during the breeding season when juveniles would be present in burrows (April to October), or in the case of hedgehog, impacts may be greater during their hibernation period (November to March). Potential impacts will be in the short-term and will only occur during the Construction Phase.

There is therefore the potential for negative effects from mortality for small mammals at a Local Level.

10.4.2.12 Reptiles and Amphibians

10.4.2.12.1 Mortality and Disturbance

No amphibian or reptile species were recorded within the study area during field surveys and there were no breeding ponds with habitat connectivity within 500m of the PAB. However, terrestrial habitat with the potential to support both amphibians and reptiles has the potential to be lost as part of construction works, which will require the removal of habitats within the PAB. Given the habitat character of the off-road sections (which is predominantly arable and pasture farmland under regular management) and the width of the construction easement (which is reduced for linear habitats in order to minimise habitat loss and potential fragmentation effects), it is unlikely that the site clearance works will have a significant impact on the locally available suitable habitat for these species, particularly given how common and widespread suitable habitats for these species is. Nevertheless, the Construction Phase has the potential to lead to disturbance and direct mortalities of these species, particularly during hibernation (November to February) or the breeding season (January to July).

There is therefore the potential for negative effects from mortality and disturbance to amphibians and reptiles at a Local Level.

10.4.2.13 Fish and Aquatic Invertebrates

10.4.2.13.1 Mortality, Habitat Loss and Degradation

The water body surveys carried out across the length of the Proposed Development found that the water bodies are largely characterised by low-energy river typologies with a silt substrate. This indicates that these water bodies are largely unsuitable for Atlantic salmon, brown trout, and lampreys, all of which are SCIs. The majority of watercourses are not likely to have active habitats for these species, and as a result, little to no effect will occur to these species.

The presence of trout and lamprey was confirmed in six water bodies, despite suboptimal spawning conditions due to limited gravels and stones on the water body beds. Therefore, these species have the potential to be affected through either direct disturbance or mortality during the Construction Phase. Indirect effects have the potential to occur from pollution of the water bodies causing a detrimental effect to the water quality and fish populations.

As outlined in the baseline conditions (Section 10.3.2.12), 16 waterbodies may offer suitable habitat for eels. The confirmed presence of eels in one watercourse (WB22) through eDNA survey further underscores this potential. Therefore, the species also has the potential to be affected through either direct disturbance or pollution causing a detrimental effect to the water quality, and in turn the population of eels, in the same manner as trout and lamprey.

White-clawed crayfish were confirmed to be likely absent in 14 of the eDNA tested watercourses. However, a negative eDNA result is not entirely proof of absence, and three watercourses could not be surveyed due to access issues. As a result, on a precautionary basis, it can be considered that white-clawed crayfish have the potential to be affected by the Proposed Development through watercourse pollution or direct disturbance.

There is therefore the potential for negative effects from mortality, habitat loss and disturbance for fish and aquatic invertebrates at a Local to County Level (European eel – County Level, white-clawed crayfish – County Level, Atlantic salmon – Local-County Level, and lamprey spp. – Local-County Level).

10.4.2.14 Invasive Species

10.4.2.14.1 Habitat Loss / Degradation

Regulation 50 of the Birds and Habitats Regulations prohibits the distribution, introduction or lease of any plant listed on the Third Schedule. The following Third Schedule invasive species were recorded in the 2023 surveys (refer to Figure 10.9 in Volume 4 of this EIAR):

- Three-cornered leek (*Allium triquetrum*) spreads by ants transporting seeds (NatureSpot 2024) and was present alongside the Proposed Development PAB (coordinate reference N 95657 44458). One stand was present within proximity of Joint Bay 6, and there is therefore the potential for a significant effect from its disturbance or degradation of habitat;
- Spanish bluebell (*Hyacinthoides hispanica*) spreads by seeds. It is a poor disperser, but there is an ongoing supply to the wild of new material through planting and dumping of garden waste. It is most likely to spread along lines of human habitation (NNSS 2024). One stand was present within the PAB, and there is therefore the potential for a significant effect from its disturbance or degradation of habitat;
- Giant hogweed (*Heracleum mantegazzianum*) spreads entirely by seeds, which are dispersed by wind, water and humans (NNSS 2024). One stand was present within the PAB, and there is therefore the potential for a significant effect from its disturbance or degradation of habitat;

- Japanese knotweed (*Reynoutria japonica*) spreads vegetatively when small root pieces of the plant break off the main plant, but no seeds are produced (INNS 2023). As all the stands recorded were outside of the PAB, there is unlikely to be a significant effect from its disturbance or degradation of habitat; and
- Rhododendron (*Rhododendron ponticum*). The small seeds are dispersed up to 100m by wind and water under favourable conditions (INNS 2023). Rhododendron was present in one location within the Proposed Development PAB. The stand was located approximately 6m from the proposed cable route (coordinate reference O 05654 45437). This stand therefore has the potential for significant effects from its disturbance and habitat loss and degradation.

As outlined in the baseline conditions (Section 10.3.2.14), a further four non-native invasive species not listed on the Third Schedule (winter heliotrope, buddleia, snowberry, and sycamore) were also recorded within the study area. Populations of these species are not known to pose risk of impact to protected, notable and rare species of conservation concern.

There is therefore the potential for negative effects from the spread of invasive plant species at a Local Level.

10.4.2.15 Summary of Potential Construction Phase Impacts

A summary of the potential impacts during the Construction Phase, in the absence of mitigation, is provided in Table 10.28.

Table 10.28: Summary of Potential Construction Phase Impacts in the Absence of Mitigation

Ecological Receptor	Ecological Valuation	Potential Impacts	Likely Significant Effect (Yes / No) and Level
Designated Sites			
Malahide Estuary SAC Malahide Estuary pNHA	International Importance National Importance	Habitat degradation (hydrology- pollution)	Yes, International Level Yes, National Level
Baldoyle Bay SAC Baldoyle Bay pNHA	International Importance National Importance	Habitat degradation (hydrology – pollution)	Yes, International Level Yes, National Level
Rockabill to Dalkey Island SAC	International Importance	None	No
Lambay Island SAC	International Importance	None	No
Malahide Estuary SPA	International Importance	Habitat degradation (hydrology – pollution) mortality, disturbance / displacement	Yes, International Level
Baldoyle Bay SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement	Yes, International Level
North-West Irish Sea SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement	Yes, International Level
North Bull Island SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement	Yes, International Level
South Dublin Bay and River Tolka Estuary SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement	Yes, International Level
Rogerstown Estuary SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement	Yes, International Level
Ireland's Eye SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement	Yes, International Level
Howth Head Coast SPA	International Importance	None	No
Lambay Island SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement	Yes, International Level

Ecological Receptor	Ecological Valuation	Potential Impacts	Likely Significant Effect (Yes / No) and Level
Dalkey Islands SPA	International Importance	None	No
Skerries Islands SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement	Yes, International Level
Rockabill SPA	International Importance	None	No
River Nanny Estuary and Shore SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement	Yes, International Level
Boyne Estuary SPA	International Importance	Habitat degradation (hydrology-pollution) disturbance/ displacement	Yes, International Level
Dundalk Bay SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement	Yes, International Level
Sluice River Marsh pNHA	National Importance	Habitat degradation (hydrology- pollution)	Yes, National Level
North Dublin Bay pNHA	National Importance	None	No
Howth Head pNHA	National Importance	Habitat degradation (hydrology- pollution)	Yes, National Level
Ireland's Eye pNHA	National Importance	None	No
Habitats (including Fossitt Codes, Outside Designated Sites)			
Arable crops (BC1)	Less than local Importance	Habitat loss (temporary and permanent)	No
Horticultural land (BC2)	Less than local Importance	None	No
Tilled land (BC3)	Less than local Importance	Habitat loss (temporary and permanent)	No
Flower beds and borders (BC4)	Less than local Importance	None	No
Earth banks (BL2)	Less than local Importance	None	No
Building or Artificial (BL3)	Less than local Importance	Habitat loss (temporary and permanent)	No
Spoil and bare ground (ED2)	Local Importance (Lower Value)	None	No
Recolonising bare ground (ED3)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation	No
Other artificial lakes and ponds (FL8)	Local Importance (Higher Value)	Habitat loss (temporary) and degradation (surface water quality)	Yes, Local Level
Depositing lowland rivers (FW2)	Local Importance (Higher Value)	Habitat degradation – surface water quality	Yes, Local Level
Drainage ditches (FW4)	Local Importance (Higher Value)	Habitat degradation – surface water quality	Yes, Local Level
Improved agricultural grassland (GA1)	Less than local Importance	Habitat loss (temporary and permanent)	No
Amenity grassland (GA2)	Less than local Importance	Habitat loss (temporary)	No
Marsh (GM1) – potential GWDTE	Local Importance (Higher Value)	Habitat degradation	Yes, Local Level
Dry calcareous grassland (GS1)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation	Yes, Local Level
Dry meadows and grassy verges (GS2)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation	Yes, Local Level
Wet grassland (GS4) – potential GWDTE	Local Importance (Higher Value)	Habitat loss (temporary and permanent), fragmentation and degradation	Yes, Local Level

Ecological Receptor	Ecological Valuation	Potential Impacts	Likely Significant Effect (Yes / No) and Level
(Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation	Yes, Local Level
Mixed broadleaved / conifer woodland (WD2)	Local Importance (Higher Value)	Habitat loss (temporary) and fragmentation	No
Conifer plantation (WD4)	Local Importance (Lower Value)	None	No
Scattered trees and parkland (WD5)	Local Importance (Lower Value)	Habitat loss (temporary) and fragmentation	Yes, Local Level
Hedgerows (WL1) species rich	County Importance	Habitat loss (temporary and permanent) and fragmentation	Yes, County Level
Hedgerows (WL1) species poor	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation	Yes, Local Level
Treeline (WL2)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation	Yes, Local to County Level
Riparian woodland (WN5) – potential GWDTE	Local Importance (Higher Value)	Habitat loss (temporary) and degradation (surface water quality)	Yes, Local Level
Scrub (WS1)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation	Yes, Local Level
Immature woodland (WS2)	Local Importance (Lower Value)	Habitat loss (temporary and permanent) and fragmentation	Yes, Local Level
Ornamental / non-native shrub (WS3)	Less than local Importance	Habitat loss (permanent)	No
Recently-felled woodland (WS5)	Local Importance (Lower Value)	None	No
Protected, Notable and Invasive Species and Taxa			
SCI bird species	International Importance	Habitat degradation (hydrology-pollution) disturbance / displacement / mortality (reduction in water quality and prey availability)	Yes, National - International Level
European eel	National Importance	Habitat degradation (hydrology – pollution); disturbance / displacement	Yes, County Level
White-clawed crayfish	County Importance	Habitat degradation (hydrology – pollution); disturbance / displacement	Yes, County Level
Otter	County Importance	Habitat degradation (hydrology – pollution); disturbance / displacement	Yes, County Level
Atlantic salmon	County Importance	Habitat degradation (hydrology – pollution); disturbance / displacement	Yes, Local to County Level
Lamprey spp.	County Importance	Habitat degradation (hydrology – pollution); disturbance / displacement	Yes, Local to County Level
All other Red, Amber or Green listed bird species (non-SCI breeding populations)	Local Importance (Higher Value)	Habitat degradation (hydrology – pollution); disturbance / displacement (including temporary lighting)	Yes, Local Level
Bats	Local Importance (Higher Value)	Habitat loss; mortality; disturbance from temporary lighting	Yes, Local Level
Badger	Local Importance (Higher Value)	Disturbance likely of two active setts	Yes, Local Level
Other small mammal species protected under the Wildlife Act	Local Importance (Higher Value)	Habitat loss; disturbance / displacement	Yes, Local Level
Smooth newt	Local Importance (Higher Value)	Habitat loss; disturbance / displacement	Yes, Local Level
Common frog	Local Importance (Higher Value)	Habitat loss; disturbance / displacement	Yes, Local Level

Ecological Receptor	Ecological Valuation	Potential Impacts	Likely Significant Effect (Yes / No) and Level
Common lizard	Local Importance (Higher Value)	Habitat loss; disturbance / displacement	Yes, Local Level
Other fish species (including trout)	Local Importance (Lower Value)	Habitat degradation (hydrology – pollution); disturbance / displacement	Yes, Local Level
Non-native invasive plant species	N/A	Spread of invasive plants	Yes, Local Level

10.4.3 Operational Phase

The impact of the Operational Phase of the Proposed Development upon IERs is expected to be not significant, as most impacts will occur during the Construction Phase due to the nature of the Proposed Development. Along most of the proposed cable route, the road will be reinstated for public use, and vegetation removed will be re-instated, except along the permanent easement, at Joint Bays, along permanent access tracks, and where over-cable planting is not technically viable, for example due to asset risk.

10.4.3.1 Habitat Loss

The width of the Joint Bays and the nature of the road network in the area means that road closures and diversions will be required in some areas along the proposed cable route during maintenance activities in the Operational Phase.

It will be necessary to provide permanent access tracks (4m wide unbound tracks for a total approximate length of 4km in private land) for infrequent use to all off-road Joint Bays during the Operational Phase. There will be 12 separate permanent access tracks which will be provided for 15 Joint Bays, as follows:

- JB 1, JB 2, JB 3 and JB 4 (access track to be shared with the Kildare Meath Grid Upgrade - planning application reference number 316372);
- JB 17;
- JB 21, JB 28 and JB 29;
- JB 30, JB 31 and JB 38; and
- JB 46, JB 47, JB48 and JB 49.

Refer to Figure 4.1 (Sheet 1 to Sheet 48) in Volume 4 of the EIAR for their locations. There is the potential for negative effects from habitat loss at these locations. However, these have been assessed under permanent loss during the Construction Phase, and as such, are not described or assessed further here.

10.4.3.2 Mortality, Pollution, Habitat Degradation and / or Fragmentation

Should unexpected and / or emergency maintenance of the proposed underground cable be required during the Operational Phase, excavation will be required, and this could occur on (in-road) and / or off-road. As per the Construction Phase, there will be the potential for the same negative effects to occur to IERs, as noted in Section 10.4.2.15.

There is therefore the potential for negative effects at a Local level from mortality and disturbance and loss or fragmentation of habitat for IERs.

10.5 Mitigation and Monitoring Measures

10.5.1 Ecological Clerk of Works

An on-site Ecological Clerk of Works (ECoW) will be appointed by the appointed contractor to carry out pre-construction surveys to ensure that the ecological baseline remains current (Section 10.5.2) and, where required, will implement appropriate mitigation measures as needed (Section 10.5.3.1 and Section 10.5.3.2). Mitigation measures are listed below and include measures to be adopted during the Construction Phase of the Proposed Development, with the aim of reducing the potential negative impact that the Proposed Development might have on protected species and habitats. These include measures adopted to prevent and control pollution, to control and reduce silt-laden runoff, to prevent the spill and the leaks of contaminating materials including oil and fuel, and to prevent the spread of invasive species. However, no mitigation measures will be required during the Operational Phase, as the impacts are expected to be minimal. Where sensitive habitats or species have the potential to be impacted, the ECoW will be on-site to implement all mitigation measures, as described below. The ECoW will have sufficient experience to carry out the task(s) at hand and will be a member of a professional body, such as CIEEM, or similar.

10.5.2 Pre-Construction Surveys

In advance of enabling works, the appointed contractor's EcoW will complete pre-construction confirmatory surveys of selected ecological features whose distribution is dynamic over time, and which are known to have the potential to occur within the ZoI of the PAB. At this time, maximum effort will be adopted to survey those small number of areas that could not be surveyed during baseline data collection, due to site access limitations. As noted above, an assessment of these non-accessed areas has been made in this Chapter, based on the available data (e.g. aerial photograph, desktop data, access from adjacent area, etc). This is in-line with the CIEEM Guidance (CIEEM 2018). These surveys will update the findings of the surveys completed between December 2021 and October 2023 (survey dates are detailed in Table 10.3), and will include the following:

- Bat trees previously identified as having roosting potential and within the ZoI will be subject to pre-construction surveys. Bat surveys will be carried out in accordance with guidance from Bat Mitigation Guidelines for Ireland – 2 (Marnell *et al*. 2022), Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority 2006a) and Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition (Collins 2023). Surveys will be carried out by a licensed bat worker, who will determine the locations where they are required, using best practice techniques;
- Otter breeding / resting sites within the ZoI of the PAB (minimum 50m from watercourse crossings, up to 150m at HDD Compound sites, will be subject to pre-construction surveys, where access allows (noting that guidance recommends 20m for non-breeding sites);
- Badger setts within the ZoI of the PAB (minimum 50m, up to 150m at HDD Compound locations, will be subject to pre-construction surveys, where access allows). Further information relating to determining sett activity and mitigation measures is provided in Section 10.5.3.2.5;
- Squirrel (grey and red), where dreys are identified within trees to be felled within the PAB will be subject to pre-construction surveys.;
- Amphibians and reptiles: a pre-construction survey will be undertaken by the ECoW of previously identified areas that are suitable to host these species including reptile habitat (dry calcareous grassland, dry meadows and grassy verges and recolonising bare ground) and of amphibian habitat (drainage ditches and wet grassland) within the PAB. A suitable safe receptor site will be pre-identified, and if amphibians or reptiles are found within the PAB, the ECoW will translocate animals if necessary to the suitable receptor habitat;
- Watercourses within the PAB will be subject to pre-construction surveys, particularly for the presence of sensitive aquatic fish and invertebrate species (e.g. white-clawed crayfish, eel, lamprey species, salmon, trout);
- Invasive species within the PAB will be subject to pre-construction surveys; and

- Hedgerows and treelines to be removed will be resurveyed before construction commences (collecting information on canopy, understorey and field layer species, and associated features such as ditches, earth banks, and walls) to inform reinstatement.

All surveys will be undertaken by the ECoW and supported by a suitably qualified ecologist where needed with demonstrable experience in the survey and assessment of the feature.

10.5.2.1 Reporting

The results of the pre-construction confirmatory surveys will inform the refinement of mitigation and monitoring measures (if required) in the appointed contractor's method statements (in accordance with the commitments set out in this EIAR and any conditions attached to any grant of planning), and all results will be incorporated into the appointed contractor's constraint mapping.

Survey reporting and mapping will be provided to the Developer's Ecologist (ESB), EirGrid's Planning and Environmental Unit (PEU) within the Chief Infrastructure Office, and to any prescribed bodies as additionally required by any planning conditions.

10.5.3 Construction Phase

10.5.3.1 Site - Wide Mitigation

A number of site-wide mitigation measures have been identified which will be applied across the Proposed Development to avoid the impacts associated with pollution of watercourses and impacts to small mammal species, amphibians and breeding bird species. In addition to this, there are mitigation measures specific to the various Proposed Development elements which are detailed in Section 10.5.3.2.

10.5.3.1.1 Ecological Clerk of Works (ECoW)

The appointed contractor's EcoW will be on-site during the Construction Phase for any works deemed to be of sensitive nature due to the number of sensitive ecological receptors and the works taking place within watercourses connected to European sites.

Where sensitive habitats or species have the potential to be impacted, the ECoW will be on-site to oversee the implementation all mitigation measures as described below. The EcoW will be at sensitive locations, for example, where there will be in-stream works and where a watercourse is hydrologically connected to European site, at locations where there is the potential for disturbance to SCI birds, where hoarding will be erected, and in areas of vegetation reinstatement, including tree planting.

Table 10.29 outlines the location of proposed silt fencing, that will be installed to prevent any silt-laden runoff from impermeable surfaces, with the aim of preserving protected areas and areas of conservation and their associated habitats and species (further detail is provided in Section 10.5.3.1.3). To note, some of these locations are not yet determined. The final locations will be determined by the EcoW on-site to ensure that the locations are suitable and are in-line with the requirements of this EIAR, and any conditions attached to any grant of planning. The EcoW will be a member of a professional body, such as CIEEM, or similar, and will be suitably experienced for the task at hand.

Table 10.29: Indicative Silt Fencing Locations Requiring ECoW Supervision

Water Body Name	European Sites with Hydrological Connection	Indicative Locations of Silt Fencing (NGR)
Tolka_020	• North-West Irish Sea SPA • North Bull Island SPA • South Dublin Bay and River Tolka Estuary SPA	2 Locations: • O 01119 43261 • O 01655 43968
Dunboyne Stream_010	• North-West Irish Sea SPA • North Bull Island SPA • South Dublin Bay and River Tolka Estuary SPA	3 Locations: • N 94483 46404 • N 94423 46442 • O 00537 42674
Pinkeen_010	• North-West Irish Sea SPA • North Bull Island SPA • South Dublin Bay and River Tolka Estuary SPA	3 Locations: • O 03952 45039 • O 04095 44965 • O 04090 45021
Ward_020	• Malahide Estuary SAC • Rockabill to Dalkey Island SAC • Lambay Island SAC • Malahide Estuary SPA • Lambay Island SPA	4 Locations: • O 05260 45264 • O 07317 44650 • O 07378 44541 • O 07489 44351
Ward_010	• Malahide Estuary SAC • Rockabill to Dalkey Island SAC • Lambay Island SAC • Malahide Estuary SPA • Lambay Island SPA	4 Locations: • O 05634 45422 • O 05654 45444 • O 06599 45597 • O 06694 45616
Ward_030	• Malahide Estuary SAC • Rockabill to Dalkey Island SAC • Lambay Island SAC • Malahide Estuary SPA • Lambay Island SPA	11 Locations: • O 09506 44418 • O 10245 45153 • O 10370 45217 • O 10840 45522 • O 11650 45815 • O 13017 44843 • O 13148 44703 • O 13218 44681 • O 14066 44606 • O 14173 44613 • O 14662 44583
Sluice_010	• Baldoyle Bay SAC • Rockabill to Dalkey Island SAC • Baldoyle Bay SPA • North-West Irish Sea SPA • Ireland's Eye SPA • Howth Head Coast SPA	1 Location: • O 16415 44423
Mayne_010	• Baldoyle Bay SAC • Rockabill to Dalkey Island SAC • Baldoyle Bay SPA • North-West Irish Sea SPA • Ireland's Eye SPA • Howth Head Coast SPA	1 Location: • O 19109 42085

The ECoW will give toolbox talk to all site personnel to highlight any environmental sensitivities and the boundaries of sensitive habitats. Toolbox talks will include findings of pre-construction surveys on baseline changes and any adaptive mitigation measures required. The ECoW will propose adaptive mitigation measures in response to, for instance, extreme weather events (amber and red Met Éireann weather warnings which can be checked on the Met Éireann website (Met Éireann 2024), or new mitigation requirements arising from pre-construction surveys. Method statements in relation to trenched crossings will be agreed with Inland Fisheries Ireland (IFI) prior to the start of works. No sensitive works will be permitted without the prior approval of the ECoW. The ECoW will be able to demonstrate previous experience and will be a member of a profession body, such as CIEEM, or similar.

10.5.3.1.2 Pollution Control

The measures set out below will be implemented to ensure that there will be no pollution of surface water during the Construction Phase of the Proposed Development. The measures are included in the Construction Environmental Management Plan (CEMP) and Appendix D to the CEMP (Surface Water Management Plan) which are included as standalone documents in this planning application pack, and will also be incorporated into the appointed contractor's final CEMP, which is a key contract document that will be implemented in full by the appointed contractor. The CEMP will be updated to include any mitigation measures prescribed by An Bord Pleanála as a condition to any grant of planning permission. The CEMP has been developed in accordance with legislation and the following guidance documents and legislation:

- Construction Industry Research and Information Association (CIRIA) C532 Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams *et al*. 2001);
- CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (Murnane *et al*. 2006a);
- CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane *et al*. 2006b);
- CIRIA C741 Environmental Good Practice on Site (Charles and Edwards 2015);
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2005); and
- S.I. No. 113/2022 - (European Union (Good Agricultural Practice for Protection of Waters) (Amended Regulations).

Mitigation measures with respect to accidental pollution are focused on prevention, safeguarding the approach to the storage and handling of materials, and managing vehicles and plant during the Construction Phase.

10.5.3.1.3 Control of Silt-Laden Runoff

Specific measures to control silt, as shown in Figure 10.11 in Volume 4 of this EIAR, will be implemented to prevent surface water flowing into surface water receptors:

- The appointed contractor will ensure no deleterious discharges are released from construction sites to the nearby water bodies during construction. If a discharge to a watercourse is necessary, the water will pass through a suitable drainage system such as a swale and / or silt buster prior to discharge. Levels of suspended solids in any discharge will be no greater than 25mg/l (milligrams per litre) as per the Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016), and flows will be controlled to levels appropriate to the receiving water. It is possible that such a discharge may require a licence under the Water Pollution Acts 1977 and 1990 (as amended), and the Arterial Drainage Act 1945 and 1995 (as amended). The appointed contractor will liaise with the regulatory authorities at an early stage to determine the need for licences and include the appropriate application time required in any construction programme;
- Silt fences will be erected along the boundary of water bodies to prevent any silt-laden runoff from impermeable surfaces, temporary or permanent, as well as spoil heaps within the construction swathe:
  - Silt fencing will also be applied to areas that are within 30m of a watercourse and hydrologically linked to a European site, where concrete pouring is to be undertaken and where there is a risk to European designated sites. Where required, this will be double silt fencing;
  - Silt fences will be installed downgradient of the potential source of the silt / sediment;
  - The silt curtain will contain the area where silted waters are being generated and will terminate on high ground;

- They will be constructed using permeable filter fabric (Hy-Tex Terrastop silt fence or similar) rather than a mesh material and its base will be embedded at least 15cm into the ground and staked at 2m intervals;
- Vegetation will be retained as far as practicable. However, where targeted vegetation removal is required, additional measures will be put in place including additional silt fencing in these areas;
- The vegetated turves will be peeled back and not detached from the ground, the materials inserted and the turves replaced to hold the base in place;
- The silt fence will be inspected regularly by the ECoW and appointed contractor, and in particular following heavy rainfall;
- Silt fences will remain in-situ until the vegetation on the disturbed ground is re-established as determined by the ECoW;
- The fence will not be pulled from the ground, but cut at ground level and the stakes / posts removed;
- Should water build up behind the fences, the sediment will settle to the bottom. Water can be released, but sediments will remain;
- Two lines of silt fencing will be installed in sensitive areas, based on the ECoW's professional judgement;
- A record of its installation, inspection and removal will be maintained by the ECoW; and
- Reinstatement of any banks affected by silt-laden runoff during construction will be reinstated back to pre-development conditions.

10.5.3.1.4 Stockpiling of Materials

The following mitigation measures will be implemented for the stockpiling of materials. Mobilisation sites will either be cleared in stages during the Construction Phase to prevent bare earth being exposed to ambient conditions for prolonged periods, or the bare earth will be immediately covered in a gravel / plastic covering to reduce the likelihood of sediment laden runoff following rainfall events. Stripped soil will be stockpiled more than 10m away from the surface interceptor drain. Stockpiles will be in a dry zone that is not subject to flooding (i.e., outside the1:100 flood extent (1% Annual Exceedance Probability (AEP)). The following measures will be put in place by the appointed contractor for the stockpiling of materials:

- Temporary stockpiles will be located away from drains and watercourses. Stockpiles will not be located within 10m of a watercourse;
- For watercourse crossings, stockpiles will not be located anywhere within the crossing working area;
- Stockpiles will be managed to prevent siltation of watercourse systems through runoff during rainstorms with the measures to be implemented by the appointed contractor. These will include the following:
    - No use of commercial seed to stabilise exposed soils;
    - Coir matting to be used, where required (e.g. along all bank surfaces), to enable vegetation to establish on the exposed soil;
    - Providing silt fences or straw barriers at the toe of the stockpile to mitigate runoff during rainfall events;
    - Surrounding stockpiles with cut-off ditches to contain runoff;
    - Directing any runoff to the site drainage system or filter drains along the construction working width and to the settlement pond (or other) treatment systems; and
    - Providing bunds or another form of diversion to keep runoff from entering the stockpile area.

10.5.3.1.5 Storage of Materials

The following mitigation measures will be implemented for the storage of materials:

- All oil and diesel storage facilities will be at least 30m from any watercourse, including surface water drains, and outside the 1:100 flood extent (1% AEP), unless prior approval is confirmed by the ECOW to reduce this distance;
- Spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed (all teams will also carry spill kits and spill kits will be suitably sized to address the amount of pollutant substances being used);
- Storage areas for solid materials, including waste soils, will be designed and managed to prevent deterioration of the materials and their escape (via surface runoff or wind blow);
- Storage areas will be kept secure to prevent acts of vandalism that could result in leaks or spills; and
- All containers of any size will be correctly labelled, indicating their contents and any hazard warning signs.

10.5.3.1.6 Spills

The following mitigation measures will be implemented across the Proposed Development to prevent spills:

- Fuel tanks, drums and mobile bowsers (and any other equipment that contains oil and other fuels) will have a secondary containment, for example double-skinned tanks;
- All tanks, drums and mobile bowsers will be located in a sealed impervious bund with sufficient capacity to contain at least 25% of the total volume of the containers or 110% of the largest container, whichever is the greatest;
- Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas;
- Fuel fill pipes will not extend beyond the bund wall and will have a lockable cap secured with a chain;
- Where fuel is delivered through a pipe permanently attached to a tank or bowser:
    - The pipe will be fitted with a manually operated pump or a valve at the delivery end which closes automatically when not in use;
    - The pump or valve will be fitted with a lock;
    - The pipe will be fitted with a lockable valve at the end where it leaves the tank or bowser;
    - The pipework will pass over and not through bund walls;
    - Tanks and bunds will be protected from vehicle impact damage;
    - Tanks will be labelled with contents, capacity information and hazard warnings; and
    - All valves, pumps and trigger guns will be turned off and locked when not in use. All caps on fill pipes will be locked when not in use.
- Suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including:
    - Each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled; and
    - Containers and equipment will be stored on a firm, level surface.
- For deliveries and dispensing activities, the appointed contractor will ensure that:
    - Site-specific procedures are in place for bulk deliveries; and
    - Delivery points and vehicle routes are clearly marked.
- Emergency procedures will be displayed, and suitably sized spill kits will be available at all delivery points, and staff will be trained in these procedures and the use of spill kits.

10.5.3.1.7 Fuel and Oil Leaks from Vehicles and Plant

The use of vehicles and plant poses similar risks to those posed by storage of liquids. Fuel and oil may leak from such equipment which may enter drains and / or watercourses, as well as contaminating the ground itself. The following mitigation measures will be implemented to reduce this risk:

- Vehicles and plant provided for use on-site will be regularly inspected to ensure they are free from leaks and promptly repaired when not in good working order;
- Sufficient spill kits will be carried on all vehicles;
- Vehicles and plant will not park near or over drains;
- Refuelling of vehicles and plant will be carried out on hardstanding, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas; and
- Vehicles and plant will be in good working order to ensure optimum fuel efficiency.

10.5.3.1.8 Concrete

Where concrete is required on-site, the following mitigation measures will be implemented to reduce risks associated with concrete pouring:

- Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to ensures it is fit for purpose;
- Established concrete washout management areas will be designated to control the discharge of concrete washout;
- An emergency response plan will be developed and communicated to site staff prior to the concrete pouring;
- The ECoW and on-site personnel will monitor the concrete pour continuously, ensuring that any spills are promptly addressed and mitigated;
- The ECoW will conduct a thorough inspection of the site after the concrete pour to identify any environmental impacts and implement clean-up measures if necessary;
- When working in or near surface water and the use of introduced materials (e.g. oil) cannot be avoided, alternative materials such as biodegradable oils will be used;
- Placing of concrete in or near watercourses will be only carried out under the supervision of the ECoW;
- Wet concrete operations adjacent to water bodies will be avoided, where possible, with a minimum separation distance of 20m, with exception to in-stream pours which will be undertaken within a sealed dry working area. The appointed contractor will ensure that all concrete truck washing / cleaning is undertaken offsite, as far as practicable, and remote from water bodies or potential pathways to water bodies;
- There will be no hosing of concrete, cement, grout or similar material spills into surface water drains. Such spills shall be contained immediately, and run-off prevented from entering the watercourse;
- Concrete waste and wash-down water will be contained and managed on-site to prevent pollution of all surface watercourses; and
- Washout from concrete lorries will not be permitted on-site and will only take place at the batching plant (or other appropriate facility designated by the manufacturer).

10.5.3.1.9 Breeding Birds

Unless suitable mitigation is adopted (see next paragraph), hedgerows, trees and scrub will not be removed within the breeding bird season (1 March to 31 August, inclusive) to avoid impacts on nesting birds.

Where this seasonal restriction cannot be adhered to, habitats that need to be removed will be inspected by a ECoW suitably experienced in the identification of nests for the presence of breeding birds prior to clearance.

When nesting birds are present, the ecologist will demarcate a suitable buffer around an active nest and clearance within this area will be postponed until the chicks have fledged. A suitable exclusion zone will be established by the ECoW. To reduce the potential of birds to nest, bird deterrents (e.g. flicker tape / compact discs) will be tied to habitat confirmed to be without nests and the habitat will be cleared within three days of the inspection. Otherwise, repeat inspections will be required to confirm the continued absence of nesting birds. If vegetation is to be cleared in the breeding season (under supervision of a suitably qualified ecologist), it will be chipped, removed or covered on the same day to prevent birds from nesting. Reinstated habitat including trees, hedgerows and grassland, will provide suitable habitat for breeding birds recorded in the study area, once established. The locations of trees that will be lost and retained are shown on Figure 18.2 to Figure 18.5 in Volume 4 in this EIAR (with discussion included in Appendix A18.2 in Volume 3 in this EIAR). It may be necessary for temporary lighting to be provided at the proposed Temporary Construction Compounds and HDD Compounds for security purposes. However, temporary lighting will be controlled and directed in order to mitigate any potential impacts to birds as advised by the appointed EcoW.

10.5.3.1.10 Bats

Any roosts recorded during the pre-construction surveys, as outlined in Section 10.5.2, will be felled under a derogation licence. As part of the licence, mitigation measures such as the provision of bat boxes as alternative roosts will be required. The type and number of bat boxes (if required) will be relative to the species and conservation status of the roost to be impacted. In all instances, bat boxes will be sited in suitable, undisturbed locations, away from works during the Construction Phase, either on third party lands (subject to agreement with landowners) or in the instance of no landowner agreement on ESB-owned lands at Woodland and / or Belcamp Substations.

The loss of trees with high potential for roosting bats will be mitigated on a 3-to-1 ratio with bat boxes, and moderate potential trees will be mitigated on a 2-to-1 ratio with bat boxes. A range of models determined by the appointed EcoW will be used, suited to the species recorded within the study area, and for different seasons. The boxes will be erected in a suitable location. It may be necessary for temporary lighting to be provided at the proposed Temporary Construction Compounds and HDD Compounds for security purposes. However, temporary lighting will be controlled and directed in order to mitigate any potential impacts to bats as advised by the appointed EcoW.

10.5.3.1.11 Otter

The following general mitigation measures for otter will be implemented during the Construction Phase, after otter pre-construction surveys have been carried out (refer to Section 10.5.2):

- Any excavations will be covered at night to prevent otter from falling in or becoming trapped;
- Should any otter be observed within the PAB or should any evidence of otter activity be found during the Construction Phase, works will cease immediately and the ECoW will be contacted for advice;
- Although there are not predicted to be any impacts on otters, if confirmatory surveys identify likely disturbance of otters, further mitigation following the Guidelines for the Treatment of Otters (NRA 2008b) will be implemented by the ECoW to ensure no significant effects on otters arise. Should a non-breeding otter holt or rest site be identified, a buffer zone of 30m will be implemented around the feature. Where a resting place is confirmed to be a natal site, this will increase to 150m. Should works occur in the vicinity of otter holts with breeding females or cubs, screening will occur and working hours will be restricted. When holts are present, no wheeled or tracked vehicles will be used within 20m, and no light work will occur within 15m. Exceptions may be adopted under licence. Appropriate fencing will be set around areas associated with otters, before works commence, to mark the areas that cannot be accessed. Disused and inactive holts will be destroyed, after verified as inactive and after blocking and monitoring the entrances for a five-day period.

10.5.3.1.12 Badger

The following general mitigation measures for badger will be implemented during the Construction Phase to avoid / minimise impacts in accordance with the mitigation hierarchy, following the completion of the badger pre-construction surveys (refer to Section 10.5.2):

- Ground excavations will be covered at night to prevent badger from falling in or becoming trapped;
- Any works within 30m of an active sett will be supervised on-site for the full duration of those works by an ECoW (extended to 50m during the breeding season for a main sett where there is breeding activity);
- Breeding setts will not be interfered with or disturbed during the badger breeding season (December to June, inclusive);
- Only the use of hand tools will be permitted within 20m of an active sett;
- No heavy machinery will be used within 30m of a sett;
- During the breeding season, none of the construction works including ground excavation, and use of tools and heavy machines, will be undertaken within 50m of active setts, and blasting (if required) will not be undertaken within 150m of active setts. Should this not be possible, the ECoW will provide advice on how best to proceed. Mitigation measures will include sett screening and restricted working hours. The ECoW will be able to advise on any mitigation options such as sett screening and restricted working hours that may be available relative to the predicted scale and duration of impact (which is informed by the proposed works and sett specifics (i.e., sett type, level of sett activity, tunnel direction, type of substrate, vegetative cover, and topography)). It should be noted that for the HDD platforms, none of the badger signs were within these distances. The nearest badger signs (prints) to the proposed HDD works under the M1 Motorway were approximately 1.15km away. The nearest badger signs (prints) to the proposed HDD works under the M2 Motorway were approximately 0.52km away. The nearest badger signs to the proposed HDD works under the M3 Motorway (a disused sett) was approximately 1.95km away;
- Night-time working will be restricted as far as possible within 100m of a sett;
- The use of noisy plant and machinery near badger setts will cease before sunset; and
- Any spoil heaps will be sited at a minimum distance of 30m from setts.

10.5.3.1.13 Red Squirrel

Where pre-construction surveys identify potential dreys at risk from felling, vantage point watches (for individual trees) or transects (for hedgerows / groups of trees) will be conducted to visualise squirrels and identify if the squirrel is grey (invasive) or red (protected). Surveys will be conducted in the early morning, during the summer months. Where visualisations are inconclusive, hair tube surveys may be required, following the best practice guidance (i.e., Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009)). As grey squirrels are a scheduled invasive species, confirmed grey squirrel dreys can be felled without mitigation. In the event that confirmed or suspected red squirrel dreys require felling, felling will only be carried out from October to January, in consultation with the NPWS, from which a licence may be required, subject to survey findings.

10.5.3.1.14 Other Protected Mammals

Removal and clearance of vegetation may affect small mammal species if present in these habitats. The following mitigation measures will be adhered to in order to minimise impacts to small mammal species:

- Any excavations will be covered at night to prevent small mammals from falling in and / or becoming trapped;
- Working at night will be prohibited where specific tasks such as vegetation removal and clearance are to be carried out;

- Any lights will be turned off after working hours;
- Noise levels will not exceed permissible levels for construction works (70 decibels (dB(A)), based on Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA 2004); and
- With the exception of permanent areas of hardstanding, the site will be re-vegetated at the end of the Construction Phase.

10.5.3.1.15 Reptiles and Amphibians

Removal and clearance of vegetation has the potential to affect amphibians or reptiles if present in these habitats. The following mitigation measures will be adhered to, to minimise impacts on amphibians or reptiles:

- A toolbox talk will be carried out to ensure all site personnel are aware of these protected species and their mitigation requirements;
- Vegetation will be cleared in the following two stages, during the reptile and amphibian active season, following the completion of the toolbox talk:
  - A hand-search will be undertaken by a licensed ECoW for any animals present within vegetation to be cleared, followed by a first cut of vegetation down to 210mm above ground-level using hand tools; and
  - A second hand-search will be undertaken of vegetation to be cleared by an ECoW for any animals present, followed by the second cut of vegetation to ground-level (or as close as practicable).
- If any reptiles are found during the pre-construction surveys or during the construction works, they will be captured and translocated by a suitably qualified and experienced ecologist under licence to a previously identified receptor site;
- Where practicable, in the context of the Construction Phase, water levels will be maintained in any ponds or ditches potentially used by amphibians; and
- Habitat reinstatement will recreate the former habitats within the PAB (excluding woody vegetation that cannot be planted within the permanent cable easement and other permanent habitat losses).

10.5.3.1.16 Invasive Species

A management plan for those Third Schedule invasive plant species recorded during the survey (refer to Table 10.23) which have the potential to be impacted by the works will be included in the final CEMP for the Proposed Development (this will be adapted from Appendix E of the CEMP included as a standalone document in this planning application pack). The mitigation measures described below follow the recommendations set out in the Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA 2010) and will be implemented during the Construction Phase:

- All staff will be informed of the proximity and identification of Giant hogweed and rhododendron and any other invasive species identified through toolbox talks;
- Giant hogweed will be controlled chemically or physically;
- The most effective chemical control for Giant hogweed is glyphosate. Foliar sprays of glyphosate are suitable for large infestations, and injection into the stem of the plant approximately 30cm above the ground with 5ml of a 5% v/v solution can be used where spot treatment is required. Chemical applications will be adopted before stem-elongation (mid-spring);
- Giant hogweed physical control will include eradication of the plant, during the springtime, as follows:
  - Young plants can be readily pulled out the soil using hand tools;

  - Where plants are larger than 1.5m, the upper part can be cut back and the lower part used to lever the roots out;
  - Seed heads on old stems will be removed by individually bagging seed heads and cutting to prevent accidental spread of seeds;
  - Mowers, strimmers or weed-whackers will not be used;
  - Periodic removal will be required to control continuous germination of seedlings;
  - Seed might remain viable up to 15 years, thus control will require continued input over time (at least 5 years), and monitoring will occur between spring and autumn;
  - Seed can be present in soil within 4m of established plants and it will not be transferred to other parts of a site;
  - The top 5 cm of soil contains the majority of the seed, and will not be stockpiled within 10m of watercourse to prevents plant spread; and
  - Giant hogweed material and infected soil will be stored on top of a membrane of fabric in a designated area for appropriate disposal; by a suitably qualified and licensed expert.
- Tracked machinery will be limited in the area and will be cleaned when leaving the site;
- Rhododendron will be controlled chemically or physically;
- Chemical control will be adopted during the active growth of the plant in late spring or summer (June to September). A variety of herbicides have proven effective for chemical control, including 2,4_glyphosate, dicamba and triclopyr. Chemical applications can include foliar spray, wiper applicator or spot treatment, stem-injection or cut-stump. Triclopyr will not be used during drought when temperatures are high;
- A range of physical control measures have been developed for rhododendron in response to the sensitivity of the site. These include:
  - Uprooting by hand: roots are relatively shallow and can be toppled using a hand operated turfer or mechanical winch. Younger plants can be hand-pulled;
  - Chainsaw cutting of root-ball: more effective on larger plants but restricted to soft soil areas. It can be used in combination with winching methods to reduce soil disturbance; and
  - Experimental methods include mulch matting to prevent regrowth following initial clearance and bud rubbing on cut stumps.
- Exclusion zones will be established where necessary to prevent the spread of invasive species;
- No machinery will be allowed within exclusion zones other than where necessary to undertake treatment measures;
- Any plant material and soil-containing plant material will be disposed of by a suitably qualified and licensed expert in accordance with the Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads;
- Care will be taken near watercourses to ensure that material that contains flower heads, seeds or cuttings of any invasive species will be disposed of correctly and not enter watercourses;
- Three-cornered leek and Spanish bluebell will be controlled chemically or physically;
- Chemical treatment for three-cornered leak and Spanish bluebell will be made in the spring (when above ground vegetation visible) but before flowering. Multiple applications may be required due to persistence of bulbs and soil seed bank; and
- Physical control of small populations of three-cornered leek and Spanish bluebell (as recorded within the PAB) will include hand digging, ensuring that all biomass including bulbs collected. Longer term eradication will also require a number of years of mechanical cutting to exhaust seed / bulb bank in wider subsurface environment.

10.5.3.2 Specific Mitigation Measures

10.5.3.2.1 European Designated Sites

The AA Screening Report determined that likely significant effects in the absence of mitigation on the following 14 European sites could not be excluded: Malahide Estuary SAC , Baldoyle Bay SAC, Malahide Estuary SPA, Baldoyle Bay SPA, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, North-West Irish Sea SPA, Rogerstown Estuary SPA, Ireland's Eye SPA, Lambay Island SPA, Skerries Islands SPA, River Nanny Estuary and Shore SPA, Boyne Estuary SPA, and Dundalk Bay SPA. Mitigation measures to protect these sites from pollution, mortality and disturbance are described in the NIS (included as a standalone document in the planning application pack) and in the site-wide measures in Section 10.5.3.1.

10.5.3.2.2 Nationally Designated Sites

No NHAs were identified within the ZoI of the Proposed Development. Four pNHAs were identified within the potential ZoI of the Proposed Development with hydrological connectivity, lying between approximately 3.5km and 8.4km away. Site-specific mitigation is not considered necessary for these pNHAs as the pollution prevention measures that are outlined in Section 10.5.3.1 are considered suitable and will be implemented to protect pNHAs.

10.5.3.2.3 Wintering Birds

10.5.3.2.3.1 Disturbance

Black-tailed godwit, Brent goose, coot, little grebe, mute swan and oyster catcher were observed exclusively at Darndale Park which is located approximately 850m to the south-east of Belcamp Substation. This is more than double the distance of the 300m distance for noise and visual disturbance suggested by the Waterbird disturbance mitigation toolkit (Cutts *et al*. 2013), and therefore, these species are unlikely to be disturbed by the Proposed Development.

However, there is the potential for disturbance impacts upon other wintering bird species, recorded during wintering bird surveys across other parts of the Proposed Development. Therefore, the following mitigation measures will be implemented to ensure that there will be no disturbance to QI species within functionally linked habitat during the Construction Phase of the Proposed Development:

- A 2m to 3 m high non-transparent visual and noise screening barrier will be erected along the perimeter of the site to block the construction works and the movement of machinery / workforce to minimise disturbance to protected birds in functionally linked habitats. This height will be achieved at the typical working level of plant and personnel and will be raised accordingly, if necessary, to ensure that the screening is of adequate height (i.e., no visual disturbance). Locations of the proposed screening are outlined in Table 10.30 and shown on Figure 10.11 in Volume 4 of this EIAR:
  - This screening barrier will have a mass per unit area exceeding 7 kg/m^2 (kilogrammes per metre squared) in accordance with the recommendations of Part B.4 of British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (hereafter referred to as BS 5228-1) (BSI 2014a). The fencing will be of adequate height to screen the works area (3m to 4m) or as advised by an experienced ecologist. The appointed ECoW will supervise the erection of the screening (where natural screening cannot be retained) and will provide guidance through a toolbox talk ensuring that these measures are effective. The ECoW will regularly check the screening throughout the works to ensure that it is maintained in good condition and working order;
  - Screening will be installed prior to site clearance, and installation will be monitored by the EcoW. There will be no restrictions on the timing of this installation as the works area will not be directly adjacent to a SPA; and

  - This screening will remain in place for the duration of the works and will be moved regularly as work advances.
- All plant used during the Construction Phase will be the quietest of its type that is practical for achieving the works, as demonstrated in writing by the appointed contractor to the local authority, with reference to other noisier models;
- Noise levels will not exceed permissible levels for construction works (70 decibels (dB(A)), based on Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA 2004);
- A Noise and Vibration Management Plan will be developed by the appointed contractor;
- All plant will be operated in accordance with the manufacturer's recommendations including the use and maintenance of specific noise reduction measures to reduce the impact further:
  - The use of mufflers on pneumatic tools;
  - Effective exhaust silencers;
  - Sound reducing enclosures;
  - Machines in intermittent use will not be left idling and will be switched off during periods where they are not required; and
  - Post construction, semi-natural habitats will be left to re-vegetate naturally from the seed bank within re-instated soils. Commercial seed mixes will only be used to reinstate vegetation on agricultural lands (EirGrid 2023).

Table 10.30: Proposed Locations of Screens For Birds

Screen Number	Point / Line	Co-ordinates (Point) (NGR)	Co-ordinates (From) (NGR)	Co-ordinates (To) (NGR)	Location Information
1	Line	N/A	N 95155 47993	N 94113 45167	Off-road, approximate Chainage 0-3,650, including construction platforms and Temporary Construction Compound (TCC0)
2	Point	N 94328 45100	N/A	N/A	Passing Bay
3	Point	N 97745 44012	N/A	N/A	Passing Bay
4	Point	N 99748 43076	N/A	N/A	Construction platform
5	Point	O 00322 42842	N/A	N/A	Temporary Construction Compound (TCC2)
6	Point	O 00457 42684	N/A	N/A	Construction platform
7	Point	O 01038 43192	N/A	N/A	Construction platform
8	Point	O 01501 43884	N/A	N/A	Construction platform
9	Line	N/A	O 01616 44016	O 01698 44179	Off-road, from approximate Chainage 12,600-12,900, including HDD Compound (HDD 1a)
10	Line	N/A	O 03703 44963	O 04091 45036	Off-road section, from approximate Chainage 15,850-16,450, including Temporary Construction Compound (TCC3)
11	Point	O 05770 45427	N/A	N/A	Passing Bay
12	Point	O 06448 45612	N/A	N/A	Passing Bay
13	Line	N/A	O 06558 45676	O 06701 45607	Off-road, from approximate Chainage 19,200-19,400
14	Point	O 06904 45338	N/A	N/A	Construction platform
15	Line	N/A	O 07295 44683	O 07367 44567	Off-road section, from approximate chainage 20,500-20650, including Passing Bay

Screen Number	Point / Line	Co-ordinates (Point) (NGR)	Co-ordinates (From) (NGR)	Co-ordinates (To) (NGR)	Location Information
16	Line	N/A	O 07688 44026	O 08931 43700	Off-road section, from approximate chainage 21,300-22,650, including Temporary Construction Compound (TCC4)
17	Point	O 08123 43840	N/A	N/A	Eastern side of Temporary Construction Compound TCC4
18	Point	O 09354 44293	N/A	N/A	Construction platform and HHD Compound (HDD 2a)
19	Line	N/A	O 09491 44460	O 09634 44661	Along HDD Compound (HDD 2b) Object ID 446, approximate Chainage 23,600-23,850
20	Point	O 10633 45379	N/A	N/A	Passing Bay
21	Point	O 11318 45696	N/A	N/A	Passing Bay
22	Point	O 11853 45799	N/A	N/A	Passing Bay
23	Point	O 12275 45751	N/A	N/A	Western, southern and eastern sides of Temporary Construction Compound (TCC5)
24	Point	O 12858 45057	N/A	N/A	Construction platform
25	Line	N/A	O 13404 44680	O 13869 44628	Off-road section, from approximate Chainage 28,650-29,150, including construction platform
26	Point	O 18246 43900	N/A	N/A	Passing Bay
27	Line	N/A	O 18511 43902	O 19273 41479	Off-road section, from approximate Chainage 34,100-37,766, including HDD Compounds (HDD 3a and HDD3b), construction platforms, and Temporary Construction Compound (TCC6)

10.5.3.2.3.2 Habitat Degradation and Mortality

Provided that the site -wide mitigation measures outlined in Section 10.5.3.1 are implemented during the Construction Phase, there is low potential for negative indirect effects from pollution to cause potential habitat degradation and reduction in food availability, and therefore, no site-specific mitigation is proposed.

10.5.3.2.4 Otter

In line with the mitigation measures set out in the Guidelines for the Treatment of Otters during the Construction of National Road Schemes (NRA 2008b), namely, when holts are present, no wheeled or tracked vehicles will be used within 20m, and no light work will occur within 15m of any holts present. When a non-breeding otter holt or rest site is identified, a buffer zone of 30m will be implemented around the feature. When a breeding otter holt or resting site is identified, the buffer zone will be extended to 150m. Buffer zones will be fenced prior to works commencing. Moreover, should works occur in the vicinity of otter holts with breeding females or cubs, screening will occur and working hours will be restricted.

Disused and inactive holts can be destroyed, after being identified as inactive holts and after their entrances have been blocked and monitored for a five-day period. Exceptions can be adopted under licence. The Guidelines for the Treatment of Otters Prior to Construction of National Road Schemes (NRA 2008b) state that a licence will be required for any works likely to cause disturbance (e.g., piling and blasting) to active breeding holts when present with 150m of a development.

During the field surveys one potential otter holt with a slide was identified approximately 145m from the proposed cable route, one otter slide was identified approximately 173m from the proposed cable route and one otter spraint was identified approximately 26m from the proposed cable route (see Figure 10.7 in Volume 4 of this EIAR). Since the holt showed signs of otter use (a slide was recorded next to it), and due to its location near to a river, there is high potential for use. However, the nearest potential holt was 145m way, close to the 150m threshold, and did not have evidence of breeding otters. Therefore, there is no requirement for monitoring and works will be able to proceed under the supervision of an ECoW.

10.5.3.2.5 Badger

During the baseline surveys, it was identified that 10 badger setts / potential badger setts have the potential to be impacted by the Proposed Development, including two within 50m of the PAB and four between 51m and 150m. Exact locations of setts, are not provided due to persecution of this species. Sensitive information relating to the location of badger setts is provided in a confidential appendix (Appendix A10.1 and Figure 10.10), which are provided to An Bord Pleanála and the NPWS separately.

The following pre-construction surveys and mitigation measures that follow the recommendations set out in the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA 2006b) will be implemented:

- Affected badger setts will be marked and the extent of bounds prohibited for vehicles will be clearly marked by fencing and signage. When there is the need to proceed with works close to active setts during the breeding season, mitigation measures, such as sett screening and restricted working hours will be adopted, prior expert consultation;
- To determine whether a sett is active or inactive, camera traps will be set up prior to the commencement of construction to monitor the entrance to the holes for a minimum of five days. If, after five days, there is no evidence that badgers are using the sett, it is presumed inactive, and no further actions will be required. However, this will only apply if the camera trap monitoring is carried out directly prior to the start of works, meaning that there was no change to the baseline. The use of the sett may change over time, so if there is a delay of more than 12 months prior to the commencement of the works from the date of the final camera monitoring, then a further badger survey will be undertaken to determine the status of the hole;
- Disused and inactive sett entrances will be blocked to prevent reoccupation, and the disused or inactive sett will be destroyed using a mechanical digger after five days of monitoring, under the supervision of a suitably experienced and qualified EcoW; and
- No heavy machinery will be used within 30m of active badger setts. Lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance. Light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances. During the breeding season (December to June, inclusive), none of the above works will be undertaken within 50m of active setts, nor blasting or pile driving within 150m of active setts.

Where an active sett is required to be closed, the following mitigation measures presented in the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes will be implemented:

- Active entrances will have one-way gates installed (plus proofing around sides of gates) to allow badgers to exit but not to return (inactive entrances will not require gates and may be soft and then hard-blocked as per inactive setts);
- The gates will be tied open for three days prior to the sett exclusion and sticks placed in the entrance to monitor sett activity;
- Gates will be left installed, with regular inspections, over a minimum period of 21 days (including period with gates tied open) before the sett is deemed inactive. Any activity at all will require the procedures to be repeated or additional measures taken;

- Sett destruction will commence immediately following the 21 day exclusion period, provided that all badgers have been excluded and will be conducted under the supervision of a suitably experienced and qualified ECoW;
- Sett destruction is usually undertaken with a tracked 12 to 25 tonne 360 excavator, commencing at approximately 25m from the outer sett entrances and working towards the centre of the sett, excavating approximately 0.5m slices in a trench to a depth of 2m;
- Exposed tunnels will be checked for recent badger activity, with full attention paid to safety requirements in so doing;
- The sett will be destroyed from several directions, in the same manner, until only the central core of the sett remains. Once it is ensured that no badgers remain, the core will then also be destroyed and the entire area back-filled and made safe; and
- Sett excavation will, preferably, be concluded within one working day, as badgers may re-enter exposed tunnels and entrances.

The NPWS Wildlife Licensing was consulted regarding licensing requirements for works in and around badgers and their setts. Section 23(7)I(iv) of the Wildlife Act outlines that if a licence or permission has been received from another public authority whose actions are directed by a statute or statutory instrument, further permission is not required from the NPWS for works affecting badgers (i.e., a licence will be issued by the relevant local authority if required rather than the NPWS).

10.5.3.2.6 Fish and Aquatic Invertebrates

Mitigation measures regarding pollution control of surface water have been detailed in the site-wide mitigation measures in Section 10.5.3.1. These measures have been developed to protect water bodies, drainage ditches and ponds / lakes and the habitats and species that they support, and will avoid a reduction in water quality during construction. Although white-clawed crayfish were confirmed to be likely absent in 14 of the watercourses, on a precautionary basis, it can be considered that white-clawed crayfish have the potential to be affected by the Proposed Development through watercourse pollution or direct disturbance.

The following control measures will be implemented during the Construction Phase in or adjacent to a watercourse:

- In-stream works will not be carried out in watercourses frequented by salmon or trout during the Annual Close Season. The duration of the season varies regionally within the period from the beginning of October to the end of February, inclusive (IFI 2016). River and brook lamprey spawn during the period March to April / May. Therefore, translocation (fish rescue) and in-stream works will be undertaken outside of the spawning season. As the spawning season can vary regionally, work will be carried out in watercourses in the period June to September to minimise the impact on fish. This mitigation will also protect white-clawed crayfish. The timing of works will be considered on a site-specific basis by the ECoW and in agreement with IFI;
- Operation of machinery in-stream will be kept to an absolute minimum. All construction machinery operating in-stream will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery will be cleaned and checked prior to commencement of in-stream works;
- The design of temporary settlement ponds, the outfalls from these temporary ponds and the construction method statements for their installation will be agreed with IFI prior to construction;
- The area of disturbance of the watercourse bed and bank will be the absolute minimum required for the installation of outfalls / culverts;
- Any de-watering flows will be directed to the construction drainage system and to the settlement pond (or other) treatment system;
- Sediment mats / silt traps or similar will be located immediately downstream of the works within and adjacent to the watercourses. These will be inspected daily, maintained and cleaned regularly by the ECoW during the course of site works. Diversion of water to and from a

temporary diversion channel will only take place during the period March to September (IFI 2016) or as agreed with IFI;
- Small check dams will be constructed in the cut-off watercourse to trap any sediment, and a sediment trap will be provided immediately downstream of the diversion to the existing watercourse; and
- Where in-stream bed material is to be removed, coarse aggregates, if present, will be stockpiled at least 10m away from the watercourse for replacement following reinstatement of a watercourse channel.

Watercourse banks affected during construction in / near a watercourse will be reinstated back to pre-construction conditions.

Where open trenching is proposed, site restoration works will be carried out following completion of the crossing, in agreement with IFI (see Table 10.29 for a list if these watercourses). These works may include riverbank and gravel replacements. In all cases, the site will be restored post-installation. An adverse weather stop work plan will be developed to ensure that activities with the potential to cause pollution are stopped under certain weather conditions (Met Éireann red, amber, yellow warnings will be monitored daily by the ECoW by accessing the Met Éireann website (Met Éireann 2024)). Works will be stopped where a red weather warning is issued. Where an amber warning is issued, works will be monitored by the ECoW and stopped where deemed appropriate based on the site conditions.

Additional mitigation measures that will be undertaken to protect fish species are as follows:

- Where in-stream trenching is to be carried out, the area will be dewatered to provide a dry works area;
- The impermeable barrier will be tailored to the watercourse in question, as per consultation with IFI to-date, and where technically feasible, fluming will be preferred to over pumping techniques to provide the dry working area (refer to Chapter 4 (Proposed Development Description) for details);
- Netting, sandbags and / or dumpy-bags filled with rock will be installed upstream to prevent fish travelling downstream into the working area;
- Fish will be removed from the working area through electrofishing and moved upstream of the dammed area; and
- Once construction is completed, the watercourse will be re-wetted under the direction of the ECoW. Water will be released slowly and silt mats, sediment traps and haybales will be used to avoid a sudden influx of sediment to the system. A silt buster will be used where required.

10.5.3.2.7 Reinstatement

10.5.3.2.7.1 General Requirements (All Hedgerows)

All planting will be native (only) and of local provenance, taking account of the vegetation that has been removed and typical species of the local landscape.

A post-consent / pre-construction baseline survey of all hedges to be removed will be carried out to characterise its canopy, understorey and field layer species, and associated features (ditches, earth banks, walls etc.) to inform reinstatement.

Unless otherwise agreed with the Developer (ESB) and the local authority, the appointed contractor will reinstate hedgerows and treelines to a species-rich condition (i.e., five native woody species per 30m (excluding brambles), with no use of commercial seed), comprising only native species. All other sites will be returned as close as possible to their pre-existing condition, using the same woody species removed, under the supervision and direction of the appointed contractor's ECoW.

Hedging / hedgerow plants will be planted as a staggered double row, six plants per metre with 330mm between rows. Suitable individual protection from browsing animals will be provided by tube, spiral or similar held in place with a short cane. Group protection of new planting will be provided by suitable fencing, but individual plant protection of spirals will be provided to protect against browsing animals. Mulch mats or similar weed suppression materials (restricted to a biodegradable specification) will be used to promote successful establishment.

The appointed contractor will make orders by the scientific name to ensure native plants are delivered and not a cultivated variety.

Nurseries prefer to grow trees to order, so the appointed contractor will make the order as soon as possible (up to a year in advance) to ensure that the required species and stock specification can be secured.

Consideration will be given to the procurement of planting so that there are suitable lead-in times to ensure that plants are of the right age / height required for when they are planted.

The appointed contractor will manage the establishment phase of planting (one to two years) in accordance with the Teagasc guidance, How to plant a hedge (Teagasc 2020), to include watering in, weed suppression (using biodegradable mulches), and (where required) protection from browsing animals.

Thereafter, the Developer (ESB) will manage plantings from years three to five in agreement with the landowner.

10.5.3.2.7.2 Specific Requirements (Hedgerows and Trees Within the Cable Easement)

At the time of writing, the latest EirGrid Functional Specification for Underground Cables (EirGrid 2021) stated:

> *"The easement area shall be cleared, and kept clear, of trees and other vegetation with deep root systems as these may damage the cable".*

Since publishing this specification, EirGrid has identified precedence from Germany and the Netherlands for safely planting certain shrubs over High Voltage (HV) underground cables. EirGrid has engaged closely with the ESB, and relevant Dutch and German Transmission System Operators across Europe, to understand feasibility of planting over HV underground cables in Ireland. A Draft Over Cable Planting Strategy is in advance development in consultation with ESB, for which the Design Risk Assessment (DRA) was ongoing at time of writing (including calculations to assess a possible cable de-rating). The draft strategy combines the requirement for a minimum cable burial depth of 1m (to top of Cement Bound Granular Mixture in the cable trench), use of a high performing Root Barrier Membrane, and a strictly defined shrub species list with known maximum root depths of less than 1m. It is possible that the DRA may conclude that over cable planting cannot be delivered while guaranteeing cable performance and security. There are also risks that the strictly defined shrub species list is not compatible with landowner farm boundary requirements and / or agricultural farm payments. As such, applying a precautionary principle, offsite compensatory planting is assumed for all permanent losses within the permanent easement (permanent loss is outlined in Table 10.26).

Subject to consent, the planting will commence in advance of, or in parallel with, the Construction Phase of the Proposed Development. EirGrid has identified candidate sites in County Meath and County Dublin in consultation with a charity partner, who provides compensatory planting options on third-party lands. Whether these candidate sites or other sites are used for compensatory planting, there will be no planting in semi-natural habitats of significant ecological value, which will be verified by the suitably qualified ecologist employed the compensation supplier. Offsite compensatory planting will deliver 130% of trees permanently lost within the PAB.

10.5.3.2.7.3 Specific Requirements (Semi-Natural Grasslands)

The appointed contractor's ECoW will develop site-specific reinstatement plans for all semi-natural habitats (including dry calcareous grassland, and dry meadows and grassy verges). These plans will be provided to the Developer's Ecologist (ESB), and the Planning and Environmental Unit in EirGrid's Chief Infrastructure Office. In accordance with the All-Ireland Pollinator Plan 2021-2025 (NBDC 2021), commercial seed mixes will not be sown with the objective of restoring biodiversity. Seeds of certain plant species, such as wildflowers and certain species included in multi-species mixtures, are not subject to the seed certification schemes as implemented by the EU Member States and The Organisation for Economic Co-operation and Development OECD-designated authorities in respect of third countries, so there is no guarantee of the species mix or its provenance. Furthermore, even where harmful weed species are not present, seeds of non-local origin (even if the species are native) introduce new genetic strains which may displace or compromise the local, naturally-occurring flora (Dublin Naturalists Field Club 2021).

As such, in the site-specific habitat reinstatement plans for semi-natural habitats, the appointed contractor's ECoW will adopt the following approach, subject to consultation with the NPWS:

- Where it is deemed appropriate to allow habitats to re-vegetate naturally (e.g. roadside verges, where similar habitat is contiguous either side of the construction area), there will be no active seeding of re-instated topsoil;
- In all other areas, the preferred approach to reinstatement will be the use of locally collected seed from similar habitats;
- Use of commercial seed in semi-natural habitats will only be permitted where local seed is not available, or where local seed establishment has failed, <u>and if both</u>:
  - Certified native by the Department of Agriculture, Food, and the Marine; and
  - With the written agreement of the NPWS.

10.5.3.2.7.4 General Requirements (Roadside Verges and Agricultural Areas)

The requirements that will be followed for use of seed in grassland reinstatement are:

- Commercial seed mixes will only be used on agricultural lands. All other areas will be left to naturally revegetate from the seed bank within reinstated soils;
- All seed mixes will be certified native by the Department of Agriculture, Food, and the Marine; and
- In agricultural areas, the rate of seeding, time and method of sowing, including the application of fertiliser, will be agreed with an experienced agronomist and will follow the guidance on reseeding – Pocket Manual for Reseeding (Teagasc 2020).

10.5.3.2.7.5 Reporting

All reinstated or indirectly impacted semi-natural vegetation will be inspected at the completion of the Construction Phase, at which time the appointed contractor's ECoW will provide written reports on habitat condition to the Developer's Ecologist (ESB), and EirGrid's Planning and Environmental Unit. At that time, the Developer's Ecologist (ESB) will determine what additional steps are required to assist vegetation growth and establishment. Additional steps will include any of the following; replacement tree planting, additional hedge mulch, protection from browsing animals, or sowing of locally harvested seed for semi-natural grassland, using a green hay approach.

10.5.4 Operational Phase

No mitigation is proposed during the Operational Phase due to the nature of the Proposed Development. The effects of the Operational Phase of the Proposed Development are expected to be minimal on the IERs, with most of the impacts to them occurring during the Construction Phase. Along most of the proposed cable route, the road will be reinstated for public use, and vegetation removed will be reinstated, except along the permanent easement, at Joint Bays, along permanent access tracks, and where over-cable planting is not technically viable due to asset risk.

10.5.5 Summary of Mitigation Measures

Table 10.31 summarises the potential impacts on receptors, the proposed mitigation measures, and any predicted residual impacts, after mitigation.

Table 10.31: Summary of Potential Construction Phase Impacts, Proposed Mitigation Measures and Predicted Residual Impacts if Present

Ecological Receptor	Ecological Valuation	Potential Impacts	Proposed Mitigation	Significant Residual Impact (Yes/No) and Level
Designated sites				
Malahide Estuary SAC Malahide Estuary pNHA	International Importance National Importance	Habitat degradation (hydrology – pollution) at an International (SAC) / National (pNHA) Level	Pollution control measures	No
Baldoyle Bay SAC Baldoyle Bay pNHA	International Importance National Importance	Habitat degradation (hydrology – pollution) at an International (SAC) / National (pNHA) Level	Pollution control measures	No
Rockabill to Dalkey Island SAC	International Importance	None	None	No
Lambay Island SAC	International Importance	None	None	No
Malahide Estuary SPA	International Importance	Habitat degradation (hydrology – pollution), mortality, disturbance / displacement at an International Level	Pollution control measures Non-transparent visual and noise barrier (temporary installation)	No
Baldoyle Bay SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement at an International Level	Pollution control measures	No
North-West Irish Sea SPA	International Importance	Habitat degradation (hydrology-pollution,) mortality, disturbance / displacement	Non-transparent visual and noise barrier (temporary installation)	No
North Bull Island SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement at an International Level	Pollution control measures	No
South Dublin Bay and River Tolka Estuary SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement at an International Level	Non-transparent visual and noise barrier (temporary installation)	No
Rogerstown Estuary SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement at an International Level	Pollution control measures	No
Ireland's Eye SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement at an International Level	Non-transparent visual and noise barrier (temporary installation)	No
Howth Head Coast SPA	International Importance	None	None	No

Ecological Receptor	Ecological Valuation	Potential Impacts	Proposed Mitigation	Significant Residual Impact (Yes/No) and Level
Lambay Island SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement at an International Level	Pollution control measures Non-transparent visual and noise barrier (temporary installation)	No
Dalkey Islands SPA	International Importance	None	None	No
Skerries Islands SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement at an International Level	Pollution control measures Non-transparent visual and noise barrier (temporary installation)	No
Rockabill SPA	International Importance	None	None	No
River Nanny Estuary and Shore SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement at an International Level	Pollution control measures Non-transparent visual and noise barrier (temporary installation)	No
Boyne Estuary SPA	International Importance	Habitat degradation (hydrology-pollution), disturbance / displacement at an International Level	Pollution control measures Non-transparent visual and noise barrier (temporary installation)	No
Dundalk Bay SPA	International Importance	Habitat degradation (hydrology-pollution), mortality, disturbance / displacement at an International Level	Pollution control measures Noise barrier erection	No
Sluice River Marsh pNHA	National Importance	Habitat degradation (hydrology-pollution) at a National Level	Pollution control measures	No
North Dublin Bay pNHA	National Importance	None	None	No
Howth Head pNHA	National Importance	Habitat degradation (hydrology-pollution) at a National Level	Pollution control measures	No
Ireland's Eye pNHA	National Importance	None	None	No
Habitats (including Fossitt codes, outside designated sites)				
Arable crops (BC1)	Less than local Importance	Habitat loss (temporary and permanent) at Less than Local Level	None	No
Horticultural land (BC2)	Less than local Importance	None	None	No

Ecological Receptor	Ecological Valuation	Potential Impacts	Proposed Mitigation	Significant Residual Impact (Yes/No) and Level
Tilled land (BC3)	Less than local Importance	Habitat loss (temporary and permanent) at Less than Local Level	None	No
Flower beds and borders (BC4)	Less than local Importance	None	None	No
Earth banks (BL2)	Less than local Importance	None	None	No
Building or Artificial (BL3)	Less than local Importance	Habitat loss (temporary and permanent) at Less than Local Level	None	No
Spoil and bare ground (ED2)	Local Importance (Lower Value)	None	None	No
Recolonising bare ground (ED3)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation at a Local Level	Habitat reinstatement	No – permanent habitat loss will occur, but based on size and distribution the effect is not significant
Other artificial lakes and ponds (FL8)	Local Importance (Higher Value)	Habitat loss (temporary) at a Local Level	Habitat reinstatement	No
Depositing lowland rivers (FW2)	Local Importance (Higher Value)	Habitat degradation – surface water quality at a Local Level	Pollution control measures	No
Drainage ditches (FW4)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and habitat degradation – surface water quality at a Local Level	Habitat reinstatement Pollution control measures	Yes, Local Level
Improved agricultural grassland (GA1)	Less than local Importance	Habitat loss (temporary and permanent) at Less than Local Level	None	No
Amenity grassland (GA2)	Less than local Importance	Habitat loss (temporary) at Less than Local Level	None	No
Marsh (GM1)	Local Importance (Higher Value)	Habitat degradation at a Local Level	Pollution control measures	No
Dry calcareous grassland (GS1)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation at a Local Level	Habitat reinstatement	Yes, Local Level
Dry meadows and grassy verges (GS2)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation at a Local Level	Habitat reinstatement	Yes, Local Level
Wet grassland (GS4)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) fragmentation and degradation at a Local Level	Habitat reinstatement Pollution control measures	Yes, Local Level

Ecological Receptor	Ecological Valuation	Potential Impacts	Proposed Mitigation	Significant Residual Impact (Yes/No) and Level
(Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation at a Local Level	Habitat reinstatement outside of the cable easement	Yes, Local Level
Mixed broadleaved / conifer woodland (WD2)	Local Importance (Higher Value)	Habitat loss (temporary) and fragmentation at a Local Level	Habitat reinstatement	No
Conifer plantation (WD4)	Local Importance (Lower Value)	None	None	No
Scattered trees and parkland (WD5)	Local Importance (Lower Value)	Habitat loss (temporary) and fragmentation at a Local Level	Habitat reinstatement	No
Hedgerows (WL1) species rich	County Importance	Habitat loss (temporary and permanent) and fragmentation at a County Level	Habitat reinstatement outside of the cable easement	Yes, Local to County Level
Hedgerows (WL1) species poor	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation at a County Level	Habitat reinstatement outside of the cable easement	Yes, Local Level
Treeline (WL2)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation at a County Level	Habitat reinstatement outside of the cable easement	Yes, Local to County Level
Riparian woodland (WN5)	Local Importance (Higher Value)	Habitat loss (temporary) and degradation (surface water quality) at a Local Level	Habitat reinstatement outside of the cable easement Pollution control measures	No
Scrub (WS1)	Local Importance (Higher Value)	Habitat loss (temporary and permanent) and fragmentation at a Local Level	Habitat reinstatement outside of the cable easement	Yes, Local Level
Immature woodland (WS2)	Local Importance (Lower Value)	Habitat loss (temporary and permanent) and fragmentation at a Local Level	Habitat reinstatement outside of the cable easement	Yes, Local Level
Ornamental / non-native shrub (WS3)	Less than local Importance	Habitat loss (temporary and permanent) at Less than Local Level	Habitat reinstatement	No
Recently-felled woodland (WS5)	Local Importance (Lower Value)	None	None	No
Protected, notable and invasive species and taxa				
SCI bird species	International Importance	Habitat degradation (hydrology-pollution), disturbance / displacement/mortality, and mortality at an National-International Level	Pollution control measures Noise barrier erections Non-transparent visual screening barrier erection Control measures to reduce machineries noise	No

Ecological Receptor	Ecological Valuation	Potential Impacts	Proposed Mitigation	Significant Residual Impact (Yes/No) and Level
			Habitat reinstatement	
European eel	National Importance	Habitat degradation (hydrology – pollution) and disturbance / displacement at a County Level	Pollution control measures Control measures for works within and adjacent to watercourses Habitat reinstatement	No
White-clawed crayfish	County Importance	Habitat degradation (hydrology – pollution) and disturbance / displacement at a County Level	Pollution control measures Control measures for works within and adjacent to watercourses Habitat reinstatement	No
Otter	County Importance	Habitat degradation (hydrology – pollution) and disturbance / displacement at a County Level	Pollution control measures Control measures to reduce machinery noise and vibration and to work within holts Temporary lighting will be controlled and directed Seasonal limitations Working distance from holts measures Habitat reinstatement Derogation licence	No
Atlantic salmon	County Importance	Habitat degradation (hydrology – pollution) and disturbance / displacement at a Local-County Level	Pollution control measures Control measures for works within and adjacent to watercourses Habitat reinstatement	No
Lamprey spp.	County Importance	Habitat degradation (hydrology – pollution) and disturbance / displacement at a Local-County Level	Pollution control measures Control measures for works within and adjacent to watercourses Habitat reinstatement	No
All other Red, Amber or Green listed bird species (non-SCI breeding populations)	Local Importance (Higher Value)	Habitat degradation (hydrology – pollution) and disturbance / displacement (including temporary lighting) at a Local Level	Pollution control measures Noise barrier erections Temporary lighting will be controlled and directed	No

Ecological Receptor	Ecological Valuation	Potential Impacts	Proposed Mitigation	Significant Residual Impact (Yes/No) and Level
			Non-transparent visual screening barrier erection Control measures to reduce machineries noise Habitat reinstatement	
Bats	Local Importance (Higher Value)	Habitat loss and disturbance from temporary lighting at a Local Level	Alternative roost provision Night-time working limited Temporary lighting will be controlled and directed Derogation licence	No
Badger	Local Importance (Higher Value)	Disturbance at a Local Level (likely of two active setts)	Seasonal work limitation Temporary lighting will be controlled and directed Control measures to reduce machineries impact within setts Working distance from setts measures	No
Other small mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Habitat loss and disturbance / displacement at a Local Level	Seasonal work limitation Derogation licence Noise and light limitation Night-time working limited Habitat reinstatement	No
Smooth newt	Local Importance (Higher Value)	Habitat loss and disturbance / displacement at a Local Level	Seasonal working limitation Individual translocation Habitat reinstatement Water levels maintained in water features potentially used	No
Common frog	Local Importance (Higher Value)	Habitat loss and disturbance / displacement at a Local Level	Seasonal working limitation Individual translocation Habitat reinstatement Water levels maintained in water features potentially used	No

Ecological Receptor	Ecological Valuation	Potential Impacts	Proposed Mitigation	Significant Residual Impact (Yes/No) and Level
Common lizard	Local Importance (Higher Value)	Habitat loss and disturbance / displacement at a Local Level	Seasonal working limitation Individual translocation Habitat reinstatement	No
Other fish species (including trout)	Local Importance (Lower Value)	Habitat degradation (hydrology – pollution) and disturbance / displacement at a Local Level	Pollution control measures Control measures for works within and adjacent to watercourses Habitat reinstatement	No
Non-native invasive plant species	N/A	Spread of invasive plants at a Local Level	Chemical and physical control and eradication Exclusion zone established to avoid spread	No

10.6 Residual Impacts and Compensation (Unrelated to European Sites)

Residual significance is defined as the level of significance of a potential impact or effect following the implementation of mitigation. For the purpose of this assessment, significant residuals impacts are only considered for permanent habitat losses (as outlined in Table 10.32). Temporary habitat losses (for GS2 dry meadow and grassy verges and FL8 other artificial lakes and ponds) are not considered as there are no significant residual impacts following the implementation of mitigation (i.e. habitat reinstatement).

There will be a Negative, Significant and Medium to Long -Term residual impacts at Local to County Level from the loss of hedgerows and treelines until new species rich hedgerows and treelines are established. There will be a Negative, Significant and Permanent residual impact estimated at County Level from the loss of mature trees as this cannot be compensated with replacement planting due to the time taken for trees to reach maturation. There is no scope for wet grassland at Belcamp Substation, where the grasslands are dry, or compensation options for dry calcareous and neutral grassland (the offsite compensation strategy does not include grassland as seeding is not permitted as outlined in Section 10.5.3.2.7.3). As such, the grassland losses are assessed as Negative, Significant and Permanent residual impacts, estimated at a Local (High) geographic scale.

Table 10.32 identifies the net habitat loss after mitigation (note dry meadows and grassy verges (GS2) is not included within this table as the predicted habitat losses are temporary with no residual impacts predicted following reinstatement), and after compensation via offsite compensatory planting being proposed to deliver 130% of trees permanently lost, which would equate to between 705 and 1,528 new trees planted. An offsite hedgerow compensation strategy has been developed, in light of the urgent biodiversity action required at European and national level, and the hedgerow / tree policy objectives outlined in the Meath County Development Plan (particularly HER POL 37, HER POL 38, HER POL 40) (MCC 2021) and the Fingal Development Plan (particularly GINHP21, GINHP22, GINHO44) (FCC 2023).

A Draft Over Cable Planting Strategy is in advance development in consultation with the ESB, for which the DRA was ongoing at the time of writing. However, applying a precautionary principle, it is assumed that the DRA will conclude planting cannot be carried out while maintaining technical and safety standards. As such, offsite compensatory planting is assumed to be the only action available to replace hedgerows / treelines removed from off-road underground cable route sections. The offsite compensatory planting will be entirely outside the PAB. A minimum of 130% compensatory offsite planting will be delivered by the Developer (ESB), in consultation with EirGrid. The surplus will help contribute towards an overall biodiversity net gain.

Subject to consent, the planting will commence in advance of, or in parallel with, the Construction Phase of the Proposed Development. EirGrid has identified candidate sites in County Meath and County Dublin in consultation with a charity partner, who provides compensatory planting options on third-party lands. Whether these candidate sites or other sites are used for compensatory planting, there will be no planting in semi-natural habitats of significant ecological value, which will be verified by the suitably qualified ecologist employed the compensation supplier.

Table 10.32: Net Habitat Loss and Gain of IERs After Mitigation and After Compensation Planting

Fossitt Habitat Code	Fossitt Habitat	Permanent Net Habitat Loss After Mitigation	Significant Residual Impact	Compensation Proposed	Net Habitat Loss or Gain After Compensation Planting NOTE 2
ED3	Recolonising bare ground	0.02 ha	No	N/A	-0.02 ha (habitat loss)
FW4	Drainage ditches	0.01 km	No	N/A	-0.01 km (habitat loss)
GS1	Dry calcareous and neutral grassland	2.85 ha	Yes	No – no compensation options available	-2.85 ha (habitat loss)
GS2	Dry meadows and grassy verges	0.35 ha	Yes	No – no compensation options available	-0.35 ha (habitat loss)
GS4	Wet grassland	0.93 ha	Yes	No – no compensation options available	-0.93ha (habitat loss)
WD1	(Mixed) broadleaved woodland	0.06 ha	Yes	0.08 ha (130% compensation)	+0.02 ha (habitat gain)
WL1	Hedgerow	0.67 km	Yes	0.87 km (130% compensation)	+0.20 km (habitat gain)
WL2	Treeline	0.04 km	Yes	0.05 km (130% compensation)	+0.01 km (habitat gain)
WS1	Scrub	0.13 ha	Yes	0.17 ha (130% compensation)	+0.04 ha (habitat gain)
WS2	Immature woodland	0.59 ha	Yes	0.77 ha (130% compensation)	+0.18 ha (habitat gain)
N/A	Individual trees within study area, including mature trees NOTE 1	512 – 1,174	Yes	666 to 1,526 trees planted offsite (130% compensation)	+154 to 352 trees (habitat gain)
NOTE 1: Study area as defined in the Arboricultural Assessment (Appendix A18.2 in Volume 3 of this EIAR), as the PAB plus a 30m buffer. Note due to the data collection methodology for the arboricultural survey, the individual tree data includes treelines, hedgerows, and woodland. The respective permanent loss and compensation figures are therefore indicative only as double counting of these habitat types is unavoidable. Trees also take many years to reach maturity so there will be residual impact from trees felled before they reach maturity. NOTE 2: The conclusion that compensation delivers a net gain relies upon a simplistic measurement of habitat length only. The significant residual effects arising from net habitat loss have been clearly stated. The offsite compensation will take place outside the PAB in Dublin and Meath, and so does not offset the permanent habitat fragmentation effects. The offsite compensation will involve planting of young trees, and so will also not offset losses of mature trees and hedges.					

10.7 Conclusion

Significant residual impacts are predicted for dry calcareous and neutral grassland, wet grassland, scrub, mixed broadleaved woodland, immature woodland, hedgerows, treelines and individual trees. There are no compensation options available at present to offset the significant residual impacts upon grassland. Compensatory measures are proposed for hedgerows, treelines and individual trees, although there will be an inevitable loss of biodiversity until these habitats have established (approximately 5 to 10 years for hedgerows and 20 to 30 years for treelines and individual trees). The loss of mature trees is considered a permanent residual impact of County Level significance due to the time taken for replacement trees to reach maturation.

Following offsite compensation, there will be a net gain in trees numbers and with EirGrid's commitment to monitoring mitigation success and embedding Nature Inclusive Design, the Proposed Development will ultimately align with the County Meath Development Plan (particularly HER POL 37, HER POL 38, HER POL 40) (MCC 2021) and the Fingal Development Plan (particularly GINHP21, GINHP22, GINHO44) (FCC 2023) policies and objectives.

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 11 – Soils, Geology and Hydrogeology

EirGrid

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Contents

11. Soils, Geology and Hydrogeology

11.1 Introduction

This Chapter presents the assessment of the likely potential impacts of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) on soils, geology and hydrogeology during the Construction and Operational Phases. This Chapter includes an assessment of the compliance of the Proposed Development with Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (hereafter referred to as the Water Framework Directive (WFD)) in terms of groundwater.

This assessment is based on the Proposed Development, as detailed in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR). This Chapter considers the potential impacts during the Construction and Operational Phases associated with:

- Land, soils and geology; and
- Hydrogeology.

Proposed environmental mitigation measures to prevent and reduce the anticipated potential impacts are presented in Section 11.5.

Interrelationships exist with other chapters and supporting documents which include attributes excluded from this Chapter, namely:

- The assessment of impacts on biodiversity is discussed in Chapter 10 (Biodiversity) in Volume 2 of this EIAR;
- The assessment of surface water is presented in Chapter 12 (Hydrology) in Volume 2 of this EIAR, including a summary of flood risk. A Flood Risk Assessment (FRA) Report is included as Appendix A12.12 in Volume 3 of this EIAR; and
- The assessment of impacts on agriculture is discussed in Chapter 15 (Agronomy and Equine) in Volume 2 of this EIAR.

11.2 Methodology

11.2.1 Study Area

A study area has been defined based on the Planning Application Boundary, within which, the construction activities associated with the Construction Phase will be undertaken and any areas required for temporary access, Temporary Construction Compounds (TCCs), Horizontal Directional Drilling (HDD) Compounds, and other enabling activities.

The study area is based on a 250m (metre) corridor from the Planning Application Boundary with regard to soils and geology. This is considered a suitable distance to enable the description of baseline conditions and allow the assessment of soils and geology. In the absence of Ireland specific, or more recent guidance this study area has been based on professional judgement with reference to the National House Building Council (NHBC) and Environmental Agency (EA) Guidance for the Safe Development of Housing on Land Affected by Contamination R&D Publication 66:2008 (NHBC and EA 2008).

With regard to hydrogeology, the study area extends 1km (kilometre) from the Planning Application Boundary in addition to any TCCs and HDD Compounds and proposed construction access routes which have their own 1km buffer. The assessment also includes any WFD groundwater bodies (which are hydrogeological receptors) which lie within this 1km buffer. The 1km buffer is informed by the design and best practice, noting that no large-scale dewatering is expected to be required for the Proposed Development, given the largely shallow nature of the works.

11.2.2 Relevant Guidelines, Policy and Legislation

This assessment has been carried out in compliance with the following guidelines, policy and legislation, and has been adapted to reflect the nature of the Proposed Development and attributes of the environmental receptors, based on professional judgement and experience:

- S.I. No. 538/2001 - European Communities (Environmental Impact Assessment) Regulations, 2001 (as amended);
- S.I. No. 722/2003 - European Communities (Water Policy) Regulations 2003;
- S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010;
- S.I. No. 366/2016 - European Union Environmental Objectives (Groundwater) Regulations 2016 (as amended);
- WFD;
- Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration (hereafter referred to as the Groundwater Directive);
- United Kingdom (UK) Environmental Agency (EA) Land Contamination Risk Management (UK EA 2023);
- British Standards Institution (BSI) British Standard (BS) 10175:2011 + A2:2017 Investigation of potentially contaminated sites. Code of practice (BSI 2017);
- Construction Industry Research and Industry Association (CIRIA) C552 Contaminated Land Risk Assessment: A Guide to Good Practice (CIRIA 2001);
- CIRIA C665 Assessing Risks Posed by Hazardous Ground Gases to Buildings (CIRIA 2007);
- Ireland-Specific Good Practice Guidance for the Development of Ground Gas Conceptual Site Models – An IBN Position Statement (Ireland Brownfield Network 2023);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022);
- The Institute of Environmental Management and Assessment (IEMA) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment (hereafter referred to as the IEMA Guide) (IEMA 2022);
- Institute of Geologists of Ireland (IGI) Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI 2013);
- National Roads Authority (NRA) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA 2009); and
- Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013).

11.2.3 Data Collection and Collation

The following data sources have been accessed during the collation of information on the baseline environment with respect to land and land use, soils and geology, and hydrogeology.

11.2.3.1 Data Sources

- Teagasc Irish Soil Information System online map (Teagasc 2024a);

- Historic Mine Sites – Inventory and Risk Classification (EPA and Geological Survey Ireland (GSI) 2009);
- Geological Survey Ireland Public Data Viewer (GSI 2024);
- 1:500,000 scale – Quaternary Geological Map of Ireland (GSI 2017);
- 1:1,000,000 scale – Bedrock Geology of Ireland (GSI 2014);
- Irish Townland and Historical Map Viewer (OSI 2024a);
- Geohive, Ordnance Survey Ireland (OSI) online spatial data viewer (OSI 2024b);
- Open Topographic Data Viewer (GSI 2023);
- EPA database and mapping (EPA 2024);
- Teagasc Agriculture and Food Development Authority soil maps (Teagasc 2023b);
- National Parks and Wildlife Service (NPWS) Public Map Viewer (NPWS 2024); and
- Map of Irish Wetlands (Wetland Ireland Surveys 2024).

11.2.3.2 Field Surveys (Ground Investigation)

A ground investigation was undertaken by Causeway Geotech Ltd. on behalf of EirGrid between 10 July 2023 and 29 September 2023 to provide geotechnical and environmental information for input to the design and construction of the Proposed Development.

Phase 1 of the ground investigation included boreholes, slit trenches, inspection pits, environmental sampling and laboratory testing and the preparation of a factual report on the findings. Further details regarding the findings of the ground investigation are presented in Section 11.3.4.

11.2.4 Appraisal Method for the Assessment of Impacts

11.2.4.1 Assessment of Importance / Sensitivity of Receptors

The potential impact of the Proposed Development on the soils, geology and hydrogeology environments has been assessed by classifying the importance of the relevant attributes and quantifying the likely magnitude of any impact on these attributes. The criteria used for assessing the importance / sensitivity of the geological and hydrogeological environments within the study area are outlined out in Table 11.1, Table 11.2 and Table 11.3.

Table 11.1: Criteria for Rating Site Importance of Geological Features (NRA 2009; IGI 2013)

Sensitivity/ Significance	Criteria	Typical Examples
Very High	• Attribute has a high quality, significance or value on a regional or national scale. • Degree or extent of soil contamination is significant on a national or regional scale. • Volume of peat and / or soft organic soil underlying alignment is significant on a local or regional scale.	• Geological feature rare on a regional or national scale. • Large existing quarry or pit. • Proven economically extractable mineral resource.
High	• Attribute has a high-quality significance or value on a local scale. • Degree or extent of soil contamination is significant on a local scale . • Volume of peat and / or soft organic soil underlying alignment is significant on a local scale.	• Contaminated soil on-site with previous heavy industrial usage. • Large recent landfill site for mixed wastes. • Geological feature of high value on a local scale (County Geological Site). • Well drained and / or high fertility soils. • Moderately sized existing quarry or pit. • Marginally economic extractable mineral resource.
Medium	• Attribute has a medium quality, significance or value on a local scale. • Degree or extent of soil contamination is moderate on a local scale. • Volume of peat and / or soft organic soil underlying alignment is moderate on a local scale.	• Contaminated soil on-site with previous light industrial usage. • Small recent landfill site for mixed wastes. • Moderately drained and / or moderate fertility soils. • Small existing quarry or pit. • Sub-economic extractable mineral resource.
Low	• Attribute has a low quality, significance or value on a local scale. • Degree or extent of soil contamination is minor on a local scale. • Volume of peat and / or soft organic soil underlying alignment is small on a local scale.	• Large historical and / or recent site for construction and demolition wastes. • Small historical and / or recent landfill site for construction and demolition wastes. • Poorly drained and / or low fertility soils. • Uneconomically extractable mineral resource.

The IEMA Guide (IEMA 2022) provides additional guidance on classifying receptor sensitivity for in-situ soils based on soil resource and soil functions, and this has also been complied with within this assessment. The IEMA Guide provides examples of UK classifications which differ to classifications in the Republic of Ireland. However, there is some commonality and Irish classifications have been input into the assessment, where appropriate and applicable. Table 11.2 describes the criteria for which soil sensitivity is based.

Table 11.2: Guidance on Rating Soil Receptor Sensitivity and Typical Soil Resource / Function Descriptions (adapted from the IEMA Guide (IEMA 2022))

Receptor Sensitivity	Soil Resource and Soil Functions
Very High	**Ecological habitat, soil biodiversity and platform for landscapes**: Soils supporting protected features within a European site (e.g., Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites); peat soils; soils supporting a national park, or ancient woodland. **Soil carbon**: Peat soils. Soils with potential for ecological / landscape restoration. **Soil hydrology**: very important catchment pathway for water flows and flood risk management. **Archaeology, Cultural Heritage, Community benefits and Geodiversity**: National Monuments and adjacent areas; World Heritage and European designated sites; soils with known archaeological interest; soils supporting community/recreational/educational access to land covered by national park designation. **Source of Materials**: Important surface mineral reserves that would be sterilised (i.e. without future access).
High	**Ecological habitat, soil biodiversity and platform for landscapes**: Soils supporting protected features within a European Union (EU) designated site (e.g., United Nations Educational, Scientific and Cultural Organization (UNESCO) Geoparks, or audited County Geological Sites (CGS)); National Parks; native forest and woodland soils; unaltered soils supporting semi-natural vegetation. **Soil carbon**: Organo-mineral soils (e.g., peaty soils). **Soil hydrology**: Important catchment pathway for water flows and flood risk management. **Archaeology, Cultural Heritage, Community benefits and Geodiversity**: Soils with probable but as yet unproven (prior to being revealed by construction) archaeological interest: Historic parks and gardens; audited County Geological Heritage Sites, Soils supporting community / recreational / educational access to audited County Geological Heritage Sites. **Source of Materials**: Surface mineral reserves that would be sterilised (i.e. without future access).
Medium	**Ecological habitat, soil biodiversity and platform for landscapes**: Soils supporting protected or valued features within non-statutory designated sites, Special Amenity Areas; Non-Native Forest and woodland soils. **Soil carbon**: Mineral soils. **Soil hydrology**: Important minor catchment pathway for water flows and flood risk management. **Archaeology, Cultural Heritage, Community benefits and Geodiversity**: Soils with possible but as yet unproven (prior to being revealed by construction) archaeological interest; soils supporting community / recreational / educational access to land. **Source of Materials**: Surface mineral reserves that would remain accessible for extraction.
Low	**Ecological habitat, soil biodiversity and platform for landscapes**: Soils supporting valued features within non-designated notable or priority habitats / landscapes. Agricultural soils. **Soil carbon**: Mineral soils. **Soil hydrology**: Pathway for water flows and flood risk management. **Archaeology, Cultural Heritage, Community benefits and Geodiversity**: Soils supporting no notable cultural heritage, geodiversity no community benefits; soils supporting limited community / recreational / educational access to land. **Source of Materials**: Surface mineral reserves that would remain accessible for extraction.
Negligible	As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions.
The table has been adapted from the IEMA Guide (IEMA 2022) to include Irish designations in place of UK examples	

The criteria for determining sensitivity of hydrogeological receptors have been adapted, based on best practice and with no key departures from the NRA Guidelines (NRA 2009). The criteria and examples for each importance status are set out in Table 11.3.

Table 11.3: Criteria for Assessing the Importance of Hydrogeological Features (NRA 2009)

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an International scale.	• Water feeding Groundwater Dependent Terrestrial Ecosystems (GWDTEs) with a high or moderate groundwater dependence with a high environmental importance and international or national value, such as Ramsar sites, SACs and SPAs. • Groundwater supports river or surface water body ecosystem protected by EU Legislation (e.g. SAC or SPA status). • Public potable water supply groundwater abstractions.
Very High	Attribute has a high quality or value on a Regional or National scale.	• Regionally Important Aquifer with multiple wellfields. • Groundwater supports river or surface water body ecosystem protected by national legislation (e.g. Natural Heritage Area (NHA) status). • Water feeding GWDTEs of low groundwater dependence with a high environmental importance and International or National value, such as Ramsar sites, SACs and SPAs; or water feeding highly or moderately GWDTE with a national priority. • Regional potable water source supplying >100 homes or other high volume groundwater usage (such as for bottling plant, large industry or large agricultural farm). • Inner source protection area for regionally important water source. • Buildings of regional or national importance.
High	Attribute has a high quality or value on a Local scale.	• Regionally Important Aquifer. • Groundwater provides large proportion of baseflow to local rivers. • Water feeding GWDTEs of low groundwater dependence with a national priority. • Locally important potable water source supplying >50 homes or used for local activities such as local medium scale industry or medium scale farming. • Outer source protection area for regionally important water source. • Inner source protection area for locally important water source. • Residential and commercial properties.
Medium	Attribute has a medium quality or value on a Local scale.	• Locally Important Aquifer. • Water feeding GWDTEs of feeding highly or moderately groundwater dependent GWDTE sites with no conservation designation. • Potable water source supplying <50 homes or sustaining local small scale activity such as small scale farming. • Outer source protection area for locally important water source. • Unoccupied residential and commercial properties and buildings.
Low	Attribute has a low quality or value on a Local scale.	• Poor Bedrock Aquifer. • Water feeding GWDTEs of low groundwater dependence with no designation. • Back-up private water supply used on an ad-hoc basis or used for secondary activities such as gardening when the main potable supply is provided by another source. • Industrial buildings that are currently not summarised, all derelict buildings and infrastructure that serves a single dwelling.

11.2.4.1.1 WFD Assessment Methodology

The design of the Proposed Development was screened against the various characteristics for groundwater bodies which can impact both the quantitative and qualitative status of the WFD groundwater body. This will determine whether the works will require further assessments to be compliant with the WFD with regard to groundwater. With regard to surface water, the WFD Assessment Report in Volume 5 (Supporting Documents) of the EIAR assesses the potential impact on WFD surface water bodies.

The following quantitative and qualitative elements of the WFD groundwater bodies have been scoped in for this assessment:

- Impact of groundwater on surface water ecological / quantitative and chemical status test;
- Quantitative and qualitative GWDTE test;
- Quantitative water balance;
- Qualitative drinking water protected areas; and
- General chemical test.

11.2.4.1.2 Magnitude of Impact

The scale or magnitude of potential impacts depends on both the degree and extent to which the Proposed Development may impact the geological and groundwater receptors during the Construction and / or the Operational Phase.

Table 11.4 describes the assessment of the magnitude of impacts to geological receptors based on the IGI Guidelines (IGI 2013), which can be described as adverse or beneficial.

Table 11.4:Criteria for Assessing the Magnitude of Impact on Geology and Soils (IGI 2013)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute.	• Loss of high proportion of future quarry or pit reserves. • Irreversible loss of high proportion of local high fertility soils. • Removal of entirety of geological heritage feature. • Requirement to excavate / remediate entire waste site. • Requirement to excavate and replace high proportion of peat, organic soils and / or soft mineral soils beneath alignment.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute.	• Loss of moderate proportion of future quarry or pit reserves. • Removal of part of geological heritage feature. • Irreversible loss of moderate proportion of local high fertility soils. • Requirement to excavate / remediate significant proportion of waste site. • Requirement to excavate and replace moderate proportion of peat, organic soils and / or soft mineral soils beneath alignment.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute.	• Loss of small proportion of future quarry or pit reserves. • Removal of small part of geological heritage feature. • Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils. • Requirement to excavate / remediate small proportion of waste site. NOTE1 • Requirement to excavate and replace small proportion of peat, organic soils and / or soft mineral soils beneath alignment.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity.	No measurable changes in attributes.
Minor Beneficial	Results in minor improvement of attribute quality.	Minor enhancement of geological heritage feature.
Moderate Beneficial	Results in moderate improvement of attribute quality.	Moderate enhancement of geological heritage feature.
Major Beneficial	Results in major improvement of attribute quality.	Major enhancement of geological heritage feature.
Note 1: Refer to Section 11.2.4.1.4 for further details of methodology for assessment of land contamination		

For hydrogeological receptors, the NRA Guidelines (NRA 2009) for determining the magnitude of impacts are utilised. The NRA Guidelines do not define beneficial impacts in their summary of impacts on hydrogeological features, and therefore, the magnitude of potential impacts is assessed on a scale of 'Negligible' to 'Large Adverse'. The criteria for determining the magnitude of impacts for hydrogeological receptors are outlined in Table 11.5.

Table 11.5: Criteria for Assessing the Magnitude of Impact on Hydrogeology (NRA 2009)

Magnitude of Impact	Criteria	Typical Example
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute.	• Removal of large proportion of aquifer. • Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. • Potential high risk of pollution to groundwater from routine runoff*. • Calculated risk of serious pollution incident >2% annually. • Dewatering effects create significant differential settlement effects on existing infrastructure and buildings leading to extensive repairs required.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute.	• Removal of moderate proportion of aquifer. • Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. • Potential medium risk of pollution to groundwater from routine runoff*. • Calculated risk of serious pollution incident >1% annually†. • Dewatering effects create moderate differential settlement effects on existing infrastructure and buildings leading to consideration of undertaking minor repairs.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute.	• Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. • Potential low risk of pollution to groundwater from routine runoff*. • Calculated risk of serious pollution incident >0.5% annually†. • Dewatering effects create minor differential settlement effects on existing infrastructure and buildings which may need to be monitored but where repairs may be avoidable.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity.	• Calculated risk of serious pollution incident <0.5% annually†. • Dewatering effects create no or no noticeable differential settlement effects on existing infrastructure and buildings.
Notes: *Design Manual for Roads and Bridges (DMRB) Volume 4, Section 2, Part 1 Road Drainage and the Water Environment, Appendix A, Method C (Transport Infrastructure Ireland (TII) 2015) † DMRB Volume 4, Section 2, Part 1 Road Drainage and the Water Environment, Appendix A, Method D (TII 2015)		

11.2.4.1.3 Significance of Impact

The significance of impacts depends on both the importance / sensitivity of the geological and groundwater receptors during the Construction and/or the Operational Phases and the magnitude of impact. Table 11.6 defines the impacts and Table 11.7 describes the assessment of the significance of impacts to geological / groundwater receptors based on the NRA Guidelines (NRA 2009), which can be described as (ranging from least to greatest impact): Imperceptible, Slight, Moderate, Significant, Severe, and Profound.

Table 11.6: Description of Impact

Significance of Impact	Description
Imperceptible	• An impact capable of measurement but without significant consequences.
Slight	• An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	• An impact that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	• An impact which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
Severe	• An impact which, by its character, magnitude, duration or intensity, significantly alters a sensitive aspect of the environment.
Profound	• An impact which obliterates sensitive characteristics.

Table 11.7: Rating of Significance of Impacts on Geological and Hydrogeological Receptors

		Magnitude of Impact			
		Negligible	**Small Adverse**	**Moderate Adverse**	**Large Adverse**
Importance of Attribute	Extremely High	Imperceptible	Significant	Profound	Profound
	Very High	Imperceptible	Significant / Moderate	Profound / Significant	Profound
	High	Imperceptible	Moderate / Slight	Significant / Moderate	Severe / Significant
	Medium	Imperceptible	Slight	Moderate	Significant
	Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

11.2.4.1.4 Assessment of Land Contamination

As part of the risk-based approach to assessing the potential risk from contaminated land mandated by the EPA (EPA 2013; EPA 2007), a Conceptual Site Model (CSM) has been developed to describe the relationship between:

- Contaminant source;
- Pathway; and
- Receptor.

The presence of a contamination source does not automatically infer a risk; if one or more of either a source, a linking pathway or a receptor are absent a viable or complete pollutant linkage is not present and therefore a risk is not present.

The preliminary CSM is presented in Appendix A11.1 in Volume 3 of this EIAR and has been used as the basis for the contaminated land risk assessment. The methodology is in line with the Land Contamination Risk Management guidance (UK EA 2023) which includes the consideration of:

- The likelihood of the event (probability), which takes into account both the presence of the hazard and receptor and the integrity of the pathway; and
- The severity of the potential consequence, which takes into account both the potential severity of the hazard and the sensitivity of the receptor.

The classification of likelihood (based on C552 (CIRIA 2001)) is detailed in Table 11.8 and the classification of consequence is detailed in Table 11.9.

Table 11.8: Classification of Likelihood

Classification	Definition
High Likelihood	An event is very likely to occur in the short-term, and is almost inevitable over the long-term OR there is evidence at the receptor of harm or pollution.
Likely	It is probable that an event will occur. It is not inevitable, but possible in the short-term and likely over the long-term.
Low Likelihood	Circumstances are possible under which an event could occur. It is by no means certain that even over a longer period such an event would take place, and less likely in the short-term.
Unlikely	It is improbable that an event would occur even in the very long-term.

Table 11.9: Classification of Consequence

Classification	Definition
Severe	Acute risks to human health. Short-term risk of pollution of sensitive water resource (e.g. major spillage into the water environment). Impact on surface water or groundwater (e.g. large-scale pollution or very high levels of contamination). Catastrophic damage to buildings or property (e.g. explosion causing building collapse). Ecological system effects – irreversible adverse changes to a protected location. Immediate risks.
Medium	Chronic risks to human health. Pollution of sensitive water resources (e.g. leaching of contaminants into the water environment). Ecological system effects – substantial adverse changes to a protected location. Significant damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy such as foundation damage).
Mild	Non-permanent health effects to human health. Pollution of non-sensitive water resources. Damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy, such As foundation damage). Substantial damage to non-sensitive environments (unprotected ecosystems e.g. crops).
Minor/Negligible	Non-permanent health effects to human health (easily prevented by appropriate use of PPE). Minor pollution to non-sensitive water resources. Minor damage to non-sensitive environments (unprotected ecosystems e.g. crops). Easily repairable effects of damage to buildings, structures, services or the environment (e.g. discoloration of concrete, loss of plants in a landscaping scene).

To determine the overall risk to the identified receptor, the likelihood and severity of the potential hazard are combined in accordance with the risk assessment matrix outlined in Table 11.10. The definitions of the outcomes are summarised in Table 11.11.

Table 11.10: Risk Assessment Matrix

		Consequence			
		Severe	**Medium**	**Mild**	**Minor/Negligible**
Probability (Likelihood)	**High**	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low	Moderate risk	Moderate/low risk	Low risk	Negligible risk
	Unlikely	Moderate/low risk	Low risk	Negligible risk	Negligible risk

Table 11.11: Definitions of Risk

Term	Description
Very high risk	Severe harm to a receptor may already be occurring OR a high likelihood that severe harm will arise to a receptor unless immediate remedial action works/mitigation measures are undertaken.
High risk	Harm is likely to arise to a receptor, and is likely to be severe, unless appropriate remedial actions/mitigation measures are undertaken. Remedial works may be required in the short term, but likely to be required over the long-term.
Moderate risk	Possible that harm could arise to a receptor but low likelihood that such harm would be severe. Harm is likely to be medium. Some remedial works may be required in the long term.
Moderate/low risk	Possible that harm could arise to a receptor, but where a combination of likelihood and consequence results in a risk that is above low but is not of sufficient concern to be classified as medium. It can be driven by cases where there is an acute risk which carries a severe consequence, but where the exposure is unlikely.
Low risk	Possible that harm could arise to a receptor. Such harm would at worst normally be mild.
Negligible risk	Low likelihood that harm could arise to a receptor. Such harm unlikely to be any worse than mild.

11.2.4.2 Limitations to the Assessment

Information from the sources detailed in Section 11.2.3 has been used to inform the assessment of baseline geology and soil conditions, where available.

The identification of potential land contamination sources has been solely reliant on desk-based assessments and the accuracy of historical mapping and no ground truthing or field surveys of these features were carried out.

The ground investigation, while conducted in accordance with best practice and considered suitable for the current stage of the Proposed Development, only investigates and samples a small quantity of the sub-surface. As such, uncertainty is inherent in such investigations and final confirmation of ground conditions is only possible at the Construction Phase.

Data sets obtained from GSI have, in some cases, limitations. Specific to this assessment, the following data sets have the following limitations:

- GSI Groundwater Karst Data: It should be noted that the GSI Groundwater Karst Data has known limitations, since it is "*not a complete database*" and that "*many karst features are not included in this database*" (GSI 2024). GSI notes that karst data in the database is only data gathered by GSI or submitted to GSI; and
- GSI Groundwater Wells and Springs: It is not required for private supplies to be registered with GSI and so there is the possibility of additional supplies present without being registered. The GSI record may also include historical abstractions which are no longer active.

Limitations inherent in the exploratory hole construction techniques used, means full characterisation of the groundwater regime may not be possible, for example due to:

- The use of casing in supporting the borehole walls during drilling may seal out groundwater strikes; and

- The use of water to aid drilling may mean groundwater is not always identified, especially the case with water flush, as used in rotary.

11.3 Baseline Environment

The study area for assessing the land, soils and geology impacts of the Proposed Development has been defined as a 250m lateral buffer around the Planning Application Boundary.

The study area for assessing the hydrogeological impacts of the Proposed Development has been defined as the area of the Planning Application Boundary and the area extending 1km from this, in addition to any TCCs, HDD Compounds, or construction access routes which will have their own 1km buffer. The study area also includes any WFD groundwater bodies (which are hydrogeological receptors) which lie within this 1km radius.

The 1km buffer is informed by the design noting that no large-scale dewatering is expected to be required, given the largely shallow nature of the works.

The following sections present a desk-based overview of the baseline conditions of all land use, soils, geological, and hydrogeological receptors which lie within the relevant study area.

11.3.1 Land Cover

The baseline land use for the Proposed Development has been derived from the CORINE land cover dataset (CORINE 2018), as summarised in Table 11.12. This baseline land use information has been used to inform the assessment, including the potential for land contamination, and is not considered as an attribute subject to assessment in itself.

The land use that covers the majority of the study area is agricultural land used for pasture. Within the areas of pasture there are small patches of non-irrigated arable land. Areas of discontinuous urban fabric are associated with the towns / villages of Dunboyne and Hollystown.

A summary of the land use and approximate locations is provided in Table 11.12.

Table 11.12: Summary of Land Use Types (CORINE 2018)

Land Use Type	Distribution
Agricultural (pastures)	Located along the majority of the proposed cable route and the surrounding area.
Agricultural (non-irrigated arable land)	Located in small sections throughout the pastures, across the entire study area.
Mixed Forest	In the western part of the study area adjacent to Barstown Industrial Estate.
Discontinuous urban fabric	At the towns / villages of Warrenstown, Dunboyne and Hollystown.
Road and rail networks and associated infrastructure	Along the M3, M2 and M1 Motorways.
Complex cultivation patterns	Located at the eastern end of the proposed cable route adjacent to Stockhole Lane.
Airport	Dublin Airport which is located at the eastern end of the proposed cable route adjacent to the M1 Motorway.
Industrial or commercial units	Dunboyne Industrial Estate.
Construction sites	West of Dublin Airport.
Sports and leisure facilities	West of Hollystown.

11.3.2 Soils and Geology

11.3.2.1 Soils

Soil types have been identified using Teagasc mapping (Teagasc 2024a). The majority of the study area is underlain by a variety of soil types, comprising fine loamy drift with limestone (reflecting the underlying limestone bedrock, as presented in Figure 11.1 in Volume 4 of this EIAR). Soils described as river alluvium are found within the study area along the courses of the rivers and their floodplains, with the most extensive areas present along the River Tolka in the centre of the study area, as outlined in Table 11.13.

Table 11.13: Summary of Soils Within the Study Area

National Soil Series	Substrate Group	Substrate Type	Description	Textural Criteria	Sensitivity
Straffan	Limestones	Drift	Fine loamy drift with limestones	Fine loamy	Medium
Elton	Limestones	Drift	Fine loamy drift with limestones	Fine loamy	Medium
River Alluvium	Alluvium	Clay	Variable clay, silt, sand and gravel	N/A	Low
Urban	N/A	N/A	Made ground of unknown nature	N/A	Low

The river alluvium is indicated as having poor drainage potential, has a limited lateral extent and either forms part of agricultural fields or has no specified land use. This soil type is assigned low sensitivity based on the methodology presented in Table 11.2. Elton sub-soil is encountered at Dunboyne and to the east of Dublin Airport. According to the Teagasc online mapper it is composed of fine loamy drift with limestones and has a moderate drainage potential. This soil type is assigned medium sensitivity based on the methodology outlined in Table 11.2. Straffan is primarily associated with agricultural land with no other designations or protections in place. This soil type is assigned a sensitivity of Medium according to the methodology detailed in Table 11.2.

11.3.2.2 Geomorphology

The landscape and geomorphology within the study area have been formed by glacial action and sub-glacial deposition (mapped geomorphological features are presented in Figure 11.2 in Volume 4 of this EIAR). Formation of the lakes, peat bogs and drumlins are linked to the Midlandian Cold Stage (75,000 to 10,000 years ago) of the last Ice Age. Landscapes within the Proposed Development are defined as mega-scale glacial lineations, glaciofluvial terraces and a composite thrust block moraine. All of the geomorphological features are not designated as protected features on a local or a national scale, according to GSI records (GSI 2024), and in accordance with the IGI Guidelines (IGI 2013), are considered to have low sensitivity.

11.3.2.3 Bedrock and Superficial Geology

Bedrock and superficial (quaternary) deposits were identified using GSI datasets (GSI 2024) including 1:100k bedrock and 1:50k quaternary datasets (GSI 2014) (mapped bedrock and quaternary deposits are presented in Figure 11.3 and Figure 11.4 in Volume 4 of this EIAR).

In general, till derived from limestone is the most common quaternary deposit, which is present across the central and southern parts of the Proposed Development. The proposed cable route, from approximate Chainage 0 to 4,825 is mainly underlain by till derived from Namurian sandstones and shales. Areas of mapped alluvium and gravels derived from limestone correlate with mapped watercourses and their floodplains. Sediments of gravels derived from limestones are present throughout the majority of the study area. A summary of quaternary deposits within the study area and those that will be crossed by the Proposed

Development is provided in Table 11.14. The depth to the bedrock encountered during ground investigation ranged from 1.4m bgl to 11.02m bgl (metres below-ground level).

As the proposed cable route will run from west to east from Woodland Substation to Belcamp Substation, it will cross multiple bedrock types with some faulting present along the central section of the Proposed Development, mainly in a north-west to south-east orientation. The geology along the Proposed Development comprises multiple limestone formations, with some mudstone, sandstone and shale formations interbedded. An outcrop of the Lucan Formation is present to the south of Dublin Airport. A summary of the bedrock geology along with locations is provided in Table 11.14.

Table 11.14: Summary of Quaternary Deposits and Bedrock Within the Study Area

Unit Name	Description	Receptor Value	Location (Approximate Chainages)
Quaternary Deposits			
Till derived from Namurian sandstones and shales	Clay to sand matrix containing variable cobbles and boulders.	Low	Covers the west section of the study area (Chainages 0 – 2,140, 2,350 – 2,750, 2,850 – 4,850).
Gravels derived from limestones	Gravel, variable minor clay, silt or sand content.	Low	Small sections bordering alluvium between Chainage 15,390 – 16,150, 16,175 – 16,275, 26,060 – 26,410, 31,975 – 33,080.
Alluvium	Variable clay, silt, sand and gravel.	Low	Underlying the River Tolka, Pinkeen, Ward and Mayne and their tributaries, as well as a tributary of the River Santry (Chainages 2,140 – 2,350, 10,710 – 10,870, 12,560 – 12,660, 12,715 – 13,000, 13,075 –13,190, 16,150 – 16,175, 18,010 – 18,060, 19,045 – 19,150, 31,245 – 31,255).
Till derived from limestone	Clay to sand matrix containing variable cobbles and boulders, likely to be calcareous.	Low	Covers the majority of the Proposed Development study area (Chainages 4,850 – 10,710, 10,870 – 12,560, 12,660 – 13,020, 13,200 – 15,350, 16,300 – 18,000, 18,075 – 19,000, 19,150 – 21,800, 21,900 – 22,050, 22,100 – 22,200, 22,400 – 25,700, 26,450 – 29,350, 29,550 – 30,450, 30,550 – 30,600, 30,900 – 31,200, 31,300 – 31,950, 33,100 – 37,253).
Lacustrine sediments	Not Classified	Low	Chainage 2,750 – 2,850.
Bedrock			
Lucan Formation	Dark limestone and shale.	Low	Primarily at the western extent of the study area beginning at the start of the proposed cable route, from the town of Woodland to Ward Upper/Lower on the east side of the M2 Motorway. Outcrop of the Lucan Formation is next seen south of Dublin Airport towards the end of the proposed cable route (Chainages 0 – 23,950, 24,350 – 24,410, 35,610 – 36,880).
Rush Conglomerate Formation	Conglomerate, shale, limestone.	Low	Mapped at the central area of the study area, north-east of the M2 Motorway and underlying much of Corrstown Golf Course (Chainages 23,950 – 24,350, 24,410 – 26,145).
Tober Colleen Formation	Calcareous shale, limestone conglomerate.	Low	This bedrock geology can be found at the north-eastern boundary of the study area, east of Swords near Dublin Airport and west of Swords. The bedrock transects the study area from north-east extending south-west beyond the N2 National Road (Chainages 26,145 – 28,315, 31,260 – 31,420, 33,580 – 35,610, 36,880 – 37,253).

Unit Name	Description	Receptor Value	Location (Approximate Chainages)
Waulsortian Limestones	Massive, unbedded lime-mudstone.	Low	This limestone is scarce and sparse across the study area and the proposed cable route will pass through it at one location (west of Junction 2 of the M1 Motorway, Dublin Airport) (Chainage 33,075 – 33,580).
Malahide Formation	Argillaceous bioclastic limestone, shale.	Low	Found in the eastern extent of the study area between Swords at the north-east to the N2 National Road, south-west of St. Margaret's (Chainages 28,315 – 31,260, 31,420 – 33,075).

11.3.2.4 Geohazards

Geohazards are identified as any karst features, areas of peat, areas susceptible to landslides / subsidence, or mining and quarrying areas that would need to be considered prior to development. Given the nature of the bedrock, there is the potential for the presence of karst features within the limestone and these include sinkholes, caves, some types of springs and turloughs.

According to the GSI Landslide Susceptibility Map (GSI 2024), no landslide events were recorded within the study area. There are no areas identified as prone to landslides in the study area (the landslide susceptibility classification of the area is presented in Figure 11.5 in Volume 4 of this EIAR). Areas of peat are not expected to directly underlie the proposed cable route. One spring is mapped at the eastern boundary of the study area (not on the proposed cable route). This spring is known as 'St. Doolagh's Well', and emanates from the boundary between the Waulsortian Limestone and the Malahide Formation.

11.3.2.5 Current and Historic Mining Sites

Parts of the study area have been affected by historic surface mining according to the information review. The historic gravel pits and quarries identified in the study area using the Irish Townland and Historical Map Viewer (OSI 2024a) are summarised in Table 11.15. The gravel pits are located on quaternary deposits of gravels derived from limestones, while the quarries are located over an area of exposed shale and sandstone bedrock, surrounded by till derived from Namurian sandstones and shales. Further details on these features are presented in the review of potential contamination sources in Section 11.3.2.10.

Table 11.15: Historic Quarries and Gravel Pits Within the Study Area

Ground Gas Source	Approximate Chainage	Approximate Distance from the Planning Application Boundary (m)
Historical Marl Pit	11,675	140m west
Historical Gravel Pit	18,150	175m south
Historical Gravel Pit	18,525	130m north
Historical Quarry	22,050	On Proposed Development alignment
Historical Quarry	23,100	200m east
Historical Quarry	24,050	25m east
Historical Gravel Pit	25,450	100m south
Historical Quarry	25,700	90m north
Historical Quarry	26,200	60m north-east
Historical Sand Pit	26,950	90m north
Historical Quarry	29,700	250m south
Historical Quarry	30,600	250m north-west
Historical Quarry	30,800	145m north-west
Historical Quarry	30,825	240m north-west
Historical Quarry	30,900	150m north
Historical Quarry	33,400	120m south
Historical Quarry	33,450	30m south
Historical Quarry	33,500	100m south
Historical Lead mine	34,550	30m south

No operational quarries have been identified within the study area, based on information available at the time of writing (EPA 2024).

The potential for future extraction of aggregate materials within the study area has been considered. Future aggregate potential of crushed rock and granular material across Ireland has been mapped by the GSI (GSI 2024), and is presented in Figure 11.6 and Figure 11.7 in Volume 4 of this EIAR.

The majority of the land within the study area is not classified as having granular aggregate potential. The relatively small areas that are classified are summarised in Table 11.16. It is considered that, of the classified areas, those with very low and low classifications are unlikely to be viable prospects for future extraction while those with moderate or high classifications could be suitable subject to current and future proposed land use. If areas are currently developed (urban or infrastructure development), they are unlikely to be suitable for future extraction, while agricultural land could in theory be suitable for future extraction, depending on planning and land purchase constraints. These factors have been taken into account in qualitative terms in Table 11.16.

Table 11.16: Granular Aggregate Potential in the Study Area

Granular Aggregate Potential	Location Description and Approximate Chainage	Potentially Viable?	Sensitivity
High	In the vicinity of Pace, approximate Chainage 12,450 – 12,550.	Unlikely - land used as dual carriageway.	Low
	In the vicinity of Corrstown, approximate Chainage 26,250 – 26,425.	Possible. Large area, however land used as established fields.	Medium
	In the vicinity of Dublin Airport, approximate Chainage 32,550 – 32,700.	Unlikely – land occupied by daa.	Low
Very High	In the vicinity of Bennetstown, approximate Chainage 11,600 – 11,700.	Possible. Large area, however land used as established fields.	Medium

Areas of sand and gravel of economic value, associated with alluvial deposits from the River Tolka (undifferentiated) and glaciofluvial sands and gravels (undifferentiated) are located within the study area and underlying parts of the proposed cable route. At Belcamp, there are small areas of till with gravel of carboniferous limestone.

Approximately half of the land within the study area is not classified for crushed rock potential. This classification is separate to the likelihood of these areas being available for aggregate extraction.

The presence of superficial deposits will reduce the likelihood of future development, while the presence of current developments (urban and infrastructure) will also constrain future development. It is considered that, of the classified areas, those with very low and low classifications are unlikely to be viable prospects for future extraction, while those areas with moderate to very high classifications could be suitable subject to land use. These factors have been taken into account in qualitative terms within Table 11.17.

Table 11.17: Crushed Rock Aggregate Potential in the Study Area

Granular Aggregate Potential	Location Description and Approximate Chainage	Potentially Viable?	Sensitivity
High	In the vicinity of Dunboyne, approximate Chainage 10,255 – 10,550.	Unlikely - land occupied by current development.	Low
	In the vicinity of Piercetown, approximate Chainage 13,100 – 13,550.	Unlikely - land occupied by current development.	Low
	In the vicinity of Gallanstown, approximate Chainage 21,250 – 22,450.	Possible. Large area, however land used as established fields.	Medium
	In the vicinity of Ward Upper, approximate Chainage 23,700 – 24,050.	Unlikely – land occupied by current development.	Low
	In the vicinity of Corrstown, approximate Chainage 25,350 – 26,400.	Possible. Large area, however land used as established fields.	Medium
	Lands surrounding Dublin Airport, approximate Chainages 29,300 – 29,600, 29,750 – 30,350, 31,025 – 31,250, 31,925 -32,525, 36,575 – 33,025.	Unlikely – land occupied by daa.	Low
Very High	In the vicinity of Gallanstown, approximate Chainages 21,850 – 21,975, 22,100 – 22,400.	Possible. Large area – however land used as established fields.	Medium
	In the vicinity of Ward Upper, approximate Chainage 23,775 – 23,875.	Unlikely – land occupied by industrial units.	Medium
	In the vicinity of Newpark, approximate Chainages 25,425 – 25,800, 25,875 – 25,925, 26,000 – 26,175.	Possible. Large area – however land used as established fields.	Medium
	In the vicinity of Dublin Airport, approximate Chainages 28,875 – 29,300, 29,625 – 29,725, 30,425 – 31,025, 33,075 – 33,725.	Unlikely – lands occupied by daa.	Medium

11.3.2.6 Irish Geological Heritage Sites

The GSI provides scientific appraisal and interpretative advice on geological and geomorphological sites and is responsible for the identification of important sites that are capable of being conserved as County Geological Sites (CGS) or Natural Heritage Areas (NHAs). The Department of Housing, Local Government and Heritage have the responsibility of designation and management of sites, with appropriate advice from the GSI. At present, the GSI has compiled a list of sites proposed for designation as proposed Natural Heritage Areas (pNHAs) noted on the GeoHive interactive map (OSI 2024b). No NHAs or pNHAs are present within the study area.

The GSI has also determined a secondary list of County Heritage Sites, which may be considered for protection at local authority functional control level. CGS are generally incorporated into County Development Plans. There are no CGS in the study area for the Proposed Development.

11.3.2.7 Waste Facilities

One material recovery facility has been identified within the study area noted from the EPA online mapper (EPA 2024). Padraig Thornton Waste Disposal Ltd. is located approximately 130m east from Chainage 11,400. For the purposes of Article 48 of S.I. No. 395/2004 - Waste Management (Licensing) Regulations 2004, this facility is classed as a non-hazardous materials recovery facility and a hazardous and non-hazardous civic amenity.

11.3.2.8 Radon

Radon is a naturally occurring radioactive gas which originates from the decay of uranium in rocks and soils. It is colourless, odourless and tasteless. As radon decays, radiation is given off in the form of alpha particles. After inhalation, the alpha particles are absorbed by the lungs and cause localised damage, which can lead to lung cancer.

Radon can accumulate in enclosed or poorly ventilated spaces, such as buildings, houses and tunnels. The receptors to radon in relation to the Proposed Development are construction and maintenance workers, future site users and adjacent residents.

Radon concentration is measured in becquerels per cubic metre of air (Bq/m^3). The becquerel is a unit of radioactivity and corresponds to one radioactive disintegration per second.

The Radiological Protection Institute of Ireland (RPII) (part of the EPA) has issued information and guidance on radon entitled, Advice on Setting a Reference Level for Radon Concentrations in Long-Stay Institutions (EPA 2019a). The reference level for long-term exposure to radon in a house, above which the need for remedial action will be considered, is $200Bq/m^3$ (determined in accordance with the RPII's standard protocol). Based on current knowledge, it is estimated that in Ireland, for the population as a whole, a lifetime exposure (i.e., 70 years) to radon in the home at the Reference Level of $200Bq/m^3$ carried a risk of about one in 50 of contracting fatal lung cancer.

Radon risk is determined by the percentage of homes in a given area that are estimated to be above the $200Bq/m^3$ Reference Level. The online Radon Map of Ireland (EPA 2024) has been used to provide an indication of the level of risk associated with the Proposed Development. According to this map, the majority of the study area is located within medium or high-risk areas.

11.3.2.9 Ground Gas

'Ground gas' refers to gases, including carbon dioxide, methane, carbon monoxide and hydrogen sulphide, which can occur naturally and from anthropogenic sources within the ground. Volatile and Semi-Volatile Organic Compounds (VOC/SVOCs) within the ground can also produce potentially harmful vapours. Typical sources of ground gases and vapours include:

- Ground gases from the breakdown of organic materials in the sub-surface from natural sources such as wetlands, peat and alluvium, and anthropogenic sources such as landfills;
- Vapours and ground gases from anthropogenic sources such as landfills or spillages / improper disposal of volatile materials such as petrol, oils or solvents;
- Methane, carbon dioxide, carbon monoxide and hydrogen sulphide from coal measures; and
- Carbon dioxide from carbonate-rich soils or bedrock.

Potential ground gas sources have been identified within the study area using the EPA online mapper (EPA 2024) and the Irish Townland and Historical Map Viewer (OSI 2024a) including natural soils with high organic content (e.g. alluvium), waste recovery facilities, gravel pits and other types of former superficial extraction sites which may have been backfilled with decomposable infill. An overview of the sources is provided in Table 11.18, and these sources are also mapped on Figure 11.8 in Volume 4 of this EIAR.

Table 11.18: Potential Ground Gas Sources within the Study Area

Potential Ground Gas Source	Approximate Chainage	Approximate Distance from the Planning Application Boundary (m)
Materials Recovery Facility	11,400	50m east
Historical Marl Pit	11,675	140m west
Historical Gravel Pit	18,150	175m south
Historical Gravel Pit	18,525	130m north
Historical Quarry	22,050	Within Planning Application Boundary
Historical Quarry	23,100	200m east
Historical Quarry	24,050	25m east
Historical Gravel Pit	25,450	100m south
Historical Quarry	25,700	90m north
Historical Quarry	26,200	60m north-east
Historical Sand Pit	26,950	90m north
Historical Quarry	29,700	250m south
Historical Quarry	30,600	250m north-west
Historical Quarry	30,800	145m north-west
Historical Quarry	30,825	240m north-west
Historical Quarry	30,900	150m north
Historical Quarry	33,400	120m south
Historical Quarry	33,450	30m south
Historical Quarry	33,500	100m south
Historical Lead mine	34,550	30m south
Unlicensed landfill	37,200	245m south

11.3.2.10 Contaminated Land

Land affected by anthropogenic contamination can pose constraints to the Proposed Development in a number of ways, such as:

- Limitations to materials reuse and increased costs of handling and disposal;
- Impact to human health of construction workers, residents and adjacent land users;
- Mobilisation of contaminants impacting the surface water, groundwater and ecological sites; and
- Impact to the integrity of construction materials.

Land contamination can be caused by activities such as historical industrial land use, waste disposal, historical mining and quarrying and pollution from accidents and spills. Potential contaminants can include a variety of elements and chemical compounds including heavy metals, hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), VOCs, SVOCs, per- and polyfluoroalkyl (PFAS) and ground gas.

The potential sources of contaminated features from the Irish Townland Historical Map Viewer (OSI 2024a) are shown on Figure 11.8 in Volume 4 of this EIAR. The desk-based study information review identified the following potential sources of contamination within the 250m study area:

- Historical marl pit;
- Historical gravel pit;
- Historical sand pit;

- Historical quarries;
- Historical lead mines;
- Areas of made ground;
- Graveyards;
- Historical smithies
- Former railway;
- A concrete works;
- Top Oil service station;
- Depot yard
- Car mechanic
- Integrated Pollution Control / Integrated Pollution Prevention Control (IPC / IPPC) licensed sites;
- Operational landfill; and
- Discharge licenses under Section 4 of Number 1 of 1977 - Local Government (Water Pollution) Act, 1977.

Of the 32 identified attributes in the study area, only six were located on or immediately adjacent to the proposed cable route:

- Railway at approximate Chainage 12,950;
- Historical quarry at approximate Chainage 22,050;
- Industrial depot at approximate Chainage 22,600;
- Car mechanic at approximate Chainage 25,500;
- Graveyard at approximate Chainage 26,850; and
- Historical smithy at approximate Chainage 33,360

Based on the review of historical and current land use, there are no current large scale polluting industries present within the study area, and while some historically potentially contaminative land uses have been identified, these are generally small scale, local and of relatively low contamination potential comprising infilled pits, infilled quarries and former railways. Specific land uses, as detailed above, may have resulted in localised impacts on soil and groundwater, as well as made ground associated with the construction of infrastructure and farming waste and chemicals (e.g. fertilisers, sheep dip and pesticides). A summary of the potential contamination sources within the study area, with associated information, is provided in Appendix A11.1 in Volume 3 of this EIAR.

11.3.3 Hydrogeology

11.3.3.1 Desk-Based Information

Hydrogeological receptors include aquifers, abstractions (public and private), groundwater / surface water interactions (baseflow contributions, groundwater dependent terrestrial ecosystems etc.) and karst features. These have been identified using the following relevant datasets:

- GSI Spatial Resources (GSI 2024); and
- EPA Geoportal (EPA 2024).

Aquifer categories, as defined by GSI, describe both resource potential (regionally or locally important, or poor) and groundwater flow type and attenuation potential (through fissures, karst conduits or intergranular) (GSI 2024). The aquifers are summarised as:

Regionally Important (R) Aquifers:

- Karstified bedrock (Rk);
- Fissured bedrock (Rf); and
- Extensive sand & gravel (Rg).

Locally Important (L) Aquifers:

- Sand & gravel (Lg);
- Bedrock which is Generally Moderately Productive (Lm);
- Bedrock which is karstified to a limited degree or limited area (Lk); and
- Bedrock which is Moderately Productive only in Local Zones (Ll).

Poor (P) Aquifers:

- Bedrock which is Generally Unproductive except for Local Zones (Pl); and
- Bedrock which is Generally Unproductive (Pu).

The superficial / quaternary deposits underlying the study area (till derived from limestones, gravels derived from limestone, and alluvium) have not been classified as locally important sand and gravel aquifers (Lg).

There are several bedrock aquifers underlying the study area which are associated with various bedrock geologies:

1. The Tober Colleen Formation (comprised of calcareous shale and limestone conglomerate);
2. The Malahide Formation (comprised of argillaceous bioclastic limestone and shales);
3. The Waulsortian Limestones (comprised of pale grey limestone);
4. The Lucan Formation (comprised of dark limestone and shale);
5. Rush Conglomerate Formation (comprised of limestone pebble, lithic sandstones and shale); and
6. Boston Hill Formation (comprised of muddy limestone and shale).

The Tober Colleen Formation partially underlies the east area of the study area (between the N2 National Road / M2 Motorway and Dublin Airport). This aquifer is classified as a poor bedrock aquifer which is unproductive except for local zones (Pl).

The Malahide Formation and Waulsortian Limestones are also underlying the eastern section of the study area (extending from the town of Swords to the N2 National Road at St. Margaret's). These aquifers are classified as locally important bedrock aquifer which is moderately productive only in local zones (Ll).

The entire western section of the study area is underlain by the Lucan Formation. This aquifer is considered a locally important aquifer and one which is moderately productive only in Local Zones (Ll).

North-east of the Cherryround Interchange is the Rush Conglomerate. This aquifer is considered a locally important aquifer and one which is moderately productive only in Local Zones (Ll).

At Kildonan, at the south-central study area boundary, is the Boston Hill Formation. This aquifer is considered a locally important aquifer and one which is moderately productive only in Local Zones (Ll).

The productivity of an aquifer was used, as outlined in Table 11.3, to assign receptor value. A summary of the aquifer types and their importance are presented in Table 11.19. Figure 11.9 in Volume 4 of this EIAR displays the locations of the aquifers.

Table 11.19: Summary of Aquifer Types within the Study Area

Unit Name	Aquifer Type	Importance	Location (including Approximate Chainages)
Quaternary Deposits			
Till derived from Namurian sandstones and shales	Not classified	Low	Covers furthest west section of the study area (in locality of Batterstown) (Chainages 0 – 2,140, 2,350 – 2,750, 2,850 – 4,850).
Gravels derived from limestones	Not classified	Low	Small sections bordering alluvium between Chainages 15,390 – 16,150, 16,175 – 16,275, 26,060 – 26,410, 31,975 – 33,080.
Alluvium	Not classified	Low	Underlying the River Tolka, Pinkeen, Ward and Mayne and their tributaries, as well as a tributary of the River Santry (Chainages 2,140 – 2,350, 10,71600 – 10,87760, 12,560 – 12,660, 12,715 – 13,000, 13,075 –13,190, 16,150 – 16,175, 18,010 – 18,060, 19,045 – 19,150, 31,245 – 31,255).
Till derived from limestone	Not classified	Low	Covers the majority of the Proposed Development study area (Chainages 4,850 – 10,710, 10,870 – 12,560, 12,660 – 13,020, 13,200 – 15,350, 16,300 – 18,000, 18,075 – 19,000, 19,150 – 21,800, 21,900 – 22,050, 22,100 – 22,200, 22,400 – 25,700, 26,450 – 29,350, 29,550 – 30,450, 30,550 – 30,600, 30,900 – 31,200, 31,300 – 31,950, 33,100 – 37,253).
Lacustrine sediments	Not classified	Low	Chainage 2,750 – 2,850.
Bedrock			
Tober Colleen Formation	Poor Aquifer- bedrock which is generally unproductive except for local zones (Pl)	Low	This bedrock geology can be found at the north-eastern boundary of the study area to the east of Swords near Dublin Airport and to the west of Swords. The bedrock transects the study area from north-east, extending south-west beyond the N2 National Road (Chainages 26,145 – 28,315, 31,260 – 31,420, 33,580 – 35,610, 36,880 – 37,253).
Malahide Formation	Locally important aquifer – bedrock which is moderately productive only in local zones (Ll)	Medium	Found in the eastern extent of the study area between Swords at the north-east to the N2 National Road to the south-west of St. Margaret's (Chainages 28,315 – 31,260, 31,420 – 33,075).
Waulsortian Limestones	Locally important aquifer- bedrock which is moderately productive only in local zones (Ll)	Medium	This limestone is scarce and sparse across the study area and the proposed cable route will pass through it at one location (west of Junction 2 of the M1 Motorway (Dublin Airport) (Chainage 33,075 – 33,580).
Lucan Formation	Locally important aquifer- bedrock which is moderately productive only in local zones (Ll)	Medium	Primarily at the western extent of the study area, beginning at the start of the proposed cable route, from the town of Woodland to Ward Upper/Lower on the east side of the M2 Motorway. Outcrop of the Lucan Formation is next seen south of Dublin Airport towards the end of the proposed cable route (Chainages 0 – 23,950, 24,350 – 24,410, 35,610 – 36,880).
Rush Conglomerate	Locally important aquifer- bedrock which is moderately productive only in local zones (Ll)	Medium	Mapped at the central area of the study area, north-east of the M2 Motorway and underlying much of Corrstown Golf Course (Chainages 23,950 – 24,350, 24,410 – 26,145).
Boston Hill Formation	Locally important aquifer- bedrock which is moderately productive only in local zones (Ll)	Medium	At Kildonan, south central study area boundary. Does not underly the proposed cable route.

11.3.3.1.1 Public Groundwater Abstractions and Source Protection Areas

There are a total of seven identified Uisce Éireann (formerly known as Irish Water) abstractions within the study area.

Three are adjacent to the R108 Regional Road (southside of the road), approximately 500m south of the proposed cable route (approximate Chainage 29,250 to 30,350). These are boreholes / wells located within the Fingal Zone. The wells are referred to as WAB1000478, WAB1000479, and WAB100080. Uisce Éireann have confirmed these abstraction points are currently out of service, and as such there is currently no source protection area associated with these abstractions. These are therefore not considered as receptors in this impact assessment.

The further four public water supply boreholes (PW1, PW2, PW3 and PW4) within the study area are located to the south of the River Tolka, approximately 750m east of Chainage 11,450 in Dunboyne. The boreholes are detailed in Table 11.20. Source Protection Areas are associated with these abstractions. An Inner Protection Area (SI) is 'designed to protect against the effects of human activities that might have an immediate effect on the source and, in particular, against microbial pollution', and an Outer Protection Area (SO) is the area 'encompassing the remainder of the zone of contribution to the groundwater abstraction point'. The Inner Protection Area extends approximately 800m from the abstraction source and the Outer Protection Area.

No group water schemes have been identified within the study area.

Table 11.20: Public Water Supply Wells

Abstraction ID	Pumping Rate (m^3/day)	Normal Consumption (m^3/day)	Depth of Borehole (m)	Importance	Bedrock
PW1	115	34	~60	Extremely High	Lucan Formation (dark limestone and shale)
PW2	175	145	~60	Extremely High	
PW3	655	N/A	61	Extremely High	
PW4	535	535	122	Extremely High	

Pumping rates and normal consumption rates have been taken from the GSI data (GSI 2024) and the Dunboyne Water Supply Groundwater Source Protection Zones (Wright 2004).

11.3.3.1.2 Private Groundwater Abstractions

The GSI database on Groundwater Wells and Springs (GSI 2024) indicates that there are 11 springs across the study area. The majority are located within bedrock outcrops and at geological boundaries (either change in bedrock and / or faulting).

A review of this dataset shows that there are over 60 boreholes / hand dug wells with recorded uses (i.e., domestic purposes, agricultural, industry etc.) within the study area.

The GSI database has known limitations. It is not required for private supplies to be registered with GSI and so there is the possibility of additional supplies present without being registered. The GSI record may also include historical abstractions which are no longer active. Due to the uncertainty of location and existence of these wells, the presence of them close to the Proposed Development cannot be ruled out.

However, as outlined in Chapter 3 (Consideration of Reasonable Alternatives) in Volume 2 of this EIAR, extensive consultations have been undertaken with the public for the Proposed Development. In addition, EirGrid's Agricultural Liaison Officers have met with each affected landowner several times to discuss the Proposed Development. These consultations and meetings have not identified any private supplies.

11.3.3.1.3 Karstic Features

No karstic features were identified on the GSI Groundwater Karst Data mapping within the study area (GSI 2024). It should be noted that the GSI Groundwater Karst Data has known limitations, since it is "*not a complete database*" and that "*many karst features are not included in this database*" (GSI 2024). Therefore, it is possible that there are karstic features present in the subsurface. One Karst Landform has been identified approximately 600m east of the study area (not on the proposed cable route). This is a spring known as 'St. Doolagh's Well' and emanates from the boundary between the Waulsortian Limestone and the Malahide Formation.

11.3.3.1.4 Groundwater Vulnerability

Areas of groundwater vulnerability are mapped on the GSI Groundwater Vulnerability mapping throughout the study area (GSI 2024). Groundwater vulnerability along the proposed cable route is categorised as 'rock at or near surface or karst', 'extreme', 'high', 'moderate', or 'low.' Over half the proposed cable route will be within a low vulnerability zone. There are localised areas where vulnerability is greater than extreme (classified as 'rock is at or near the surface / karstic'). The largest area where rock is at surface or karstic is at the south of the study area, near Huntstown, north of the M50 Motorway. Less than 2% of the proposed cable route will be within this vulnerability category.

The majority of the proposed cable route will avoid areas of high, extreme, and rock near surface or karst groundwater vulnerable areas, particularly in the western study area and the furthest extent to the east. In total, there are five areas where the proposed cable route will directly cross areas classified as either extremely vulnerable or rock at or near the surface / karstic. These are located at Cloghran (near the National Show Centre), Forrest Great, Newpark (south of the River Ward), Ward Lower, and Killamonan.

11.3.3.1.5 Surface Water / Groundwater Connectivity

The Proposed Development has multiple potential crossing points across multiple WFD designated river water bodies and their tributaries. For specific chainage for the crossing points (please refer to Section 12.3.4 of Chapter 12 (Hydrology)) in Volume 2 of the EIAR:

- Dunboyne Stream (tributary of River Tolka) ;
- River Pinkeen ;
- River Ward ;
- River Mayne ; and
- River Sluice.

For the most part, these watercourses are underlain by alluvium and till derived from limestone, with moderately permeable geology. It is likely that there is a degree of continuity between the rivers, groundwater within the alluvium, and groundwater within the underlying bedrock aquifers. The proposed cable route will cross the River Ward at a bedrock outcrop, which indicates that there is a strong likelihood that the river is receiving base flow from the bedrock aquifer. Therefore, the watercourses can be classed as groundwater receptors in terms of base flow.

Potential crossing points at non-WFD designated river water bodies have been identified from Ordnance Survey and Aerial Imagery and there are 34 in total (GSI 2024). The location and chainage of these are discussed in Chapter 12 (Hydrology) in Volume 2 of this EIAR. The nature of these water bodies is unknown as they are unnamed, though evident on Ordnance Survey Mapping (GSI 2024). It is likely in some instances that these water bodies are highway drainage ditches and other drainage canals (both urban and rural), and thus, ephemeral and not groundwater supplied.

11.3.3.1.6 Designations

There are no statutory designated sites or pNHAs located within the study area.

11.3.3.1.7 Groundwater Levels

Groundwater level data accessed in November 2024 from three EPA groundwater monitoring stations located near Maynooth, to the south-west of Dunboyne, indicate that groundwater levels within the limestone derived till and Lucan Formation have been between 1m to 3m below ground level in the past year. Table 11.21 provides a summary of this information (EPA 2024).

Table 11.21: Summary of Local Groundwater Level

Monitoring Well	EPA ID	Minimum Groundwater Elevation (mAOD)	Maximum Groundwater Elevation (mAOD)	Average Groundwater Elevation (mAOD)	Minimum Groundwater Level (mBGL)	Maximum Groundwater Level (mBGL)	Average Groundwater Level (mBGL)
RW1 Deep	IE_EA_G_008_1400_0021	57.7	59.0	58.5	3.08	1.78	2.28
RW1 Shallow	IE_EA_G_008_1400_0022	57.9	59.0	58.5	2.92	1.82	2.32
RW1 Transition	IE_EA_G_008_1400_0023	57.7	58.7	58.3	3.22	2.216	2.62
RW2 Deep	IE_EA_G_008_2300_0024	54.3	55.9	55.3	2.98	1.38	1.98
RW2 Shallow	IE_EA_G_008_2300_0025	54.4	55.8	55.3	2.92	1.52	2.02
RW2 Transition	IE_EA_G_008_2300_0026	54.6	55.9	55.4	2.75	1.45	1.95
RW3 Shallow	IE_EA_G_008_2300_0028	46.1	47.0	46.7	0.67	-0.23	0.07
RW3 Transition	IE_EA_G_008_2300_0029	46.1	47.0	46.7	0.97	0.07	0.37
RW3 Subsoil	IE_EA_G_008_2300_0030	43.8	45.6	44.7	3.32	1.52	2.42
Note: mAOD -metres Above Ordnance Datum, mBGL – metres Below Ground Level							

11.3.3.1.8 Groundwater Dependent Terrestrial Ecosystems (GWDTE)

Based on the Map of Irish Wetlands (Wetland Ireland Surveys 2024), artificial ponds associated with golf courses, urban drainage, and quarry / mining have been identified within the study area. These are not considered groundwater supplied, though flooded quarries have a natural groundwater component.

A Fossitt habitat survey was undertaken by Jacobs between January 2023 and August 2023 for the Proposed Development, with a 150m buffer from the proposed cable route, as presented in Chapter 10 (Biodiversity) in Volume 2 of this EIAR. This buffer is sufficient to identify potential GWDTE which could be impacted by the Proposed Development since any impact is expected to be localised.

Following this survey, nine potential GWDTEs were identified; seven as 'GS4' - Wet Grassland, one as 'WN5' - Riparian Woodland, and one as 'GM1' Marsh'. These are listed in Table 11.22 and shown on Figure 11.10 in Volume 4 of this EIAR. (Note, in Chapter 10 (Biodiversity) in Volume 2 of this EIAR, the ecosystems have been discussed as a group where they are in close proximity. For the purposes of this Chapter, they are discussed individually).

Table 11.22: Potential GWDTEs Within the Study Area

Feature	Description	Location and Approximate Chainage	Importance	Superficial Geology
1	Wet grassland	Chainage 2,200 – 2,650 1.6km south of Woodland Substation between Ballymaglassan and Woodcockstown.	Medium	Till derived from Namurian sandstones and shales
2	Wet grassland	Inside buffer zone (not on proposed cable route), parallel to Chainage 2,750-2,850, near Cullendragh.	Medium	Lacustrine Sediments
3	Wet grassland	Chainage 2,750 – 2,850.	Medium	Lacustrine Sediments
4	Wet grassland	Inside buffer zone (not on proposed cable route), east of Chainage 2,900 in Culcommon.	Medium	Till derived from Namurian sandstones and shales / Lacustrine Sediments
5	Wet grassland	Inside buffer zone (not on proposed cable route), south of Chainage 4,100 – 4,200 in Barstown.	Medium	Till derived from Namurian sandstones and shales
6	Wet grassland	Chainage 26,200 – 26,250, between Newpark and Corrstown.	Medium	Bedrock Outcrop
7	Wet grassland	Inside buffer zone (not on proposed cable route), north of Chainage 28,900, in Kingstown.	Medium	Till derived from limestones
8	Riparian Woodland	Inside buffer zone and extending north outside of zone. On proposed cable route at Chainage 12,500, west of Junction 5 of the M3 Motorway.	Medium	Alluvium
9	Marsh	Outside of buffer zone (50m east of the proposed cable route at Chainage 22,700).	Medium	Till derived from limestones

The locations of the potential GWDTEs are for the majority underlain by lacustrine sediment and / or till derived from Namurian sandstones and shales which can be fine grained dark grey clay and silt. The lacustrine sediment and till overlies the Lucan Formation (limestone bedrock). At Feature 6, there are no mapped deposits, but rather a bedrock outcrop of the Rush Conglomerate Formation and Feature 7 is underlain by Till derived from limestone. In the absence of groundwater level information for this area, it is likely that any near surface saturation is derived from shallow groundwater, potentially perched, within the more permeable lenses of the superficial deposits. In the case of Feature 6, desk-based information does not indicate any superficial deposits being present. However, this has not been verified in-situ. It is therefore unclear whether the wet grassland is fed by ponding surface water or shallow groundwater (or a combination of both).

The proposed cable route will intercept the eastern most edge of Features 1 and 3 and will clip the northern point of Feature 6. Construction activities are expected to occur within a portion of these wet grasslands. The proposed cable route will also intercept the southern part of Feature 8 (riparian woodland).

11.3.3.1.9 WFD Groundwater Bodies

There are four WFD groundwater bodies within the study area. Details of these groundwater bodies are summarised in Table 11.23, their status is presented in Table 11.24, and their locations are displayed in Figure 11.11 in Volume 4 of this EIAR.

Table 11.23: Status of WFD Groundwater Bodies within the Study Area

Unit Name	Description	Location and Approximate Chainage
Swords (IE_EA_G_011)	Poorly productive bedrock	North central portion of the study area extending from St. Margaret's to Swords (Chainage 2,300 – 31,800).
Dublin (IE_EA_G_008)	Poorly productive bedrock	The western portion of study area, south central area, and eastern portion of study area extending beyond Dublin Airport (Chainages 750 – 23,200, and 34,100 – 37,253).
Industrial Facility (P0480-02) (IE_EA_G_086)	Poorly productive bedrock	Majority of Dublin Airport (runway, shops etc.) (Chainage 32,100 – 34,100).
Dunshaughlin (IE_EA_G_031)	Productive fissured bedrock	North-western boundary of the study area, and along the initial Chainage 0-750.

Table 11.24: Status of WFD Groundwater Bodies

WFD Groundwater Body	Overall Status (2016-2021)	Quantitative Status (2016-2021)	Chemical Status (2016-2021)
Swords (IE_EA_G_011)	Good	Good	Good
Dublin (IE_EA_G_008)	Good	Good	Good
Industrial Facility (P0480-02) (IE_EA_G_086)	Poor	Good	Poor
Dunshaughlin (IE_EA_G_031)	Good	Good	Good

The Dublin, Swords, and Dunshaughlin WFD groundwater bodies have good overall status and good quantitative and chemical status (EPA 2024). The Industrial Facility WFD groundwater body (P0480-02) (IE_EA_G_086) has poor overall status, with good quantitative status but poor chemical groundwater status.

11.3.4 Ground Investigation

A ground investigation was undertaken along the proposed cable route. The ground investigation was undertaken by Causeway Geotech Ltd. on behalf of EirGrid, with site works carried out between 10 July 2023 to 29 September 2023.

11.3.4.1 Ground Investigation Scope

In summary the ground investigation comprised the following:

- 71 boreholes:
  - 19 light cable percussion boreholes;
  - 12 boreholes by light cable percussive extended by rotary follow-on drilling;
  - Seven boreholes by rotary drilling; and
  - 33 boreholes by dynamic (windowless) sampling.

- Standpipe groundwater monitoring installations in 15 boreholes; and
- 10 inspection pits (two hand dug pits and eight machine dug pits).

Selected samples were submitted for a suite of geotechnical and chemical testing. The samples selected for chemical testing were variably submitted for the following analysis suite:

- Metals;
- Speciated total petroleum hydrocarbons (TPH);
- Speciated polycyclic aromatic hydrocarbons (PAH);
- BTEX compounds;
- Volatile Organic Compounds (VOCs);
- Polychlorinated biphenyls (PCBs);
- Phenols;
- Organic matter;
- Total Organic Carbon (TOC);
- Cyanides;
- Asbestos screen;
- Sulphate and sulphide;
- Sulphur;
- pH; and
- Waste acceptance criteria (WAC).

The laboratory test certificates from the Causeway Geotech Ltd. ground investigation are attached as Appendix A11.2 in Volume 3 of this EIAR.

11.3.4.2 Encountered Geology

Based on review of the 2023 ground investigation data along the proposed new cable route, the geological strata encountered is summarised in the sections below.

11.3.4.2.1 Topsoil

Topsoil was encountered in 70 exploratory hole locations ranging in thickness from 0.1m to 0.5m.

11.3.4.2.2 Made Ground

Made ground / possible made ground was encountered in isolated locations in 12 of the exploratory holes, ranging in thickness (including topsoil where present above the made ground) from 0.3m to 1m.

The made ground was generally described as consisting of reworked sandy gravelly clay or gravelly sand or silty sandy gravel fill. One exploratory hole location also recorded concrete and brick fragments.

11.3.4.2.3 Superficial Geology

Superficial quaternary deposits were identified in exploratory holes underlying the entire Proposed Development. The superficial quaternary deposits primarily consist of sandy gravelly clay, typically soft to firm in upper horizons, becoming very stiff with increasing depth, frequently with low cobble content and with occasional sand and gravel horizons.

No peat was identified in exploratory holes along the proposed cable route.

Given the above, the superficial deposits identified by the ground investigation are generally in accordance with the published geological information presented previously.

11.3.4.2.4 Bedrock Geology

Bedrock was encountered in 11 boreholes, while possible bedrock was identified in a further 24 exploratory holes. The depth to the bedrock ranged from 1.4m bgl to 11.02m bgl (with possible bedrock encountered at 1.3m at one location (BHB37 at Chainage 23,400).

Given the above, bedrock may be encountered at variable depths along the entire proposed cable route.

The bedrock predominantly comprises strong dark grey limestone interbedded with weak dark grey mudstone and no karstic features were identified. The bedrock encountered is generally in accordance with the published geological information presented in Section 11.3.2.3. However, given the spacing of exploratory hole locations, the presence of karstic features cannot be entirely ruled out.

11.3.4.2.5 Hydrogeology

During drilling / excavation groundwater strikes were recorded in nine locations ranging in depth from 1.3m bgl to 2.8m bgl.

Causeway Geotech Ltd. monitored 13 boreholes between 24 August 2023 and 4 October 2023. The recorded groundwater levels range in depth from 0.05m bgl to 3.95m bgl. Given the positioning of the borehole response zones, the data indicates that groundwater is present within the bedrock, and superficial gravels.

Generally, given the lack of groundwater strikes and their depth, shallow excavations (<1.5m bgl) proposed for the majority of the proposed cable route may not encounter groundwater. However, the data also shows that there may be localised areas of shallower groundwater in which shallower excavations may encounter groundwater.

It should, however, be noted that interpretation of the data presented here is a summary of ground investigation data and also that there are limitations due to the following:

- A limited monitoring dataset means that there may be the potential for seasonal variations in groundwater depths not identified to-date;
- The GI monitoring distribution network means that areas of shallower groundwater conditions may not be recorded;
- Limitations inherent in the exploratory hole construction techniques used means full characterisation of the groundwater regime may not be possible, for example due to:
  - The use of casing in supporting the borehole walls during drilling may seal out groundwater strikes;
  - The use of water to aid drilling may mean groundwater is not always identified, especially the case with water flush, as used in rotary; and
  - The placement of response zones within groundwater monitoring installations may not target all water bearing zones.

11.3.4.3 Chemical Testing Data

In order to provide an assessment of potential risks to human health and water environment receptors from the soils within the study area, an assessment of the soil chemical testing data generated by the ground investigation carried out in 2023 has been undertaken. The assessment was completed by comparison of the chemical testing data against appropriate generic screening criteria, selected in accordance with the Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013), as detailed below.

11.3.4.3.1 Human Health Assessment Methodology

Soils chemical testing data from the 2023 ground investigation for relevant substances were directly compared to published Human Health Assessment Criteria (HHAC) derived in accordance with the EPA guidance (EPA 2013), HHAC have been derived for a range of land uses. While no land use directly represents this Proposed Development, it is considered that the Public Open Space (park) land use will facilitate an appropriate assessment of long-term risks to human health receptors (future site users). This also provides an indication (albeit conservative) of the potential risk posed to construction workers. Assessment of human health risks from asbestos within soils was undertaken via screening of all soil samples for the presence of asbestos.

11.3.4.3.2 Human Health Results Assessment

Based on the lack of made ground (indicative of potential contamination) identified by the ground investigation described within the study area above, contamination representing a risk to human health is considered unlikely. This is confirmed by the chemical testing, whereby contaminants indicative of potential anthropogenic contamination (e.g., hydrocarbons, heavy metals, polychlorinated biphenyl compounds) have not been detected or if so at only very low concentrations, below the HHAC. A notable exception to this was the presence of asbestos (chrysotile present in fibre bundles) recorded in a sample taken at 0.5m bgl from made ground at WS42, Chainage 15,750 near Stokestown. It is noted that the presence of asbestos in this sample was at a level below the laboratory detection limit. Nonetheless, the identified presence of asbestos at this location could pose a risk to construction workers (and third-party residents) through inhalation of fibres.

In addition, a sample taken at 1m bgl from BHB56 around Chainage 33,400 near Cloghran, was found to contain an elevated pH level (11.9) for which there is no HHAC available. However, this pH level is most likely related to concrete which was recorded in this borehole and is therefore considered unlikely to pose a risk to human health (construction workers).

11.3.4.3.3 Water Environment Assessment Methodology

The assessment of potential risks from on-site soils to water receptors has been undertaken by comparing the results of the soil leachate testing from the 2023 ground investigation, with Controlled Waters Screening Criteria (CWSC). The results are compared against two criteria selected in accordance with Towards Setting Guideline Values For The Protection Of Groundwater In Ireland (EPA 2003) and Groundwater Threshold Values (GTVs) set out in S.I. No. 366 /2016 - European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016). The adopted CWSC provides a conservative assessment of the potential risks to water receptors from the site soils.

11.3.4.3.4 Water Environment Results Assessment

A summary of the relevant determinants and samples which exceed either of the CWSC is presented in Table 11.25.

Table 11.25: Summary Results for Substances Exceeding the CWSC

Analyte	Unit	Interim Guideline Values	Groundwater Threshold Values	Number of Results	Number Exceeding Interim Guideline Values	Number Exceeding Groundwater Threshold Values	Maximum Concentra-tion	Location of Max Concentrati-on
Cadmium	µg/l (micrograms per litre)	5	3.75	43	1	1	5.9	0.5m bgl WS75 at approximate Chainage 29,500 near Dublin Airport

As shown on Table 11.25, only a single sample has been identified with a concentration greater than the CWSC for cadmium. Given the following, the sampled soils are not considered to represent a risk to the water environment:

- The inherent conservatism in comparing leachate testing directly with the CWSC, especially given the slight exceedance of the thresholds for cadmium; and
- While the strata from which the sample was taken comprised made ground, no evidence of contamination was recorded. In addition, a further sample retrieved from this location at 1m bgl did not contain a similar slightly elevated level of cadmium.

11.3.4.3.5 Chemical Testing Results Assessment Summary

Assessment of potential risks to human health and the water environment by comparison of the chemical testing with HHAC and CWSC have confirmed that risks from site soils are likely to be low. Isolated exceedance of the HHAC and CWSC were identified in three instances. In two of the three instances (elevated pH in soil from BHB56 at Chainage 33,400 and elevated cadmium in water from WS75 at Chainage 29,500), these results were not considered to represent a viable risk, or warrant specific mitigation. However, the identified presence of asbestos (chrysotile present in fibre bundles) in shallow soils at one location could pose an unacceptable risk to human health (construction workers and third-party residents) through inhalation of fibres, and therefore, mitigation will be implemented as described in Section 11.5.1.

11.4 Potential Impacts

11.4.1 Introduction

Both the Construction and Operational Phases have the potential to affect soils, geology and hydrogeology. These potential impacts are discussed for each attribute within this Section, considering embedded design measures for the Proposed Development design. Any additional mitigation that may be required beyond embedded design measures, including any additional monitoring requirements, are discussed in Section 11.5.

The design details including embedded design measures may be found in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. It is noted that vegetation and topsoil stripping will be required to facilitate the construction of the proposed cable trench, TCC / HDD Compound areas and any temporary Passing Bays. Additionally, for off-road sections of the Proposed Development a 30m wide temporary working strip is proposed which will also require vegetation and topsoil stripping.

11.4.2 'Do Nothing' Scenario

In the Do Nothing scenario, the Proposed Development would not be implemented and there would be no resulting impacts on the soils, geology and hydrogeology as a result of the Proposed Development. The impact would therefore be Neutral.

11.4.3 Construction Phase

11.4.3.1 Land Use

At the off-road locations, the land required to install the proposed cable route will be unavailable to the landowner throughout from initial fencing-off to the reinstatement of the land and fence removal. In addition, there will be disruption to land use from trenching for cable installation, temporary storage of excavated materials and change of land use at the TCCs and HDD Compounds. Restoration works will be carried out to restore the land back to pre-construction conditions, excluding permanent Joint Bays and permanent access tracks.

Such temporary and permanent losses of agricultural land are considered in Chapter 15 (Agronomy and Equine) in Volume 2 of this EIAR, while effects on soils are considered in Section 11.4.3.2.

11.4.3.2 Soils

Disruption to underground soils during excavation could impact the soil's physical, chemical and biological characteristics. Soils may be impacted by the following activities during the Construction Phase:

- **Loss of soil cover:** Loss of soil cover from fields affected by construction of the Proposed Development, also leading to loss of agricultural land;
- **Soil sealing:** Covering of the soil surface with an impermeable material or urban development on areas of natural undisturbed land (IEMA 2022). Depending on the degree, soil sealing reduces natural soil functions and ecosystem services within the area concerned. Soil sealing can impact biodiversity and agricultural land;
- **Soil compaction:** Soil compaction can lead to permanent loss / reduction in one or more soil functions. Soil compaction can occur through creation of access tracks outside areas of excavation and construction, plant movements, grading of stockpiles and handling / reinstatement of soils;
- **Soil erosion:** Soil erosion comprises the displacement of the upper horizon of the soil which can lead to soil mass loss, loss of soil structure, changes in chemistry and mobilisation of sediment; and
- **Degradation in chemical or organic quality:** All the above processes can result in degradation in soil quality especially from stripping, storage and reinstatement of soils during construction.

Approximately 26km of the proposed cable route will be constructed in the public road, and approximately 11.5km in private land. As the majority (70%) of the proposed cable trench will be constructed in the public road, this will limit the extent of adjacent agricultural land affected by trenching. Notable exceptions will include off-road sections such as in the areas of Batterstown, Gallanstown, Kingstown and east of the M1 Motorway. Given that the effects on the soils will be highly localised, a small adverse magnitude of impact has been assigned. Given the low to medium baseline sensitivity of the soils, the significance of impact is assessed as Slight.

11.4.3.3 Geomorphology

Geomorphological features such as mega-glacial lineations, glaciofluvial terraces and a composite thrust block moraine, have been identified in the study area. Construction work will result in a permanent loss of part of these features where it will intersect with surface works. As such, the magnitude of impacts can be considered to be small adverse. This feature does not have any designation and is considered to have a low sensitivity. The significance of impact is assessed Imperceptible.

11.4.3.4 Superficial Geology

The superficial geological deposits within the study area comprise till from Namurian sandstones, till from limestone, gravels from limestones, pockets of alluvial sediments and lacustrine sediments. These superficial deposits have been assigned a low sensitivity. Due to the shallow depth of the trenching (up to 1.8m), large scale disturbance and excavation of superficial deposits is not planned. A small adverse magnitude of impact is likely, and in considering the low sensitivity of the attribute, the significance of impact is assessed as Imperceptible.

11.4.3.5 Bedrock Geology

The majority of the study area is underlain by limestone. No karstic features have been identified along the proposed cable route. However, the limestone units have the potential to contain karst features. Data regarding the ground conditions across the proposed cable route are limited, but bedrock or suspected bedrock was encountered at depths of between 1.4m bgl to 11.02m bgl, and therefore, there is the potential to encounter bedrock during construction. The excavation of any bedrock may lead to potential instabilities that may be significant, especially if karstic features are encountered. However, significant excavation of bedrock is unlikely to be required given the shallow workings.

Nowhere within the study area has been identified as being susceptible to landslides, and therefore, impacts associated with landslides and slope stability are not anticipated. Furthermore, no large-scale dewatering is proposed, and therefore, the risks of subsidence are negligible, and if they were to occur would be localised to the proposed cable route.

The bedrock geology within the study area does not have a heritage value and is not considered to have future economic value. Excavation of bedrock is unlikely to be required given the shallow workings. Based on the low sensitivity, and the small adverse magnitude of impact, the significance of impact is assessed as Imperceptible.

11.4.3.6 Current and Historic Mining Sites

Effects on mineral resources may occur where mineral reserves or resources are wholly or partly sterilised. This can be permanent or temporary, or where access to the resource is impaired. Mineral extraction identified within the study area is historic, with former historic sites (such as gravel pits) already sealed. The majority of the site is agricultural, with only small areas of urban and residential development, so mineral extraction in the future may be possible, subject to economic, planning and environmental constraints.

No current mining sites have been identified within the study area and have therefore not been assessed. The various historical mining / extraction sites may have been infilled or have some form of industrial residue and are considered under the assessment of land contamination.

Future extraction of aggregate materials has been considered based on the GSI aggregate (granular and crushed rock) potential maps. As summarised in Table 11.16 and Table 11.17, the granular and crushed rock aggregate potential varies across the Proposed Development and has been assessed as varying from Low to Medium sensitivity depending on local geology. The proposed cable route will be constructed mainly (70%)

along the public road and will take up a relatively small area of the exploitable deposits. Based on the low to medium sensitivity and the small adverse magnitude of impact, the significance of impact is assessed as Slight.

11.4.3.7 Radon and Ground Gas

Construction will involve excavation for Joint Bays, the installation of services such as road drainage, temporary construction access roads and trenching for electrical cabling. Construction activities will therefore create voids within which ground gases and radon could accumulate and present a human health risk, as well as potentially creating pathways for gas to migrate to new receptors. Hazards associated with ground gases and vapours include:

- Explosion / flammability (methane, hydrogen sulphide, VOCs / SVOCs);
- Asphyxiation (methane, carbon dioxide, carbon monoxide);
- Toxicity (carbon monoxide, hydrogen sulphide, VOCs / SVOCs); and
- Long term cancer risk (radon).

The Proposed Development will be located mainly within medium or high radon risk areas. Radon has the potential to result in chronic risks to human health and using the land contamination assessment methodology (UK EA 2023), has the potential to result in a Medium potential severity of impact classification. However, it will be noted that such classification is based on assessment of surface buildings over the long term rather than a detailed classification of specific geological units and assessment of short-term risks to construction workers. During construction, excavations will be formed. However, occupation of these will be temporary. As such the likelihood of a risk being realised is generally considered to be of low likelihood or unlikely. The potential risks from radon during construction are summarised in Table 11.26.

Table 11.26: Summary of Potential Impacts from Radon During Construction

Radon Potential	Location (Approximate Chainage)	Severity	Likelihood	Risk
Medium	Chainages 0 to 4,650, 11,600, 15,400 to 15,800, 21,100 to 21,850, 23,850 to 24,000, 25,350 to 25,600, 29,150 to 29,700, 30,350 to 31,050 and 33,150 to 33,600	Medium	Unlikely	Low
High	Chainages 26,250 to 36,400, 29,300 to 29,400 and 30,900 to 31,000	High	Unlikely	Moderate/Low

In Table 11.26, although severity and likelihood are the same for the two entries (based on the criteria within Table 11.9), the moderate / low classification for the second entry takes into account the greater radon potential in 'High' areas.

The Construction Phase activities have the potential to result in ground gases accumulating in voids or other enclosed spaces.

11.4.3.8 Contaminated Land

Construction activities have the potential to result in both adverse (e.g., exposure of construction workers to contaminants in the sub-surface) and beneficial (e.g., removal of contaminated material from site) effects on baseline land contamination conditions.

Given the largely rural setting of the Proposed Development and the results of the sampling / analysis and risk assessments presented in Section 11.3.4.3, contaminated soils are not anticipated to be encountered along the majority of the study area (see List of Sources and Screening Assessment in Table 2 in Appendix A11.1 in Volume 3 of this EIAR). However, asbestos was identified in made ground at one location which could pose a risk to human health through inhalation of fibres. Thirty-two potential sources of contamination were identified in the vicinity of the Proposed Development, although only six were on or immediately adjacent to the proposed cable route. In addition, within urban areas along the proposed cable route, there is the potential for soil contamination to be present. As such, given the spacing of exploratory hole locations and inherent uncertainty associated with environmental sampling of heterogeneous subsurface materials, there remains the potential for encountering unidentified / unforeseen contamination during construction.

As mandated by current best practice (EPA 2013; EA 2021), a preliminary CSM was developed for the Proposed Development to define the relationships between the potential contamination sources, receptors which could be affected by contamination and the exposure pathways (see Table 1 in Appendix A11.1 in Volume 3 of this EIAR).

The preliminary CSM has been updated based on baseline conditions and qualitative assessment of potential risks for the Construction Phase, as summarised in Table 11.27. The likelihood of risk being realised is not uniform across the alignment. The updated CSM is presented on the basis of a precautionary approach, whereby each potential pollutant linkage is classified on the basis of the highest risk across the entire alignment (see updated CSM Table 3 in Appendix A11.1 of Volume 3 of this EIAR).

Table 11.27: Summary of Construction Phase Impacts from Land Contamination

Source	Receptor	Pathway	Pollutant Linkage (PL)	Severity	Likelihood	Risk
Contaminants within soil and groundwater	Human health (construction workers)	Dermal contact, ingestion and inhalation of impacted soil, dust, fibres (asbestos) and waters.	PL1	Medium	Likely	Moderate
		Migration of ground gases and vapours to shallow pits or enclosed spaces.	PL2	Medium	Low Likelihood	Moderate/ Low
	Human health (adjacent residents / workers, transient foot traffic)	Dermal contact, ingestion and inhalation of windblown soil, dust, fibres (asbestos) during construction.	PL3	Medium	Low Likelihood	Moderate/ Low
		Migration of ground gases into homes or workplaces via preferential pathways during construction.	PL4	Medium	Low Likelihood	Moderate/ Low
	Property	Direct contact with sub-surface materials including made ground.	PL13	Mild	Likely	Moderate/ Low
		Migration of ground gases into property through preferential pathways posing a potential explosion risk from ignition of explosive gases.	PL14	Mild	Unlikely	Negligible

11.4.3.9 Summary of Potential Impacts on Soil and Geological Receptors During Construction

The potential Construction Phase impacts are summarised in Table 11.28.

Table 11.28: Summary of Potential Impacts on Soils and Geological Receptors During Construction

Receptor	Importance	Magnitude of Impact	Significance of Impact
Soils			
Soils (including agricultural)	Medium	Small Adverse	Moderate / Slight
Geomorphology			
Geomorphology	Low	Small Adverse	Imperceptible
Superficial Geology			
Till derived from Namurian sandstones and shales	Low	Small Adverse	Imperceptible
Gravels derived from limestones			
Alluvium			
Till derived from limestones			
Lacustrine Sediments			
Bedrock Geology			
Waulsortian Limestone	Low	Small Adverse	Imperceptible
Lucan Formation			
Rush Conglomerate			
Boston Hill Formation			
Current and Historic Mining Sites			
Granular aggregate potential	Low	Small Adverse	Imperceptible
Crushed rock aggregate potential	Low	Small Adverse	Imperceptible
Contaminated Land and Ground Gas			
Refer to Section11.4.3.7 and Section 11.4.3.8			

11.4.3.10 Hydrogeology

11.4.3.10.1 Proposed Cable Route

Vegetation and topsoil stripping is required for the proposed cable trench, temporary Passing Bays, TCCs and HDD Compounds. For the off-road sections temporary working strips (including construction access tracks) will also require vegetation removal and topsoil stripping.

Changes to groundwater quality from the removal of vegetation and disturbance of ground have the potential to lead to increased suspended solid concentrations in the groundwater. In addition to this, the open trench required for the proposed cable route have the potential to create new pathways from the surface into shallow aquifer units impacting groundwater quality. These direct impacts to groundwater have the potential to lead to secondary impacts and affect the quality of groundwater discharging to surface waters. However, due to the filtering effect of the unsaturated zone and aquifer material, suspended solids would not migrate to any substantial extent in poorly productive bedrock and would attenuate relatively quickly in the locally important aquifers and potential impacts would be negligible at an aquifer scale. The significance of impact is assessed as Imperceptible.

For aquifers with fracture flow, and particularly for flow in aquifers with karstic features, suspended solids can move considerable distances and rapidly. However, no aquifer units within the study area have been described as karstified. Also, the proposed cable route will avoid most areas of high, extreme, and rock near surface or karst groundwater vulnerable areas (see Section 11.3.3.1.4). As a result, potential magnitude of impacts on groundwater quality are expected to be negligible to small adverse at the scale of the aquifer.

Aquifers underlying the study area are of low to medium importance, and therefore, the significance of impact is assessed as Imperceptible.

Contamination may also be introduced to groundwater through leaks and spillages, or from structures associated with the Proposed Development acting as a preferential pathway for contaminant transport. This would result in potential moderate adverse impact on superficial deposits and a small adverse magnitude of impact on bedrock aquifers. Taking into account the potential of superficial deposits to attenuate contamination, this would result in a significance of impact of Slight to Imperceptible, depending on sensitivities across all aquifer units.

Due to the shallow depths of the trenching (up to 1.8m) across the proposed cable route, work is generally not expected to occur below the water table. However, there is the potential for localised dewatering if groundwater levels are shallow at any point along the proposed cable route in superficial deposits. This would result in a negligible magnitude of impact at the scale of the superficial deposit aquifer. Therefore, the significance of impact is assessed as Imperceptible.

No impact would be expected on bedrock groundwater flows as the proposed cable route will not be constructed into the bedrock and so will not cause an obstruction to flow.

The proposed cable route will intercept the Inner Protection Area of Dunboyne Public Water Supply between Chainage 10,950 and 12,100. The foremost threat to the Dunboyne Public Water Supply is microbiological contamination from farming, septic tanks, and the water quality in the River Tolka upstream of the supply. The excavation of the till derived limestone along the cable route could mobilise pollutants (any legacy rural contamination, hydrocarbons from the tarmac / road, and fuels / oil spills from machinery on-site) and lead to the release of contaminated waters to the nearby upstream tributaries of the Tolka. The pathway to the bedrock aquifer would also be reduced due to the excavation increasing aquifer vulnerability. This has the potential to lead to a small adverse magnitude of impact locally to the underlying aquifer, and thus, adverse impacts to the water quality in the Dunboyne source. This is an extremely high importance receptor, and given a small adverse magnitude of impact, the significance of impact is assessed as Significant.

Based on the GSI wells and springs dataset, the proposed cable route will overlap the 1km buffer zone of two dug wells which are used for domestic supply. At present, the proposed cable route does not appear to intercept any springs or domestic wells. The majority of the proposed cable route (70%) will follow the existing roads (see Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR for details) and so the risk of intercepting any groundwater wells and springs is very low. This would result in a negligible magnitude of impact and the significance of impact is assessed as Imperceptible.

The potential for unknown private supplies has been assessed to be medium. This is because of the historical development in the area (See Chapter 13 (Archaeology, Architectural Heritage, and Cultural Heritage) in Volume 2 of this EIAR for further details), the absence of group water supplies / public water supplies in the majority of the study area, the agricultural nature of land, and the hydrogeological conditions that are generally suitable for productive wells, springs, and boreholes. The review of the GSI database, public consultations, and landowner meetings have reduced the possibility of finding additional private supplies but the possibility of additional supplies is included for in this assessment (see Section 11.4 and Section 11.6 of this Chapter) (GSI 2024). Mitigation measures are identified in Section 11.5.

The proposed cable route will intercept portions of four identified potential GWDTEs between Chainage 2,200 and 2,650 (Feature 1, Wet Grassland), between Chainage 2,750 and 2,850 (feature 3, wet grassland), between Chainage 26,200 and 26,250 (feature 6, wet grassland), and around Chainage 12,500 (Feature 8, Riparian Woodland). All other potential GWDTEs identified in Section 11.3.3.1.8 are outside of the proposed cable route and either within the buffer zone or adjacent to the proposed cable route. There is a risk of intercepting shallow and / or perched groundwater when the 1.5m deep trenches are excavated. There is the potential for small scale, localised dewatering. There is also the potential for a localised impact on the groundwater quality supporting these potential GWDTEs. Given the medium importance of these potential GWDTEs, with no conservation designation and a moderate adverse magnitude of impact (on both flow and quality), this is assessed as a potential Moderate impact on flow and quality in the short-term on these GWDTEs (Features 1, 3, 6 and 8, as outlined in Table 11.22).

11.4.3.10.2 Temporary Construction Compounds

The seven proposed TCCs (i.e., TCC0 to TCC6) will be located on locally important aquifers (moderately productive in local zones). The TCCs, along with topsoil stripping for construction access tracks and temporary Passing Bays have the potential to lead to a compaction effect on underlying shallow aquifer units and impact shallow groundwater levels, flows and quality locally. This has the potential to lead to small adverse impacts locally to the underlying aquifers. However, at an aquifer scale, the magnitude of impacts is assessed as negligible given the size of the aquifer compared to the working footprint. Therefore, the significance of impact is assessed as Imperceptible.

Contamination may also be introduced to groundwater through leaks and spillages, or from structures associated with the Proposed Development acting as a preferential pathway for contaminant transport. This has the potential to result in a moderate adverse magnitude of impact on superficial deposits and a small adverse magnitude of impact on bedrock aquifers, taking into account the potential of superficial deposits to attenuate contamination. This significance of impact is assessed as Slight to Imperceptible, depending on sensitivities.

No impact is expected on potential GWDTEs and identified groundwater abstractions as a result of TCCs.

The impact on private water supplies as a result of the TCCs is covered under the proposed cable route assessment due to the uncertainty in the location and number of private water supplies in the study area.

11.4.3.10.3 Horizontal Directional Drilling Compounds

HDD Compounds will be required at three locations; crossing the M3 Motorway at Junction 5, crossing the M2 Motorway at the R121 Regional Road and crossing the M1 Motorway at Junction 2.

The HDD Compounds at M3 Motorway crossing (HDD 1a and HDD 1b) and at the M2 Motorway crossing (HDD 2a and HDD 2b) will be located on locally important aquifers (moderately productive in local zones). The HDD Compounds at the M1 Motorway crossing (HDD 3a and HDD 3b) will be located on a poorly productive aquifer (Tober Colleen Formation). As for the TCCs, there is the potential for contamination to reach this aquifer. This has the potential to result in small adverse magnitudes of impacts locally to the underlying aquifers. However, at an aquifer scale, impact magnitudes are likely to be negligible given the size of the aquifer compared to the working footprint. Therefore, the significance of impact of the HDD Compounds is assessed as Imperceptible.

The HDD Compounds at M3 Motorway crossing (HDD 1a and HDD 1b) will be between approximately 550m to 700m to the north-east of the Inner Protection Area of Dunboyne Water Supply. This is also upstream of the supply and adjacent to the River Tolka. HDD activities have the potential to create a direct contaminant pathway to the aquifer and the River Tolka which both support the water supply. Drilling is proposed to take place within the superficial deposits (alluvium and till) which have moderate interstitial permeability and do not confine the bedrock aquifer. During drilling, drilling fluids will inevitably be lost to ground. HDD activities will be temporary and are unlikely to require excessive use of drilling fluids and water flushing, so is unlikely to affect the bedrock aquifer, any effects will be within the alluvium and till. The appointed contractor will be required to use biodegradable drilling fluids as part of the HDD which will reduce this risk. This has the potential to lead to small adverse magnitude impacts locally to the underlying aquifer, and thus, adverse effects to the water quality in the Dunboyne source. This is an extremely high importance receptor, and given a small adverse magnitude of impact, the significance of impact is assessed as Significant.

No substantial dewatering is expected to result from HDD activities except potentially at launch and reception sites, which may require excavation to depths equivalent to a trench. However, dewatering effects in such cases would be expected to be negligible at the scale of the aquifer. The significance of impact of HDD activities on the bedrock aquifers is therefore assessed as Imperceptible.

It is not expected that HDD activities will occur in proximity to or on groundwater wells or springs as determined from GSI mapping (GSI 2024). Due to the lack of precision in this data set, it cannot be categorically ruled out that a spring / well will not be present along the proposed cable route. The impact on private water supplies as a result of the HDD Compounds is covered under the proposed cable route assessment due to the uncertainty in the location and number of private water supplies in the study area.

HDD activities will not cross the potential GWDTE so there will be no impact to this receptor as a result of these activities.

11.4.3.10.4 Dewatering

In the locale of Clonshagh (Chainage 36,450 to 36,650), an excavation is proposed to a depth of 3 to 4m below ground level. Desk based information indicates that groundwater levels within the superficial deposits (limestone derived till) are on average 2mBGL. Therefore, dewatering may be required for this excavation to be safely constructed.

A high-level assessment of dewatering at this location has been performed with the expectation that at least 2m of groundwater drawdown will be necessary.

The radius of influence was calculated using the empirical formula of Sichardt (CIRIA 2016). Where groundwater is intercepted, a minimum radius of influence of 30m has been set (Cashman and Preene 2021).

In the absence of ground investigation information, hydraulic conductivities from literature have been used for this formula. This area is underlain by Limestone Derived Till. The hydraulic conductivity for Glacial Till can range from 10^{-4} to 10^{-12} metres per second (m/s). As the baseline geology has a noted limestone component (and not an amalgamation of clay, sand, silt, and gravel), the conductivity value used in this instance was 10^{-6}m/s which is the lower end of conductivities for limestone and dolomite but also within the range for Glacial Till (Freeze and Cherry 1979).

The radius of influence was calculated to be 12m. A 30m search was performed about this excavation to identify sensitive receptors to the dewatering:

- The excavation is within the Dublin WFD groundwater body and the Lucan Formation, classified as a locally important aquifer which is moderately protective only in local zones. The potential impact on groundwater flows at the scale of the aquifer is assessed as an Imperceptible significance of impact;
- There are no surface water features within 30m of the excavation;
- There are no known abstractions, springs, or wells within 30m of the excavation. (Note: this information is based on GSI data which is accurate to between 10m and 1km); and
- There are no statutory or designated sites within 30m of the excavation.

Where the proposed cable route will cross smaller watercourses (i.e., the tributaries of the River Pinkeen, Tolka, and Ward), open cut trenching is proposed which will require the installation of a temporary impermeable barrier to keep the working area dry. Trenching in this area is not expected to be more than 1.3m below the watercourse bed. However, if the watercourse is groundwater fed then some localised dewatering may be required in the working area to keep it dry. This has the potential to change local groundwater flows and levels in the underlying aquifers, and interrupt baseflow contributions to the watercourse resulting in a temporary, small adverse magnitude of impact at a local scale. However, at an aquifer scale any changes would be negligible. This is assessed as an Imperceptible significance of impact.

The water pumped out of the working area will be treated using settlement tanks prior to discharge back to the watercourse. However, there is potential that the water would need to be discharged to ground, for it to naturally drain back into the watercourse. This could lead to small impacts locally on groundwater quality. In addition, discharges to ground could occur from groundwater dewatering activities, either where the trench is shallow and requires dewatering prior to the installation of the proposed cables (likely areas of shallow groundwater conditions) or where dewatering is potentially required at trenchless crossings . This has the potential to lead to small impacts locally on groundwater quality. Given the low / moderate importance of the bedrock aquifers, the significance of impact as a result of impacted groundwater quality is assessed as Imperceptible to Slight.

At the time of writing, it is not expected that dewatering activities will occur in proximity to or on groundwater wells or springs as determined from GSI mapping (GSI 2024). Due to the lack of precision in this data set, it cannot be categorically ruled out that a spring / well will not be present along the proposed cable route. The impact on private water supplies as a result of the TCCs is covered under the proposed cable route assessment due to the uncertainty in the location and number of private water supplies in the study area.

None of the potential GWDTE are in the location of dewatering activities so there will be no impact to this receptor as a result of these activities.

As discussed in Section 11.3.2.10, no major contamination has been identified within the study area.

11.4.3.10.5 Summary of Potential Impacts to Groundwater Receptors During Construction

Taking into consideration the construction activities, pathways, and receptors identified, the potential significance of the impact to each receptor has been summarised in Table 11.29. These do not consider the proposed mitigation measures or the implementation of a Construction Environmental Management Plan (CEMP) which is included as a standalone document in this planning application pack.

For the majority of receptors, no measurable impact is assessed, or where there is noticeable change, there are no significant consequences. However, should there be an impact to the water quality supplying the Uisce Éireann public supply wells, the significance of impact will be Significant. The potential GWDTEs may undergo alteration in its environment as a result of the construction activities. However, this will be short-term and reversible.

Table 11.29: Summary of Potential Impacts to Groundwater Receptors During Construction

Receptor	Parameter	Importance	Magnitude of Impact	Significance of Impact
Uisce Éireann Public Supply Wells	Groundwater Flow	Extremely High	Negligible	Imperceptible
	Groundwater Quality	Extremely High	Small Adverse	Significant
Private Water Supplies from GSI dataset	Groundwater Flow	Medium	Negligible	Imperceptible
	Groundwater Quality	Medium	Negligible	Imperceptible
Unknown Private Water Supplies	Groundwater Flow	Medium	Large Adverse	Significant
	Groundwater Quality	Medium	Large Adverse	Significant
Potential GWDTEs	Groundwater Flow	Medium	Moderate Adverse	Moderate

Receptor	Parameter	Importance	Magnitude of Impact	Significance of Impact
	Groundwater Quality	Medium	Moderate Adverse	Moderate
Tober Colleen Formation	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Small Adverse	Imperceptible
Malahide Formation	Groundwater Flow	Medium	Small Adverse	Slight
	Groundwater Quality	Medium	Small Adverse	Slight
Waulsortian Limestone	Groundwater Flow	Medium	Small Adverse	Slight
	Groundwater Quality	Medium	Small Adverse	Slight
Lucan Formation	Groundwater Flow	Medium	Small Adverse	Slight
	Groundwater Quality	Medium	Small Adverse	Slight
Rush Conglomerate	Groundwater Flow	Medium	Small Adverse	Slight
	Groundwater Quality	Medium	Small Adverse	Slight
Boston Hill Formation	Groundwater Flow	Medium	Small Adverse	Slight
	Groundwater Quality	Medium	Small Adverse	Slight
Till derived from Namurian sandstones and shales	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Moderate Adverse	Slight
Gravels derived from limestones	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Moderate Adverse	Slight
Alluvium	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Moderate Adverse	Slight
Till derived from limestone	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Moderate Adverse	Slight
Lacustrine Sediments	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Moderate Adverse	Slight

11.4.3.10.6 WFD Groundwater Screening Assessment

The groundwater WFD assessment is summarised in Table 11.30. Only elements scoped in (as detailed in Section 11.3.3.1.9) have been assessed.

In general, the scale of the Proposed Development relative to the size of the groundwater bodies as a whole is very small, as can be seen in Figure 11.11 in Volume 4 of this EIAR. Therefore, no significant impacts are anticipated to the WFD groundwater bodies, in terms of water quality and flow. This is evidenced also by the Imperceptible / Slight significance of impact assessed for the aquifers (see Table 11.30) which the groundwater bodies flow through. As a result, the Proposed Development will not cause deterioration of the WFD status of any groundwater body either quantitatively or qualitatively or jeopardise the ability of such groundwater bodies to achieve such status.

Table 11.30: Impact Assessment for WFD Groundwater Bodies

Proposed Activity	WFD Groundwater Body	Water Balance (Quantitative)	GWDTE Test (Quantitative)	Impact of Groundwater on Surface Water Ecological / Quantitative Status Test	Drinking Water Protected Area (Chemical)	General Chemical Test	GWDTE Test (Chemical)	Impact of Groundwater on Surface Water Ecological / Chemical Status Test
Cable route trenching and HDD	Swords (IE_EA_G_011)	Trenching is expected to be to depth <1.8m. Therefore, minor dewatering may be required for the proposed cable route where groundwater is shallow. However, any changes would be short-lived and negligible on a groundwater body scale. Therefore, there is no potential for significant change to water balance.	Two potential GWDTEs were identified within this groundwater body. However, these are not part of designated / protected sites. Therefore, these do not hold a WFD status.	The proposed cable route will cross tributaries of the River Ward at multiple locations. The River Ward (Ward_003) is within the Swords groundwater body. Minor dewatering may be required for the proposed cable route where groundwater is low. Any dewatering has the potential to indirectly lower water levels the underlying aquifer if the watercourse is in hydraulic continuity with the aquifer, and vice versa. However, this impact is likely to be localised and minimal and insignificant at the scale of the groundwater body and surface water receptor. Therefore, no impact is expected.	Based on information available, no private active abstractions have been identified within this groundwater body. Due to the uncertainty and incompleteness of the data it is unknown if any other active abstractions lie within the footprint of the proposed cable route within this groundwater body.	There are potential risks of mobilising suspended solids and spillage incidents to generate contamination that could infiltrate into groundwater. Mitigation measures are required (refer to Section 11.5) to protect the aquifers.	Two potential GWDTEs were identified within this groundwater body. However, these are not part of designated / protected sites. Therefore, these do not hold a WFD status.	Small / minor changes to groundwater quality anticipated. Therefore, at a groundwater body scale there would be limited to no change in quality status.
	Dublin (IE_EA_G_008)		Seven potential GWDTEs were identified within this groundwater body. However, these are not part of designated / protected sites. Therefore, these do not hold a WFD status.	The proposed cable route will cross the Dunboyne Stream, a tributary of the River Tolka, and River Pinkeen (watercourses within the Dublin groundwater body). Any dewatering could indirectly lower water levels in underlying aquifer if the watercourses are in hydraulic continuity with the aquifer, and vice versa. However, this impact is likely to be localised and minimal and insignificant at the scale of the groundwater body and surface water receptor. Therefore, no impact is expected on WFD status.	The proposed cable route will cross an Inner Source Protection Zone associated with Uisce Éireann abstractions (Dunboyne PWS). Potential impact on this extremely high important receptor cannot be ruled out and additional mitigation measures are required (refer to Section 11.5). Based on available Information on private groundwater abstractions / springs at this stage, two abstractions have been identified. Due to the uncertainty and incompleteness of the data, it is unknown if any other active abstractions lie within the footprint of the proposed cable route or in the wider study area.		Seven potential GWDTEs was identified within this groundwater body. Two of these are on the cable route. However these are not part of designated / protected sites. Therefore, these do not hold a WFD status.	
	Industrial Facilities (P0480-02) (IE_EA_G_086)		No potential GWDTEs were identified within these groundwater bodies. Therefore, no change to quantitative status is anticipated.	The Sluice_010 watercourse is located on the boundary of this groundwater body and is approximately 125m north of the proposed cable route at its closest point. However, any dewatering is not expected to cause a drawdown beyond 30m. Therefore, no changes to the quantitative status are anticipated.	Based on available Information on private groundwater abstractions / springs at this stage, no active abstractions have been identified within this groundwater body. Due to the uncertainty and incompleteness of the data it is unknown if any other active abstractions lie within the footprint of the proposed cable route within this groundwater body.		No potential GWDTEs were identified within this groundwater body. Therefore, no change to qualitative status is anticipated.	
	Dunshaughlin (IE_EA_G_031)			The Tolka_020 watercourse is within this groundwater body but is not within close proximity to the proposed cable route. Minor dewatering may be required for the proposed cable route where groundwater is shallow. Any dewatering has the potential to indirectly lower water levels in underlying aquifer if the Tolka_020 is in hydraulic continuity with the aquifer, and vice versa. However, this impact is likely to be localised and minimal and insignificant at the scale of the groundwater body and surface water receptor. Therefore, no impact is expected on WFD status.	Of the 60 GSI wells / springs, only two hand dug wells have been identified along the proposed cable route with an accuracy of 1km within this groundwater body. It is not known whether these are a drinking water supply or even active. Due to the uncertainty and incompleteness of the data it is unknown if any other active abstractions lie within the footprint of the proposed cable route or in the wider study area.			

Proposed Activity	WFD Groundwater Body	Water Balance (Quantitative)	GWDTE Test (Quantitative)	Impact of Groundwater on Surface Water Ecological / Quantitative Status Test	Drinking Water Protected Area (Chemical)	General Chemical Test	GWDTE Test (Chemical)	Impact of Groundwater on Surface Water Ecological / Chemical Status Test
TCC and HDD Compound Areas	Swords (IE_EA_G_011)	No significant excavations or dewatering is expected to be required for the TCCs / HDD Compounds and access routes. Therefore, there is limited to no potential for significant change to water balance.	No potential GWDTEs were identified within close proximity of the proposed works. Therefore, no change to quantitative status is anticipated.	No significant excavations or dewatering is expected to be required for the TCCs / HDD Compounds. Therefore, no impacts to baseflow to surface waters are anticipated.	Based on available Information on private groundwater abstractions / springs at this stage, no active abstractions have been identified within this groundwater body. Due to the uncertainty and incompleteness of the data, it is unknown if any other active abstractions could be present. Impacts on drinking water protected areas from this activity are unlikely to cause deterioration in water quality such that additional treatment will be required.	There are potential risks of mobilising suspended solids and spillage incidents to generate contamination that could infiltrate into groundwater. Mitigation measures are required (refer to Section 11.5) to protect the aquifers.	Two potential GWDTEs were identified within this groundwater body. However, they are not in the vicinity of the proposed TCC / HDD Compound areas, and therefore, no change to qualitative status is expected.	Small / minor changes to groundwater quality expected. Therefore, at a groundwater body scale, there would be limited to no change in quality status.
	Dublin (IE_EA_G_008)				Based on available Information on private groundwater abstractions / springs at this stage, no abstractions have been identified within this groundwater body along the route. Due to the uncertainty and incompleteness of the data, it is unknown if any other active abstractions could be present. Impacts on drinking water protected areas from this activity are unlikely to cause deterioration in water quality such that additional treatment will be required.		Seven potential GWDTEs were identified within this groundwater body. However, they are not in the vicinity of the proposed TCC / HDD Compound areas, and therefore, no impact is expected.	
	Industrial Facilities (P0480-02) (IE_EA_G_086) Dunshaughlin (IE_EA_G_031)				Of the 60 GSI wells / springs, only two hand dug wells have been identified along the proposed cable route with an accuracy of 1km within this groundwater body. It is not known whether these are a drinking water supply or even active. Due to the uncertainty and incompleteness of the data, it is unknown if any other active abstractions could be present. Impacts on drinking water protected areas from this activity are unlikely to cause deterioration in water quality such that additional treatment will be required.		No potential GWDTE were identified within this groundwater body. Therefore, no change to qualitative status is expected.	

11.4.4 Operational Phase

11.4.4.1 Land Use

All areas where vegetation removal and topsoil stripping has occurred along the proposed cable trench and for TCCs, HDD Compounds, temporary access tracks and Passing Bays will be reinstated following installation of the proposed cables. As part of the off-road sections there will be small areas of land lost for agricultural use associated with permanent access tracks for off-road Joint Bays. These permanent tracks will be located mainly on agricultural land used for pasture, which covers the majority of the study area.

During the Operational Phase the proposed cables will require routine maintenance activities along its route, requiring permanent access tracks to off-road Joint Bays. The permanent access tracks will be used to reach off-road sections of the proposed cables for maintenance access. The off-road sections will be situated within agricultural land. The assessment of agricultural land use is covered in Chapter 15 (Agronomy and Equine) in Volume 2 of this EIAR.

11.4.4.2 Soils

Activities will be limited to maintenance during the Operational Phase with no further disturbance of the ground, resulting in little or no long-term loss or degradation of remaining undisturbed soil or subsoil. The magnitude of impact is considered to be negligible and the overall significance of impact is assessed as Imperceptible.

11.4.4.3 Geomorphology

No further disruption of the ground will be required during the Operational Phase, resulting in a negligible magnitude of impact for geomorphological features within the study area. This, in turn, is assessed as an Imperceptible significance of impact on geomorphology, taking into account the low significance / sensitivity of these features.

11.4.4.4 Superficial Geology

Superficial geology will not be affected by the Proposed Development during the Operational Phase, as no further ground works will be undertaken. The magnitude of impact is considered to be negligible and the overall significance of impact is assessed as Imperceptible.

11.4.4.5 Bedrock Geology

No further disturbance or excavation of bedrock geology will occur during the Operational Phase, and therefore, no measurable alterations of bedrock conditions are expected. The magnitude of impact is assessed as negligible and the overall significance of impact is assessed as Imperceptible.

11.4.4.6 Current and Historic Mining Sites

Current mining sites are not present within the study area. No further disturbance of the ground will occur during the Operational Phase and the impact on historic mining sites is therefore assessed as negligible and the overall significance of impact is assessed as Imperceptible.

No further sterilisation of aggregate potential (both granular and crushed rock) will occur during the Operational Phase. Therefore, no further impact is assessed. The magnitude of impact is considered to be negligible and the overall significance of impact is assessed as Imperceptible.

11.4.4.7 Radon and Ground Gas

During the Operational Phase, the majority of the Proposed Development will consist of a sub-surface cable with few enclosed spaces within which radon or ground gases can accumulate. The only enclosed spaces present will comprise limited service runs within Belcamp Substation. Where these are present near to ground gas and radon sources there is the potential for gas build up. A potential risk is therefore present where maintenance workers will be required to access such places. Based on the low likelihood of such risk occurring across the whole Proposed Development, the risk to maintenance workers is considered to be Moderate / Low.

11.4.4.8 Contaminated Land

Following the Construction Phase, land contamination remaining within the Proposed Development footprint may present risks to future site workers (such as maintenance staff).

The preliminary CSM for the Operational Phase of the Proposed Development has been updated on the basis of the estimated effects on baseline conditions as presented in Section 11.3, and summarised in Appendix A11.1 in Volume 3 of this EIAR. The likelihood of a risk being realised is not uniform across the Planning Application Boundary a (as detailed in the baseline), and the updated CSM is presented on the basis of a precautionary approach, whereby each potential pollutant linkage is classified on the basis of the highest risk across the Planning Application Boundary Pollutant linkages 19 to 28 have been scoped out as they are covered in hydrogeology. The operational impacts from land contamination are summarised in Table 11.31 and the operational impacts on soil and geological receptors are summarised in Table 11.32.

Table 11.31: Summary of Potential Operational Phase Impacts from Land Contamination

Source	Receptor	Pathway	Pollutant Linkage (PL)	Severity	Likelihood	Risk
Contaminants within soil and groundwater	Human health (construction workers)	Dermal contact, ingestion and inhalation of impacted soil, dust, fibres (asbestos) and waters.	PL15	Medium	Unlikely	Low
		Migration of ground gases and vapours to shallow pits or enclosed spaces.	PL16	Medium	Low Likelihood	Moderate/ Low
	Human health (adjacent residents / workers, transient foot traffic)	Dermal contact, ingestion and inhalation of windblown soil, dust, fibres (asbestos) during construction.	PL17	Medium	Unlikely	Low
		Migration of ground gases into homes or workplaces via preferential pathways during construction.	PL18	Medium	Unlikely	Low
	Property	Direct contact with sub-surface materials including made ground.	PL29	Mild	Unlikely	Negligible
		Migration of ground gases into property through preferential pathways posing a potential explosion risk from ignition of explosive gases.	PL30	Mild	Unlikely	Negligible

Table 11.32: Summary of Potential Operational Phase Impacts on Soil and Geological Receptors

Receptor	Importance	Magnitude of Impact	Significance of Impact
Soils			
Soil	Medium	Negligible	Imperceptible
Geomorphology			
Geomorphology	Low	Negligible	Imperceptible
Superficial Geology			
Till derived from Namurian sandstones	Low	Negligible	Imperceptible
Gravels derived from limestones	Low	Negligible	Imperceptible
Alluvium	Low	Negligible	Imperceptible
Till derived from limestones	Low	Negligible	Imperceptible
Lacustrine Sediments	Low	Negligible	Imperceptible
Bedrock Geology			
Waulsortian Limestone	Low	Negligible	Imperceptible
Lucan Formation	Low	Negligible	Imperceptible
Rush Conglomerate	Low	Negligible	Imperceptible
Boston Hill Formation	Low	Negligible	Imperceptible
Current and Historical Mining Sites			
Granular aggregate potential	Low	Negligible	Imperceptible
Crushed rock aggregate potential	Low	Negligible	Imperceptible
Contaminated Land and Ground Gas			
Refer to Section 11.4.4.7 and Section 11.4.4.8			

11.4.4.9 Hydrogeology

No discharge to ground is expected during the Operational Phase.

Permanent access tracks to off-road Joint Bays have the potential to lead to compaction effects which could impact shallow groundwater levels and flows. However, at an aquifer scale these impacts are likely to be negligible to small adverse. Additionally, there is the potential of accidental leaks and spills on the access tracks during the Operational Phase which have the potential to impact groundwater quality. These would be of limited extent but have the potential to result in small adverse magnitude of impact locally and would be negligible at aquifer scale. The significance of impact is assessed as Imperceptible.

Following the Construction Phase, the backfilled trench has the potential to act as a preferential flow pathway, thereby disturbing shallow groundwater flow pattern, where shallow groundwater is present. This could in places drain an area, and in other places facilitate accumulation of shallow groundwater and create localised ponding / flooding. At the scale of the superficial aquifers, this is of no significance and would be a negligible magnitude of impact, in turn, resulting in an assessed Imperceptible significance of impact.

Four GWDTEs have been identified as being intercepted by the proposed cable route. This has the potential to form an artificial drain which could direct shallow groundwater away from the potential GWDTE causing a drying up of the grassland and dieback of vegetation. Therefore, a locally moderate adverse magnitude impact would be expected in the locale of this potential GWDTE, which is assessed as a potential Moderate significance of impact.

There may be some areas where the water table is shallow in proximity to the alluvium underlying the River Tolka and its tributaries (Dunboyne Stream) and the River Pinkeen, where small changes to flows are possible due to the presence of sub-surface structures containing the Joint Bays and the proposed cable route. The proposed cable route will cross the River Ward at a stretch of the watercourse underlain by bedrock, and therefore, small changes in water quality are possible due to operation works operating in / adjacent to an exposed bedrock aquifer (Rush Conglomerate). However, these impacts will be very localised and result in a negligible magnitude of impact on an aquifer scale. No potential impact is expected on bedrock aquifer, both in terms of flow and quality.

Table 11.33 provides a summary of potential impacts to receptors during the Operational Phase.

Table 11.33: Summary of Potential Operational Phase Impacts

Receptor	Parameter	Importance	Magnitude of Impact	Significance of Impact
Uisce Éireann Public Supply Wells	Groundwater Flow	Extremely High	Negligible	Imperceptible
	Groundwater Quality	Extremely High	Negligible	Imperceptible
Private Water Supplies from GSI dataset	Groundwater Flow	Medium	Negligible	Imperceptible
	Groundwater Quality	Medium	Negligible	Imperceptible
Unknown Private Water Supplies	Groundwater Flow	Medium	Large Adverse	Significant
	Groundwater Quality	Medium	Large Adverse	Significant
Potential GWDTE	Groundwater Flow	Medium	Moderate Adverse	Moderate
	Groundwater Quality	Medium	Negligible	Imperceptible
Tober Colleen Formation	Groundwater Flow	Low	None	N/A
	Groundwater Quality	Low	None	N/A
Malahide Formation	Groundwater Flow	Medium	None	N/A
	Groundwater Quality	Medium	None	N/A
Waulsortian Limestone	Groundwater Flow	Medium	None	N/A
	Groundwater Quality	Medium	None	N/A
Lucan Formation	Groundwater Flow	Medium	None	N/A
	Groundwater Quality	Medium	None	N/A
Rush Conglomerate	Groundwater Flow	Medium	None	N/A
	Groundwater Quality	Medium	None	N/A
Boston Hill Formation	Groundwater Flow	Medium	None	N/A
	Groundwater Quality	Medium	None	N/A
Till derived from Namurian sandstones and shales	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Small Adverse	Imperceptible
Gravels derived from limestones	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Small Adverse	Imperceptible
Alluvium	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Small Adverse	Imperceptible

Receptor	Parameter	Importance	Magnitude of Impact	Significance of Impact
Till derived from limestone	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Small Adverse	Imperceptible
Lacustrine Sediments	Groundwater Flow	Low	Small Adverse	Imperceptible
	Groundwater Quality	Low	Small Adverse	Imperceptible

11.5 Mitigation and Monitoring Measures

11.5.1 Construction Phase

The following mitigation measures will be implemented prior to the commencement and throughout the duration of the Construction Phase to limit any impacts on soils and geology:

- The results of further confirmatory ground investigations to be carried out in 2024 will be evaluated and reviewed as part of the detailed design, within the parameters of the planning application;
- The CEMP (included as a standalone document in this planning application pack) which includes good industry working practice and pollution prevention measures, with a particular focus on controlling run off and suspended solids, preventing accidental spillages, excavated material stockpile management, and ensuring safe storage of materials and product in sealed areas will be implemented;
- Topsoil stripping will be undertaken in some areas of the proposed cable route as part of constructing with the Joint Bays. A Soil Management Plan will be developed for the Proposed Development, which will include measures for segregation of soil types and to maintain soil quality during movement, stockpiling and subsequent placement;
- Risks to workers from ground gas when working within confined spaces will be mitigated through the development and adoption of an appropriate safe system of work, including the use of personal protective equipment (PPE) and Respiratory Protective Equipment (RPE) as a last resort;
- Prior to the Construction Phase commencing, appropriate health and safety and waste management procedures for working with potentially contaminated soils (including asbestos) and water will be established, including the development and adoption of safe systems of work, including the use of PPE as a last resort. With specific regard to asbestos in soils (as identified at one location) a competent asbestos specialist will develop a plan to manage risks taking into account guidance presented in Asbestos-containing Materials (ACMs) in Workplaces – Practical Guidelines on ACM Management and Abatement (Health and Safety Authority (HSA 2013), and Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction & Demolition materials: Industry Guidance (shortened name CAR-SOIL™) (CL:AIRE 2012). The plan will include the use of appropriate PPE and RPE and the carrying out of air monitoring during works at relevant locations. In addition, all staff working with soils potentially containing asbestos will be trained to identify asbestos containing material;
- To mitigate potential risks from radon migration into excavations and other enclosed spaces during the Construction Phase, an occupational monitoring programme will be implemented by the relevant contractor(s) to identify whether radon migration and build up is occurring in areas where the risk is considered to be present. The monitoring will be undertaken in accordance with the EPA Protocol for the Measurement of Radon in Homes & Workplaces (EPA 2019b). If the workplace reference level of 300Bq/m^3 is exceeded (EPA 2019a), mitigation measures will

be required during the Construction Phase, such as development of safe systems of work to ensure protection of personnel, potentially including measures such as use of PPE, RPE and working time restrictions; and

- A watching brief will be implemented to identify the potential presence of previously unidentified contamination. Personnel appointed by the appointed contractor will be appropriately trained in ground contamination identification (including Asbestos Awareness Training) if involved in earthworks activities. Any such instances of previously unidentified contamination will be recorded, the associated risks assessed, and a remedial strategy developed by the appointed contractor to manage the identified risks as appropriate.

Specifically relating to individual receptors, such as GWDTEs and groundwater abstractions, the following mitigation measures will be implemented, prior to the commencement of, and throughout the duration of the Construction Phase to limit these impacts:

- Again, the CEMP will include good industry working practice and pollution prevention measures, with a particular focus on controlling runoff and suspended solids, preventing accidental spillages, excavated material stockpile management, and ensuring safe storage of materials and product in sealed areas;
- Uisce Éireann will be further consulted during the detailed design stage regarding the Dunboyne abstractions. This will include relevant aspects of the CEMP in addition to agreeing a method statement within the final CEMP for the works in the relevant location (potentially including monitoring and reporting requirements);
- Where trenching is carried out outside of existing roads, the methodology to backfill trenches will ensure that the backfill is not creating preferential subsurface flow pathway. Soil compaction will be undertaken, and where needed on off road sections, additional clay bunds will be installed within the trench in areas that are adjacent to or in proximity to potential GWDTEs:
    - Clay bunds are proposed to be installed along the proposed cable trench, with an increased frequency between approximate Chainages 2,200 to 2,650, 2,750 to 2,850, 26,200 to 26,250, and around Chainage 12,500 in proximity of the potential GWDTEs to prevent the formation of a drainage pathway.
- Should any unknown private supplies be identified in the vicinity of the proposed cable route, the supply will be monitored and, if required, an alternative supply will be provided.

11.5.2 Operational Phase

The following mitigation measures will be implemented during the Operational Phase:

- Risks to maintenance workers from ground gas when working within confined spaces will be mitigated by the development and adoption of safe system of work, including the use of PPE and RPE as a last resort; and
- In the event that ground works are required during the Operational Phase (it is currently assumed that no further ground works will be undertaken), appropriate health and safety and waste management procedures for working with potentially contaminated soils (including asbestos) and water will be established by the relevant appointed contractor, prior to such works commencing, such as the development and adoption of safe systems of work including the use of PPE as a last resort.

11.6 Residual Impacts

11.6.1 Construction Phase

The predicted residual impacts are expected to range from Imperceptible to Slight during the Construction Phase, following the implementation of the mitigation measures. A summary of the predicted residual impacts as a result of the Construction Phase is outlined in Table 11.34.

Table 11.34: Predicted Residual Impacts on Soil and Geological Receptors Post Mitigation – Construction Phase

Receptor	Impact Summary	Pre-Mitigation Summary			Post-Mitigation (Residual Impacts)	
		Importance	Magnitude	Significance	Magnitude of Impact	Significance
Soils	Loss of cover, sealing, compaction, erosion and degradation	Medium	Small Adverse	Moderate / Slight	Negligible	Slight
Geomorphology	Loss of features during construction	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
Superficial Geology	Extraction of resources during shallow excavation	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
Bedrock Geology	Potential for unmapped solution	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
Granular and Crushed rock aggregate potential	Sterilisation of resources	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
Contaminated Land and Ground Gas (The method of assessment for these attributes varies from the standard impact assessment (as described in Section 11.2.4.1.4))						
Attribute	**Impact Summary**	**Post-Mitigation Summary**				
		Importance	**Magnitude**	**Significance**		
Human Health (construction workers)	Dermal contact, ingestion and inhalation of impacted soil, dust fibres (asbestos) and waters.	Medium	Likely	Moderate Risk		
	Migration of ground gases and vapours to shallow pits or enclosed spaces.	Medium	Low Likelihood	Moderate / Low		
Human health (adjacent residents / workers, transient foot traffic)	Dermal contact, ingestion and inhalation of windblown soil, dust, fibres (asbestos) during construction.	Medium	Low Likelihood	Moderate / Low		
	Migration of ground gases into homes or workplaces via preferential pathways during construction.	Medium	Low Likelihood	Moderate / Low		

Attribute	Impact Summary	Post-Mitigation Summary		
		Importance	Magnitude	Significance
Property	Direct contact with sub-surface materials including made ground.	Mild	Likely	Moderate / Low
	Migration of ground gases into property through preferential pathways posing a potential explosion risk from ignition of explosive gases.	Mild	Unlikely	Negligible

Table 11.35: Predicted Residual Impacts on Hydrogeological Receptors Post Mitigation – Construction Phase

Receptor	Parameter	Impact Summary	Pre-Mitigation Summary			Post-Mitigation (Residual Impacts)	
			Importance	Magnitude	Significance	Magnitude of Impact	Significance
Private Water Supplies from GSI dataset	Groundwater Flow	N/A	Medium	Negligible	Imperceptible	Negligible	Imperceptible
	Groundwater Quality	N/A	Medium	Negligible	Imperceptible	Negligible	Imperceptible
Unknown Private Water Supplies	Groundwater Flow	Dewatering can alter groundwater level and flow locally, reducing water available to supplies.	Medium	Large Adverse	Significant	Small Adverse	Slight
	Groundwater Quality	Contamination may be introduced to groundwater through leaks and spills, impacting resources reliant on groundwater.	Medium	Large Adverse	Significant	Small Adverse	Slight
Uisce Éireann Public Supply Wells	Groundwater Flow	N/A	Extremely High	Negligible	Imperceptible	Negligible	Imperceptible
	Groundwater Quality	Excavation for cable route may mobilize contaminants and the pathway to the aquifer supporting the supplies is reduced, increasing its vulnerability to contamination	Extremely High	Small Adverse	Significant	Negligible	Imperceptible

Receptor	Parameter	Impact Summary	Pre-Mitigation Summary			Post-Mitigation (Residual Impacts)	
			Importance	Magnitude	Significance	Magnitude of Impact	Significance
Potential GWDTEs	Groundwater Flow	Small scale localized dewatering may reduce the quantity of groundwater available to support the vegetation resulting in drying up.	Medium	Moderate Adverse	Moderate	Small Adverse	Slight
	Groundwater Quality	Cable route trench crosses some GWDTEs, increasing suspended solids	Medium	Moderate Adverse	Moderate	Small Adverse	Slight
Tober Colleen Formation	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Small Adverse	Imperceptible
	Groundwater Quality	N/A	Low	Small Adverse	Imperceptible	Small Adverse	Imperceptible
Malahide Formation	Groundwater Flow	Cable route trench may require dewatering, changing local groundwater levels and flows.	Medium	Small Adverse	Slight	Negligible	Imperceptible
	Groundwater Quality	Excavation and soil stripping for construction of cable route, HDD, and TCCs creates pathway to aquifer and can increase suspended solids. Exposed to leaks and spills from machinery.	Medium	Small Adverse	Slight	Negligible	Imperceptible
Waulsortian Limestone	Groundwater Flow	Cable route trench may require dewatering, changing local groundwater levels and flows.	Medium	Small Adverse	Slight	Negligible	Imperceptible
	Groundwater Quality	Excavation and soil stripping for construction of cable route, HDD, and TCCs creates pathway to aquifer and can increase suspended	Medium	Small Adverse	Slight	Negligible	Imperceptible

Receptor	Parameter	Impact Summary	Pre-Mitigation Summary			Post-Mitigation (Residual Impacts)	
			Importance	Magnitude	Significance	Magnitude of Impact	Significance
		solids. Exposed to leaks and spills from machinery.					
Lucan Formation	Groundwater Flow	Cable route trench may require dewatering, changing local groundwater levels and flows.	Medium	Small Adverse	Slight	Negligible	Imperceptible
	Groundwater Quality	Excavation and soil stripping for construction of cable route, HDD, and TCCs creates pathway to aquifer and can increase suspended solids. Exposed to leaks and spills from machinery.	Medium	Small Adverse	Slight	Negligible	Imperceptible
Rush Conglomerate	Groundwater Flow	Cable route trench may require dewatering, changing local groundwater levels and flows.	Medium	Small Adverse	Slight	Negligible	Imperceptible
	Groundwater Quality	Excavation and soil stripping for construction of cable route, HDD, and TCCs creates pathway to aquifer and can increase suspended solids. Exposed to leaks and spills from machinery.	Medium	Small Adverse	Slight	Negligible	Imperceptible
Boston Hill Formation	Groundwater Flow	Cable route trench may require dewatering, changing local groundwater levels and flows.	Medium	Small Adverse	Slight	Negligible	Imperceptible
	Groundwater Quality	Excavation and soil stripping for construction of cable route, HDD, and TCCs creates pathway to aquifer and	Medium	Small Adverse	Slight	Negligible	Imperceptible

Receptor	Parameter	Impact Summary	Pre-Mitigation Summary			Post-Mitigation (Residual Impacts)	
			Importance	Magnitude	Significance	Magnitude of Impact	Significance
		can increase suspended solids. Exposed to leaks and spills from machinery.					
Till derived from Namurian sandstones and shales	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Small Adverse	Imperceptible
	Groundwater Quality	Excavation and soil stripping for construction of cable route, HDD, and TCCs creates pathway to aquifer and can increase suspended solids. Exposed to leaks and spills from machinery.	Low	Moderate Adverse	Slight	Negligible	Imperceptible
Gravels derived from limestones	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Small Adverse	Imperceptible
	Groundwater Quality	Excavation and soil stripping for construction of cable route, HDD, and TCCs creates pathway to aquifer and can increase suspended solids. Exposed to leaks and spills from machinery.	Low	Moderate Adverse	Slight	Negligible	Imperceptible
Alluvium	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Small Adverse	Imperceptible
	Groundwater Quality	Excavation and soil stripping for construction of cable route, HDD, and TCCs creates pathway to aquifer and can increase suspended solids. Exposed to leaks and spills from machinery.	Low	Moderate Adverse	Slight	Negligible	Imperceptible
	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Small Adverse	Imperceptible

Receptor	Parameter	Impact Summary	Pre-Mitigation Summary			Post-Mitigation (Residual Impacts)	
			Importance	Magnitude	Significance	Magnitude of Impact	Significance
Till derived from limestone	Groundwater Quality	Excavation and soil stripping for construction of cable route, HDD, and TCCs creates pathway to aquifer and can increase suspended solids. Exposed to leaks and spills from machinery.	Low	Moderate Adverse	Slight	Negligible	Imperceptible
Lacustrine Sediments	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Small Adverse	Imperceptible
	Groundwater Quality	Excavation and soil stripping for construction of cable route, HDD, and TCCs creates pathway to aquifer and can increase suspended solids. Exposed to leaks and spills from machinery.	Low	Moderate Adverse	Slight	Negligible	Imperceptible

11.6.2 Operational Phase

The predicted residual impacts are expected to range from Imperceptible to Slight during the Operational Phase, following the implementation of the mitigation measures. A summary of the predicted residual impacts as a result of the Operational Phase is outlined in Table 11.36 and Table 11.37.

Table 11.36: Predicted Residual Impacts on Soil and Geological Receptors Post Mitigation – Operational Phase

Attribute	Impact Summary	Post-Mitigation Summary		
		Importance	Magnitude	Significance
Contaminated Land and Ground Gas* * The method of assessment for these attributes varies from the standard impact assessment (as described in SectionAssessment of Land Contamination 11.2.4.1.4)				
Human health (maintenance workers)	Dermal contact, ingestion and inhalation of soil, dust, fibres (asbestos) and waters during routine maintenance	Medium	Unlikely	Low
	Migration of ground gases and vapours to enclosed spaces	Medium	Low Likelihood	Moderate / Low
Human health (end users, adjacent	Dermal contact, ingestion and inhalation of windblown soil, dust, fibres	Medium	Unlikely	Low

Attribute	Impact Summary	Post-Mitigation Summary		
		Importance	Magnitude	Significance
residents workers)	(asbestos) from retained surface soils			
	Migration and accumulation of ground gases into homes or workplaces via preferential pathways created during construction	Medium	Unlikely	Low
Property	Direct contact with sub-surface materials including made ground.	Mild	Unlikely	Negligible
	Migration of ground gases into property through preferential pathways posing a potential explosion risk from ignition of explosive gases	Mild	Unlikely	Negligible

Table 11.37: Predicted Residual Impacts on Hydrogeological Receptors Post Mitigation – Operational Phase

Attribute	Parameter	Impact Summary	Pre-Mitigation Summary			Post-Mitigation (Residual Impacts)	
			Importance	Magnitude	Significance	Magnitude of Impact	Significance
Private Water Supplies from GSI dataset	Groundwater Flow	N/A	Medium	Negligible	Imperceptible	Negligible	Imperceptible
	Groundwater Quality	N/A	Medium	Negligible	Imperceptible	Negligible	Imperceptible
Unknown Private Water Supplies	Groundwater Flow	Change in shallow groundwater level and flow direction due to presence of subsurface features – Joint Bays and cable	Medium	Large Adverse	Significant	Small Adverse	Slight
	Groundwater Quality	Chance of leaks and spills from access tracks into the groundwater supporting the supplies	Medium	Large Adverse	Significant	Small Adverse	Slight
Uisce Éireann Public Supply Wells	Groundwater Flow	N/A	Extremely High	Negligible	Imperceptible	Negligible	Imperceptible
	Groundwater Quality	N/A	Extremely High	Negligible	Imperceptible	Negligible	Imperceptible
Potential GWDTEs	Groundwater Flow	During excavation for the cable	Medium	Moderate Adverse	Moderate	Small adverse	Slight

Attribute	Parameter	Impact Summary	Pre-Mitigation Summary			Post-Mitigation (Residual Impacts)	
			Importance	Magnitude	Significance	Magnitude of Impact	Significance
		route, the open trench will provide a flow path / drain for shallow groundwater supporting the area to drain away, resulting in potential drying up of the wet grassland					
	Groundwater Quality	N/A	Medium	Negligible	Imperceptible	Negligible	Imperceptible
Tober Colleen Formation	Groundwater Flow	N/A	Low	None	N/A	N/A	N/A
	Groundwater Quality	N/A	Low	None	N/A	N/A	N/A
Malahide Formation	Groundwater Flow	N/A	Medium	None	N/A	N/A	N/A
	Groundwater Quality	N/A	Medium	None	N/A	N/A	N/A
Waulsortian Limestone	Groundwater Flow	N/A	Medium	None	N/A	N/A	N/A
	Groundwater Quality	N/A	Medium	None	N/A	N/A	N/A
Lucan Formation	Groundwater Flow	N/A	Medium	None	N/A	N/A	N/A
	Groundwater Quality	N/A	Medium	None	N/A	N/A	N/A
Rush Conglomerate	Groundwater Flow	N/A	Medium	None	N/A	N/A	N/A
	Groundwater Quality	N/A	Medium	None	N/A	N/A	N/A
Boston Hill Formation	Groundwater Flow	N/A	Medium	None	N/A	N/A	N/A
	Groundwater Quality	N/A	Medium	None	N/A	N/A	N/A
Till derived from Namurian sandstones and shales	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
	Groundwater Quality	N/A	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Negligible	Imperceptible

Attribute	Parameter	Impact Summary	Pre-Mitigation Summary			Post-Mitigation (Residual Impacts)	
			Importance	Magnitude	Significance	Magnitude of Impact	Significance
Gravels derived from limestones	Groundwater Quality	N/A	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
Alluvium	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
	Groundwater Quality	N/A	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
Till derived from limestone	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
	Groundwater Quality	N/A	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
Lacustrine Sediments	Groundwater Flow	N/A	Low	Small Adverse	Imperceptible	Negligible	Imperceptible
	Groundwater Quality	N/A	Low	Small Adverse	Imperceptible	Negligible	Imperceptible

11.7 Conclusion

Following the implementation of the mitigation measures outlined in Section 11.5, no significant impacts on soils and geology are predicted as a result of the Proposed Development. Similarly, no significant impacts are expected on hydrogeological receptors. There will be a short-term impact on the four potential GWDTEs along the proposed cable route during construction and operation which are assessed to have a Slight significance residual impact on their ecosystem.

There will be temporary adverse impacts to the ground surface due to the disruption associated with trenching for the proposed cable installation, temporary storage of excavated materials and change of land use at TCCs and HDD Compounds. However, given the minimal extent of the directly impacted land use areas compared to the land use of the wider study area, these impacts are deemed to be of Slight significance. In addition, following the installation of the proposed cable, restoration works will be carried out to restore the land back to pre-construction condition, excluding the permanent access tracks and Joint Bay locations. Therefore, any impacts will be temporary, for the duration of the Construction Phase, and overall this will result in an impact of Slight significance.

The proposed cable route will cross multiple economic deposits comprising very high / high potential aggregate and crushed rock and sands and gravels. However, the areas directly impacted by the construction activities and proposed construction depths will be small relative to the size of the economic deposits as a whole across the study area. Therefore, potential losses in economic deposits across the study area are deemed to be low, and assessed as resulting in an Imperceptible significance of impact.

There could be temporary adverse impacts to groundwater bodies, protection areas, potential GWDTE, abstractions, and aquifers due to trench works, HDD activities, and any dewatering required. However, the scale of the Proposed Development relative to the size of the groundwater bodies as a whole is very small. For the majority, the works are unlikely to intersect groundwater (groundwater on average being 2m bgl and trenching to extend not further than 1.8m bgl) except at the final chainage of the proposed cable route where excavations will locally be up to 4m. Any dewatering will be minor, short term, mitigated, and with a negligible magnitude of impact to identified receptors. Therefore, significance of impact is assessed as Imperceptible.

Uisce Éireann will be further consulted during the detailed design stage regarding the Dunboyne abstractions, on relevant aspects of the CEMP and agreeing a method statement within the final CEMP for the works in the relevant location (potentially including monitoring and reporting requirements). The risk of encountering unrecorded Private Water Supplies is low, and with the implementation of the mitigation measures for private supplies, there will be no significant residual impacts.

Risks to groundwater quality and associated receptors will be mitigated with the adoption of a CEMP. Long term shallow groundwater flow disruptions in the backfilled trench will be mitigated by the use of clay bunds within the trench along the proposed cable route, in particular in areas where potential GWDTEs are intercepted.

A review of GSI records on private abstractions has been undertaken and the known supplies have been assessed. There is also the possibility of currently unknown abstractions and supplies that could be affected by the Proposed Development. Albeit the risks being low, as proposed trenching will be <1.8m deep by 1.5m wide and short-lived. With the implementation of the mitigation measures for private supplies, there will be no significant impacts, as the impact is assessed as Imperceptible to Slight.

In addition, no significant impacts are anticipated to the WFD groundwater bodies, protection areas, aquifers, or abstractions. As a result, the Proposed Development is not expected to cause deterioration in the status of any groundwater body either quantitatively or qualitatively.

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European Union (EU) Environmental Objectives (Groundwater) (Amendment) Regulations 2016

Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (Water Framework Directive)

European Communities Environmental Objectives (Surface Waters) Regulations 2009

EU Environmental Objectives (Surface Waters) (Amendment) Regulations 2019

Local Government (Water Pollution) Act, 1977;

Waste Management (Licensing) Regulations, 2014, [Statutory Instrument (S.I.) No. 395/2004]

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 12 – Hydrology

EirGrid

March 2024

Contents

12. Hydrology

12.1 Introduction

This Chapter presents the assessment of the potential impacts of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) on the surface water environment during the Construction and Operational Phases of the Proposed Development. A full description of the Proposed Development is presented in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

The assessment of impacts on biodiversity and groundwater are discussed in Chapter 10 (Biodiversity) and Chapter 11 (Soils, Geology, and Hydrogeology) in Volume 2 of the EIAR, respectively. A Natura Impact Statement (NIS) has also been prepared and is included as a standalone document in the planning application pack. A Flood Risk Assessment (FRA) has been prepared and is included as Appendix A12.1 in Volume 3 of this EIAR, and a Water Framework Directive (WFD) Compliance Assessment is included as a supporting document in Volume 5 of this EIAR.

This Chapter considers the Construction and Operational Phases of the Proposed Development, in relation to the following subtopics:

- Hydrology, including surface water drainage;
- Hydromorphology;
- Surface water quality including surface water supply and wastewater discharge;
- WFD assessment; and
- A summary of flood risk (refer to the separate FRA which is included as Appendix A12.1 in Volume 3 of the EIAR).

12.2 Methodology

12.2.1 Study Area

The baseline study area for this assessment is 250 metres (m) from the centreline of the Proposed Development, which includes the upgrade works to both Belcamp and Woodland Substations and vegetation clearance areas, as shown in Figure 12.1 in Volume 4 of this EIAR. Given the nature and extent of the Proposed Development, it is anticipated that any likely significant impacts from the Proposed Development would occur at a local water body scale, and therefore, a 250m study area is based on professional judgement and is considered appropriate to encompass all water bodies that may be susceptible to significant impacts. Therefore, any identified surface water bodies within that area have been considered as receptors which include WFD designated and non-designated water bodies.

12.2.2 Relevant Guidelines, Policy and Legislation

This Chapter has been prepared in accordance with the following legislation:

- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (hereafter referred to as the Water Framework Directive (WFD));
- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended by S.I. No. 327/2012, S.I. No. 386/2015, S.I. No. 77/2019) which gives effect to the WFD; and

- S.I. No. 722/2003 - European Communities (Water Policy) Regulations 2003 (as amended by S.I. No. 413/2005, S.I. No. 219/2008, S.I. No. 93/2010, S.I. No. 326/2010, S.I. No. 350/2014, and S.I. No. 166/2022) (hereafter collectively referred to as the Water Policy Regulations), which give legal effect to the WFD in Ireland.

The following national policies are considered relevant to the Proposed Development:

- Project Ireland 2040 - National Planning Framework (Government of Ireland 2020); and
- Project Ireland 2040 - National Development Plan 2021-2030 (Government of Ireland 2021).

The following guidance documents are adhered to in the assessment:

- Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016);
- Planning for Waterbodies in the Urban Environment: A Guide to the Protection of Waterbodies through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI 2020);
- EirGrid's Ecology Guidelines for Electricity Transmission Projects (EirGrid 2020);
- The Department of the Environment, Heritage and Local Government (DEHLG) and the Office of Public Works (OPW) Planning System and Flood Risk Management, Guidelines for Planning Authorities (hereafter referred to as the Flood Risk Guidelines) (DEHLG and OPW 2009); and
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022a).

This assessment also follows guidelines established by Transport Infrastructure Ireland (TII) (formerly the National Roads Authority (NRA)), namely the Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (hereafter referred to as the NRA Guidelines) (NRA 2009) and the Guidelines for the Crossing of Waterbodies During the Construction of National Road Schemes (NRA 2005), in terms of the criteria for ranking significance of potential impacts. Although these guidelines were developed for road schemes, they are applicable to this assessment given that the Proposed Development is associated with new linear infrastructure.

12.2.2.1.1 Water Framework Directive

The WFD established a framework for the protection of both surface water bodies and groundwaters and provides a vehicle for establishing a system to improve and / or maintain the quality of water bodies across the European Union (EU). The WFD requires all water bodies (rivers, lakes, groundwater, transitional, coastal) to attain 'Good Water Status' (qualitative and quantitative) by 2027.

The Water Policy Regulations require the assessment of permanent impacts of a project on WFD water bodies, (rivers, lakes, estuaries, coastal waters and groundwater). Typically, the permanent impacts include all operational impacts, but can also include impacts from construction depending on the length and / or nature of the works of the Proposed Development as some potential construction impacts are considered permanent in the absence of mitigation.

River Basin Management Plans (RBMPs) provide the mechanism for implementing an integrated approach to the protection, improvement and sustainable management of the water environment, and are published every six years under the Water Policy Regulations.

The second cycle RBMP for Ireland 2018 - 2021 (hereafter referred to as the RBMP 2018 – 2021) was published by the Department of Housing, Planning and Local Government (DHPLG) in April 2018 and covers Ireland as a whole (DHPLG 2018). For the second cycle, the original (2009) Eastern, South-Eastern, South-

Western, Western and Shannon River Basin Districts were merged to form one national River Basin District (RBD).

In September 2021, the Minister of Housing, Local Government and Heritage (DHLGH), published the Draft River Basin Management Plan for Ireland 2022 – 2027 (hereafter referred to as the Draft RBMP) for public consultation (DHLGH 2021). The consultation period closed on 31 March 2022. The Draft RBMP sets out from the outset that it is published in the context of a rapidly changing policy landscape at European and International levels and against a backdrop of "*widespread, rapid and intensifying climate change*". In addition, Ireland is now experiencing a sustained decline in water quality following many years of improvements. Therefore, stronger measures are now required to achieve sustainable water management in order to address and adapt to the impacts of climate change and achieve the desired outcomes for biodiversity.

The third cycle Draft RBMP sets out a Programme of Measures (PoMs) necessary to deliver the objectives of the WFD in full and to contribute to the other environmental priorities.

12.2.3 Data Collection and Collation

Information on the baseline environment, including hydrology, hydromorphology and water quality of the surface water receptors within the study area has been collated through desk study and field surveys.

12.2.3.1 Data Sources

The key data sources used for the purpose of this assessment are:

- Catchments.ie – Water quality data for Ireland (DHLGH, EPA and Local Authority Waters Programme 2024);
- Environmental Protection Agency (EPA) – WFD Ireland online map viewer (EPA 2024);
- GeoHive (Ireland) – National Geospatial Data Hub (Government of Ireland and Tailte Éireann 2024);
- National Parks and Wildlife Service (NPWS) - Designated Sites (NPWS 2024);
- Office for Public Works (OPW) Flood Mapping (OPW 2024);
- Summary Report - Water Quality in Ireland 2016-2021 (EPA 2022b); and
- Tailte Éireann (formerly Ordinance Survey Ireland (OSI)) Drainage ditch layer from Prime 2 data (Tailte Éireann 2024).

12.2.3.2 Difficulties Encountered in Compiling Information

The following limitations and difficulties compiling information were encountered during the production of this Chapter:

- Water levels and flow rates are subject to weather variations in the days leading up to field surveys. Where water levels at the crossing locations were too deep, the bed was not be visible from the bank side, and therefore, the identification of specific morphological features and bed material types could not be fully determined and recorded. This was the case at one crossing location (see Appendix 12.2 in Volume 3 of this EIAR for specific locations);
- Safe access to the exact crossing locations was not always possible due to vegetation or land access issues. This was the case at five crossing locations (see Appendix A12.2 in Volume 3 of this EIAR for specific locations), and desk-based sources alongside professional judgment were used to extrapolate observations;
- Only WFD designated water bodies were visited as part of the field surveys; and
- Unnamed, non-designated watercourses were not visited as part of the site survey and have been determined using OS mapping. In some cases, OS mapping indicates unnamed non-designated

and some WFD designated watercourses immediately downstream of existing road crossings but does not map them upstream. Where this is the case, it has been assumed that there is an upstream channel, but it is either not mapped and / or not designated.

12.2.3.3 Field Surveys

Field surveys were carried out between 9 to 11 May 2023. During the surveys, visual observations were made at proposed water body crossing locations to further characterise the nature of the water bodies. The results from the field survey are presented in Appendix A12.2 in Volume 3 of this EIAR.

Where possible, walkover surveys were undertaken at, and immediately up- and downstream of, proposed water body crossing locations. Where access was constrained or landowner issues were identified (see Section 12.2.3.2), visual observations were made from bridges and from the top of riverbanks, as close as practicable to the crossing location. The following visual observations were recorded at each survey location:

- Planform - recording the channel pattern (e.g. straight, meandering, single thread or multiple thread));
- Flow conditions (recording observations such as flow types, heights and velocities);
- Bank stability (recording any instances of erosion, aggradation or incision);
- Riverbed (sediment type, qualitative description of size and shape, noting any potential erosion or deposition issues (i.e. incision or aggregation));
- Anthropogenic modifications (including structures (bridges, footbridges, culverts etc.) flood walls, bed and/or bank reinforcement or in channel structures;
- Runoff pathways and risk (recording the pathway for any surface runoff to the water body and the likelihood of surface runoff reaching the river);
- Riparian vegetation (type, density, height, maturity);
- Outfalls and discharges (recording any outfalls and discharges / active or derelict); and
- Land use (recording the use of land on the left and right floodplains and surrounding area).

No water quality sampling was carried out as water quality is not a constant parameter and varies significantly depending on weather, flows and seasons. EPA data on water quality from catchments.ie (DHLGH, EPA and Local Authority Waters Programme 2024) was deemed sufficient to get a representative baseline.

It is possible that some minor drainage ditches located in proximity to the Proposed Development works may not be identified in this Chapter. However, the mitigation detailed and proposed as part of this planning application (contained within Section 12.5 of this Chapter and within the Construction Environmental Management Plan (CEMP) which is included as a standalone document in the planning application pack) will be implemented when dealing with any such features to avoid, reduce or offset any potential negative impacts.

12.2.3.4 Flood Risk Assessment

A FRA has been completed for the Proposed Development (refer to Appendix A12.1 in Volume 3 of this EIAR) in accordance with the Flood Risk Guidelines (DEHLG and OPW 2009).

The FRA considers the potential flood risk to the Proposed Development during the Construction and Operational Phases. This assessment has been undertaken through review of the OPW flood risk maps (OPW 2024) and assessing water body locations with respect to the Proposed Development. The assessment of flood risk is based on existing information at the time of the study and recommendations of climate change allowances by the OPW.

12.2.4 Appraisal Method for the Assessment of Impacts

12.2.4.1 General Approach

The following method for the assessment of impacts has been adapted from the NRA Guidelines. The surface water environment is intrinsically linked to flood risk, ecological receptors and groundwater, considered in the FRA Report (Appendix A12.1 in Volume 3 of this EIAR), and Chapter 10 (Biodiversity) and Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of this EIAR. Commercial and recreational uses of the water environment are not included in the scope of this Chapter, as commercial and recreational interests are considered and assessed in Chapter 5 (Population), Chapter 15 (Agronomy and Equine) and Chapter 17 (Material Assets) in Volume 2 of this EIAR.

The NRA Guidelines outline how impact type, magnitude, and duration should be considered relative to the importance of the hydrological receptors and their sensitivity to change in order to determine significance of impacts.

The overall impact on surface water receptors (i.e., rivers, canals, transitional water bodies, coastal water bodies and lakes) as a result of the Proposed Development will be determined based on two parameters:

1. The importance of the water body attributes (hydrology, surface water quality, hydromorphology and surface water supply) to change; and
2. The magnitude of the impacts on water body attributes.

12.2.4.2 Importance of Receptors

The importance of surface water receptors to changes as a result of the Proposed Development are determined by a set of criteria based on those outlined in the NRA Guidelines. These are presented in Table 12.1.

Table 12.1: Criteria Used to Evaluate the Importance of Surface Water Receptors (NRA 2009)

Importance	Criteria	Typical Example
Extremely High	Receptor (or receptor attribute) has a very high quality or value on an international scale	Any WFD water body which is protected by EU legislation e.g. a Designated European Sites (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) or 'Salmonid Waters'; and A water body that appears to be in natural equilibrium and exhibits a natural range of morphological features (such as pools and riffles). There is a diverse range of fluvial processes present, free from any modification or anthropogenic influence.
Very High	Receptor (or receptor attribute) has a high quality or value on an international scale or very high quality or value at a national scale	Any WFD water body (specific EPA segment) which has a direct hydrological connection of <2km to European sites or protected ecosystems of international status (SAC / SPA or Salmonid Waters); WFD water body ecosystem protected by national legislation (Natural Heritage Area (NHA) status); A water body that appears to be largely in natural equilibrium and exhibits a diverse range of morphological features (such as pools and riffles). There is a diverse range of fluvial processes present, with very limited modifications; and Nutrient Sensitive Areas.
High	Receptor (or receptor attribute) has a moderate value at an international scale or high quality or value on a national scale	A WFD water body with High or Good Status; A Moderate WFD Status (2013 – 2018) water body with some hydrological connection (<2km) to European sites or protected ecosystems of international status (SAC / SPA or Salmonid Waters) further downstream; WFD water body which has direct hydrological connection to sites/ecosystems protected by national legislation (NHA status); A water body that appears to be in some natural equilibrium and exhibits some morphological features (such as pools and riffles). There is a diverse range of fluvial processes present, with very limited signs of modification or other anthropogenic influences; and Direct hydrological connectivity to Nutrient Sensitive Areas.
Medium	Receptor (or receptor attribute) has some limited value at a national scale	WFD water body with Moderate WFD Status (2013 – 2018); WFD water body with limited (>2km <5km) hydrological importance for sensitive or protected ecosystems (much further downstream); A water body showing signs of modification or culverting, recovering to a natural equilibrium and exhibiting a limited range of morphological features (such as pools and riffles). The water body is one with a limited range of fluvial processes and is affected by modification or other anthropogenic influences; Evidence of historical channel change through artificial channel straightening and re-profiling; and Some hydrological connection downstream Nutrient Sensitive Areas.
Low	Receptor (or receptor attribute) has a low quality or value on a local scale	Water body with Bad to Poor WFD Status (2013 – 2018); and A WFD water body with >5km (or no) hydrological connection to European sites or national designated sites. Or A non-WFD water feature with minimal hydrological importance to sensitive or protected ecosystems; and/or economic and social uses; A highly modified water body that has been changed by channel modification, culverting or other anthropogenic pressures. The water body exhibits no morphological diversity and has a uniform channel, showing no evidence of active fluvial processes and not likely to be affected by modification. Highly likely to be affected by anthropogenic factors. Heavily engineered or artificially modified and could dry up during summer months; and Many existing pressures which are adversely affecting biodiversity.

12.2.4.3 Magnitude of Impact

The magnitude of impacts on receptors (or attributes) is determined in accordance with the EPA Guidelines (EPA 2022a). The scale or magnitude of potential impacts (both beneficial and adverse) depends on both the degree and extent of which the Proposed Development may impact the surface water receptors during the Construction and Operational Phases.

Factors considered to determine the magnitude of potential impacts include the following:

- Nature of impacts;
- Intensity and complexity of the impacts;

- Expected onset, duration, frequency and reversibility of the impacts;
  - Momentary Effects lasting from seconds to minutes;
  - Brief Effects lasting less than a day;
  - Temporary Effects lasting less than a year;
  - Short-term 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.
- Cumulation of the impacts with other existing and / or approved project impacts; and
- Possibility of effectively reducing the impacts.

Table 12.2 illustrates the criteria used for determining the magnitude of impact on surface water receptors.

Table 12.2: Criteria for Determining the Magnitude of Impact on Surface Water Receptors (NRA 2009)

Nature of Impact	Description	Scale and Nature of Impacts
Large Adverse	Results in loss of attribute and/or quality and integrity of the attribute	Loss or extensive change to a fishery; Loss of regionally important public water supply; Loss or extensive change to a designated nature conservation site; Reduction in water body WFD classification or quality elements; Results in loss of receptor and/or quality and integrity of receptor; and An impact, which has a high likelihood of occurrence and that has the potential to alter the character of a small part or element of the receptor in the medium to long-term. This could be frequent or consistent in occurrence, and result in impact which may alter the existing or emerging trends.
Medium Adverse	Results in effect on attribute and/or quality and integrity of the attribute	Partial loss in productivity of a fishery; Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies; Contribution to reduction in water body WFD classification; Results in impact on integrity of receptor or loss of part of receptor; and An impact, which has reasonable likelihood of occurrence and that has the potential to alter the character of a small part or element of the receptor in the medium-term. This could be intermittently or occasionally, and result impact which may be consistent with existing or emerging trends.
Small Adverse	Results in some measurable change in attributes, quality or vulnerability	Measurable impact but with no change in overall WFD classification or the status of supporting quality elements; Minor impacts on water supplies; Results in minor impact on integrity of receptor or loss of small part of receptor; and An impact, which has low likelihood of occurrence and that has some potential to alter the character of a small part or element of the receptor in the short-term. This could be on a once off occasion or rare occurrence, and result impact which may be consistent with existing or emerging trends.
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	No measurable impact on integrity of the attribute; and Results in an impact on receptor but of insufficient magnitude to affect either use or integrity.
Small Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	No measurable impact on integrity of the attribute; and Results in an impact on receptor but of insufficient magnitude to affect either use or integrity.
Medium Beneficial	Results in moderate improvement of attribute quality	Has some potential to result in minor improvement WFD quality element(s).
Large Beneficial	Results in major improvement of attribute quality	Improvement in water body WFD Classification.

12.2.4.4 Significance of Impacts

The significance of an impact is determined by combining the importance of the receptor with the predicted magnitude of impact. Any residual impacts are reported after the assessment of the effectiveness of essential mitigation measures required to reduce and, if possible, offset likely significant adverse environmental impacts. The matrix used for the determination of significance is shown in Table 12.3 (EPA 2022a).

Table 12.3: Categories of Environmental Impacts

Importance of Attribute	Magnitude of Impact			
	Negligible	Small Adverse	Medium Adverse	Large Adverse
Extremely High	Imperceptible	Significant	Very significant to Profound	Profound
Very High	Imperceptible	Significant/Moderate	Very Significant	Very Significant to Profound
High	Imperceptible	Moderate / Slight	Significant/Moderate	Very Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/Moderate

12.3 Baseline Environment

Baseline data were collated through a desk-based study and field survey. The Proposed Development and associated study area is located within the Hydrometric Area (HA) 09 (Liffey and Dublin Bay) and HA 08 (Nanny-Delvin) water catchment areas (EPA 2021b).

12.3.1 Catchment Overview

The Proposed Development will span two hydrometric areas, the first of which is the Liffey and Dublin Bay Catchment. The 3rd Cycle Draft Liffey and Dublin Bay Catchment Report (HA09) (EPA 2021a) describes this catchment as including the area drained by the River Liffey and by all streams entering tidal water between Sea Mount and Sorrento Point, County Dublin, draining a total area of 1,616km^2 (kilometres squared). The catchment is characterised by a sparsely populated, upland south-eastern area and a densely populated, flat, low-lying area over the remainder of the catchment basin. The largest urban centre in the catchment is Dublin City. The catchment area is heavily urbanised and industrialised within the vicinity of the city of Dublin.

The second hydrometric area which the Proposed Development will interact with is the Nanny Delvin catchment. The 3rd Cycle Draft Nanny Delvin Catchment Report (HA08) (EPA 2021b) describes this catchment as including the area drained by the River Nanny and the River Delvin and by all streams entering tidal water between Mornington Point and Sea Mount, County Dublin, draining a total area of 711km^2. The largest urban centre in the catchment is Swords. The other main urban centres in this catchment are Donabate, Lusk, Skerries, Balbriggan, Stamullen, Laytown, Bettystown, Duleek, Ashbourne, Ratoath and Dunshaughlin. The total population of the catchment is approximately 159,230 (EPA 2021b) with a population density of 224 people per km^2.

12.3.2 Designated Sites

12.3.2.1 Overview

A review was conducted to determine those European sites which are within the study area and / or hydrologically connected to the study area. There are no Special Areas of Conservations (SAC), designated bathing waters, Natural Heritage Areas (NHA), or shellfish protection areas within 5km of, or in direct hydrological connection to, the Proposed Development. A summary of the closest WFD protected areas is provided in Table 12.4.

Table 12.4: Designated Sites within and Adjacent to the Study Area

WFD Register of Protected Areas Category	Designated Sites Present in Study Area?	Designated Sites Present Within 5km	Commentary
Nutrient Sensitive Areas	No	No	Closest Nutrient Sensitive Area is >5km south of the Proposed Development, and not in direct hydrological connection.
Shellfish Areas		No	Closest shellfish area is Malahide within the Irish Sea >5km to the north-east of the Proposed Development
Bathing Waters		No	Closest bathing water is located at Portmarnock Velvet Strand Beach, approximately 5.5km to the east of the Proposed Development.
SACs		Yes	Closest SAC is the Malahide Estuary SAC located approximately 3.5km to the north-east of the Proposed Development and not hydrologically connected.
SPAs		Yes	Closest SPA is the Malahide Estuary SPA located approximately 3.5km north east from the Proposed Development. Hydrological connections via the Sluice_010 and Mayne_010 water bodies are approximately >5km downstream.
NHAs		No	Closest NHA is the Hodgestown Bog NHA located more than 20km to the south-west of the Proposed Development.
pNHAs	No	Yes	Closest pNHA is associated with Baldoyle Bay (Feltrim Hill), located at its closest approximately 1.1km east from the Proposed Development. Hydrological connections via the Sluice_010 and Mayne_010 water bodies are >5km downstream.
Salmonid Rivers	No	No	No designated Salmonid Rivers within the study area. No water bodies hydrologically connected to designated Salmonid Rivers downstream.
Drinking Water Protected Rivers			No designated Drinking Water Protected Rivers within the study area. No hydrologically connected water bodies to downstream Drinking Water Protected Rivers.

12.3.3 Drinking Water Supply (Surface Water Abstractions)

There are no surface water Geological Survey Ireland (GSI) Public Supply Source Protection Areas or National Federation of Group Water Schemes (NFGWS) Source Protection Areas located within the study area. None of the river segments within the study area are designated Drinking Water Rivers.

12.3.4 Surface Water Features

The EPA River dataset (EPA 2024) is designed as a geometric river network for monitoring, management, and reporting purposes. The EPA has split rivers and streams up into smaller sections to allow areas to be easily distinguished. These segments are assigned segment codes. The EPA's segmented coding and naming has been applied throughout this Chapter. The WFD status of the rivers and streams within the study area of the Proposed Development are detailed in Table 12.5. Baseline descriptions for each water body within the study area are provided in Section 12.3.5.

Table 12.5: Current Designation Status for Identified WFD Water Bodies within the Study Area (EPA 2024)

WFD Water Body Name	WFD Water Body Code	WFD Sub-Catchment	Approximate Chainage along Proposed Development Route (m)	Ecological Status or Potential (2016 - 2021)	Risk Status	Importance	Key Pressures: Elements Causing or with Potential to Cause Less than Good Status	Proposed Crossing Methodology
Dunboyne stream_010	IE_EA_09D040500	Tolka_SC_010	2,165	Poor	At Risk	Low	Agriculture, Domestic Wastewater	Open Cut Trenching
Dunboyne stream_010	IE_EA_09D040500	Tolka_SC_010	10,800	Poor	At Risk	Low	Agriculture, Domestic Wastewater	Within Road Structure
Rye Water_030	IE_EA_09R010400	Liffey SC_080	3,000	Poor	At Risk	Low	Agriculture	Not crossed, adjacent to works area and Construction Compound
Tolka_020	IE_EA_09T010600	Tolka_SC_010	11,640	Moderate	At Risk	Medium	Agriculture	Within Road Structure
Tolka_020	IE_EA_09T010600	Tolka_SC_010	12,545	Moderate	At Risk	Medium	Agriculture	Open Cut Trenching
Pinkeen_010	IE_EA_09P020500	Tolka_SC_010	16,340	Moderate	At Risk	Medium	Agriculture, Domestic Wastewater	Open Cut Trenching
Ward_020	IE_EA_08W010070	Broadmeadow_SC_010	17,750	Moderate	At Risk	Medium	Agriculture, Hydromorphology, Urban Wastewater	Within Road Structure
Ward_010	IE_EA_08W010050	Broadmeadow_SC_010	18,160	Poor	Under Review	Low	None Identified	Open Cut Trenching
Ward_010	IE_EA_08W010050	Broadmeadow_SC_010	18,200	Poor	Under Review	Low	None Identified	Open Cut Trenching
Ward_010	IE_EA_08W010050	Broadmeadow_SC_010	19,235	Poor	Under Review	Low	None Identified	Open Cut Trenching
Ward_020	IE_EA_08W010070	Broadmeadow_SC_010	20,460	Moderate	At Risk	Medium	Agriculture, Hydromorphology, Urban Wastewater	Affected by Passing Bay. Within Road Structure
Ward_020	IE_EA_08W010070	Broadmeadow_SC_010	20,640	Moderate	At Risk	Medium	Agriculture, Hydromorphology, Urban Wastewater	Within Road Structure
Ward_020	IE_EA_08W010070	Broadmeadow_SC_010	20,855	Moderate	At Risk	Medium	Agriculture, Hydromorphology, Urban Wastewater	Within Road Structure

WFD Water Body Name	WFD Water Body Code	WFD Sub-Catchment	Approximate Chainage along Proposed Development Route (m)	Ecological Status or Potential (2016 - 2021)	Risk Status	Importance	Key Pressures: Elements Causing or with Potential to Cause Less than Good Status	Proposed Crossing Methodology
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	23,635	Poor	At Risk	Low	Agriculture, Urban Runoff, Urban Wastewater, Other Anthropogenic Pressures	Open Cut Trenching
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	24,600	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Within Road Structure
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	24,800	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Within Road Structure
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	26,190	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Open Cut Trenching
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	28,355	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Open Cut Trenching
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	29,290	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Within Road Structure
Ward_030	IE_SE_08W010300	Broadmeadow_SC_010	29,900	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Within Road Structure
Sluice_010	IE_EA_09S071100	Mayne_SC_010	31,770	Poor	Under Review	High	None Identified	Within Road Structure
Mayne_010	IE_EA_09M030500	Mayne_SC_010	36,820	Poor	At Risk	High	Urban Runoff Pressures	Open Cut Trenching

12.3.5 Baseline Descriptions

The following sections provide baseline descriptions for each of the water bodies within the 250m study area associated with the Proposed Development. As part of baseline data gathering, walkover surveys of the crossed water bodies were undertaken to further characterise the nature of the water body in these locations. The study area associated with the Proposed Development was surveyed on 9, 10 and 11 May 2023. The results of the field surveys, including photographs taken at each survey location are provided in Appendix A12.2 in Volume 3 of this EIAR. The field surveys are also supplemented from desk-based information using data sources outlined in Section 12.2.3.

12.3.5.1 Dunboynestream_010

Dunboynestream_010 forms part of the Tolka_SC_010 catchment. The catchment area of Dunboynestream_010 measures 19.32km^2, draining from the west upstream of Bogganstown, through Dunboyne town before discharging to the River Tolka at its confluence downstream of the study area. The water body displays a single thread channel with two small tributaries evident.

Dunboynestream_010 was visited as part of the site surveys (Water Body Crossing References: WCP01 and WCP02). The flow in the water body was observed to be low velocity, smooth and rippled in places. The banks appeared to be stable, with evidence of erosion and minor undercutting; there was evidence of poaching along the right bank top at WCP01. At WCP02 the banks are concrete at the existing road crossing structure and are heavily vegetated and stable outside the crossing.

The bed at WCP01 was comprised of predominately silt and fine sand with rare gravels. Small poorly developed riffles are present downstream from the crossing location. At WCP02, bed material is comprised of predominately silt to fine sands with rare gravels contained within a trapezoidal channel cross-section with approximately 40-degree banks. No distinct bedforms were observed. Riparian vegetation comprises overhanging shrubs and mature deciduous vegetation at WCP01 and vegetation consisting of herbaceous grasses and shrubs was observed at WCP02.

Existing pressures include agricultural and domestic wastewater which may impact baseline water quality in the water body. Hydromorphological pressures include an existing masonry bridge at Rathregan Court, discharge pipes were observed to be present along the bank adjacent to the field, these are likely field drainage at WCP01 and a box culvert at Summerhill Road.

There are no known abstractions from the water body, and it is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River.

12.3.5.2 Rye Water_030

Rye Water_030 forms part of the Liffey_SC_080 catchment. The water body displays an overall length of 33.87 km draining from the north, upstream of Barstown and the R156 road before discharging to the Rye Water_040 >10km downstream of the study area. The water body holds an overall poor ecological status and fail for surface water chemical status under the WFD.

The channel displays a single thread, low sinuosity planform within the study area. The water body was not visited as part of the site surveys. Aerial imagery indicates that mature riparian vegetation consisting of deciduous trees lines both banks which overhang the channel, making further characterisation of the watercourse bed and banks difficult. Existing pressures include agricultural which may impact baseline water quality in the water body. Hydromorphological pressures include an existing crossing below the R156 road.

There are no known abstractions from the water body, and it is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River.

12.3.5.3 Tolka_020

Tolka_020 forms part of the Tolka_SC_010 catchment. The catchment area of the Tolka_020 measures approximately 25.68km^2, draining from the west downstream of Woodtown, the water body then flows in an easterly direction to its confluence with the River Tolka (Tolka_030) at Clonee downstream of the study area. The water body displays a single thread channel and dendritic drainage pattern where small tributaries enter.

The Tolka_020 was visited as part of the site surveys (Water Body Crossing References: WCP03 and WCP04). The flow in the water body was observed to be of low velocity and smooth at both crossing locations. Some chute flow was noted at WCP04 where a 20cm drop in bed level was observed downstream of the proposed crossing. The banks appear to be stable and heavily vegetated at both crossing points; some minor undercutting to the left bank downstream of WCP04 was noted. The bed at WCP03 was not visible due to dense vegetation cover; at WCP04 the bed was noted to be comprised of steps formed from cobbles and boulders. Riparian vegetation comprises dense herbaceous grasses, shrubs, brambles and deciduous trees which overhang the channel from both banks.

Existing pressures comprise agricultural sources which may impact baseline water quality in the water body. Hydromorphological pressures include a concrete right bank and a pipe culvert at WCP03. At WCP04 a discharge pipe and a twin box culvert below Dunboyne Bypass were noted.

There is one discharge location on the Tolka_20 at Batterstown (Emission ID: TPEFF2300A0063SW001). There are no known abstractions from the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River. Consultation with IFI indicates that the River Tolka systems supports populations of Lamprey and brown trout, in addition to other fish species.

12.3.5.4 Pinkeen_010

Pinkeen_010 forms part of the Tolka_SC_10 catchment. The catchment area of the Pinkeeen_010 measures 13.80km2, draining from the northwest at Rathbeggan and then flowing south easterly towards its confluence with the Tolka_030. The Pinkeen_010 displays a single thread mainstem channel with a number of tributaries inputting.

Pinkeen_010 was visited as part of the site surveys (Water Body Crossing Reference WCP05). At the crossing point, the flow was noted to be generally smooth and rippled. The banks were observed to be steep with bank angles ranging between 35 and 60 degrees and heavily vegetated. Vegetation consists of herbaceous and water-based grasses, nettles, brambles and shrubs. The bed of the water body is a mixture of sand and gravel substrate smothered with fine silts and often choaked with in-channel vegetation growth. In channel vegetation was observed to trap fine sediment which combined to cause ponded flow.

Existing pressures comprise of agricultural and domestic wastewater sources which may impact baseline water quality. Hydromorphological pressures include a masonry bridge (L1010) observed on site at the crossing point.

There are no known discharges or abstractions from the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River.

12.3.5.5 Ward_020

The Ward_020 forms part of the Broadmeadow_SC_010 catchment. The catchment area of Ward_020 is 8.60km2, draining from the west at Nuttstown and then flowing in an easterly direction towards its confluence with Ward_030 west of North Road at Ward Cross. Within the study area, the Ward_020 displays a single thread channel with input from several tributaries outside of the study area.

Ward_020 was visited as part of the site surveys (Water Body Crossing References: WCP06, WCP09, WCP10 and WC11). At WC11, the water body crossing was not surveyed due to dense vegetation restricting safe access. At the remaining crossing points, the flow was noted to be smooth, rippled and ponded in areas. The banks were noted to be steep with angles ranging between 50 and 80 degrees. Both banks were and heavily covered by dense vegetation including herbaceous and water-based grasses, shrubs and deciduous trees which overhang the channel in places. The channel bed was not visible at WCP06. At WCP09 and WCP10, the channel was trapezoidal in shape and bed material consisted of predominately fine silts and sands with rare gravels. No distinct bedforms were observed however loosely defined riffles are potentially forming in place. Riparian vegetation comprises dense shrubs and deciduous trees which overhang the channel, herbaceous and water-based grasses and managed grassed fielded areas.

Existing pressures comprise agricultural and urban wastewater sources which may impact baseline water quality. Hydromorphological pressures include a masonry bridge and a pipe culvert on Kilbride Road and at WCP09, a drainage ditch on the left bank was also observed draining nearby agricultural fields.

There are no known abstractions from the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River. Consultation with IFI indicates that the Ward River System is an important salmonid system throughout, with salmon present in the lower reaches.

12.3.5.6 Ward_010

Ward_010 forms part of the Broadmeadow_SC_010 catchment. The catchment area of Ward_010 is 9.18km^2, draining from the northwest from Fairyhouse Road to the east of Rathbeggan. The water body then flows in a general southwest and westerly direction before its confluence with Ward_020 east if Ballymacarney Solar Farm. Within the study area the Ward_010 displays a single thread, low sinuosity planform.

Ward_010 was visited as part of the site surveys (Water Body Crossing References: WCP07 and WCP08). The flow in the water body was observed to be predominately smooth with occasional rippled flow. Banks are steep with angles of approximately 75 degrees and heavily vegetated with shrubs and deciduous trees overhanging the channel. The channel bed is comprised of predominately silt and fine sands with rare gravels and no distinct bedforms observed. Woody debris in the channel was noted at WCP08. Discharge pipes were also noted to be present at both crossing points.

There are no existing pressures identified which may impact baseline water quality. Hydromorphological pressures include a masonry bridge at Priest Town Road and wire fences which cross the channel.

There are no known discharges or abstractions from the on or to the water body, however the presence of discharge pipes at both crossing location indicate likely agricultural discharges from adjacent fields. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River. Consultation with IFI indicates that the Ward River System is an important salmonid system, with salmon present in the lower reaches.

12.3.5.7 Ward_030

Ward_030 forms part of the Broadmeadow_SC_010 catchment. The catchment area of Ward_030 is 32.93km^2, draining from the northwest at Muckerstown Solar Farm and flows in a general south westerly direction to its confluence with Ward_040 at Toberburr. Ward_030 displays a single thread channel with input from a number of tributaries out with the study area.

Ward_030 was visited as part of the site surveys (Water Body Crossing References: WCP12, WCP13, WCP14, WCP15, WCP16, WCP17, WCP18, WCP19). At WCP12, WCP13, WCP18 the water body was not surveyed due to landowner constraints and inaccessibility. At the remaining WCP locations, flow in the water body was observed to be of low velocity and often smooth with some ponded flow, isolated rippled flow and unbroken standing waves are also noted. Banks are steep with angles between 45 and 75 degrees and heavily vegetated with deciduous vegetation and shrubs which overhang most of the channel.

At WC14, a masonry wall occupies the bank top and at WCP17 the right bank, adjacent to the field appears to have been regraded to a 45-degree slope with soil exposed. The channel bed at the crossing locations was trapezoidal in shape. Bed material consists of predominately fine silt and sand with no distinct bedforms observed at WCP14, WCP15 and WCP19. Bed material at WCP17 was observed to be coarser with mobile gravels and rare cobbles and boulders, alongside regularly spaced loosely defined riffles. At WCP16, the water depth was too deep to observe bed material, but rippled flows and unbroken standing waves indicate that bedforms may be visible during lower flows.

Existing pressures comprise of agricultural, urban runoff, urban wastewater and other anthropogenic pressures which may impact baseline water quality. Hydromorphological pressures include a pipe culvert and a masonry arch culvert on Newpark Road.

There are no known discharges or abstractions from or to the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River. Consultation with IFI indicates that the Ward River System is an important salmonid system, with salmon present in the lower reaches.

12.3.5.8 Sluice_010

Sluice_010 forms part of the Mayne_SC_010 catchment. The catchment area is 25.90km2, draining from the eastwards from its source north of Dublin Airport prior to discharging to the Irish Sea at Portmarnock. Sluice_010 displays a single thread channel within the study area. Out with the study area there are a number of tributary inputs.

Sluice_010 was visited as part of the site surveys (Water Body Crossing Reference: WC20). The flow in the water body was observed to be alternating smooth and rippled flow. Banks were noted to be steep with angles ranging between 45 and 70 degrees and heavily vegetated. Some minor undercutting was observed along the right bank where tree roots were exposed. Bed material consists of silts, fine sands, coarse gravel with occasional cobbles. The silt was observed to smother the coarser bed material and some woody debris was noted on the channel bed. Riparian vegetation was observed to be dense consisting of grasses, shrubs, hedges and deciduous trees which overhand the channel.

The EPA Mapper identifies anthropogenic influence as an existing pressure on the Sluice_010 which is likely related to the number of times it is crossed by existing infrastructure. Hydromorphological pressures include a discharge pipe located downstream of the crossing and multiple infrastructure crossings.

There is one recorded discharge location (a storm water overflow, registration number: D0021-01) at Kinsealy. There are no known abstractions from the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River. Consultation with IFI indicates that the Sluice River system supports a resident population of Brown trout within the lower reaches.

12.3.5.9 Mayne_010

Mayne_010 forms part of the Mayne_SC_010 catchment displaying a catchment area of 20.29km2. The single thread channel drains eastwards from Dublin airport, prior to discharge to the Irish Sea. Mayne_010 forms two mains channel which converge at the confluence north of Belmayne.

Mayne_010 was visited as part of the site surveys (Water Body Crossing Reference: WCP21). The flow in the water body was observed to be alternating smooth and rippled flow with unbroken standing waves in the rippled sections. Banks were noted to be comprised on the left bank of masonry wall and the right bank appears to have been regraded to a 45 degree slope.

The channel bed is composed of concrete at the crossing location. When the concrete bed ends, bed material was noted to comprise of sands, gravels and cobbles with rare boulders. Coarse sediment appears mobile forming riffles upstream of the existing crossing location where the channel bed gradient steepens locally. Riparian vegetation is observed to consist of dense vegetation including shrubs, hedges and deciduous trees which overhand the channel margins along the left bank. Where the masonry wall is present, riparian vegetation is absent.

Existing pressures include urban runoff which may impact upon baseline water quality. Hydromorphological pressures include a discharge pipe located downstream of the crossing point and a concrete bed at the proposed WCP.

There are two recorded discharge points, one to the north of Clonshaugh Business Park at the Airport Motorway Interchange (Registration Number: D0034-01), and another at the intersection between the R123 Moyne Road and the R106 Coast Road (Registration Number: D0034-02) that may impact baseline water quality. There are no known abstractions from the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River.

12.3.5.10 Unnamed Non-Designated Watercourses

There are numerous unnamed non-designated watercourses within the 250m study area. These are straightened land drains / ditches. A number of these unnamed watercourses (See Table 12.6) will be crossed by the Proposed Development. Those unnamed watercourses that are within the study area but are not proposed to be crossed by the Proposed Development have been scoped out of this assessment as it is not considered there will be any impacts on these as a consequence of the Proposed Development during the Construction or Operational Phases. The unnamed watercourses that are crossed by the Proposed Development have been named from west to east to be included within the assessment. Table 12.6 details the unnamed watercourses and their baseline description.

Table 12.6: Unnamed Watercourse Crossings

Watercourse	Approximate Chainage	Baseline Description	Crossing type
Unnamed Watercourse 1	1050	These watercourses were not visited as part of the site surveys. Ordnance Survey (OS) mapping and aerial imagery indicate the channels display straightened single thread planforms over the entire length. Riparian vegetation is dominated by improved pasture and vegetation lining the banks including deciduous trees. Aerial imagery of the channel is obscured by riparian vegetation making further characterisation difficult.	Off road.
Unnamed Watercourse 2	1600		Off road.
Unnamed Watercourse 3	2750		Off road.
Unnamed watercourse 4	4020		In-road.
Unnamed Watercourse 5	5900		In-road.
Unnamed Watercourse 6	6000		In-road.
Unnamed watercourse 7	7000		No crossing but runs parallel to works area.
Unnamed Watercourse 8	7900 – 8000		No crossing but runs parallel to works area.
Unnamed Watercourse 9	8100		In-road.
Unnamed Watercourse 10	8250		In-road.
Unnamed Watercourse 11	8350		In-road.
Unnamed Watercourse 12	8460		Not crossed but runs parallel to works area.
Unnamed Watercourse 13	8750-9300		In-road.
Unnamed Watercourse 14	9150 - 9250		In-road.

Watercourse	Approximate Chainage	Baseline Description	Crossing type
Unnamed Watercourse 15	9350		In-road.
Unnamed Watercourse 15A	9800		Unclear if crossed by existing road. If watercourse extends upstream this will be an in-road crossing.
Unnamed Watercourse 16	10425		In-road.
Unnamed Watercourse 17	10950 – 11025		In-road.
Unnamed Watercourse 18	11450		In-road.
Unnamed Watercourse 19	11950		Unclear if crossed by existing road. If watercourse extends upstream this will be an in-road crossing.
Unnamed Watercourse 20	12100 - 12225		In-road.
Unnamed Watercourse 21	13900 – 15100		In-road.
Unnamed Watercourse 22	14450		In-road.
Unnamed Watercourse 23	14450 - 14950		In-road.
Unnamed Watercourse 24	15250 - 15475		Unclear if crossed by existing road. If watercourse extends upstream this will be an in-road crossing.
Unnamed Watercourse 24A	16800		Unclear if crossed by existing road. If watercourse extends upstream this will be an in-road crossing.
Unnamed Watercourse 25	17050		In-road.
Unnamed Watercourse 26	19700-19825		Unclear if crossed by existing road. If watercourse extends upstream this will be an in-road crossing.
Unnamed Watercourse 27	20375		In-road.
Unnamed Watercourse 28	21350		Off-road.
Unnamed Watercourse 29	21600 - 22100		Off-road – Unclear if crossed. If watercourse extends upstream this will be an offroad crossing.
Unnamed Watercourse 30	25500-25550		In-road not crossed runs parallel to the proposed cable route.
Unnamed Watercourse 30A	28000		In-road, not crossed, flows parallel with the proposed cable route.
Unnamed Watercourse 30B	28250		In-road.
Unnamed Watercourse 31	30150 – 30475		In-road.
Unnamed Watercourse 32	30750 – 31150		Not crossed, runs parallel to works area.
Unnamed Watercourse 33	31150-31650		In-road.
Unnamed Watercourse 33A	34700		Off-road.
Unnamed Watercourse 34	35225		Off-road.
Unnamed Watercourse 35	36600		Off-road.

12.3.6 Flood Risk

A separate site-specific Flood Risk Assessment has been completed for the Proposed Development. A copy of the FRA report is included in Appendix A12.1 in Volume 3 of this EIAR. Given the connectivity between this assessment and the FRA, a summary of the baseline flood risk and the assessment of future risk from the FRA is provided in this Chapter for ease of reference. The FRA has been prepared in accordance with the Flood Risk Guidelines (DEHLG and OPW 2009).

The FRM Guidelines define three Flood Zones:

- Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% Annual Exceedance Probability (AEP) or 1 in 100 year for river flooding or 0.5% AEP or 1 in 200 for coastal flooding);
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% AEP or 1 in 1,000 year and 1% AEP or 1 in 100 year for river flooding and between 0.1% AEP or 1 in 1,000 year and 0.5% AEP or 1 in 200 year for coastal flooding); and
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP or 1 in 1,000 for both river and coastal flooding). Flood Zone C covers all areas which are not in Flood Zone A and Zone B.

The majority of the Proposed Development is located in Flood Zone C, apart from localised areas in close proximity to watercourses. A detailed baseline assessment of flood risk, including flood zone mapping, is provided in Appendix A12.1 in Volume 3 of this EIAR.

12.3.7 Summary of Receptor Importance

Table 12.7 provides an indication of importance for the identified receptors based on NRA Guidelines as discussed in Section 12.2.4.

Table 12.7: Summary of Scoped in Baseline Receptor Importance.

Water Body ID	Attributes	Indicator/Feature	Importance
Dunboynestream_010	Hydrology and Surface Water Quality	Water body has poor WFD status and is >5km from European or national designated sites.	Low
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of potentially mobile gravels a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Rye Water_030	Hydrology and Surface Water Quality	Water body has poor WFD status and is >5km from European or national designated sites.	Low
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of potentially mobile gravels. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Tolka_020	Hydrology and Surface Water Quality	Water body has a moderate WFD status and is >5km from European or national designated sites. Supports populations of salmonids.	High
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Pinkeen_010	Hydrology and Surface Water Quality	Water body has a moderate WFD status and is >5km from European or national designated sites.	Medium
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium

Water Body ID	Attributes	Indicator/Feature	Importance
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Ward_020	Hydrology and Surface Water Quality	Water body has a moderate WFD status and is >5km from European or national designated sites.	Medium
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Ward_010	Hydrology and Surface Water Quality	Water body has poor WFD status and is >5km from European or national designated sites.	Low
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Ward_030	Hydrology and Surface Water Quality	Water body has Moderate WFD status and is >5km from European or national designated sites.	Medium
	Hydromorphology	Water body appears to generally be in natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Sluice_010	Hydrology and Surface Water Quality	Water body has poor WFD status and is >5km from European or national designated sites.	Low
	Hydromorphology	Water body appears to generally be in natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Mayne_010	Hydrology and Surface Water Quality	Water body has poor WFD status and is >5km from European or national designated sites.	Low
	Hydromorphology	Water body is modified and is engineered. However, displays some evidence of natural features indicating an attempt to recover to a natural equilibrium.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Unnamed Watercourses 1 to 35	Hydrology and Surface Water Quality	Water body is not designated under WFD and is >5km from European or national designated sites.	Low
	Hydromorphology	Water bodies are straightened and channelised with potential to be largely constrained by hard engineering or lack of morphological diversity in features and process. Watercourses may be subject to drying up during summer months.	Low
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A

12.4 Potential Impacts

This Section presents potential impacts that may occur due to the Proposed Development on the identified and in-scope receptors. All potential impacts are identified in the absence of control measures or mitigation. The assessment informs the need for mitigation and / or monitoring measures, which are presented in Section 12.5. Section 12.6 presents the predicted residual impacts, following the implementation of these mitigation and / or monitoring measures.

12.4.1 'Do Nothing' Scenario

If the Proposed Development does not go ahead, there will be no change to baseline surface water conditions as a result of the Proposed Development. The impact would therefore be Neutral.

12.4.2 Construction Phase

Key infrastructure and construction activities required for the Proposed Development are described in detail in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR. The proposed construction timeline, the location of Temporary Construction Compounds (TCCs) and Horizontal Directional Drilling (HDD) Compounds, the duration of any necessary traffic diversions, hours of working and numbers of personnel involved are also outlined in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR.

Given the nature of the Proposed Development, the potential for impacts on the water environment, is for the most part, associated with the Construction Phase, and are similar to any civil engineering project. These include potential impacts on:

- Surface water quality from sediment runoff, spillages, discharges or physical modification;
- Drainage patterns from formation of impermeable surfaces and working in or near water bodies;
- Working within water bodies and disturbing natural bed material and features; and
- Flood risk.

Construction impacts for the proposed cable route are assessed based on the construction methodology provided in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR. This involves open cut trenching, and such construction methods will require the provision of a dry working area. Provision of a dry working area will be undertaken using techniques outlined in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. These techniques include temporary watercourse diversions (where practicable i.e. where there are no topographical or space constraints), fluming and over pumping. Where watercourses are flumed or over pumped, the dry works area will be isolated by installing an impermeable barrier between the watercourse and the works area. The impermeable barrier will be tailored to the watercourse in question. Techniques will include the use of inflatable dams, frame dams, or sandbags in smaller watercourses. For larger watercourses, water will be carried over or around the isolated dry works area.). It is noted that consultation with IFI indicates that temporary diversions are preferred, with fluming second to this and over pumping least preferred. Therefore, the appointed contractor will consult IFI prior to a final decision being made on water crossing techniques.

Where possible, provided that there is no risk of excessive scour and favourable topographical and space constraints, any temporary diversions will be within the footprint of the existing channel. Where temporary diversions are not achievable due to space or topographic constraints, fluming or over pumping will be utilised. This will have a direct impact on the cross section of the channel and is expected to give rise to localised changes in water depth, velocities and sediment erosion / deposition. Once the underground cable crossing is completed, the landscape will be restored as described in Chapter 4 (Proposed Development Description) Section 4.5.2.5 in Volume 2 of this EIAR. These works will include riverbank stabilisation, gravel replacements, bank reprofiling and vegetation planting should they be required post construction. In all cases, the site will be restored post-installation as described in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.

Construction impacts have been assessed based on the above construction methodology. Such methods allow the provisions of a dry working area whilst maintaining downstream flows.

12.4.2.1 Hydrology

12.4.2.1.1 Impact 1 – Changes in Surface Water Drainage Pathways

The proposed activities may result in localised changes to surface water drainage patterns and restrictions to infiltration of rainfall in soils. Given the largely rural locations of the Proposed Development, existing drainage networks are available, and any disturbance will be localised and temporary in duration. Surface water contributions will remain unchanged and will likely discharge to the same catchment.

12.4.2.2 Surface Water Quality

12.4.2.2.1 Impact 2 – Contaminated Runoff and Release of Sediment

Excavation works and works associated with the creation of the proposed cable route, Passing Bays and Joint Bays, alongside the storage of excavated material, vegetation clearance, crossing of water bodies and infilling of trenches can pose a risk to surface water quality through the potential for contaminated surface water runoff and the release of sediment to water bodies. In addition, surface water quality may be impacted by open cut trenching, either by the direct crossing of a water body, or from crossings in close proximity to water bodies. Elevated levels of sediment would impact on water quality by affecting dissolved oxygen, pH, turbidity, nutrient levels, and temperature, all of which have the potential to have negative impacts on aquatic species. The construction of below-ground structures, such as Joint Bays, may require dewatering (depending on ground conditions and water table elevations at the time of excavation), and any associated discharges from groundwater to surface water bodies which have the potential to alter baseline water quality.

Working adjacent to water bodies and along the bank top can induce sediment-laden runoff as a result of destabilisation and erosion of the banks due to heavy plant and machinery.

12.4.2.2.2 Impact 3 – Increased Erosion of Exposed Surfaces

The use of construction vehicles and machinery can cause increased erosion of exposed surfaces, which once exposed to rainfall, can result in excessive volumes of eroded material entering surface water features. Excessive sediment-laden runoff may potentially have a negative impact on water quality. Proposed access tracks used to facilitate construction may affect surface runoff patterns, creating alternative flow paths and may promote erosion of previously unaffected areas.

12.4.2.2.3 Impact 4 – Accidental Release of Polluting Materials

An accidental release of potentially polluting substances such as cement and oils (hydrocarbons) can result in significant impacts on the surface water environment and associated aquatic environment. The release of hydrocarbons from accidental spillages from plant, vehicles and machinery may result in a deterioration to water quality including a reduction in dissolved oxygen. This can have a negative impact on any water-dependant species present. The immiscible nature of hydrocarbons will hamper dilution until degradation is achieved.

Concrete and cement are highly alkaline and fresh concrete has corrosive properties. Concrete wash water is a particularly severe pollutant, as it typically has a high pH (11-12) coupled with extremely high suspended sediment content. In the freshwater environment, pH levels which are elevated beyond natural conditions can have significant impacts upon water bodies.

During the Construction Phase, TCCs (including HDD Compounds) will be required along the Proposed Development. All wastewater will be collected in sealed tanks and taken off site for appropriate disposal by licensed waste contractors.

12.4.2.3 Hydromorphology

12.4.2.3.1 Impact 5 – Changes in Water Depth and Channel Cross-Section

Open cut trenching will be carried out in the dry works area which will be achieved through the installation of an impermeable barrier, the type of which will be tailored to the specific water body. The existence of a temporary impermeable barrier to facilitate open cut trenching will have a direct impact on the cross section of the channel. This is likely to give rise to localised but temporary changes in water depth and flow velocities with the potential for subsequent changes in sediment transport, erosion and deposition. This will occur over the Construction Phase, and for a short time (1 to 7 years) post-construction as the water bodies re-equilibrate.

12.4.2.3.2 Impact 6 – Removal of Riparian Vegetation

Vegetation clearance / topsoil stripping and tracking of plant and machinery within a water body floodplain and along banks has the potential to increase fine sediment delivery to water bodies through accelerated fluvial activity causing an increase in the rate of bank erosion. Construction within the floodplain leading to possible reduction in riparian corridor extents and composition along water bodies, reduction in habitat diversity, bank stability and increased risk of bank retreat. In-channel construction associated with open cut trenching can lead to the removal of natural bed substrate and natural morphological features and disruption to lengths of natural bank.

The changes to water body hydromorphology may potentially lead to changes in river processes and habitats upstream and downstream. Such impacts would occur on a local scale and will be short-term over the Construction Phase. However, impacts may be extended for a short term beyond the Construction Phase until vegetation re-establishes.

12.4.2.3.3 Impact 7 – Temporary Culverting for Construction Access

Temporary culverting to facilitate construction access has the potential to induce changes to the channel bed, banks substrate and flow patterns through accelerated fluvial activity causing an increase in the rate of bed and bank erosion and a reduction in habitat ecological connectivity.

<u>Construction Traffic</u>

The Proposed Development will cross three motorways (M1, M2 and M3), and a further 10 regional and local roads are expected to be affected by temporary traffic management (TTM) measures. No disruption to access is anticipated for the M1, M2 and M3 Motorways as trenchless techniques will be used to avoid direct impacts on these routes. The regional and local roads which may be affected include the R156, R157, R147, L5026 Pace, L010 Nuttstown Road, Priestown Road, Kilbride Road, the R121, R122, Kilreesk Road, R108, Naul Road and Stockhole Lane. Figure 14.5 in Volume 4 of this EIAR shows the location of regional and local roads likely to be affected by TTM measures. TTM could increase vehicle traffic on roads which would not normally experience such levels of traffic and this could lead to increased pollutant loadings from general road pollutants being washed into watercourses.

As stated, these will be temporary (limited to the Construction Phase) and will be captured by the existing road drainage network. Therefore, no significant impacts are anticipated.

12.4.2.4 Surface Water Supply

As identified within the baseline, there are no known surface water abstractions within the study area. Additionally, none of the WFD designated water bodies are designated as drinking water protected rivers, nor are they hydrologically connected to such within 5km of the Proposed Development. Therefore, no impacts to surface water supply are anticipated. This is therefore scoped out of further assessment for both the Construction and Operational Phases.

12.4.2.5 Construction Phase Impacts on Scoped in Receptors

Table 12.8 identifies the potential Construction Phase impacts on the identified and in scope receptors. Note that the unnamed watercourses were not visited as part of the site survey and have been determined using OS mapping. In some cases, OS mapping indicates unnamed non-designated and some WFD designated watercourses immediately downstream of existing road crossings but does not map them upstream. Where this is the case, it has been assumed that there is an upstream channel, but it is either not mapped and / or not designated.

Table 12.8: Potential Pre-Mitigation Impacts on Specific Water Features – Construction Phase

<table>
<tr><th>Water Body</th><th>Water Body Crossing</th><th>Attribute</th><th>Description of Specific Construction Impacts on Water Feature (without mitigation)</th><th>Importance</th><th>Magnitude</th><th>Significance</th></tr>
<tr><td rowspan="4">Dunboyne Stream_010</td><td rowspan="4">WCP01, WCP02</td><td colspan="5">Main activities:
• Excavations and construction activities within 50m of water body to form trenching for cable laying;
• Formation and use of construction compound TCC2 and access adjacent to the water body;
• Formation of temporary access culvert; and
• Open cut trench crossing of water body.</td></tr>
<tr><td>Hydrology</td><td>Potential hydrology impacts include:
• Impact 1 – disruption to local drainage systems due to diversions required to accommodate the construction works; and
• Impact 3 – increases in surface water run-off and discharge to the water body due to increased impermeable area from construction access tracks.
The above impacts will be short-term and at a localised scale. Fluming or over pumping of the channel will be required to provide a dry working area to construct the cable crossing. This will maintain downstream flows. Therefore, the magnitude of impacts is reported as Negligible.</td><td>Low</td><td>Negligible</td><td>Imperceptible</td></tr>
<tr><td>Surface Water Quality</td><td>Potential surface water quality impacts include:
• Impact 2 – increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing and to excavate around the existing culvert on WCP2 to allow for the proposed cable route; also, increased risk of sediment pollution from disturbed riverbed and bank material during construction; and
• Impact 4 – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body.
• Impact 7 – temporary construction access crossing risk of changes to morphological features, process and ecological connectivity as a result of temporary culverting.
These impacts are short-term in nature and will be confined to the construction phase. Impacts will be on a localised scale but will have the potential to impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as Large Adverse.</td><td>Low</td><td>Large Adverse</td><td>Moderate</td></tr>
<tr><td>Hydromorphology</td><td>Potential hydromorphology impacts include:</td><td>Medium</td><td>Large Adverse</td><td>Significant</td></tr>
</table>

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing and temporary culvert. Provision of a dry working area and excavations required for the cable trench will temporarily remove flow from a section of channel and would also remove natural bed substrate. The requirement for temporary culverting will constrain channel cross sectional area over the culvert footprint and duration of the works; and • **Impact 6** – works within the vicinity of and along the banks, is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Large Adverse**.			
Rye Water_030	**N/A**	**Main activities:** • Excavations and construction activities within 100m of water body to form construction compound TCC1; and • Operation of TCC1 during construction period.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1** - disruption to local drainage systems due to diversions required to accommodate the construction compound and access; and • **Impact 3 –** increases in surface water run-off and discharge to the water body due to increased impermeable area from construction compound and access tracks. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. This would maintain downstream flows. Therefore, the magnitude of impacts is reported as **Negligible**.	Low	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during near channel works; and • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a reach scale but would have the potential to impact the water body	Low	Medium Adverse	Slight

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			downstream. Without mitigation the need for working and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Medium Adverse.**			
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, are likely to remove riparian vegetation, altering and destabilising channel banks, However the location for the works is approximately 100m from the water body, and therefore riparian vegetation removal is unlikely. Given the above, without mitigation, the magnitude of impact is reported as **Negligible**.	Medium	Negligible	Imperceptible
Tolka_020	**WCP03, WCP04**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; • Formation and use of construction access adjacent to the water body; • Open cut trench crossing of water body; and • Upgrades to the Woodland substation which would require working adjacent to the water body.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works; and • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. This would maintain downstream flows. Therefore, the magnitude of impacts is reported as **Negligible**.	High	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:**	High	Large Adverse	Very Significant

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing. Increased risk of sediment pollution from disturbed riverbed and bank material during construction; and • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale but would have the potential to impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**			
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**	Medium	Medium Adverse	Moderate
Pinkeen_010	**WCP05**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; • Formation and use of construction access adjacent to the water body; and • Open cut trench crossing of water body.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works; and	Medium	Negligible	Imperceptible

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. This would maintain downstream flows. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. Therefore, the magnitude of impacts is reported as **Negligible**.			
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction; and • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale but would have the potential to impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**	Medium	Large Adverse	Significant
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, are likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse**.	Medium	Medium Adverse	Moderate

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
Ward_010	**WCP6, WCP07, WCP08**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; • Formation and use of construction access adjacent to the water body; and • Open cut trench crossing of water body. There are two crossings on this water body located on separate tributaries which converge downstream of Belgree Road.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works; and • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. This would maintain downstream flows and discharge from runoff. Therefore, the magnitude of impacts is reported as **Negligible**.	Low	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction of the open cut trenching and dry working area; and • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale on both tributaries and would have the potentially to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**	Low	Large Adverse	Moderate
		Hydromorphology	**Potential hydromorphology impacts include:**	Medium	Medium Adverse	Moderate

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**			
Ward_020	**WCP09, WCP10, WCP11**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; and • Open cut trenching of the water body;				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works; and • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. This would maintain downstream flows and discharge from runoff. Therefore, the magnitude of impacts is reported as **Negligible**.	Medium	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction of the open cut trenching and dry working area; and	Medium	Large Adverse	Significant

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a reach scale on both tributaries and would have the potentially to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**			
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**	Medium	Medium Adverse	Moderate
Ward_030	**WCP12, WCP13, WCP14**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; • Construction and use of HDD Compound and construction access; • Open cut trenching of the water body; and • This water body would be crossed in three separate locations (outwith existing road crossings).				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works and HDD compound; and • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding.	Medium	Negligible	Imperceptible

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. This would maintain downstream flows and discharge from runoff. Therefore, the magnitude of impacts is reported as **Negligible.**			
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction of the open cut trenching and dry working area; • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale on both tributaries and would have the potentially to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**	Medium	Large Adverse	Significant
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, and is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts Are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**	Medium	Medium Adverse	Moderate
Sluice_010	**WCP15**	**Main activities:**				

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
		• Excavations and construction activities within 50m of water body to form trenching for cable laying; • Construction and use of HDD Compound and construction access; • Open cut trenching of the water body;				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works, HDD Compound Joint Bay formation and open cut crossing; • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding; and The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. This would maintain downstream flows. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. Therefore, the magnitude of impacts is reported as **Negligible.**	Low	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction of open cut trenching and the dry working area; • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale on both tributaries and would have the potentially to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**	Low	Large Adverse	Moderate
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features;	Medium	Medium Adverse	Moderate

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, and is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**			
Mayne_010	**WCP16**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying and Joint Bay formation; and • Open cut trenching of the water body; • Formation and use of construction access adjacent to the water body; and • Upgrade to Belcamp Substation adjacent to the water body including formation of TCC6				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction of the TCC6 and the upgrades to Belcamp Substation; and • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding; The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. This would maintain downstream flows. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. Therefore, the magnitude of impacts is reported as **Negligible.**	Low	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction of open cut trenching and the dry working area;	Low	Large Adverse	Moderate

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale on both tributaries and would have the potential to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**			
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2** – potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, and is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**	Medium	Medium Adverse	Moderate
Offroad Unnamed Watercourse crossings: Unnamed Watercourse 1, 2, 3, 28, 29, 33A, 34, 35	**N/A**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying and Joint Bay formation; and • Open cut trenching of the water body; and • Formation and use of construction access adjacent to the water body.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1** – disruption to local drainage systems due to diversions required to accommodate the construction works Joint Bay formation and open cut crossing; and • **Impact 3** – increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing.	Low	Negligible	Imperceptible

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			This would maintain downstream flows. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. Therefore, the magnitude of impacts is reported as **Negligible.**			
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing, Passings Bays (where within 50 m of UNWC's) and Joint Bays. Increased risk of sediment pollution from disturbed riverbed and bank material during construction of the open cut trench; and • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale on both tributaries and would have the potential to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Medium Adverse.**	Low	Medium Adverse	Slight
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6 –** works within the vicinity of and along the banks, and is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**	Low	Medium Adverse	Slight

12.4.2.5.1 Construction Impacts for Proposed 'In-Road' Water Body Crossings

There are 33 locations where the proposed cable route will cross an existing water body or unnamed watercourse where that water body/watercourse is already crossed by the existing road network. A list of these crossing types is provided in Table 12.5 and Table 12.6. The potential Construction Phase impacts in these locations will differ from the ones listed in Table 12.8.

At existing road crossings, the water bodies are culverted and will therefore be sealed from potential increases in silty runoff over the culvert footprint. Additionally, due to the culvert structures, the water bodies do not have natural banks or riparian zone and therefore runoff due to erosion and removal of riparian vegetation would not occur. This can also be said for the disturbance of natural bed material which is unlikely to be present within the culverts. If natural bed material is contained within the culverts, then this would remain sealed from the works area by the culvert and therefore will not be impacted.

There is the potential for works in the road immediately before or after existing culvert crossings to generate silty runoff which could enter the upstream / downstream channel out with the culvert. Any runoff generated from the works will be captured within existing road drainage, where present.

Based on the above, the magnitude of impact for hydrology, surface water quality and hydromorphology for the water bodies which the Proposed Development will cross within the existing road structure is reported as Negligible. This results in an Imperceptible significance of impact for all water bodies associated with in-road crossings.

12.4.3 Operational Phase

During the Operational Phase of the Proposed Development, all new cable infrastructure will be located below-ground and will not interface with surface water receptors.

There is a requirement for a permanent crossing of the Dunboyne Stream_010 to allow for the provision of the new permanent access track extending north from the R156 Regional Road to Joint Bay 1. At the time of writing, there is little design information available on the arrangement and type of watercourse crossing (i.e., culvert or bridge). Further work will be undertaken at the detailed design stage to develop the crossing design. Therefore, for the purpose of this EIAR, as a precautionary approach, it is assumed that the crossing will take the form of a pipe culvert. It is assumed that the temporary culvert (for the proposed construction access track) will also form the operational culvert upon completion.

12.4.3.1 Hydrology and Surface Water Quality

During the Operational Phase of the Proposed Development, all new cable infrastructure will be located below-ground and will not interface with surface water receptors. As the land will continue to drain as per the existing situation along the proposed cable route, significant adverse impacts on drainage infrastructure as a result of the Proposed Development are not anticipated.

The proposed substation upgrades at Belcamp and Woodland are upgrades that will occur within the existing substation footprints in the context of existing grid infrastructure. The substations will continue to function as they do under baseline conditions (in terms of the surface water environment) with no changes to existing or new discharges. Therefore, no operational impacts are anticipated.

12.4.3.2 Hydromorphology

Site restoration works will be carried out following completion of any water body crossings, as described in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR), to baseline conditions or to provide betterment, thereof. All restoration will be in agreement with IFI. These works will include riverbank stabilisation, gravel replacements and replacements of local riparian vegetation etc. Each water body crossing location will be restored post-installation. The upgrades to the substations at Belcamp and Woodland will be contained within the existing substation footprints and will not encroach on any water body. Any riparian vegetation removed during construction will be reinstated and is expected to recover.

During the Operational Phase of the Proposed Development all new cable infrastructure will be located below-ground and will not interface with surface water receptors.

Given the need for a permanent culvert crossing of Dunboyne Stream_010, there is the potential for changes in the baseline hydromorphology of the water body. The crossing will cause a permanent removal of the bed and banks over the crossing footprint. There will be a loss of lateral and longitudinal fluvial and ecological connectivity and the removal of hydromorphological features over the culvert footprint. The culvert also has the potential to alter channel flow patterns through the slackening or steepening of channel gradients. This has the potential to lead to downstream erosion and instability of the natural channel, with the potential for erosion to migrate upstream. This will be a permanent and initially localised impact, with the potential for erosion to migrate upstream to the culvert. The magnitude of impact is therefore reported as **Large Adverse** and given the sensitivity of the receptor this equates to a Significant magnitude of impact.

12.5 Mitigation and Monitoring Measures

12.5.1 Construction Phase

12.5.1.1 Mitigation Item 1 – General Mitigation

The following mitigation measures will be implemented prior to commencement, and throughout the duration of the Construction Phase:

- The Construction Environmental Management Plan (CEMP), (which is included as a standalone document in the planning application pack), and its associated appendices (Appendix C - Construction Resource Waste Management Plan (CRWMP) and Appendix D - Surface Water Management Plan (SWMP)) will be implemented in full. General measures to control and manage activities, surface water, drainage and waste at the surface to prevent issues are outlined within Sections 1 to 5 of the SWMP and Sections 1 to 4 of the CEMP. The measures include general mitigation to control accidental spillage or increased runoff as a result of hardstanding or precipitation infiltration into stockpiles, exposed soils and silt;
- A full-time on-site Environmental Clerk of Works (EnCoW) will be appointed prior to the commencement of works. The role of the EnCoW will be to monitor and report on compliance with planning consents, environmental permits, legislation and mitigation. The EnCoW will be experienced in the types of construction works that are being carried out;
- Works will be carried out in accordance with the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (IFI 2016);
- Works method statements will be agreed with IFI for all water body crossings, prior to works commencing at each crossing. The works method statement will include details on monitoring requirements for instream concrete pouring works and handheld turbidity monitoring for instream works. The method statements will ensure that:
    - Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to ensures it is fit for purpose;
    - Established concrete washout management areas will be designated to control the discharge of concrete washout;
    - An emergency response plan will be developed and communicated to site staff prior to the concrete pouring;

- The EnCoW and on-site personnel will monitor the concrete pour continuously, ensuring that any spills are promptly addressed and mitigated; and
- The EnCoW will conduct a thorough inspection of the site after the concrete pour to identify any environmental impacts and implement clean-up measures if necessary.

- An adverse weather stop work plan will be developed to ensure that activities with the potential to cause pollution are stopped under certain weather conditions. Met Éireann (red, amber, yellow) warnings will be monitored daily by the EnCoW by accessing the Met Éireann website (Met Éireann 2024). Works will be stopped where red weather warning are issued. Where an amber weather warning is issued, works will be monitored by the EnCoW and stopped where deemed appropriate based on the site conditions.

12.5.1.2 Mitigation Item 2 - Surface Water Quality Protection Measures

The following surface water quality mitigation measures will be implemented prior to commencement, and throughout the duration of the Construction Phase. Works will only be completed outside of any known seasonal restrictions including instream working restrictions which are generally confined to the summer/early autumn season (i.e., June / July / August / September):

- Activities will be planned in advance and machinery will be managed to ensure that the number of trips is limited to the minimum required at each location;
- A buffer zone of 20m will be maintained between storage and working areas and WFD designated water bodies (as listed in Table 12.7), taking account of the minimum working area required to facilitate the works;
- Oil or fuel stored in or adjacent to the works area will be kept in a bunded area (providing 110% capacity of the largest storage unit), at a minimum distance of 20m from any WFD designated water body, or any non-designated water body that appears on a 1:50,000 OS map. This will include all unnamed watercourses as listed in Table 12.7;
- Tracking beside streams and tracks will be avoided where practicable to avoid damage to the bankside. Where tracking of plant and machinery is necessary, steps will be taken to reduce the impact to channel banks through the provision of track mats to reduce the impacts on the substrate;
- Geotextile or timber matting will be used on soft ground unless the EnCoW advises, before or after monitoring, that use of a wide-tracked machine alone, will produce relatively lower siltation risk, than the installation and removal of bog mats;
- The time period over which areas of clearance are left open will be reduced insofar as is reasonably practicable;
- Re-instatement method statements will be subject to approval by the EnCoW. Species local to the surrounding area will be used in the reinstatement for any vegetation lost during construction, as described in Chapter 10 (Biodiversity) in Volume 2 of this EIAR;
- Concrete will be brought to site by covered truck;
- Wet concrete operations adjacent to water bodies will be avoided, where possible, with a minimum separation distance of 20m, with exception to in-stream pours which will be undertaken within a sealed dry working area. The appointed contractor will ensure that all concrete truck washing / cleaning is undertaken off site, where possible, and remote from water bodies or potential pathways to water bodies;
- In order to reduce the risk of contamination arising as a result of spills or leakages, measures including, but not limited to, the following will be employed:
    - All collected waste will be managed in accordance with Number 10 of 1996 - Waste Management Act, 1996 (as amended), and all associated Regulations;
    - Fuels, chemicals, liquid and solid waste will be stored on impermeable surfaces;
    - All tanks and drums containing potentially polluting materials will be bunded;

    - Refuelling of plant, equipment and vehicles will be carried out on impermeable surfaces; and
    - All tanks will be marked with the substances they are carrying. Tanks will not be emptied and refilled with another substance (i.e. emptied of fuel and refilled with water) prior to appropriate cleaning and removal of contaminating substances.
- Spill kits will be provided at all compound locations and carried by all crews during underground cable installation works. Spill kits will be of adequate size for the volume of substances being carried;
- The Emergency Incident Response Plan and environmental control and mitigation measures described in the CEMP will be agreed prior to construction with IFI; and
- Water pumped from the dry works areas and dewatering will be treated using settlement tanks to remove sediment prior to discharge onto grass and allowed to filter back to water body

12.5.1.3 Mitigation Item 3 - Silt Control Measures

- Silt control measures will be used to control silt generated from activities on-site and prevent it gaining access to surface drainage which could convey silt to larger streams and water bodies;
- Silt traps will be located in small drains where flow is small and silt fences will be located where runoff from large areas needs to be controlled;
- Silt fences will be installed in the working areas and not at the water body;
- Where distances between the works and water body allow, a minimum setback distance of 20m from the water body will be maintained;
- Proposed construction access routes will be delineated, such that an appropriate set back distance from water bodies is maintained;
- Where an appropriate set back distance cannot be maintained, and works are to be undertaken adjacent to water bodies, the setback distance will be delineated and monitored by the EnCoW on-site;
- Where the site is constrained, the best available set back distance will be determined by the EnCoW, taking account of the minimum working area required to facilitate the works;
- Clearing and stripping of topsoil or existing roads and footpaths that expose underlying granular layers at each phase of works will be delayed as long as possible, and will be carried out shortly before construction begins; and
- Cut-off ditches, berms or diversion channels will be utilised around working area boundaries, where possible, to limit surface water entering the excavated areas and silty water running off the site into surface water drains or watercourses.

12.5.1.3.1 Silt Traps

The purpose of a silt trap is to reduce the level of solids in slow flowing water. The silt trap works by allowing a build-up of water behind it slowing the flow and allowing solids to settle out. The following requirements will apply during the Construction Phase:

- Silt traps will be placed in drains downstream of working areas where the volume of water flow is expected to be low and will be identified on-site by the EnCoW;
- Silt traps will be made of terram, not mesh;
- The silt trap will be staked into the banks of the drain / water body, such that no water can flow around the sides;
- The material will be bedded into the drain bed / water body to prevent water flowing beneath it;
- The height of the trap will be lower than the bank heights. The upper edge will be fixed to a timber cross piece. This will allow water to overtop the silt trap and not burst through or around it;

- Inspections will be carried out daily during the proposed Construction Phase works by the EnCoW, and after heavy rains and / or strong winds; weekly on completion of the works for at least one month, and monthly thereafter until bare areas have developed new growth;
- Any build-up of solids will be carefully removed without removing any vegetation growing on the bottom;
- The silt trap will not be pulled from the ground but cutaway at ground level and posts removed; and
- A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package.

12.5.1.3.2 Silt Fences

The following measures will be implemented in relation to silt fences during the Construction Phase:

- Silt fences will be installed prior to the commencement of works and will be inspected daily by the site team and EnCoW to inform adaptive management, as required. The locations of the same will be determined by the EnCoW;
- Site restoration post-works will be carried out, in agreement with IFI. These works will include riverbank stabilisation, gravel replacements, bank profiling and planting where required. In all cases, the site will be restored post-installation;
- Silt fences will be installed downslope of the area where silt is being generated;
- The silt fence will contain the area where silt is generated and will terminate on high ground (i.e., an elevated area not adjacent to any watercourse);
- The base of the silt fence will be bedded at least 15cm to 30 cm into the ground at 2m intervals. The manufacturer's installation instructions will be followed during installation to ensure that the silt fence is appropriately installed;
- Once installed, the silt fence will be inspected regularly by the EnCoW, daily during the proposed Construction Phase works, and regularly on completion of the works until bare areas have developed new growth, but particularly after heavy rains and / or strong winds. Any defects will be rectified immediately;
- Two lines of silt curtain / fence will be installed for the receptors outlined in Table 12.7, unless otherwise agreed by the EnCoW;
- Any build-up of sediment along the fence boundary will be removed daily;
- Silt fences will be maintained until vegetation on the disturbed ground has re-established;
- The silt fencing will be left in place until the works are completed (which includes removal of any temporary ground treatment) and will remain in place until bare areas have developed new growth;
- Silt fences will not be removed during heavy rainfall;
- The silt fence will not be pulled from the ground but cutaway at ground level and posts removed; and
- A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package.

12.5.1.4 Mitigation Item 4 - Construction Compounds / Laydown Areas

All proposed TCCs and HDD Compounds will be secured with hoarding / fencing around the compound perimeters, as appropriate. Where temporary construction areas are required and existing hardstanding is not available, engineered stone fill will be laid, compacted, and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed, and the land will be reinstated to its original condition. Temporary facilities will be provided at the TCCs / HDD Compounds, including Construction Phase car parking and welfare facilities and temporary material storage areas, as necessary.

Where a construction access route is required, engineering stone fill will be laid and compacted and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed, and the land will be reinstated to its original condition. All construction workers will be required to use the designated access / egress routes only. Storage of fuel and refuelling will be undertaken within bunded areas.

Any discharges from temporary welfare facilities will be connected to either the existing sewage network (where available) or to a sealed holding tank to be emptied and disposed of off site by a licensed contractor to an approved licensed facility.

Storage of fuel and refuelling will be undertaken within bunded hardstanding areas. Water will be brought to site via tankers, as required. Where a potential flood event is forecast, plant and materials vulnerable to flooding in any 'at risk' compounds areas will be relocated to parts of the compound that are considered to be not at risk of flooding.

12.5.1.5 Mitigation Item 5 - Open Trench Water Crossings

As with all construction works proposed, no works on water bodies will be allowed to commence until the relevant Risk Assessment Method Statements (RAMS) and pertinent Health and Safety documents are received from the specialist appointed contractor and are reviewed and agreed by the Client's representative. The appointed contractor documents will include method statements, open trenching risk assessments and environmental management plans specific to the area where the trenching is to take place. These plans will be submitted by the appointed contractor to the Employer's Representative on-site for review and comment, prior to commencing open trench operations. In addition to this, for the in-channel crossings, the appointed contractor will be required to prepare detailed construction method statements. Such method statements will be provided to IFI for approval.

All open trenched water body crossings will take place during the June to September period in order to avoid the period of salmon and trout spawning, unless otherwise agreed with IFI. Consultation to-date with IFI indicates that for the crossings of the Tolka_020 (WB06), as a minimum, instream timing restrictions will apply as per the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (IFI 2016).

The ground preparation works (such as soil stripping and hardstand formation) adjacent to the water body crossing will be carried out in the same manner as that for other works activities. All clean coarse surface material (gravel, cobbles and boulders) on the riverbed or stream to a depth of 30cm will be removed. Where a depth of 30cm is not present, the full depth of the layer will be removed to where the substrate is mainly clay or sand. Any natural bed substrate removed from water bodies will be stored separately to other stockpiled material and covered with suitable waterproofing (geotextile base and cover) to prevent the washing out of fines such that they can be reinstated upon completion of the works.

Design options considered for open cut crossings include the following:

- Temporary watercourse diversions;
- Fluming; and
- Over pumping.

An exercise was undertaken to look at the required space needed to temporarily realign the channels during construction, and this concluded that temporary realignment would not be feasible within the footprint of the Proposed Development due to the limited space available within the planning application boundary and / or the presence of nearby infrastructure. Following consultation with IFI to-date, fluming was agreed to be the preferred option to over pumping (see Section 3.5.2.4 in Chapter 3 (Consideration of Reasonable Alternatives) in Volume 2 of this EIAR).

Where sites can be flumed, the diameter of the flume pipe will be chosen to accommodate flows at the time, with spare capacity to cover that predicted over the period that the works are expected to last. A clay material will be used around the flume pipe to create a seal and prevent leakage and loss of flow volumes. Image 4.21 in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR includes an example graphic of a typical flume pipe crossing.

Where fluming cannot be achieved, and damming and pumping methods are to be used for open trenching, sandbags will be used with an impermeable barrier. Material excavated from the trench (and an upstream pump sump, if required) will be placed on terram on level ground as far back from the water body edge, as is practicable, and surrounded on its downslope side by a silt fence and / or impermeable berm to prevent material re-entering the water body. This material, if deemed suitable, can be used to partially backfill the trench. However, a significant amount of material will be in excess and will be removed from site by a suitably licensed handler to a suitably licensed facility. All pumps will be monitored on a daily basis, and if failure occurs, pumps will be repaired or replaced as soon as possible.

Dewatering of the excavation will be treated on-site, and where necessary, pumps will be used to remove excess water from excavations. De-watering volumes will be treated using settlement tanks before the settled water is returned to the water body. A second tank in series with the first will be used if the first is not sufficient to remove enough solids. Pumped over water will be directed to a splash plate to prevent erosion of the riverbed / bank at the downstream outlet.

The natural bed material removed which was set aside will be used to reinstate the stream bed after the ducts have been installed and the flume pipe has been removed, as well as all the damming materials. The stream bed will be reinstated at the same level and grade as it was prior to the works to ensure that there are no changes in channel bed gradient.

All bank surfaces will be reinstated using biodegradable stabilising materials (e.g. coir matting), which will be allowed to degrade and revegetate naturally from wind-blown seed. A silt fence will be placed along the riverbank where the works were undertaken to prevent solids washed off during heavy rainfall from entering the stream while the surface re-vegetates. This measure will be particularly important at sites which slope to the edge of the water body. Visual monitoring, supported by visual turbidity monitoring of receiving waters, will be conducted by appointed contractor’s EnCoW for the duration of the works. Post-reinstatement, weekly monitoring will also be undertaken until vegetation is established.

Where temporary culverts are required, they will be designed with input from a fluvial geomorphologist during the detailed design phase. At a minimum they will:

- Not lead to changes in channel gradient upstream, through and downstream of the structure;
- Have buried inverts and be embedded with material removed from the channel during construction. This will aid in maintaining fluvial process and ecological connectivity;
- For the detailed design of the crossing structure, climate change will be considered to ensure the culvert is adequately sized.

12.5.2 Pre-Construction / Detailed Design

In relation to the proposed permanent crossing of the Dunboyne_010 water body, an options appraisal will be undertaken at the detailed design stage to outline the most appropriate crossing methodology. Mitigation Item 6 is provided based on a culverted crossing method (a precautionary approach, as described in Section 12.4.3). For clarity, bridge crossing mitigation measures are provided in Mitigation Item 7, should a bridge crossing be selected as the most appropriate option at the detailed design stage.

12.5.2.1 Mitigation Item 6 – Permanent Culvert Crossing

In relation to the proposed permanent culvert crossing on Dunboyne Stream_010, the detailed design stage will consider the following:

- The culvert will be positioned on the straightest part of the water body and aligned with the water body bed in this location;
- Culvert lengths will be the minimum required to facilitate the crossing;
- Bottomless or clear span culverts will be favoured during the detailed design stage with respect to closed pipe culverts;
- All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse (and will be agreed with IFI during the detailed design stage);
- Where possible, pre-cast elements for culverts and concrete works will be used;
- Culverts will be installed such that, where practicable, they align with the existing channel gradient and maintain existing channel width. This will help to ensure adequate water depth and velocity for fish passage;
- The natural riverbed level and slope will be maintained, by burying the culvert invert below the natural bed level. The culvert invert will be embedded to a minimum depth of 300mm (millimetres), or as agreed with IFI during the detailed design stage;
- All guidance / mitigation measures proposed by the OPW or the IFI will be incorporated into the detailed design of the proposed culvert;
- A sediment retention system (e.g. baffles) will be installed within culverts, where required, based on channel gradient and likely flow conditions;
- A low flow channel will be considered during the detailed design stage to account for periods of low flow during summer months. The low flow channel will be designed in conjunction with the hydraulics of the culvert with input from an experienced fluvial geomorphologist; and
- Energy dissipation at culvert outlets (where deemed necessary, based on hydraulic analysis during the detailed design stage) will be designed with reference to appropriate guidance and technical standards guidance.

12.5.2.2 Mitigation Item 7 - Permanent Bridge Crossing

In relation to the proposed permanent crossing on Dunboyne Stream_010, should the detailed design identify a bridge crossing as the preferred option, the detailed design will consider the following:

- Abutments will be set back from the river channel and banks to allow the continuation of the riparian corridor underneath the structure. This will help to minimise or prevent the need for bed and bank reinforcement, reduce the risk of creating a barrier to fish passage and will allow mammal passage under the bridge structure;
- The distance between the bridge abutments will be designed to be as wide as possible to maintain the bank habitat, maximising the riparian corridor and allowing the water body some space to move;
- The natural channel width will be maintained;
- The foundations (of abutments) will be buried deep enough to minimise or prevent the need for bed or bank reinforcement or bridge weirs or aprons. This will maintain the natural bed material and bed levels, protecting habitat and allowing fish passage;
- The foundations will be buried deep enough to allow for scour during high flows. A suitably qualified engineer or geomorphologist will be consulted to advise on an appropriate depth;
- The structure will be designed to facilitate the passage of woody debris;
- The requirements for bed and bank reinforcement will be considered, only if the risk of erosion cannot reasonably be eliminated through the above measures;

- The length of bed and bank protection will be restricted and green bank protection measures will be implemented, where applicable;
- Bridge piers / abutments will be designed to minimise impacts on morphological processes such that abutments are set back on the floodplain. In-channel structures will not be favoured as part of the detailed design; and
- The crossing location will be identified with input from an experience geomorphologist to identify preferential crossing locations within the Planning Application Boundary in relation to channel alignment.

12.5.3 Operational Phase

12.5.3.1 Mitigation Item 8

- Regardless of the crossing type selected and designed for the proposed permanent crossing of the Dunboyne_010 water body, post-construction management and maintenance will be carried out and will include sediment and debris clearance, riparian vegetation management, and structure repair or maintenance as and when required by regular inspection.

12.6 Residual Impacts

12.6.1 Construction Phase

Table 12.9 shows the predicted residual impacts for surface water features, following the implementation of mitigation and monitoring measures during the Construction Phase.

Table 12.9: Predicted Residual Impacts on Specific Water Features Post Mitigation – Construction Phase

Construction			Pre-Mitigation Significance			Mitigation ID	Post-Mitigation (Residual Impacts)	
Water Body (Water crossing point ID	Attribute	Impact Summary	Importance	Magnitude	Significance		Magnitude of Impact	Significance
Dunboyne Stream_010: WCP1 and WCP2	Hydrology	• Disruption to local drainage systems due to diversions required to accommodate the construction works; • Increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks; and • Impacts will be temporary and confined to the construction period.	Low	Negligible	Imperceptible	N/A	Negligible	Imperceptible
	Surface water quality	• Increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing and to excavate around the existing culvert on WCP 2 to allow for the proposed cable route; • Increased risk of sediment pollution from disturbed riverbed and bank material during construction; • Risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body; and • Impacts will be temporary and confined to the construction period and a short period after until vegetation re-establishes.	Low	Large Adverse	Moderate	Mitigation Items 1 - 5	Negligible	Imperceptible
	Hydromorphology	• Potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • In-channel works to construct the proposed open cut crossing and temporary culvert. Provision of a dry working area and excavations required for the cable trench would	Medium	Large Adverse	Significant		Negligible	Imperceptible

Construction			Pre-Mitigation Significance			Mitigation ID	Post-Mitigation (Residual Impacts)	
Water Body (Water crossing point ID	Attribute	Impact Summary	Importance	Magnitude	Significance		Magnitude of Impact	Significance
		temporarily remove flow from a section of channel and would also remove natural bed substrate; • Works within the vicinity of and along the banks, is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body; and • Impacts will be temporary and confined to the construction period.						
Rye Water_030	Hydrology	• Disruption to local drainage systems due to diversions required to accommodate the construction works; • Increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks; and • Impacts will be temporary and confined to the construction period.	Low	Negligible	Imperceptible	Mitigation items 1-4	Negligible	Imperceptible
	Surface Water Quality	• Sediment laden runoff as a result of TCC1 construction compound; and • Impacts will be temporary and confined to the construction period.	Low	Medium Adverse	Slight		Negligible	Imperceptible
	Hydromorphology	• Potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; and • Impacts will be temporary and confined to the construction period.	Medium	Negligible	Imperceptible		Negligible	Imperceptible
Tolka_020: WCP03 and WCP04	Hydrology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	High	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP01 and WCP02)	High	Large Adverse	Significant		Negligible	Imperceptible

Construction			Pre-Mitigation Significance			Mitigation ID	Post-Mitigation (Residual Impacts)	
Water Body (Water crossing point ID	Attribute	Impact Summary	Importance	Magnitude	Significance		Magnitude of Impact	Significance
	Hydromorphology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Pinkeen_010: WCP05	Hydrology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Large Adverse	Significant		Negligible	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Ward_010: WCP07 and WCP08	Hydrology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Low	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Low	Large Adverse	Moderate		Negligible	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Ward_020: WCP06, WCP09, WCP010, WCP11	Hydrology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Large Adverse	Significant		Negligible	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Ward_030: WCP12, WCP13, WCP14, WCP15 WCP16, WCP17, WCP18, WCP19	Hydrology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Large Adverse	Significant		Negligible	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Sluice_010: WCP20	Hydrology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Large Adverse	Moderate		Negligible	Imperceptible

Construction			Pre-Mitigation Significance			Mitigation ID	Post-Mitigation (Residual Impacts)	
Water Body (Water crossing point ID	Attribute	Impact Summary	Importance	Magnitude	Significance		Magnitude of Impact	Significance
	Hydromorphology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Mayne_010: WCP21	Hydrology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Large Adverse	Moderate		Negligible	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP1 and WCP0)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Unnamed Watercourses 1, 2, 3, 7, 8, 12, 17,28, 29, 30, 32, 34 and 35	Hydrology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Medium Adverse	Slight		Small Adverse	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Medium Adverse	Slight		Small Adverse	Imperceptible

12.6.2 Operational Phase

Table 12.10 shows the predicted residual impacts for surface water features during the Operational Phase, following the implementation of pre-construction and detailed design and Operational Phase mitigation and monitoring measures, as outlined in Section 12.5.2 and Section 12.5.3.

Table 12.10 Predicted Residual Impacts on Specific Water Features Post Mitigation – Operational Phase

Operation			Pre-Mitigation Significance			Mitigation ID	Post-Mitigation (Residual Impacts)	
Water Body (Water Crossing Point ID	Attribute	Impact Summary	Importance	Magnitude	Significance		Magnitude of Impact	Significance
Dunboyne Stream_010: Permanent Access Track	Hydromorphology	• Permanent removal of the bed and banks over the crossing footprint. • Loss of lateral and longitudinal fluvial and ecological connectivity • Removal of hydromorphological features over the culvert footprint. • Potential to alter channel flow patterns through the slackening or steepening of channel gradients. This can lead to downstream erosion and instability of the natural channel, with the potential for erosion to migrate upstream.	Medium	Large Adverse	Significant	Mitigation Item 6 and / or Mitigation Item 7 and Mitigation Item 8	Small Adverse	Slight

12.6.3 WFD Assessment Summary

The WFD assessment (presented as a supporting document in Volume 5 of the planning application pack) concluded:

> *"Taking into consideration the impacts of the Proposed Development on the biological, physico-chemical and hydromorphological quality elements, it is concluded that following the implementation of design and mitigation measures, it will not compromise progress towards achieving GES or GEP or cause a deterioration of the overall status of the water bodies that are in scope; it will not compromise the qualifying features of protected areas and is compliant with other relevant Directives. It can therefore be concluded that the Proposed Development is fully complaint with WFD and therefore does not require assessment under Article 4.7 of the WFD."*

12.6.4 Flood Risk Assessment Summary

The conclusions of the FRA (included as Appendix A12.1 in Volume 3 of this EIAR) are summarised in the sections below:

12.6.4.1 Impacts on Fluvial Flooding

The Proposed Development is at low risk from fluvial flooding during construction. Any works at watercourses (e.g. open cut trenching for crossings) have been designed to maintain waterflows and allow the discharge of water without affecting flood risk. Once construction is complete, the Proposed Development is expected to slightly increase existing impermeable areas at the locations where off-road Joint Bays are proposed. In the crossing of the Dunboyne Stream_010, the structure will be designed to not increase the fluvial flood risk over the adjacent areas. The hardstanding areas around the off-road Joint Bay will be similarly constructed to not increase fluvial flood risk. All Joint Bays and link boxes are designed with watertight connections, as standard. Drainage sumps are proposed for the Joint Bays, to provide for additional drainage. It is considered that the hardstanding areas, Joint Bays, and permanent access tracks will not result in any significant loss of floodplain and will not increase the risk of flooding.

Future climate change is predicted to give rise to an increased risk of flooding through rising sea levels and an increase in river flows and the frequency and intensity of extreme rainfall. The OPW has identified two potential scenarios for the impacts of climate change that are known as the Mid-Range Future Scenario (MRFS) and High-End Future Scenario (HEFS). For river flow, the MRFS indicates a rise of 20% in river flows. For the MRFS, there is only a temporary risk of flooding during construction. Future climate change will not affect this conclusion, with exception to the proposed construction access track crossing with Dunboyne Stream. For the detailed design of the crossing structure, climate change will be considered. The Proposed Development will have no known impact on fluvial flood risk based on online information provided by the OPW (refer to Appendix A12.1 in Volume 3 of the EIAR for further details on fluvial flooding).

12.6.4.2 Impacts on Pluvial Flooding

In order to assess the increase in pluvial flood risk, the following points need to be considered:

- Will the Proposed Development increase the rainfall runoff rate?; and
- Will the Proposed Development alter existing flow or drainage paths?

The Proposed Development will result in a slight increase in the area of hardstanding surfaces. The permanent access track materials will be water permeable to a degree, but there will be a change from the current greenfield conditions. The permanent access tracks will be sloped to discharge to the adjacent greenfield. There will be no significant change in runoff as a result of the hardstanding areas, Joint Bays, and permanent access tracks. On the off-road sections, these areas will runoff to the adjacent greenfield areas. There will be a low impact on surrounding areas due to pluvial flooding, due to the proposed additional hardstanding areas, and permanent access tracks around off-road Joint Bays (refer to Appendix A12.1 in Volume 3 of the EIAR for further details on pluvial flooding).

12.6.4.3 Impacts on Groundwater Flooding

Groundwater flooding occurs as a result of upwelling in occurrences where the water table or confined aquifers rise above the ground surface. This tends to occur after long periods of sustained rainfall and / or very high tides. High volumes of rainfall and subsequent infiltration to ground will result in a rising of the water table. Groundwater flooding tends to occur in low-lying areas where, with additional groundwater flowing towards these areas, the water table can rise to the surface causing groundwater flooding. The Proposed Development will involve new works below the existing ground levels, but it is unlikely that this will contribute to groundwater flooding, based on available online mapping from the OPW and GSI (refer to Appendix A12.1 in Volume 3 of the EIAR for further details on groundwater flooding).

12.6.4.4 Impacts on Artificial Drainage Systems

The Proposed Development is not expected to cross any existing artificial drainage systems, as the proposed cable route will be significantly deeper than the expected level of existing drainage networks. During the Operational Phase, the Proposed Development is also expected to have no impact on artificial drainage systems.

12.7 Conclusion

Following the implementation of mitigation measures, as outlined in Section 12.5, any residual impacts upon water bodies have been assessed to be Slight or Negligible during the Construction Phase, and therefore, no significant residual impacts have been predicted. There will be no significant residual impacts on water bodies for surface water elements during the Operational Phase, following the implementation of mitigation measures.

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 13 – Archaeology, Architectural Heritage and Cultural Heritage

EirGrid

March 2024

Contents

13. Archaeology, Architectural Heritage and Cultural Heritage

13.1 Introduction

This Chapter presents the assessment of the likely potential impacts of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) on archaeology, architectural heritage and cultural heritage during the Construction and Operational Phases. A full description of the Proposed Development is provided in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

In line with the guidance in Cultural Heritage Guidelines for Electricity Transmission Projects (EirGrid 2015), cultural heritage has been assessed under the following topics:

- Archaeology - defined as "*the study of past societies through the material remains left by those societies and the evidence of their environment. The 'archaeological heritage' consists of such material remains (whether in the form of sites and monuments or artefacts in the sense of moveable objects) and environmental evidence*" (EirGrid 2015, page 5);
- Architectural Heritage - comprising "*all structures and buildings (together with their settings and attendant grounds, fixtures and fittings, groups of such structures and buildings and sites), which are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. Architectural heritage is generally visible and has a presence in the landscape which requires assessment*" (EirGrid 2015, page 6); and
- Cultural Heritage - defined as "*a general term used to describe aspects of the environment and intangible heritage which are valued for their age, beauty, history or tradition. It encompasses aspects of archaeology, architecture, history, landscape and garden design, folklore and tradition and topography. Cultural heritage is expressed in the physical landscape in numerous often interrelated ways*" (EirGrid 2015, page 6).

Cultural heritage assets can be designated or non-designated and are defined as:

> "*…places and objects of aesthetic, cultural, historic, scientific, social or spiritual value. They include recorded archaeological monuments (RMP), national monuments, UNESCO world heritage sites (WHS), tentative WHS known and unknown surface and subsurface archaeological remains, protected structures, designed landscapes, architectural conservation areas (ACAs), NIAH building and garden survey sites, structures of architectural heritage merit (vernacular, urban and rural), cultural heritage features, placenames, language and inherited traditions*" (EirGrid 2015).

Section 13.2 provides the methodology used for the assessment. Section 13.3 presents information on the baseline environment, and Section 13.4 presents the assessment of the Proposed Development. Proposed mitigation is presented in Section 13.5, and Section 13.6 presents residual impacts. An inventory of archaeology, architectural heritage and cultural heritage is also provided in Appendix A13.1 in Volume 3 of this EIAR. Figure 13.1 to Figure 13.6 which accompany this Chapter can be found in Volume 4 of this EIAR.

13.2 Methodology

13.2.1 Relevant Guidelines, Policy and Legislation

This assessment was undertaken in accordance with the following legislation, policy and best practice guidance:

- National Monuments Acts 1930 to 2014 (as amended):
  - National Monuments Act 1930;

  - National Monuments (Amendment) Act 1954;
  - National Monuments (Amendment) Act 1987;
  - National Monuments (Amendment) Act 1994;
  - National Monuments (Amendment) Act 2004;
  - EIA of Proposed Demolition of National Monuments Regulations 2012;
  - S.I. 229/2005 - National Monuments Act 1930 (Section 14B) Regulations 2005; and
  - S.I. 114/2013 (EIA re Approved Road Developments).
- European Cultural Convention 1954 (European Treaty Series No. 018) (Council of Europe 1954);
- International Council on Monuments and Sites (ICOMOS) International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter1964) (ICOMOS 1965);
- United Nations Educational, Scientific and Cultural Organisation (UNESCO) Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO 1972);
- Convention for the Protection of the Architectural Heritage of Europe (The Granada Convention) (European Treaty Series No. 121) (Council of Europe 1985);
- Convention for the Protection of the Archaeological Heritage of Europe (revised) (The Valetta Convention) (European Treaty Series No. 143) (Council of Europe 1992);
- Number 19 of 1999 - Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999;
- Former Department of Arts, Heritage, Gaeltacht and Islands (DAHGI) Framework and Principles for the Protection of the Archaeological Heritage (DAHGI 1999);
- Planning and Development Acts 2000 to 2023 (as amended);
- Convention for the Safeguarding of the Intangible Cultural Heritage (the Paris Convention) UNESCO 2003);
- Convention on the Value of Cultural Heritage for Society (The Faro Convention) (European Treaty Series No. 199) (Council of Europe 2005);
- Code of Practice between the Department of the Environment, Heritage and Local Government and EirGrid (Department of the Environment, Heritage and Local Government (DEHLG) and EirGrid 2009);
- Former Department of Arts Heritage and the Gaeltacht (DAHG) Architectural Heritage Protection Guidelines for Planning Authorities (DAHG 2011);
- Cultural Heritage Guidelines for Electricity Transmission Projects (EirGrid 2015);
- National Planning Framework (Government of Ireland 2018);
- Meath County Council (MCC) Meath County Development Plan 2021 – 2027 (MCC 2021);
- Fingal County Council (FCC) Fingal Development Plan 2023 – 2029 (FCC 2023); and
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022).

Archaeological sites and monuments are protected under the National Monuments Acts 1930-2014 (as amended), primarily through inclusion in the Record of Monuments and Places (RMP), the Register of Historic Monuments (RHM) and / or by being declared a National Monument. Section 2 of the National Monuments Act 1930 (as amended) defines a National Monument as:

> "*a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic, or archaeological interest attaching thereto*".

In addition, Section 8 the National Monuments Act 1930 (as amended) of the Act states that the Minister may also place a Preservation Order on a monument:

> "*which in his [the minister's] opinion is a national monument in danger of being or is actually being destroyed, injured, or removed, or is falling into decay through neglect*".

It is illegal to demolish, or remove wholly or in part, a National Monument or disturb the ground within, around or in proximity to a National Monument, without written consent from the Minister (and / or the local authority if they are the owners or guardians).

Under Section 5 of the National Monuments (Amendment) Act 1987, an RHM is required to be established and maintained. Monuments included on the RHM are afforded statutory protection under this Act, of a similar level to Recorded Monuments (see below).

Section 12 (1) of the National Monuments (Amendment) Act 1994 (as amended) requires the establishment and maintenance of a RMP. Sites included in the RMP are legally protected and are referred to as Recorded Monuments. The RMP is maintained by the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage (DHLGH) who have defined Zones of Notification around each Recorded Monument. Zones of Notification do not define the extent of a site but are defined for the purposes of notification to the Minister under Section 12 (1) of the National Monuments (Amendment) Act 1994.

While the Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 was enacted in October 2023, it has not fully entered into force and therefore the relevant sections of the National Monuments Acts 1930 to 2014 (as amended) identified above remain in force and continue to do so until their repeal (NMS 2023). While the Planning and Development Bill 2023 has completed the second stage of debate in Dáil Éireann, it has not fully entered into force and therefore the Planning and Development Acts 2000 to 2023 (as amended) remains in force. The Sites and Monuments Record (SMR) is the national database of the Archaeological Survey of Ireland (ASI) compiled and maintained by the NMS. The SMR details all sites where a monument is known to the ASI pre-dating AD (Anno Domini) 1700 and includes a selection of monuments from the post-AD 1700 period. Inclusion on the SMR does not, in itself, confer legal protection.

The Planning and Development Act, 2000 (as amended) sets out the conditions relating to the protection of architectural heritage. Structures of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest are protected under this Act, through their inclusion on the Record of Protected Structures (RPS) and are known as Protected Structures.

The Planning and Development Act 2000 (as amended) defines an ACA as "*a place, area, group of structures or townscape, taking account of building lines and heights, that:*

> a) *is of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or value, or*
> b) *contributes to the appreciation of protected structures*" (Planning and Development Act, 2000, Part IV, Chapter II).

Development plans are required to include an objective to preserve the character of an ACA. In considering applications for permission for development within an ACA, the effect of a proposed Works on the character of an ACA is a consideration for the planning authority. The MCC Meath County Development Plan 2021 – 2027 (MCC 2021) and the FCC Fingal Development Plan 2023 – 2029 (FCC 2023) include lists of ACAs protected under the Act. In addition, the Meath County Development Plan 2021 – 2027 and the Fingal Development Plan 2023 – 2029 include objectives for the protection of archaeology, architectural heritage and cultural heritage (see below).

Undertaken under the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999, the National Inventory of Architectural Heritage (NIAH) is a nationwide survey of architectural heritage including buildings, structures, and historic gardens and designed landscapes. Inclusion on the NIAH alone does not in itself confer legal protection. The NIAH includes an assessment of the significance of structures based on an appraisal of their contribution to architectural heritage. Significance ratings are: International, National, Regional, Local and Record Only (NIAH 2022). Structures that are considered of International, National, and Regional significance are recommended by the Minister to the relevant local authority for inclusion in their RPS.

The Survey of Historic Gardens and Designed Landscapes (NIAH 2013), undertaken by the NIAH, includes the sites of demesne lands from First Edition Ordnance Survey maps and assesses the level of survival and change. These gardens and designed landscapes (GDLs) largely date from the post-medieval period when the lands surrounding large houses assumed an increasingly ornamental role providing a landscape setting for the house.

While not ratified by Ireland, the 2005 Framework Convention on the Value of Cultural Heritage for Society (the Faro Convention) provides the following useful definition of cultural heritage:

> "*a group of resources inherited from the past which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. It includes all aspects of the environment resulting from the interaction between people and places through time*".

Ireland ratified the Convention for the Safeguarding of the Intangible Cultural Heritage (the Paris Convention; UNESCO, 2003) in 2015. Ireland's obligations under the Paris Convention include establishing National Inventory of Intangible Cultural Heritage to protect, promote and celebrate Irish living cultural heritage practices, customs, crafts, and traditions. Currently, the Inventory includes entries under the following categories:

- Oral traditions and expressions, including language;
- Social practices, rituals, and festive events;
- Traditional craftsmanship;
- Performing arts; and
- Knowledge and practices concerning nature and the universe.

Successful applicants to the National Inventory may also consider seeking nomination by the State for inscription on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity, to which the State is entitled to make one nomination every year. Ireland has successfully inscribed three elements of Irish Intangible Cultural Heritage on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity: Irish Harping was inscribed in 2019, Hurling was inscribed in 2018 and Uilleann Piping was inscribed in 2017.

13.2.1.1 Meath County Development Plan 2021 – 2027

The Cultural and Natural Heritage Strategy of the Meath County Development Plan 2021 – 2027 (MCC 2021) identifies Meath's wealth of built heritage, making it exceptional in Ireland. The identity of the county is linked to its unique heritage, which forms an intrinsic part of the character and attractiveness of the county. The Meath County Development Plan 2021 – 2027 sets out specific policies for the management of: archaeological heritage (HER POL 1 to HER POL 5), architectural heritage (HER POL 14 to HER POL 23), industrial heritage (HER POL 24 and HER POL 25), and designed landscapes, gardens and demesnes (HER POL 26).

Policies of relevance to the Proposed Development include:

- HER POL 1: which aims to protect sites, monuments, places, areas or objects including sites recorded on the SMR, Recorded Monuments, sites on the RHM, National Monuments, and sites with Preservation Orders placed on them. In addition, HER POL 2 aims to protect sites of archaeological interest discovered after the publication of the RMP, in situ (or at a minimum preservation by record);
- HER POL 14: which aims to protect and conserve the architectural heritage of the county; and
- HER POL 26: which encourages the protection and enhancement of GDLs.

13.2.1.2 Fingal Development Plan 2023 – 2029

The Heritage, Culture and Arts chapter of the Fingal Development Plan 2023 – 2029 (FCC 2023) describes FCC's commitment to ensuring the conservation, management, protection, and enhancement of the archaeological, architectural heritage and cultural heritage of Fingal. Specific policies include those to protect archaeological heritage (HCAP2 to HCAP7), architectural heritage (HCAP8 to HCAP16, HCAP21 to HCAP26) and historic designed landscapes (HCAP18 to HCAP20).

Policies of relevance to the Proposed Development include:

- HCAP3: which safeguards archaeological sites, monuments, objects and their settings listed in the RMP, SMR, underwater cultural heritage including protected wrecks, and any additional newly discovered archaeological remains and HCAP 4 which favours the preservation in-situ (or at a minimum preservation by record) of all sites and features of historical and archaeological interest;
- HCAP8: which ensures the conservation, management, protection and enhancement of the architectural heritage of Fingal through the designation of Protected Structures and ACAs, the safeguarding of designed landscapes and historic gardens, and the recognition of structures and elements with no specific statutory designation that contribute positively to the vernacular, industrial, maritime or 20th century heritage of the county;
- HCAP21: which seeks to protect and enhance the historic environment and built heritage assets, including elements of historic street furniture, paving and historic boundary treatments; and
- HCAP18 and HCAP19: which seek to protect the setting, significant views, and built features of historic designed landscapes and promote the conservation of their essential character, both built and natural, and resist proposals that would lead to the loss, or cause harm to the character, principal components or setting of historic designed landscapes and demesnes of significance.

13.2.2 Study Area

Using professional judgement, the study area for archaeology, architectural heritage and cultural heritage was defined as the Planning Application Boundary for the Proposed Development plus a 50m buffer. This study area is large enough to establish a robust baseline as it allows archaeological, architectural heritage and cultural heritage assets within and immediately adjacent to the Planning Application Boundary (and which could potentially extend into it) to be identified, it provides a wider context for these, and enables an informed assessment of the possible presence of unknown archaeological remains to be made. As works (i.e. excavation for the cable trench, Joint Bays, and launch and reception pits for Horizontal Directional Drilling (HDD), construction of the Passing Bays and off-road construction access routes, and establishment of Temporary Construction Compounds (TCCs) / HDD Compounds could have a direct impact on archaeology, architectural heritage and cultural heritage assets within the Planning Application Boundary. The study area allows direct impacts on sites within the Planning Application Boundary, or that potentially extend into it, to be identified and assessed.

Indirect impacts could result from changes to the setting of archaeology, architectural heritage and cultural heritage assets during the Construction and Operational Phases. During the Construction Phase, the activities that could result in indirect impacts would be restricted to the Planning Application Boundary. In addition, areas disturbed during the Construction Phase will be reinstated and, apart from Joint Bay covers and permanent access tracks (in off-road sections), the Proposed Development will be largely underground during the Operational Phase (excluding the Woodland Substation and Belcamp Substation upgrade works, where new infrastructure will largely be within the footprint of the existing substation (at Woodland) and seen in the context of the existing substations). Therefore, indirect impacts are not anticipated beyond the study area. Indirect impacts have been assessed both during the Construction and Operational Phases.

13.2.3 Data Collection and Collation

The following sources of information were consulted to establish the archaeology, architectural heritage and cultural heritage baseline for the study area:

- The results of the previous project stages of work: Capital Project 1021 CP1021 Environmental Constraints Report (Jacobs 2022) and CP1021 East Meath – North Dublin Grid Upgrade Step 4A Report – Analysis of Route Options (Jacobs 2023);
- The lists of National Monuments in State Care: Ownership and Guardianship for County Meath (former Department of the Environment, Heritage and Local Government and NMS 2009a) and National Monuments in State Care: Ownership and Guardianship - Dublin City and County (DEHLG and NMS 2009b);
- The list of Preservation Orders held by the NMS (Department of Culture, Heritage and the Gaeltacht and NMS 2019);
- The RMP for County Meath (DAHGI 1996) and County Dublin (The Heritage Service National Monuments and Historic Properties 1998);
- The SMR for County Meath and County Dublin (Government of Ireland n.d. a);
- The NIAH survey of County Meath and County Dublin and the Survey of Historic Gardens and Designed Landscapes by the NIAH (NIAH 2013);
- Inventory of Intangible Cultural Heritage (Government of Ireland n.d. b);
- The Meath County Development Plan 2021 – 2027 (MCC 2021) for the RHM, Protected Structures and ACAs and Fingal Development Plan 2023 – 2029 (FCC 2023) for Protected Structures and ACAs (please note that there is no RHM for Fingal);
- Aerial imagery (aerial photographs and satellite imagery (see Section 13.8 (References) for details of the sources consulted). A range of aerial imagery from different dates was used which maximised the potential to identify archaeological, architectural heritage and cultural heritage assets. Overall ground conditions within the study area were considered to be suitable for the identification of previously unknown assets;
- Historic mapping available online (see Section 13.8 (References));
- Placename information and information from the National Folklore Collection, including information from the Schools' Collection (1937 to 1938), via the University College Dublin (UCD) digital library (logainm.ie n.d.; UCD Digital Library n.d.);
- National Museum online finds database and the results of previous archaeological investigations recorded by the Database of Irish Excavations Reports, Transport Infrastructure Ireland's (TII) Digital Heritage Collection and the Dublin County Archaeology Project (The Heritage Council, n.d.);
- Archaeological Inventory of County Meath (Moore 1987) (an Archaeological Inventory of Dublin has not been published);
- Information from public consultation and engagement with prescribed bodies;
- Sources held by the National Library of Ireland (see Section 13.8 (References));

- Site inspection and walkover survey (undertaken 12 June 2023 to 14 June 2023 (see Section 13.2.3.2)); and
- Bibliographic sources (see Section 13.8 (References)).

Some archaeological, architectural heritage and cultural heritage assets are entered separately on one or more datasets. Where assets appear on more than one dataset, duplicates have been removed to avoid double counting. These assets have been included under their designation (or more significant designation) as it affords the asset legal protection. Where an asset does appear on more than one dataset, this has been identified in Section 13.3 and in Appendix A13.1 in Volume 3 of this EIAR.

A unique reference number was assigned to each asset identified from the sources listed in this Section. Archaeological assets are prefixed with 'AY' and architectural heritage assets are prefixed with 'AH'. Demesne lands are prefixed with 'DL' and undesignated cultural heritage sites are prefixed with 'CH'. Assets identified from a review of Light Detection and Ranging (LiDAR) data acquired for the Proposed Development are prefixed with 'LI', and townland boundaries are prefixed with 'TB'. Please note that in order to provide consistency with previous stages of assessment, unique reference numbering has been retained with new assets added following subsequent data gathering to inform this EIAR. As a result, numbering does not start at '01' or run sequentially.

13.2.3.1 LiDAR

To inform the archaeology, architectural heritage and cultural heritage baseline by identifying previously unrecorded potential assets and gathering additional information on known assets, Jacobs was commissioned by EirGrid to undertake a review of LiDAR data captured for the Proposed Development. The LiDAR was captured on 14 February 2023 at 0.25m lateral resolution and accurate to +/- 0.05m vertical resolution.

LiDAR data were processed and Digital Elevation Models (DEMs) were produced which were then used to create a number of complementary visualisations. These visualisations were then reviewed, and potential archaeological features were identified. The locations of known assets were then reviewed to gather additional information about them. In addition, a range of sources were consulted to verify interpretations of the results. A report on the results of the review of the LiDAR data is included in Appendix A13.2 in Volume 3 of this EIAR.

The review of the LiDAR data identified 65 previously unrecorded archaeological assets and provided additional information on six known assets.

13.2.3.2 Site Inspection and Walkover Survey

The baseline for archaeology, architectural heritage and cultural heritage was also informed by a walkover survey and site inspection of the Planning Application Boundary which was undertaken between 12 June 2023 and 14 June 2023.

This involved a drive-through, as well as a visual inspection of off-road sections where land access was granted, to note topography and current land use, the presence and condition of known assets and their setting, and to identify previously unrecorded sites and their setting.

13.2.3.3 Consultation

A meeting was held with the NMS on 13 December 2023 to discuss the Proposed Development, where a presentation of an overview of the Proposed Development was provided, along with results of the Step 5 assessment for archaeology, including an approach to establishing the baseline, and the results of the impact assessment. The NMS advised on the archaeological potential of watercourses and suggested mitigation measures. Following a discussion with the NMS, the mitigation measures that are outlined in Section 13.5 of this Chapter were agreed.

13.2.3.4 Limitations

Not all areas were accessible during the walkover survey and site inspection. However, baseline data from desk-based sources, including a review of LiDAR data acquired for the Proposed Development (refer to Appendix A13.2 in Volume 3 of this EIAR), was available and sufficient to inform the assessment for assets in these locations.

This limitation did not reduce the efficacy of the assessment.

13.2.4 Appraisal Method for the Assessment of Impacts

13.2.4.1 Assessment of Significance

For archaeology, architectural heritage and cultural heritage, an assessment of significance of each asset was undertaken on a six-point scale of Very High, High, Medium, Low, Very Low / Negligible, and Unknown, as presented in Table 13.1, based on professional judgement and guided by the criteria provided in the draft Cultural Heritage Impact Assessment (CHIA) of TII Projects – Overarching Technical Document (TII forthcoming) . This approach was used because while the TII guidance is in draft it has been widely consulted on and provides a method for the assessment of significance of impacts of linear infrastructure projects on archaeological, architectural heritage and cultural heritage assets aligned with the EPA Guidelines (EPA 2022).

Table 13.1: Criteria to Assess the Significance of Archaeology, Architectural and Cultural Heritage Assets

Significance	Criteria
Very High	World Heritage Properties and properties on the World Heritage Tentative List; Built Heritage assets rated as being of International importance by the NIAH; Historic landscapes of international value (designated or undesignated), including those identified by the NIAH. Such landscapes will be extremely well-preserved with exceptional coherence, time-depth, or other critical factors; Places or features of international intangible heritage value; and Other designated and undesignated assets of demonstrable international Cultural Heritage importance.
High	National Monuments; Undesignated sites and monuments that might reasonably be considered a national monument by the Minister because of their historical, architectural, traditional, artistic, or archaeological interest; Recorded Monuments (or sites and monuments scheduled for inclusion on the RMP) of high quality and importance; Sites and monuments subject to Preservation Order or a Temporary Preservation Order; Protected Structures; Undesignated assets of comparable quality and importance as Recorded Monuments and Protected Structures; Architectural Conservation Areas containing important buildings / groupings of buildings that contribute either individually or collectively to the streetscape and the character and appearance of the ACA; Built Heritage assets rated as being of National importance by the NIAH including historic landscapes (designated or undesignated) of outstanding interest and of demonstrable national value, including those identified by the NIAH. These will be well-preserved historic landscapes exhibiting considerable coherence, time-depth or other critical factors; Places or features of national heritage value; and Other designated or undesignated assets of national Cultural Heritage importance.
Medium	Recorded Monuments (or sites and monuments scheduled for inclusion on the RMP) of good quality / preservation; Built Heritage assets rated as being of Regional importance by the NIAH; Historic townscapes or built-up areas with importance historic integrity in their buildings or built settings (e.g., including street furniture and other structures); Historic landscapes or regional value (designated or undesignated), including those identified by the NIAH; Places or features of regional intangible heritage value; and Other designated or undesignated assets of regional Cultural Heritage importance.
Low	Assets compromised by poor preservation and / or poor survival of contextual associations; Built Heritage assets rated as being of Local importance by the NIAH; Undesignated historic buildings of modest quality in their fabric or historical association; Historic Townscape or built-up areas of limited historic integrity in their buildings, or built settings (e.g., including street furniture and other structures); Historic landscapes whose value is limited by poor preservation and / or poor survival of contextual associations, including those identified by the NIAH; Places or features of local intangible heritage value; and Other designated or undesignated assets of local importance.
Very Low / Negligible	Assets / landscapes with very little or no surviving Cultural Heritage interest; and Buildings of no architectural, historical, archaeological, artistic, cultural, scientific, social, traditional, or technical interest; buildings of an intrusive character.
Unknown	The importance of the asset has not yet been ascertained (e.g., a LiDAR feature that may or may not be archaeological). In such cases, the significance of impact will be 'Indeterminable'.

13.2.4.2 Impact Magnitude

Magnitude combines judgements about the size and scale of the impact, the extent of the area over which it occurs, whether it is reversible or irreversible, and whether it is short or long-term in duration. Magnitude of impact has been assessed without reference to the significance of the asset, and may include direct and indirect impacts, and can either be 'Positive' (i.e., beneficial) or 'Negative' (i.e., adverse).

Assessment of magnitude was based on professional judgement informed by the criteria presented in Table 13.2.

Table 13.2: Magnitude of Impact on Archaeology, Architectural Heritage, and Cultural Heritage Assets

Magnitude of Impact	Criteria / Typical Descriptions
Very High	Major alteration to, or complete loss of, archaeological, architectural, and cultural heritage interests. Effects likely to be experienced at a very large scale, considered permanent and irreversible.
High	Notable or long-term change to archaeological, architectural, and cultural heritage interests.
Medium	Moderate or long-term change over a restricted area or a moderate change to archaeological, architectural, and cultural heritage interests.
Low	Minor short- or medium-term change over a restricted area or a minor change to archaeological, architectural, and cultural heritage interests.
Very Low / Negligible	Imperceptible change to archaeological, architectural, and cultural heritage interests.

13.2.4.3 Significance of Impacts

For archaeology, architectural heritage and cultural heritage, the significance of impacts with and without mitigation was assessed as a combination of the significance and the magnitude.

In accordance with the guidance provided in the EPA Guidelines (EPA 2022), significance of impacts was assessed on a seven-point scale of Profound, Very Significant, Significant, Moderate, Slight, Not Significant and Imperceptible. The seven levels of significance apply equally to positive and negative impacts. Unless otherwise stated, impacts assessed are negative.

The significance of impacts was assessed using professional judgement informed by the matrix presented in Image 13.1.

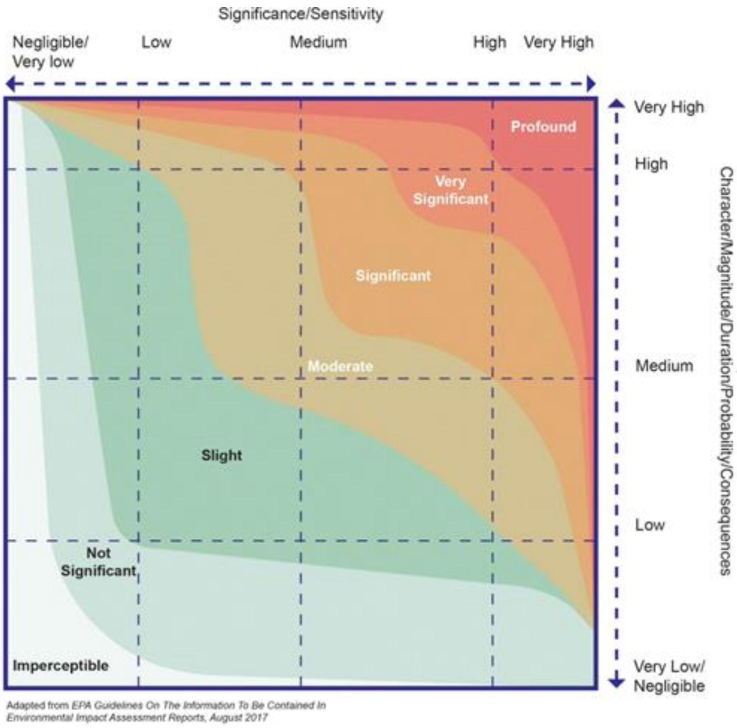

Image 13.1: Matrix for Determination of Significance of Impacts (TII 2020)

13.3 Baseline Environment

This section presents the baseline conditions for the archaeology, architectural heritage and cultural heritage of the study area. Further details on individual archaeology, architectural heritage and cultural heritage assets identified within the study area are provided in Appendix A13.1 in Volume 3 of this EIAR.

13.3.1 Archaeological and Historical Background

No evidence for the Mesolithic period (c. 8000 – 4000 BC) has been identified within the study area. However, a number of watercourses and palaeochannels have been identified, and in the Mesolithic period transient populations often used areas near water sources to exploit natural resources. Evidence of Neolithic (c. 4000 – 2500 BC) activity has been identified within the study area in Barberstown, as part of a multi-phase occupation site (Licence Number: 17E0282), and during archaeological excavations for the M3 Clonee–Kells Motorway (Licence Number: E3034; O'Hara 2009) in the townland of Dunboyne. Concentrations of activity dating to this period have also been identified more widely around Dunboyne and Dunshaughlin (DHLGH 2023).

Within the study area, the Bronze Age (c. 2500 – 600 BC) is characterised by domestic and funerary sites. A burnt mound was excavated in Bennetstown (AY_12) along with a possible rectangular Bronze Age house (Licence Numbers: A017/002, E3024; DHLGH 2023). Burnt mounds comprise circular or irregularly shaped mounds of burnt stones, ash and charcoal around a sunken trough, often located near a water supply. These sites are common in Ireland and were primarily used to heat water, likely for a variety of purposes. A possible Bronze Age structure and a late Bronze Age habitation site, including a possible token cremation, were also excavated in the townlands of Dunboyne (AY_07 and AY_08; Elliott and Ginn 2008) and Ward Upper (AY_21). A number of ring ditches, which are circular ditches usually less than 20m in diameter, identified from aerial imagery were identified in Woodland (CH_61 and CH_62). While these may comprise the remains of round houses, they could represent the remains of clusters of ploughed out barrows (artificial mounds of earth, and / or stone, normally constructed over burials or which have burials inserted into them) which typically date to the Bronze Age or Iron Age (c. 600 BC – AD 500). Evidence of Iron Age settlement has also been identified in the townland of Dunboyne, including a structure, pit and kiln (O'Hara 2009).

The early medieval period (AD 400 – 1100) saw the introduction of Christianity to Ireland. Ecclesiastical centres were established during this period and often comprised a church, or monastery enclosed by a large oval or circular enclosure defined by a bank and external fosse, or drystone wall. An early monastic site is located in the townland of Dunboyne (ME050-029; outside the study area) comprising a complex of earthwork banks including a rectangular enclosure, overlying a possible earlier circular enclosure, within a larger subcircular enclosure and field system. A medieval church is also located within Ward Lower (AY_23; DU011-039001 and RPS 660; a Recorded Monument and Protected Structure).

Early medieval settlement within the study area is characterised by raths (ringforts), circular enclosures typically between 25m and 35m in diameter, defined by ditches and earthen banks (O'Sullivan and Nicholl 2011). These sites are thought to have been farmsteads, with one or more houses within each enclosure. Within the study area, examples of ringforts have been identified in Common, Forrest Great and Cloghran (AY_29; DU011-023001, AY_41; DU011-043, and AY_43; DU011-046; Recorded Monuments).

The study area is partially located within the barony of Coolock, to the north of Dublin, which was described as having "*soyle of said Barony is Generall good either for Corne or Cattle*" in the 17th century (Simington 1945), and historic mapping depicts the area north of Dublin as largely agrarian with dispersed settlements, scattered farms, and country houses (Down Survey of Ireland 1656 – 1658; Rocque 1760). The barony of Dunboyne is also depicted as in use for arable and pasture farming (Down Survey of Ireland 1656 – 1658). Country houses were established from the 17th Century onwards, during a period of relative political calm, with landowners building country estates to demonstrate wealth and satisfy changing social values (Costello 2014; Reeves-Smyth 2005). These estates often comprised grand rural residencies set within designed grounds including features such as ancillary buildings, avenues and drives, woodland, fishponds and, in the later 18th Century with changing fashions, large areas of open ground and 'naturalised' parkland (Costello 2014; Reeves-Smyth 2005).

The land use of the study area remained largely agricultural, and the field pattern depicted on historic Ordnance Survey mapping (Ordnance Survey 6" 1843) remains perceptible both through extant field boundaries, and the remains of former field boundaries. Recent development within the study area comprises the network of roads, motorways and associated infrastructure (such as the M3 parkway car park in Bennetstown), Dublin Airport, and areas of residential infill, recreational sites (such as Forrest Little Golf Club), and commercial complexes (such as Avoca Dunboyne in Piercetown).

13.3.2 Archaeology

Archaeological assets identified within the study area comprise:

- Eight Recorded Monuments (AY_18, AY_23, AY_24, AY_25, AY_29, AY_41, AY_43 and AY_47); and
- Six sites on the SMR (AY_07, AY_08, AY_09, AY_11, AY_12, and AY_21).

No National Monuments or sites with Preservation Orders placed on them were identified within the study area.

13.3.2.1 Recorded Monuments

A total of eight Recorded Monuments are located within the study area as shown on Figure 13.1 in Volume 4 of this EIAR.

St. Brigid's Church and Graveyard comprises a ruined medieval parish church (AY_23; DU011-039001) and associated graveyard (AY_24; DU011-039002) and is both a Recorded Monument and a Protected Structure

(AH_06; RPS 660). The site is located within the study area adjacent to the R121 Regional Road in Ward Lower. The church comprises the foundations of a rectangular structure, which survives up to 1m in height. The church is located within a raised, oval graveyard bounded by a roughly coursed, limestone wall. The elevated interior of the site suggests that the graveyard has been in use for a long period of time and the oldest headstone recorded dates to 1720 (Egan 1991). The graveyard continues in use, and a modern roadside shrine and a 'grotto' are located to the east of the church. The rural church and graveyard are surrounded on three sides by arable fields with the R121 Regional Road to the east with views across fields to the north, west and south and across the busy road (R121 Regional Road) towards houses to the east. These assets hold historical and archaeological interest because of their potential to contribute to the understanding of Christianity in Ireland through their physical remains, group value as a group of related assets, and social interest as a graveyard still in use today. In consideration of this, and their designation as Recorded Monuments, and a Protected Structure, these assets have been assessed to be of High significance.

An ephemeral cropmark of a possible circular enclosure (AY_18; ME051-002), measuring approximately 50m in diameter, is located in a small pasture field within the study area in Ballintry. Aerial imagery shows a faint circular feature in a field adjacent to the road (CUCAP No.: BDK006). While not depicted on historic mapping, the enclosure is located adjacent to a field named 'Raheens', meaning 'The Little Rath' (Meath Field Names Project n.d.). While construction of a modern house to the south-west may have truncated the enclosure, this asset is of archaeological interest because of its potential to contribute to the understanding of enclosure sites, including their construction, function, date and duration of occupation through its physical remains.

A large circular earthwork (AY_41; DU011-043), measuring approximately 80m in diameter, is located within the study area in Forrest Great. This is interpreted as a platform ringfort, which were typically constructed by scarping a natural knoll or drumlin (O'Sullivan *et al*. 2021). AY_41 is enclosed by an external water-logged fosse (ditch). A large circular earthwork is depicted in this location on First Edition Ordnance Survey mapping (Ordnance Survey 6" 1843) and the ringfort is visible on aerial imagery and LiDAR data (Image 13.2). AY_41 is located in an agricultural field and has been truncated by modern infrastructure, including the roundabout between Naul Road and the R108 and airport lighting. However, this asset remains visible as a very low rise to the south-east of the field with the fosse vaguely perceptible at ground level (Photo 13.1). This asset is of archaeological interest because of its potential to contribute to the understanding of platform ringforts through its physical remains.

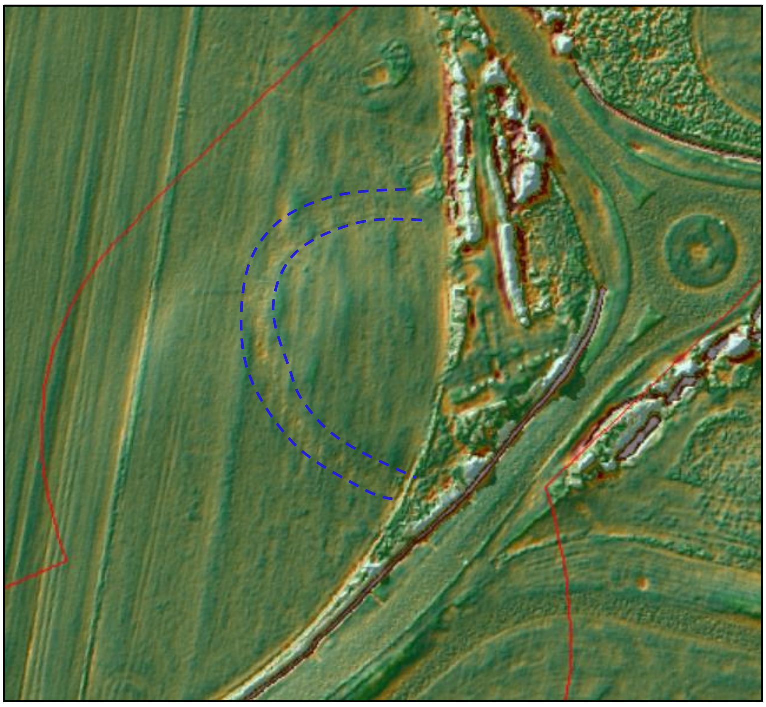

Image 13.2: The Ringfort in Forrest Great (AY_41; Recorded Monument) (Including the Fosse Indicated by Blue Dashed Lines (Simple Local Relief Model Produced from the LiDAR Data Acquired for the Proposed Development)) (Approximate Chainage 30,700)

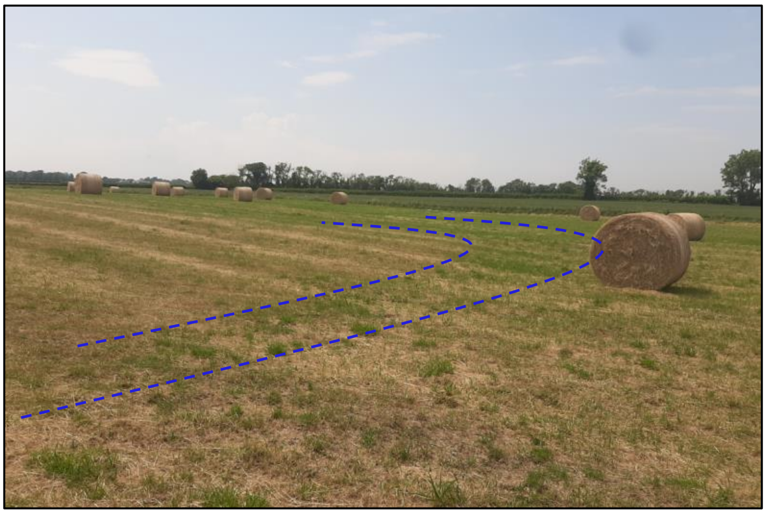

Photo 13.1: The Ringfort in Forrest Great (AY_41; Recorded Monument) (Including the Fosse Visible in the Grass (Indicated by Blue Dashed Lines))

Two further ringforts (AY_29 and AY_43; DU011-023001 and DU011-046) were also identified within the study area. An oval enclosure (AY_29), interpreted as a ringfort, is located in Common. The enclosure is depicted on First Edition Ordnance Survey mapping (Ordnance Survey 6" 1837). However, it is not depicted on later mapping (Ordnance Survey 25" 1908) and is not visible on aerial imagery or LiDAR data. This location has been developed for a house and archaeological testing (Licence Numbers: 99E0693 and 18E0722) did not identify any features of archaeological significance. AY_43 comprises the site of a 'fort' depicted on First Edition Ordnance Survey mapping (Ordnance Survey 6" 1843). This location has since been redeveloped as part of Dublin Airport. While both these locations have been redeveloped, these assets are recorded on the RMP and therefore have been included as assets. These assets are of archaeological interest because of their potential to contribute to the understanding of ringforts, through their surviving physical remains.

The site of a castle (AY_25; DU011-068) is located within the study area in Ward Upper. In the late 12th Century, a large fosse called 'Halfpenny Trench' was constructed in the "manor of Ward", and at the end of the 16th Century, a castle was garrisoned at this location (D'Alton 1838). Located within Ward House GDL (DL_07; see Section 13.3.3) this asset is described as "*the walls of an olde castle*" and formed part of a single holding along with the ruins of the medieval church [AY_23] (Simington 1945). No castle is depicted on historic mapping (Rocque 1760; Ordnance Survey 6" to 1 mile, 1853) and no remains are visible on aerial imagery. This asset is of archaeological interest because of its potential to contribute to the understanding of the political and social landscape of the post-medieval period, through its physical remains and documentary evidence.

Located in the townland of Cloghran, AY_47 (DU015-001) comprises the site of an earthen mound recorded on the RMP. Identified from aerial imagery from the 1970s (FSL453/2), the mound is described as a circular feature measuring approximately 15m in diameter located within an arable field approximately 50m to the north-west of the farmhouse and 30m to the west of the eastern field boundary (Duffy 2008). This asset is not depicted on historic mapping, or visible on more recent aerial imagery, and no above ground remains were visible during the walkover survey. This asset is of archaeological interest because of its potential to contribute to the understanding of this site type, through its physical remains.

In consideration of their designations as Recorded Monuments, these assets have been assessed to be of Medium significance.

13.3.2.2 Sites and Monuments Record

A total of six sites recorded on the SMR have been identified within the study area. Of these, five comprising the sites of a structure, kiln, pits and a burnt mound (AY_08; ME050-062001, AY_09; ME050-062002, AY_11; ME050-057, and AY_12; ME050-058) were identified during archaeological investigations for the M3 Motorway while a prehistoric habitation site (AY_21; DU011-091) was excavated in advance of the construction of the N2 National Road (Finglas to Ashbourne). While these five sites provide an indication of archaeological activity within the study area, they have not been included as assets, as they have been removed and their locations developed.

The one surviving site recorded on the SMR and located within the study area (Figure 13.1 in Volume 4 of this EIAR) comprises a field system (AY_07), bisected by the R157 Regional Road, in the townland of Dunboyne. This asset was identified from aerial imagery with a ditch that corresponds with a boundary on the Down Survey (1656-8). The fields comprise large regular parcels, with boundaries that run parallel to the current boundaries. This area was subject to geophysical survey which confirmed the presence of the ditches and subsequent archaeological investigations in advance of the Dunboyne Bypass identified single fill ditches and drainage containing post-medieval and modern ceramics, as well as a prehistoric structure (AY_08) with a possible associated kiln (AY_09) (Elliott and Ginn 2008). Linear cropmarks are visible on aerial imagery in fields adjacent to the R157 Regional Road (Image 13.3), including a possible trackway and field boundaries, and a large circular enclosure (ME050-029) (located outside the study area). This asset is of limited archaeological interest because of its limited potential to contribute to the understanding of the historic landscape, through its surviving physical remains. In consideration of this, this asset has been assessed to be of Low significance.

Image 13.3: The Field System in Dunboyne (AY_07) (MapGenie, 1996 – 2000 © Ordnance Survey Ireland Licence No. EN 0061519-24) (Approximate Chainage 10,800 to 11,400)

13.3.3 Architectural Heritage

Architectural heritage assets within the study area comprise:

- Two Protected Structures (AH_06 and AH_10) (shown on Figure 13.2 in Volume 4 of this EIAR);
- One structure included on the NIAH (AH_13; assessed to be of Regional importance by the NIAH) (shown on Figure 13.2 in Volume 4 of this EIAR); and
- Ten GDLs (DL_04, DL_05, DL_07, DL_08, DL_09, DL_11, DL_13, DL_15, DL_16 and DL_17) (shown on Figure 13.3 in Volume 4 of this EIAR).

No ACAs have been identified within the study area.

13.3.3.1 Protected Structures

Two Protected Structures (AH_06 and AH_10) are located within the study area (Figure 13.2 in Volume 4 of this EIAR). Of these, St. Brigid's Church and Graveyard (AH_06) is also a Recorded Monument and is described under AY_23 and AY_24 in Section 13.3.2.

AH_10 is a post-medieval stone lined well located within the Limepark GDL (DL_13 (see Table 13.3)). It comprises an enclosed stone well located at the base of a set of steps beneath a tree (FCC 2023). The well is not labelled on First Edition Ordnance Survey mapping (Ordnance Survey 6" 1843). However, it is identified as a 'well' on later editions (Ordnance Survey 25" 1909) at the end of a trackway at the corner of a pair of field boundaries to the north-east of 'Lime Park' (DL_13). The well has been identified as a 'Lady's Well' (a holy well) (FCC 2023; Skyvova 2005; Branigan 2012). Often dedicated to saints, holy wells can be located in proximity to the sites of medieval churches with the spring, a venerated tree and venerated stones key structural features (O'Sullivan and Downey 2006). The site of an early medieval church (DU014-009001) is located approximately 200m to the west of AH_10, along with another holy well (DU014-010), approximately 200m to the south. While the area is overgrown with dense vegetation, a curved course of stones was visible below a mature tree and identified as forming part of the wall to the well (Photo 13.2). This asset is of limited architectural, historical and social interest, given its poor condition and limited contribution to the architectural heritage of the locality and tradition of holy wells. While this asset is designated as a Protected Structure, given its poor condition and limited interest, it has been assessed to be of Medium significance.

Photo 13.2: Row of Stones in Dense Vegetation Indicating the Top of the Enclosed Stone Well in Cloghran (AH_10; a Protected Structure) (Approximate Chainage 33,600).

13.3.3.2 National Inventory of Architectural Heritage

Belcamp House (AH_13; assessed by the NIAH to be of Regional importance, shown on Figure 13.2 in Volume 4 of this EIAR) was a country house built in approximately 1820. The house comprised a detached three-bay, two-storey house including bows framing a prostyle distyle Ionic portico with central door. The house is depicted on First Edition Ordnance Survey mapping (Ordnance Survey 6" 1843) within its associated demesne (DL_17). The house was demolished in 2001. This asset is of very limited artistic and architectural interest, given its poor condition and very limited contribution to the understanding of country houses and architectural heritage of the locality. It has therefore been assessed to be of Low significance.

13.3.3.3 Gardens and Designed Landscapes

Ten GDLs have been identified within the study area. Information on these GDLs and an assessment of their significance is provided in Table 13.3. All GDLs are shown on Figure 13.3 in Volume 4 of this EIAR.

Table 13.3: GDLs Identified within the Study Area

Reference Number	Name	Description and Assessment of Significance	Townland	NIAH Reference
DL_04	Priest Town House	The GDL to Priest Town House, including principal house and ancillary buildings depicted on historic mapping (Ordnance Survey 6" 1837). Retains elements of parkland and woodland, as well as original driveways and entrances, as well as interior and exterior boundaries. Boundary along Belgree Lane formed of hedgerows and 'Crockanee' woodland. This asset is of architectural interest given its historic fabric, continued legibility and extant demesne features. In consideration of this, DL_04 has been assessed to be of Medium significance.	Priest Town	NIAH 5156
DL_05	Hollywoodrath	The GDL to Hollywoodrath, including principal building (RPS 0665) as well as garden and ancillary buildings, including the lodge (NIAH 11347003) on Kilbride Road, depicted on historic mapping (Ordnance Survey 6" 1837; Ordnance Survey 25" 1909). While there has been development within the footprint of the site, including the golf course to the west and housing to the north, the external boundary remains partially extant, as well as internal boundary features including the roadside boundary wall and entrance to the south of the site along the road that bisects the demesne. This asset is of architectural interest given its historic fabric, continued legibility and extant demesne features. In consideration of this, DL_05 has been assessed to be of Medium significance.	Hollystown; Hollywood; Hollywoodrath; Spricklestown	NIAH 2267
DL_07	Ward House	Demesne identified from historic mapping as 'Ward House' (Ordnance Survey 6", 1837) located on the junction between the R135 and R121 Regional Roads. The majority of the demesne features, including the exterior boundary demarcating its footprint, appear to have been removed and modern agricultural buildings and a bungalow, as well as the R121 / R135 Roundabout, have encroached on the demesne. This asset is of very limited architectural interest given its very limited legibility and very few remaining demesne features. Given its condition and lack of legibility, this asset has been assessed to be of Very Low / Negligible significance.	Ward Lower	-
DL_08	Newpark House	Demesne identified from historic mapping as 'Newpark House' (Ordnance Survey 6" 1837) located to the south of the R121 Regional Road. The area appears to have been redeveloped as a commercial complex, including a concrete block roadside boundary wall. However, some external boundaries and the pond remain extant. This asset is of very limited architectural interest given its very limited legibility and very few remaining demesne features. Given its condition and lack of legibility, this asset has been assessed to be of Very Low / Negligible significance.	Newpark	-
DL_09	Kingstown House	Demesne identified from historic mapping as 'Kingstown House' (Ordnance Survey 6" 1843). The exterior boundaries of the demesne reflect those depicted on historic mapping (Ordnance Survey 6" 1843). However, the buildings appear to have been removed. The alignment of the driveway remains perceptible, albeit overgrown, leading from Kilreesk Road to the site of the house. Boundary features include a ditch and established boundary (trees and hedgerow), as well as a modern post and rail fence. This asset is of very limited architectural interest given its very limited legibility and very few remaining demesne features. Given its condition and lack of legibility, this asset has been assessed to be of Very Low / Negligible significance.	Kingstown	-
DL_11	Castle Mount	The GDL to Castle Mount. The principal building remains extant (RPS 611); however, the area has been developed. The boundary depicted on historic mapping (Ordnance Survey 6", 1837 – 1842) is vaguely perceptible in places as hedgerows.	Cloghran	NIAH 5726

Reference Number	Name	Description and Assessment of Significance	Townland	NIAH Reference
		The boundary on the R132 appears to have been replaced with a new wall. This asset is of limited architectural interest given the poor preservation of demesne features and its limited legibility. In consideration of this, this asset has been assessed to be of Low significance.		
DL_13	Limepark	Demesne identified from historic mapping as 'Limepark' (Ordnance Survey 6" 1843). While the principal building has been demolished and the demesne has been bisected by Stockhole Lane and a local access road from Stockhole lane to Old Stockhole Lane, portions of the northern and eastern boundaries, driveway, and Glebe House (to the south-east) remain extant. This asset is of very limited architectural interest given its very limited legibility and very few remaining demesne features. Given its condition and lack of legibility, this asset has been assessed to be of Very Low / Negligible significance.	Cloghran	-
DL_15	Upper Middletown	Demesne identified from historic mapping as 'Upper Middletown' (Ordnance Survey 6" 1843). One internal boundary remains extant along with some of the external boundary. However, the principal building, driveway and 'Turret' depicted on historic mapping (Ordnance Survey 6" 1843), have been removed and the location of the gate lodge to the east of Stockhole Lane has been redeveloped as modern dwellings. Where extant, boundaries comprise established hedgerows and ditches, with sub-divisions visible as cropmarks on aerial imagery. The footings of a roadside range, or boundary wall, were identified during the site inspection and walkover survey (refer to Photo 13.3) and are visible as an area of disturbance on aerial imagery and LiDAR data (CH_34 (see Section 13.3.4)). This asset is of very limited architectural interest given its very limited legibility and very few remaining demesne features. Given its condition and lack of legibility, this asset has been assessed to be of Very Low / Negligible significance.	Middletown	-
DL_16	Glebe House	Demesne identified from historic mapping as 'Glebe House' (Ordnance Survey 6" 1843), located to the east of Stockhole Lane. While the principal building has been replaced with modern dwellings and the driveway removed, the external boundary and sub-divisions of the demesne reflect those depicted on historic mapping (Ordnance Survey 6 1843). Boundaries comprise established hedgerows, including trees, some of which have modern fences running parallel. This asset is of limited architectural interest given the poor preservation of demesne features and its limited legibility. In consideration of this, this asset has been assessed to be of Low significance.	Glebe	-
DL_17	Belcamp	The GDL to Belcamp (AH_13; see Section 13.3.3.2). The principal building and ancillary buildings have been demolished. The footprint is vaguely perceptible on aerial imagery and features depicted on historic mapping (Ordnance Survey 6", 1837 – 1842), such as the bridge, weir and gardens are perceptible. This asset is of very limited architectural interest given its very limited legibility and very few remaining demesne features. Given its condition and lack of legibility, this asset has been assessed to be of Very Low / Negligible significance.	Belcamp	NIAH 2455

Photo 13.3: Rubblestone Wall Associated with 'Upper Middletown' GDL (DL_15) (Approximate Chainage 36,550)

13.3.4 Cultural Heritage

A total of 194 cultural heritage assets were identified within the study area (detailed in Appendix A13.1 in Volume 3 of this EIAR and shown on Figure 13.4 to Figure 13.6 in Volume 4 of this EIAR), comprising:

- 38 cultural heritage sites (12 Medium, 16 Low and 10 Very Low/Negligible significance) identified from historic mapping, aerial imagery and during the site inspection and walkover survey;
- 61 assets (13 Medium, 14 Low and 34 Very Low / Negligible significance) identified from LiDAR data acquired for the Proposed Development (detailed in Appendix A13.2 in Volume 3 of this EIAR); and
- 98 townland boundaries (49 Medium, 41 Low and eight Very Low / Negligible significance).

These cultural heritage assets are characterised by evidence of settlement, funerary activity, agriculture, and industrial activity, dating from the prehistoric to post-medieval periods. Further information on these 194 cultural heritage assets is provided below.

Five groups of ring-diches (circular or near circular ditched features comprising the possible remains of barrows or round houses) were identified in Woodland (CH_61, CH_62 and CH_65), Cullendraugh (CH_67) and Stockhole (CH_78). In addition, seven palaeochannels were identified within the study area from aerial imagery (CH_72) and LiDAR data (LI_18, LI_24, LI_27, LI_36, LI_58 and LI_69) in the townlands of Harlockstown, Dunboyne, Pace, Nuttstown and Cloghran. A possible group of pits was also identified in Baytownpark (LI_20). While these could also evidence prehistoric activity in the area, LI_20 has been interpreted as being of unknown date and function and could equally be non-archaeological in nature. These assets hold archaeological interest due to their physical remains having the potential to contribute to the understanding of the prehistoric period, including funerary practices (CH_61, CH_62 and CH_65). These cultural heritage assets have been assessed to be of Medium significance.

11 previously unrecorded enclosures were identified within the study area from aerial imagery and from LiDAR data acquired for the Proposed Development in Spicklestown, Cullendragh, Shallon, Forrest Great, Cloghran, Stockhole (CH_58, CH_66, CH_75, CH_76, CH_77 and CH_79), Kinoristown, Stokestown, Irishtown and Cloghran (LI_31, LI_34, LI_40, LI_54 and LI_65). These assets comprise circular or sub-circular areas demarcated by a single enclosing element (e.g. a bank and / or ditch). These cultural heritage assets hold archaeological interest due to their physical remains having the potential to contribute to the understanding

of enclosure sites, including their construction, function, date and duration of occupation. Therefore, these assets have been assessed to be of Medium significance.

A total of 25 post-medieval structures, sites of structures, and associated features were identified within the study area comprising:

- Two extant farms (CH_12 and CH_33) and an agricultural range (CH_25) identified from historic mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913). The farms remain operational and include more recent agricultural buildings;
- Six houses (CH_01, CH_04, CH_13, CH_24, CH_29 and CH_71) and the site of two houses (CH_34 and CH_80) depicted on historic mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913);
- The site of a police station depicted on historic mapping and identified from LiDAR data acquired for the Proposed Development (LI_14);
- A roadside building (CH_60) possibly associated with Forrest House depicted on historic mapping (Rocque 1760; Taylor and Skinner 1778) (identified as 'in ruins' on Taylor's Environs of Dublin 1816), the site of a small roofless building (CH_64) identified from historic mapping, and the sites of a cluster of buildings and a possible roadside structure identified from LiDAR data acquired for the Proposed Development (LI_08 and LI_44) of unknown function;
- A roadside pump (CH_63) identified during the site inspection and walkover survey comprising a cast-iron pump in a concrete roadside recess. A pump is not depicted in this location on historic Ordnance Survey mapping (1837; 1911; 1940). However, a pump is depicted further to the east outside a nearby farm (CH_12) and therefore the pump may not be in its original location;
- Dublin and Navan Branch of the Midland Great Western Railway (CH_73) identified on historic Ordnance Survey mapping (Ordnance Survey 25", 1888–1913). A section of which remains operational; and
- Five boundary features (LI_01, LI_13, LI_15, LI_62 and LI_67), a driveway (LI_17) and the site of a pond (LI_41) associated with Hollywoodrath GDL (DL_05).

These cultural heritage assets are of architectural, archaeological, technical, or historical interest due to their physical remains and / or remaining historic fabric, which have the potential to contribute to the understanding of post-medieval settlement and architectural heritage of the study area. However, in cases they are not rare types and/or in poor condition. Therefore, they have been assessed to be of Low significance (CH_01, CH_12, CH_13, CH_24, CH_25, CH_29, CH_33, CH_63, CH_71, CH_73, LI_08, LI_14 and LI_44) and Very Low / Negligible significance (CH_04, CH_34, CH_60, CH_64, CH_80, LI_01, LI_13, LI_15, LI_17, LI_41, LI_62 and LI_67).

A total of 32 field boundaries and field systems were identified from aerial imagery (CH_32, CH_59, CH_68, CH_69 and CH_70) and LiDAR data acquired for the Proposed Development (LI_02, LI_03, LI_05, LI_06, LI_07, LI_09, LI_10, LI_11, LI_16, LI_19, LI_21, LI_23, LI_26, LI_28, LI_29, LI_32, LI_35, LI_38, LI_45, LI_46, LI_48, LI_50, LI_51, LI_56, LI_57, LI_60 and LI_61). While some of these field systems correspond with the field pattern depicted on historic mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913) and are likely post-medieval in date, some (such as LI_21 in Baytownpark) may be earlier examples given they do not match the pattern depicted on historic Ordnance Survey mapping. An additional seven linear features were interpreted as ditches (CH_81, CH_82, CH_83, LI_25, LI_42, LI_49 and LI_70) and a rectangular enclosure (LI_63). There are no corresponding features depicted on historic mapping. Therefore, these ditches are of unknown date. These cultural heritage assets hold limited archaeological interest due to limited potential to contribute to the understanding of the historic landscape through their physical remains. Given these assets are not rare, and in some cases comprise isolated examples of former post-medieval field boundaries, they have been assessed to be of Low (CH_32, CH_59, CH_69, CH_70, LI_07, LI_09, LI_10, LI_11, LI_16, LI_21, LI_25, LI_42, LI_49, LI_63 and LI_70) and Very Low / Negligible (CH_68, CH_81, CH_82, CH_83,

LI_02, LI_03, LI_05, LI_06, LI_19, LI_23, LI_26, LI_28, LI_29, LI_32, LI_35, LI_38, LI_45, LI_46, LI_48, LI_50, LI_51, LI_56, LI_57, LI_60, and LI_61) significance.

Two stone road bridges (CH_15 and CH_74) and the alignments of a former road (LI_55) and track (LI_66) were also identified within the study area. CH_15 and CH_74 are depicted on historic mapping (Ordnance Survey 6", 1837–1842) and continue to form part of the road network carrying roads across the River Ward. LI_55 and LI_66 were identified from LiDAR data acquired for the Proposed Development. The former corresponds with the alignment of the road depicted on historic Ordnance Survey mapping (1843) associated with Glebe House and farm. The latter is not depicted on historic mapping and is of unknown date. Given that CH_15 is of limited architectural, technical and historical interest due to its surviving historic fabric and continued use, this asset has been assessed to be of Low significance. Given that LI_55 and LI_66 are not rare types and are of limited interest, these assets have been assessed to be of Very Low / Negligible significance.

Six former gravel pits and quarries (CH_53, LI_30, LI_33, LI_37, LI_47 and LI_68) were identified within the study area. These comprise irregular areas of disturbance that correspond with sites depicted on historic mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913). These cultural heritage assets hold limited archaeological interest due to their limited potential to contribute to the understanding of local industrial activities and mineral extraction through their surviving physical remains. Given these assets are not rare types and have limited potential to contribute to the understanding of these site types at a local level, they have been assessed to be of Very Low / Negligible significance.

13.3.4.1 Previous Excavation

A review of the Excavations Bulletin, TII's Archaeological Excavation Reports and Dublin Archaeology's archaeological, dive survey and geophysical survey data (The Heritage Council n.d.) identified the following archaeological excavations within the study area, as outlined in Table 13.4.

Table 13.4: Previous Excavations Identified within the Study Area

Licence Number	Townland	Findings
A017/004., E3026, A017/005, and E3027	Bennetstown	Archaeological testing for the M3 Motorway (Clonee to North of Kells) identified three sites including a spread of heat-fractured stone and charcoal, another burnt spread, and a group of pits and postholes, some of which formed a possible semi-circular structure.
16E0335	Barberstown	Archaeological testing carried out in relation to the North Runway development at Dublin Airport identified a rectangular ditched enclosure and a number of linear ditches.
E3024	Bennetstown	Archaeological excavation for the M3 Motorway (Clonee to North of Kells) also identified postholes, some of which were interpreted as the remains of possible structures, a clay-lined, keyhole-shaped kiln and several pits, and burnt mound. Sherds of Middle or Late Bronze Age pottery were recovered from one of the postholes.
00E0950 and 00E0951	Stockhole	Archaeological monitoring of topsoil-stripping prior to the construction of the Airport–Balbriggan Bypass identified a small, oval area of charcoal enriched soil and a small area of burnt topsoil.
03E1358	Ward Upper	Archaeological excavations in advance of the N2 National Road (Finglas to Ashbourne) realignment identified a small pit or token cremation, as well as a pit containing a large amount of prehistoric pottery.
13R020	Killamonan	Archaeological geophysical survey in Killamonan identified a series of possible enclosures, pits and possible areas of burning, and an extensive network of relict field boundaries (Earthsound 2013).
13E0464, 10R0010	Stockhole	Archaeological geophysical survey in advance of development for a cemetery identified features of potential archaeological interest including possible banked and ditched features and a possible former trackway; however, these could equally be natural or agricultural. Probable former field boundaries and field drains were also identified (Crumlish 2015).
17E0282	Barberstown	Archaeological investigations in advance of construction of the North Runway Project at Dublin Airport identified a number of early medieval and medieval features including two enclosures, a kiln and pits and ditches (Murphy 2018).

A further six archaeological excavations also took place within the study area (under Licence numbers: 99E0693, 18E0722, 04E0381, 04E0557 08E0333 and 09E0467). However, these did not identify any archaeological remains or deposits of archaeological significance.

13.3.4.2 Topographical Files

A review of the National Museum Topographical Finds available online (The Heritage Council n.d.) did not identify any casual finds within the study area.

13.3.4.3 Townland Boundaries

Along with baronies and parishes, townlands comprise a geopolitical unit of land still in use today (Smith 2003). They form the oldest and smallest territorial division in Ireland, and in rural areas are often characterised by historic hedgerows which follow more organic pre-18th Century improvement boundaries (Aalen, Whelan and Stout 2011). Many townland names are particularly old and provide invaluable information about the past at a local level, including information on natural features and past land use, local traditions and landmarks, and in some cases, historic landownership.

Townland boundaries have been identified within the study area, which are detailed in Appendix A13.1 in Volume 3 of this EIAR and shown on Figure 13.6 in Volume 4 of this EIAR. The townlands within the study area and information derived from their names from online sources and Irish Place Names (Flanagan and Flanagan 2002) are presented in Table 13.5.

Table 13.5: Townlands Within the Study Area

English Name	Irish Name	Possible Meaning
Ballintry	Béal Átha an Tré	áth ford béal opening, approach, mouth 'opening', 'approach', or 'access', very frequently coupled with 'ford' – 'mouth of the ford' 'the town of the three (persons)' (logainm.ie n.d.; Flanagan and Flanagan 2002; Joyce 1913)
Ballymacarney	Baile Mac Cearnaiy	-
Ballymagillin	-	-
Ballystrahan	Baile an tSrutháin	baile townland, town, homestead sruth stream 'town of the streamlet' (logainm.ie n.d.; Flanagan and Flanagan 2002)
Barberstown	Baile an Bhearbóraigh	baile townland, town, homestead
Barstown	-	-
Baskin	Baiscín	'trees or land of trees' The place-name Baskin / Baiscín in Dublin is well attested in English sources, but the underlying meaning remains unclear. It could possibly be a diminutive form of baisc 'heap', in reference to the small hill in this townland (cf. Baskin Hill [House] as depicted on the OS 6" map). In this regard, it is quite interesting to note that a hill is also situated in the likewise-named Baskin in County Westmeath. However, research has not been completed on the townlands of that county and the underlying Irish form of Baskin in Westmeath therefore remains uncertain at this juncture. Moreover, the word baisc 'heap' is not clearly attested in other toponyms which further renders the suggested explanation of Baiscín problematic. Given this situation, it is worth comparing the word baiscín with baiscneach 'thorny, tree-like' (see Irish-English Dictionary, P. Dinneen), but there is no clear relationship between the two.
Baytownpark	-	-
Belcamp	Belcamp	-
Belgree	Baile Graí	baile townland, town, homestead
Bennettstown	-	-
Blackhall Big	An Halla Dubh Mór	dubh, dú-, duí- black mór great, big
Cherryhound	Cherryhound	-
Cloghran	Clochrán	stepping-stones' 'stony place' (logainm.ie n.d.; Flanagan and Flanagan 2002; Joyce 1913)
Clonshaugh	-	-
Colliersland North	-	-
Common	An Coimín	coimín commonage, common land; little hollow, glen
Corrstown	Baile an Chorraigh	baile townland, town, homestead
Court	An Chúirt	'Moore of the court of Belgree' (logainm.ie n.d.)
Creemore	-	-
Culcommon	Cúil Chomáin	'Common's corner or angle' (logainm.ie n.d.)
Cullendragh	An Chuileanntrach; Cuileanntrach	'denotes land producing holly' (logainm.ie n.d.)
Cushinstown	-	-
Dunboyne	Dún Búinne	dún, dúnaibh fort 'fort of the white cow goddess' (logainm.ie n.d.; Flanagan and Flanagan 2002)
Forrest Great	An Fhoraois Mhór	mór great, big
Forrest Little	An Fhoraois Bheag	beag, big small
Gallanstown	Baile an Ghalóntaigh	baile townland, town, homestead

English Name	Irish Name	Possible Meaning
Gaulstown	-	Possibly from Ballynagall townland of the English (Joyce 1913)
Glebe (E.D. Kinsaley)	An Ghléib	gléib glebe
Harlockstown	-	-
Hollystown	Baile an Alabhóidigh	baile townland, town, homestead
Hollywood	Cnocán an Alabhóidigh	cnocán hillock
Irishtown	An Baile Gaelach	baile townland, town, homestead
Killamonan (E.D. Blanchardstown)	Coill na Mónann	coill, coillidh, coillte, coille wood "Mac Monan's wood"
Kilreesk	Cill Réisc	cill church 'church of the M-?'
Kingstown	-	-
Kinoristown	-	-
Lynaghstown	Baile na Laighneach	There is a fort in it; 'town of the Leinstermen' (logainm.ie n.d.)
Middleton	-	-
Nevinstown East	Baile Naoimhín Thoir	baile townland, town, homestead
Newpark	An Pháirc Nua	nua new páirc field
Normansgrove	Garrán an Normannaigh	garrán grove
Nuttstown	-	-
Pace	An Bealach	bealach way, pass
Pickardstown	Baile an Phiocóidigh	baile townland, town, homestead
Piercetown	-	-
Portan	-	-
Portmanna	Port manaig	'the monk's fort or bank' (logainm.ie n.d.)
Priest Town	-	-
Rowan	-	'Reddish land' (logainm.ie n.d.)
Sarney	Searnaí	-
Shallon	Sealúin	Sealan [shallan] signifies the rope used by an executioner; and it is sometimes used to designate the place where people were hanged' (logainm.ie n.d.; Joyce 1913)
Skephubble	Sceich an Phubaill	sceach, sceich hawthorn, thorn-bush (logainm.ie n.d.; Flanagan and Flanagan 2002)
Spricklestown	Baile Spreiceal	baile townland, town, homestead
Staffordstown Little	-	-
Stockhole	Steach Comhaill	teach, steach, stigh, tigh house 'Conichghaill's house'?
Stokestown	-	-
Vesingstown	-	-
Ward Lower	An Barda Íochtarach	-
Ward Upper	An Barda Uachtarach	-
Waynestown	-	-
Whitesland	-	-
Woodland	Fearann na Coille	coill, coillidh, coillte, coille wood, fearann land
Woodpark	-	-
Yellow Walls	Na Ballaí Buí	buí yellow (logainm.ie n.d.; Flanagan and Flanagan 2002)

The key characteristics of these assets comprise their physical remains and documentary (cartographic) evidence. Given their historical, cultural, traditional, and social interest, 11 townland boundaries have been assessed to be of Medium significance (TB_01, TB_04, TB_38, TB_39, TB_44, TB_67, TB_68, TB_88, TB_89, TB_91 and TB_99).

While the remaining townland boundaries retain some historical, cultural, traditional, and social interest given their poor condition, or having been removed by development, they have been assessed to be of Low (TB_02, TB_03, TB_05, TB_06, TB_07, TB_08, TB_13, TB_14, TB_15, TB_17, TB_18, TB_19, TB_23, TB_30, TB_31, TB_32, TB_33, TB_35, TB_37, TB_43, TB_45, TB_46, TB_47, TB_48, TB_49, TB_50, TB_51, TB_52, TB_53, TB_56, TB_57, TB_76, TB_77, TB_78, TB_79, TB_81, TB_82, TB_83, TB_85, TB_86, TB_87, TB_90, TB_94, TB_95, TB_96 and TB_97), and Very Low / Negligible (TB_09, TB_10, TB_11, TB_12, TB_16, TB_20, TB_21, TB_22, TB_24, TB_25, TB_26, TB_27, TB_28, TB_29, TB_34, TB_36, TB_40, TB_41, TB_42, TB_54, TB_55, TB_58, TB_59, TB_60, TB_61, TB_62, TB_63, TB_64, TB_65, TB_66, TB_69, TB_70, TB_71, TB_72, TB_73, TB_74, TB_75, TB_80, TB_92, TB_93 and TB_98) significance.

13.3.4.4 Potential for the Presence of Unknown Archaeological Remains

The sources identified in Section 13.2.2 and in Section 13.8 provide a thorough understanding of the potential for the presence of unknown archaeological remains within the study area.

Off-road sections assessed to be of very high potential for the presence of unknown archaeological remains comprise:

- The off-road section south of the Woodland Substation (approximate Chainage 0 to 3,600) due to the presence of assets identified from aerial imagery (e.g. the remains of ring-ditches; CH_61 and CH_62) and LiDAR data acquired for the Proposed Development (e.g. a cluster of buildings of unknown date; LI_08) that may date from the prehistoric period onwards; and
- The off-road section to the east of the M1 Motorway due to the presence of known assets and assets identified from aerial imagery within the study area (AY_47; a Recorded Monument and LI_58; a palaeochannel) and adjacent to the study area (such as enclosures; DU015-120 and DU015-008, in Baskin and Middletown respectively) that may evidence activity dating to the prehistoric period onwards.

The potential for the presence of unknown archaeological remains has been reduced in the off-road sections that have been subject to disturbance such as in Kingstown between approximate Chainage 28,650 to 29,100, and the existing Woodland and Belcamp Substations. However, given the number of known archaeological assets within the study area, the results of previous archaeological investigations (see Section 13.3.4.1), as well as cropmarks identified from aerial photographs and sites identified from LiDAR (Appendix A13.2 in Volume 3 of this EIAR), the potential for the presence of unknown archaeological remains within the remaining off-road sections of the Proposed Development has been assessed to be high.

Ireland’s extensive river network is known to have been the foci for human activity from the Mesolithic period onwards (Mossop and Mossop 2009; Aalen, Whelan and Stout 2011; Woodman 2015). In addition, votive offerings, objects deposited for religious reasons, were deposited in rivers, loughs and bogs, with a floruit in the Iron Age. Rivers were later used in the medieval and post-medieval period as a source of power, such as for mills, breweries and industrial facilities. In addition, the palaeochannels identified within the study area (LI_18, LI_24, LI_27, LI_36, LI_58 and LI_69 (see Section 13.3.4)) have the potential to contain evidence of the palaeoenvironment as well as containing archaeological remains, including votive offerings. There is therefore potential for archaeological remains in and around watercourses.

The Proposed Development will cross 47 watercourses (some of which will be crossed multiple times) and details of these are provided in Table 13.6. As can be seen from Table 13.6, 35 are drainage ditches, eight are streams (up to 3m in width) and four are rivers (over 3m in width).

Table 13.6: Watercourses to be Crossed by the Proposed Development

Reference Number	Type	Notes	Approximate Chainage
UNWC 1	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 1,050
UNWC 2	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping (Ordnance Survey 25", 1888–1913).	Chainage 1,600
WCP01	Stream	Dunboyne Stream. A stream depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913) following the same course.	Chainage 2,175
UNWC 3	Drainage ditch	A ditch depicted on later historic Ordnance Survey mapping (Ordnance Survey 25", 1888–1913). Located within an area of Lacustrine sediments (Geological Survey of Ireland (GSI) n.d.).	Chainage 2,750
UNWC 4	Stream	A stream depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913). Crossed by the road (R156), northern section no longer perceptible.	Chainage 4,000
UNWC 5	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 5,900
UNWC 6	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 6,050
UNWC 9	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 8,225
UNWC 10	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 8,350
UNWC 11	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 8,450
UNWC 13	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 8,900
UNWC 15 (1)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 9,150
UNWC 14	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 9,200
UNWC 15 (2)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 9,300
UNWC 15A	Drainage ditch	A drainage ditch not depicted historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 9,750
UNWC 16	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 10,450
WCP02	Stream	A stream depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913). Located in an area of alluvium (GSI n.d.).	Chainage 10,800
UNWC 18	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842Ordnance Survey 25", 1888–1913).	Chainage 11,400
WCP03	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 11,650
UNWC 19	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 11,950

Reference Number	Type	Notes	Approximate Chainage
UNWC 20 (1)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6”, 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25”, 1888–1913).	Chainage 12,050
UNWC 20 (2)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6”, 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25”, 1888–1913).	Chainage 12,150
WCP04	River	River Tolka. Depicted on historic Ordnance Survey mapping (Ordnance Survey 6”, 1837–1842) and appears to have been straightened on later editions (Ordnance Survey 25”, 1888–1913). The meanders of the former channel are still depicted on later mapping and in LiDAR data acquired for the Proposed Development (LI_69). On modern mapping the course of the river appears to have been straightened further. Located in an area of alluvium (GSI n.d.).	Chainage 12,550
UNWC 21 (1)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6”, 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25”, 1888–1913).	Chainage 13,200
UNWC 21 (2)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6”, 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25”, 1888–1913).	Chainage 14,200
UNWC 21 (3)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary on a slightly different alignment (Ordnance Survey 6”, 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25”, 1888–1913).	Chainage 14,300
UNWC 22	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6”, 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25”, 1888–1913).	Chainage 14,450
UNWC 23	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6”, 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25”, 1888–1913), to the north and south of the road.	Chainage 14,800
UNWC 24	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6”, 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25”, 1888–1913).	Chainage 15,450
WCP05	River	Pinkeen River. Depicted on historic Ordnance Survey mapping (Ordnance Survey 6”, 1837–1842; Ordnance Survey 25”, 1888–1913). Located in an area of alluvium with gravels surrounding (GSI n.d.). A palaeochannel (LI_36) was identified adjacent to the current channel from LiDAR acquired for the Proposed Development that may comprise river terraces and levees associated with the river.	Chainage 16,350
UNWC 24A	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as the edge of the road (Ordnance Survey 6”, 1837–1842) then a ditch on later edition (Ordnance Survey 25”, 1888–1913).	Chainage 16,800
UNWC 25 (1)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6”, 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25”, 1888–1913), to the north and south of the road.	Chainage 17,050
UNWC 25 (2)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping (Ordnance Survey 25”, 1888–1913).	Chainage 17,100
WCP07	River	Ward River. Depicted on historic Ordnance Survey mapping (Ordnance Survey 6”, 1837–1842; Ordnance Survey 25”, 1888–1913). Located in an area of alluvium (GSI n.d.). This river forms part of an Arterial Drainage Scheme of the Office of Public Works (Broadmeadow and Ward (C2)) which strongly suggests this river may have been subject to modification (Drainage Map n.d.).	Chainage 18,200
WCP08	River	Ward River. Depicted on historic Ordnance Survey mapping (Ordnance Survey 6”, 1837–1842; Ordnance Survey 25”, 1888–1913). Located in an area of alluvium (GSI n.d.). This river forms part of an Arterial Drainage Scheme of the Office of Public Works (Broadmeadow and Ward (C2)) which strongly suggests this river may have been subject to modification (Drainage Map n.d.).	Chainage 19,225

Reference Number	Type	Notes	Approximate Chainage
UNWC 26 (1)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 19,700
UNWC 26 (2)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 19,825
UNWC 27	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 20,375
WCP10	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913). This watercourse forms part of an Arterial Drainage Scheme of the Office of Public Works (Broadmeadow and Ward (C2/4)) and the Ward Drainage District which strongly suggests this river may have been subject to modification, including deepening and widening (Drainage Map n.d.).	Chainage 20,700
UNWC 28	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 21,350
UNWC 29	Drainage ditch	A drainage ditch not depicted historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 21,550
UNWC 30	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 25,325
WCP12	Stream	A stream depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913). This watercourse forms part of an Arterial Drainage Scheme of the Office of Public Works (Broadmeadow and Ward (C2/2)) which strongly suggests this river may have been subject to modification (Drainage Map n.d.). Located in an area of bedrock outcrop or subcrop (GSI n.d.).	Chainage 26,200
UNWC 30A	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 28,150
UNWC 30B	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 28,200
WCP13	Stream	A stream depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913). This watercourse forms part of an Arterial Drainage Scheme of the Office of Public Works (Broadmeadow and Ward (C2/1)) which strongly suggests this river may have been subject to modification (Drainage Map n.d.).	Chainage 28,350
UNWC 31 (1)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 30,150
UNWC 31 (2)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 30,425
UNWC 33 (1)	Stream	A stream depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913). Located in an area of alluvium (GSI n.d.).	Chainage 31,400
UNWC 33 (2)	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913). Located in an area of alluvium (GSI n.d.).	Chainage 31,625
UNWC 33A	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842) then as a drainage ditch on later editions (Ordnance Survey 25", 1888–1913).	Chainage 34,650

Reference Number	Type	Notes	Approximate Chainage
UNWC 34	Stream	A drainage ditch depicted on historic Ordnance Survey mapping as a field boundary (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 35,200
UNWC 35	Drainage ditch	A drainage ditch depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 35, 600
WCP16	Stream	A drainage ditch depicted on historic Ordnance Survey mapping (Ordnance Survey 6", 1837–1842; Ordnance Survey 25", 1888–1913).	Chainage 36,875

The potential for in-situ archaeological remains within smaller watercourses and field drains, likely established in the 18th and 19th Century as part of agricultural improvement (O'Sullivan and Downey 2010), is considered to be lower than within unaltered streams and rivers. In addition, this potential is reduced where watercourses have been modified such as through canalisation or dredging, or part of the drainage works by the Office of Public Works. Where the evidence indicates that watercourses within the study area have been modified, this is identified in Table 13.6.

While not confirmed by ground investigation (Causeway Geotech Ltd. 2023), alluvium and lacustrine deposits were identified from the Geological Survey of Ireland (GSI) online mapper (GSI 2023) along watercourses (see Table 13.6) and these are considered to have a higher potential for the presence of palaeoenvironmental remains and preserved organic materials.

13.4 Potential Impacts

13.4.1 'Do Nothing' Scenario

Should the Proposed Development not be implemented (i.e., the Do Nothing scenario), there would be no negative impacts to any of the archaeology, architectural heritage and cultural heritage assets as a result of the Proposed Development. The impact would therefore be Neutral.

13.4.2 Construction Phase

13.4.2.1 Direct

13.4.2.1.1 Archaeology

A summary of the assessment of direct impacts on archaeology during the Construction Phase is presented below while the complete assessment is presented in Appendix A13.3 in Volume 3 of this EIAR. Unless otherwise stated, impacts described are negative.

Construction of the Proposed Development will remove a mound (AY_47; Recorded Monument; Medium significance) in Cloghran (Chainage 34,850 and Chainage 34,950). As this archaeological asset will be wholly removed, the magnitude of this permanent impact has been assessed to be Very High and the significance of impact has been assessed to be Very Significant.

The Proposed Development will be located approximately 4m to the east of the enclosing wall of a graveyard (AY_24) in Ward Lower (a Recorded Monument; High significance). While the enclosing wall to the graveyard will be retained, there is the potential for accidental damage to this structure given its location adjacent to the R121 Regional Road (Chainage 23,975 to Chainage 24,025). The magnitude of this permanent impact has been assessed as High and the potential impact is assessed as Very Significant.

In addition, the Proposed Development will also be located within the Zones of Notification of the following seven Recorded Monuments:

- An enclosure (AY_18; Medium significance) in Ballintry, approximately 35m to the south of the Proposed Development (Chainage 17,200);
- A church and graveyard (AY_23 and AY_24; both High significance) in Ward Lower, approximately 26m and 4m to the east of the Proposed Development, respectively (Chainage 23,975 to Chainage 24,025);
- A castle (AY_25; Medium significance) in Ward Upper, approximately 44m to the north-west of the Proposed Development (Chainage 24,350); and
- Three ringforts (AY_29, AY_41 and AY_43; Medium significance) in Common, Forrest Great and Cloghran, approximately 57m to the north (Chainage 26,950 to Chainage 27,000), immediately to the north (Chainage 30,600 to 30,725), and 27m to the south, respectively (Chainage 32,650 to Chainage 32,775).

While the Proposed Development will not directly impact the Recorded Monuments themselves, excavation of the proposed cable trench will have a direct impact on any archaeological remains that may survive within these zones. However, the Proposed Development will be in-road in these locations, and as road construction is likely to have already removed or truncated any archaeological remains that may have been present, the magnitude of these permanent impacts has been assessed to be Low and the significance of impact has been assessed to be Slight.

Construction of the Proposed Development, including the excavation of the proposed cable trench and Joint Bays, temporary Passing Bays, the excavation of temporary launch and reception pits for HDD and Belcamp Substation upgrade works, may also result in a direct impact on any previously unknown archaeological remains that may be present within the land required for the Proposed Development.

There is the potential for impacts on archaeological remains and artefacts that may survive in watercourses and in the land adjacent to them. A total of 37 watercourses will be crossed in-road using existing road structures (UNWC 4, UNWC 5, UNWC 6, UNWC 9, UNWC 10, UNWC 11, UNWC 13, UNWC 15 (1), UNWC 14, UNWC 15 (2), UNWC 15A, UNWC 16, WCP02, UNWC17, UNWC 18, WCP03, UNWC 19, UNWC 20 (1), UNWC 20 (2), UNWC 21 (1), UNWC 21 (2), UNWC 21 (3), UNWC 22, UNWC 23, UNWC 24, UNWC 24A, UNWC 25 (1), UNWC 25 (2), UNWC 26 (1), UNWC 26 (2), UNWC 27, WCP10, UNWC 30, UNWC 30A, UNWC 30B, UNWC 31 (2) and UNWC 33 (1)), therefore avoiding watercourses themselves and the land immediately adjacent to them. No potential impacts on archaeological remains and artefacts that may survive have been identified.

Instream trenching will be required at 18 watercourses. Of these:

- 10 are drainage ditches (UNWC 1, UNWC 2, UNWC 3, UNWC 28, UNWC 29, UNWC 31 (1), UNWC 33 (2), UNWC 33A and UNWC 35);
- Five are streams (WCP01, WCP12, WCP13, UNWC 34 and WCP16); and
- Four are rivers (WCP04, WCP05, WCP07and WCP08).

As identified in Section 13.3.4.4, the potential for the presence of unknown archaeological remains is considered lower in drainage ditches than within unmodified streams and rivers.

Of these streams and rivers, five appear to have been dredged (WCP04, WCP07, WCP08, WCP12 and WCP13) based on drainage scheme information from the Commissioners of Public Works in Ireland flood maps (Drainage Map n.d.) and the potential for the presence of archaeological remains within these watercourses is also considered to be lower than those that have not. In addition, one of these rivers (WCP04) has been subject to modification, based on historic mapping, and therefore, the potential for the presence of archaeological remains within this watercourse is also considered to be lower.

13.4.2.1.2 Architectural Heritage

A summary of direct impacts on architectural heritage assets assessed to be Significant (i.e. of Moderate significance or above) before mitigation is presented below. The assessment of all impacts (both significant and non-significant) on architectural heritage assets is presented in Appendix A13.3 in Volume 3 of this EIAR. Unless otherwise stated, impacts described are negative.

Construction of the watercourse crossing at Chainage 18,200 will remove an area of 'Crockanee' wood and approximately 120m of boundary associated with the Priest Town GDL (DL_04; Medium significance). The magnitude of this permanent impact has been assessed to be Medium and the significance of impact has been assessed to be Moderate.

In addition, two direct impacts of Slight significance (DL_05 and DL_15) and one direct impact of Not Significant significance (DL_16) have been assessed. These impacts are presented in Appendix A13.3 in Volume 3 of this EIAR.

13.4.2.1.3 Cultural Heritage

A summary of direct impacts on cultural heritage assets assessed to be Significant (i.e., of Moderate significance or above) before mitigation is presented below. The assessment of all impacts (significant and non-significant impacts) on cultural heritage assets is presented in Appendix A13.3 Volume 3 of this EIAR. Unless otherwise stated, impacts described are negative.

Construction of the Proposed Development will:

- Remove the majority of an enclosure (LI_40; Medium significance) in Irishtown, identified from LiDAR data acquired for the Proposed Development in the off-road section between Chainage 22,100 and Chainage 22,200;
- Wholly remove three ring-ditches (CH_78; assessed to be of Medium significance), identified from aerial imagery in the townland of Stockhole in the off-road section between Chainage 35,750 and Chainage 35,950;
- Wholly remove three ring-ditches and partially remove two ring-ditches forming part of CH_62, assessed to be of Medium significance, identified from aerial imagery, in Woodland in the off-road section between Chainage 325 and Chainage 725; and
- Wholly remove the footings of a small group of buildings (LI_08; Low significance) in Cullendragh identified from LiDAR data acquired for the Proposed Development in the off-road section at Chainage 2,650.

The magnitude of these permanent impacts has been assessed to be Very High and the significance of impact has been assessed to be Very Significant.

Construction of the Proposed Development will also:

- Remove curvi-linear features forming part of CH_67 (assessed to be of Medium significance), identified from aerial imagery in Cullendragh in the off-road section between Chainage 3,100 and Chainage 3,300; and
- Remove half of an enclosure (CH_75; assessed to be of Medium significance) identified from aerial imagery in Shallon for TCC4 between Chainage 26,800 and Chainage 26,925.

The magnitude of these permanent impacts has been assessed to be High and the significance of impact has been assessed to be Significant.

Construction of the Proposed Development will also remove deposits associated with three palaeochannels (LI_24, LI_36 and LI_58; Medium significance) in Dunboyne between Chainage 10,450 and Chainage 10,650, Nuttstown between Chainage 16,350 and Chainage 16,425, and Cloghran between Chainage 34,950 and Chainage 35,150, respectively. These assets have the potential to contain information about the palaeoenvironment as well as archaeological remains. The magnitude of these permanent impacts has been assessed to be Medium and the significance of impact has been assessed to be Moderate.

Construction of the Proposed Development will remove:

- Approximately 37m of an approximately 300m townland boundary (the Woodland - Gaulstown townland boundary; TB_01) at Chainage 1,050;
- Approximately 30m of an approximately 1,500m townland boundary (the Gaulstown - Cullendraugh townland boundary; TB_04) at Chainage 2,150;
- Approximately 35m of an approximately 580m townland boundary (the Rowan – Nuttstown townland boundary; TB_39) at Chainage 16,350;
- Approximately 52m of an approximately 2,000m townland boundary (the Priest Town – Belgree townland boundary; TB_44) at Chainage 19,225;
- Approximately 50m of an approximately 980m townland boundary (the Shallon – Shallon townland boundary; TB_67) between Chainage 26,150 and Chainage 26,200; and
- Approximately 230m of an approximately 1.9km townland boundary (the Clonshaugh – Belcamp townland boundary; TB_87) at Chainage 36,825.

The magnitude of these permanent impacts has been assessed to be Medium and the significance of impact has been assessed to be Moderate.

An additional 14 direct Slight impacts (CH_15, CH_32, CH_59, CH_63, LI_05, LI_09, LI_11, TB_38, TB_52, TB_82, TB_85, TB_86, TB_96 and TB_97), 13 direct Not Significant impacts (CH_34, CH_53, CH_68, CH_80, CH_81, CH_82, CH_83, LI_57, LI_60, TB_51, TB_57, TB_76 and TB_78) and two direct Imperceptible impacts (LI_37 and TB_54) are assessed for cultural heritage. These impacts are presented in Appendix A13.3 in Volume 3 of this EIAR.

13.4.2.2 Indirect

13.4.2.2.1 Archaeology

No significant indirect impacts (i.e., of Moderate significance or above) have been identified on archaeology as a result of the Construction Phase of the Proposed Development. An indirect impact of Slight significance on the setting of two Recorded Monuments (AY_23 and AY_24) resulting from noise and visual intrusion from construction plant has been identified, and these are presented in Appendix A13.3 in Volume 3 of this EIAR.

13.4.2.2.2 Architectural Heritage

Four indirect impacts of Slight significance have been assessed for four GDLs (DL_04, DL_05, DL_15 and DL_16), as a result of the Construction Phase of the Proposed Development, and these are presented in Appendix A13.3 in Volume 3 of this EIAR.

13.4.2.2.3 Cultural Heritage

A total of six indirect impacts of Slight significance (CH_01, CH_13, CH_24, CH_29, CH_75 and LI_40) and five indirect impacts of Not Significant significance (CH_04, CH_12, CH_25, CH_33 and CH_71) have been assessed, as a result of the Construction Phase of the Proposed Development, and these are presented in Appendix A13.3 in Volume 3 of this EIAR.

13.4.3 Operational Phase

13.4.3.1 Direct

No direct impacts were identified on archaeology, architectural heritage and cultural heritage assets as a result of the Operational Phase of the Proposed Development.

13.4.3.2 Indirect

Indirect impacts on the setting of archaeological, architectural heritage and cultural heritage assets resulting from noise and visual intrusion from construction plant during the Construction Phase would not continue into the Operational Phase. In addition, as in-road sections will be reinstated post-installation, the Proposed Development will not be visible in in-road sections during the Operational Phase, and therefore, no indirect impacts on the setting of archaeological, architectural heritage and cultural heritage assets in these locations have been identified. Similarly, while the temporary Passing Bays will require the removal of hedgerows during the Construction Phase, these will be reinstated (see Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR), and the off-road sections will be largely reinstated to agricultural land, and therefore, no indirect impacts on the setting of archaeological, architectural heritage and cultural heritage assets in these locations have been identified. Some permanent private access tracks, off-road Joint Bays and permanent watercourse crossings may be visible within off-road sections, and therefore, have the potential to result in indirect impacts to the setting of archaeological, architectural heritage and cultural heritage assets. These are identified below and an impact assessment presented in Appendix A13.3 in Volume 3 of this EIAR.

No significant indirect impacts (i.e., of Moderate significance or above) are identified on architectural heritage assets as a result of operation of the Proposed Development. Two indirect impacts of Slight significance have been assessed (DL_04 and DL_05) and are presented in Appendix A13.3 in Volume 3 of this EIAR.

13.5 Mitigation and Monitoring Measures

This Section identifies measures required to mitigate or monitor the potential impacts that have the potential to result from the Proposed Development on archaeological, architectural heritage and cultural heritage assets.

Mitigation will be undertaken within the framework provided by the Code of Practice between the Department of the Environment, Heritage and Local Government and EirGrid (Department of the Environment, Heritage and Local Government and EirGrid 2009).

Where preservation in-situ is feasible, a methodology for this will be agreed with the NMS.

All mitigation will be carried out under the supervision of a suitably qualified archaeologist under Licence (where required) granted by the Minister for Housing, Local Government and Heritage, and in accordance with the provisions of the National Monuments Acts 1930–2004 (as amended). Written reports on the results of all mitigation undertaken will be prepared in accordance with the requirements of the Licence(s) granted by the NMS.

The appointed contractor will allow sufficient time in their programme to allow the mitigation to be completed in the areas in which such mitigation is required.

13.5.1 Pre-Construction Phase

Mitigation measures for known archaeological, architectural heritage and cultural heritage assets, that will be undertaken post-consent, but in advance of the Construction Phase, will comprise the following:

- Topographical survey of the upstanding remains of LI_08;
- A photographic and written record of the elements of GDLs DL_04, DL_05, DL_15 and DL_16 impacted by the Proposed Development;
- Townland boundary surveys comprising a detailed written and photographic survey, and test trenching of TB_01, TB_04, TB_38, TB_39, TB_44, TB_51, TB_52, TB_54, TB_57, TB_67, TB_76, TB_78, TB_82, TB_85, TB_86, TB_87, TB_96 and TB_97;
- Palaeoenvironmental assessment and analysis of LI_24, LI_36 and LI_58;
- Archaeological excavation of AY_47, CH_32, CH_59, CH_62, CH_67, CH_75, CH_78, LI_05, LI_08, LI_09, LI_11, LI_24, LI_36, LI_40 and LI_58, informed by archaeological geophysical survey and archaeological test excavation, where preservation in-situ is not feasible;
- Underwater assessment comprising wade and metal detecting survey of:
  - Dunboyne Stream (WCP01);
  - Pinkeen River (WCP05); and
  - Two unnamed streams (UNWC 34 and WCP16).
- An archaeological metal detecting survey will be undertaken of the banks of UNWC 1, UNWC 2, UNWC 3, WCP04, WCP07, WCP08, UNWC 28, UNWC 29, WCP12, WCP13, UNWC 31 (1), UNWC 33 (2), UNWC 33A and UNWC 35).

In addition, archaeological geophysical survey and archaeological test excavation will be undertaken post consent but pre-construction in all off-road sections required for construction, including land required for the proposed access tracks, Passing Bays and Joint Bays, and HDD Compounds and TCCs. Where preservation in situ is not feasible, the results of the archaeological geophysical survey and archaeological test excavation will inform the design of archaeological excavation required to mitigate the impact on any unknown archaeological remains identified.

13.5.2 Construction Phase

During construction, the following mitigation measures will be implemented:

- Archaeological monitoring of on-road construction works within the Zones of Notification of Recorded Monuments (AY_18, AY_23, AY_24, AY_25, AY_29, AY_41 and AY_43) and for assets CH_34, CH_53, CH_68, CH_80, CH_81, CH_82, CH_83, LI_37, LI_57 and LI_60 will be undertaken; and
- AY_24, CH_15 and CH_63 will be clearly demarcated with temporary fencing within the Planning Application Boundary to avoid accidental damage.

If archaeological remains are identified during the archaeological monitoring, and preservation in-situ is not feasible, archaeological excavation will be undertaken under an excavation licence granted by the Minister for Housing, Local Government and Heritage and in accordance with the provisions of the National Monuments Acts 1930–2004 (as amended).

13.5.3 Operational Phase

No mitigation for archaeological, architectural heritage and cultural heritage is required during the Operational Phase.

13.6 Residual Impacts

13.6.1 Construction Phase

Residual impacts on archaeological, architectural heritage and cultural heritage assets during construction and operation are summarised in Section 13.6.1.1, 13.6.1.2 and 13.6.1.3. A full assessment is presented Appendix A13.3 in Volume 3 of this EIAR. In addition, where a significant impact (i.e., an impact of Moderate significance or above) had previously been identified prior to mitigation (see Section 13.4), an assessment of the residual significance of impact is also presented in Table 13.7. All impacts are negative unless otherwise stated.

13.6.1.1 Archaeology

Construction of the Proposed Development will remove AY_47 (a Recorded Monument assessed to be of Medium significance). Following the application of the mitigation measures identified in Section 13.5, the residual magnitude of impact has been assessed to be Medium and the residual significance of impact has been assessed to be Moderate.

A Slight residual significance of impact has been assessed for two archaeological assets (AY_23 and AY_24) and a Not Significant residual significance of impact has been assessed for seven archaeological assets (AY_18, AY_23, AY_24, AY_25, AY_29, AY_41 and AY_43) during construction. These are presented in Appendix A13.3 in Volume 3 of this EIAR.

13.6.1.2 Architectural Heritage

No significant residual impacts are predicted on architectural heritage assets as a result of the construction of the Proposed Development.

During the Construction Phase, a Slight residual significance of impact has been assessed for four GDLs (DL_04. DL_05, DL_15 and DL_16), a Not Significant residual significance of impact has been assessed for one GDL (DL_05) and an Imperceptible residual impact has been assessed for two GDLs (DL_15 and DL_16). These are presented in Appendix A13.3 in Volume 3 of this EIAR.

13.6.1.3 Cultural Heritage

The residual significance of impact has been assessed to be Slight for 19 cultural heritage assets (CH_01, CH_13, CH_24, CH_29, CH_62, CH_67, CH_75, CH_78, LI_08, LI_24, LI_36, LI_40, LI_58, TB_01, TB_04, TB_39, TB_44, TB_67 and TB_87). A Not Significant residual significance of impact has been assessed for six cultural heritage assets (CH_04, CH_12, CH_25, CH_33, CH_71 and TB_38) and an Imperceptible residual significance of impact has been assessed for 28 cultural heritage assets (CH_15, CH_32, CH_34, CH_53, CH_59, CH_63, CH_68, CH_80, CH_81, CH_82, CH_83, LI_05, LI_09, LI_11, LI_37, LI_57, LI_60, TB_51, TB_52, TB_54, TB_57, TB_76, TB_78, TB_82, TB_85, TB_86, TB_96 and TB_97) during construction. These are presented in Appendix A13.3 in Volume 3 of this EIAR.

Table 13.7: Assessment of Residual Impacts for Archaeological, Architectural and Cultural Heritage Assets Where a Significant Impact Has Been Assessed Prior to Mitigation

Asset Reference	Designation	Significance	Impact Magnitude (Pre-Mitigation)	Impact Significance (Pre-Mitigation)	Mitigation Measures	Residual Magnitude of Impact	Residual Significance of Impact
Construction Phase							
Archaeology							
AY_47	Recorded Monument	Medium	Very High	Very Significant	Archaeological excavation informed by archaeological geophysical survey and archaeological test excavation	Medium	Moderate
Architectural Heritage							
DL_04	None	Medium	Medium	Moderate	Photographic and written record of the elements of GDL impacted by the Proposed Development	Low	Slight
Cultural Heritage							
CH_62	None	Medium	Very High	Very Significant	Archaeological excavation informed by archaeological geophysical survey and archaeological test excavation	Medium	Slight
CH_67	None	Medium	High	Significant	Archaeological excavation informed by archaeological geophysical survey and archaeological test excavation	Medium	Slight
CH_75	None	Medium	High	Significant	Archaeological excavation informed by archaeological geophysical survey and archaeological test excavation	Medium	Slight
CH_78	None	Medium	Very High	Very Significant	Archaeological excavation informed by archaeological geophysical survey and archaeological test excavation	Medium	Slight
LI_08	None	Low	Very High	Very Significant	Topographical survey (written, photographic and drawn survey). Archaeological excavation informed by archaeological geophysical survey and archaeological test excavation.	Medium	Slight
LI_24	None	Medium	Medium	Moderate	Palaeoenvironmental assessment and analysis Archaeological excavation informed by archaeological geophysical survey and archaeological test excavation	Low	Slight

Asset Reference	Designation	Significance	Impact Magnitude (Pre-Mitigation)	Impact Significance (Pre-Mitigation)	Mitigation Measures	Residual Magnitude of Impact	Residual Significance of Impact
LI_36	None	Medium	Medium	Moderate	Palaeoenvironmental assessment and analysis Archaeological excavation informed by archaeological geophysical survey and archaeological test excavation	Low	Slight
LI_40	None	Medium	Very High	Very Significant	Archaeological excavation informed by archaeological geophysical survey and archaeological test excavation.	Medium	Slight
LI_58	None	Medium	Medium	Moderate	Palaeoenvironmental assessment and analysis Archaeological excavation informed by archaeological geophysical survey and archaeological test excavation	Low	Slight
TB_01	None	Medium	Medium	Moderate	Townland boundary survey	Low	Slight
TB_04	None	Medium	Medium	Moderate	Townland boundary survey	Low	Slight
TB_39	None	Medium	Medium	Moderate	Townland boundary survey	Low	Slight
TB_44	None	Medium	Medium	Moderate	Townland boundary survey	Low	Slight
TB_67	None	Medium	Medium	Moderate	Townland boundary survey	Low	Slight
TB_87	None	Medium	Medium	Significant	Townland boundary survey	Low	Slight

13.6.2 Operational Phase

No direct impacts have been identified for archaeology and cultural heritage during the Operational Phase.

Two indirect impacts have been identified for architectural heritage during the Operational Phase (DL_04 and DL_05). The residual magnitude of these impacts has been assessed to be Low and the residual significance of impact has been assessed to be Slight.

13.7 Conclusion

This Chapter presents the results of the assessment for archaeology, architectural heritage and cultural heritage arising from the Proposed Development.

During the Construction Phase, there is the potential for significant impacts. After the application of the mitigation measures identified in Section 13.5, the majority of these are not anticipated to be significant. One direct impact identified on a Recorded Monument (AY_47) has been assessed to be a Moderate residual impact.

No significant impacts are anticipated for archaeology, architectural heritage and cultural heritage during the Operational Phase.

13.8 References

Aerial Imagery

Cambridge University Collection of Aerial Photography (CUCAP)

CUCAP Number	Date	Type	Subject
BDK006	14/07/1970	Oblique	Crop marks. Dunboyne, Meath, Ireland

Fairey Survey of Ireland (FSL453/2), 1971, National Monuments Service Archive

Ortho imagery (1995, 2000, 2005): https://heritagemaps.ie/WebApps/HeritageMaps/index.html

OSi Ortho

DigitalGlobe aerial imagery

GoogleEarth, various dates

Historic Maps

The Down Survey of Ireland, 1656-1658

Rocque, 1760, Dublin County

Taylor and Skinner Dublin to Swords, 1778

Taylor's Environs of Dublin, 1816

Ordnance Survey, 6" to 1 mile, 1837 – 1842,

Ordnance Survey, 25" to 1 mile, 1888-1913,

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 14 – Traffic and Transport

EirGrid

March 2024

Contents

14. Traffic and Transport

14.1 Introduction

This Chapter presents the assessment of the likely potential impacts of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) on traffic and transport as a result of the Construction Phase and Operational Phase of the Proposed Development. The sequencing of the Construction Phase is split into five phases:

- Phase 0 (site establishment and advanced works);
- Phase 1 (installation of Joint Bays and Passing Bay structures);
- Phase 2 (excavation and installation of cable ducts);
- Phase 3 (installation and jointing of cables); and
- Phase 4 (substation works).

A full description of the Proposed Development is provided in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

This Chapter includes a review of the existing baseline conditions of the traffic and roads environment in the study area identified in Section 14.2.1. For this purpose, the road network has been reviewed and traffic counts have been undertaken. An analysis based on this information, and consideration on how to minimise impacts resulting from the Proposed Development and any proposed mitigation measures are presented in this Chapter. Throughout this Chapter, the factual consequences of the Proposed Development and its construction and operation are referred to as 'effects', while the significance they are deemed to have on the baseline environment is referred to as 'impacts'.

Consistent with advice set out in the Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Traffic and Movement (hereafter referred to as the IEMA Guidelines) (IEMA 2023) and the Transport Infrastructure Ireland (TII) Traffic and Transport Assessment Guidelines (PE-PDV-02045) (hereafter referred to as the TII Guidelines) (TII 2014), this Chapter assesses the impacts of the Construction Phase of the Proposed Development and details the levels of construction vehicles generated and their most likely construction access routes to the respective construction locations. This Chapter is supported by the Construction Traffic Management Plan (CTMP) which forms Appendix B of the Construction Environmental Management Plan (CEMP) (which is included as a standalone document in the planning application pack).

The estimates within this Chapter of construction duration and construction traffic are based on professional judgement in addition to a range of assumptions relating to the Proposed Development.

14.2 Methodology

14.2.1 Study Area

The study area for the traffic and transport assessment is the existing road network that will potentially be impacted by the Proposed Development which comprises the two substations (Woodland and Belcamp Substations), Temporary Construction Compounds (TCCs) / Horizontal Directions Drilling (HDD) Compounds and the proposed cable route. The construction access routes, identified in Section 14.3.1, determined the extent of the assessed study area.

The Proposed Development at Woodland Substation and Belcamp Substation will consist of new electricity transmission infrastructure at the existing substation sites which will be expanded over an adjacent area. TCCs and HDD Compounds, required to facilitate the Construction Phase of the Proposed Development are detailed in Section 4.5.6 of Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.

The proposed cable route will traverse a number of regional and local roads which are predominantly rural in nature. Three motorways, the M1, M2 and M3, and the M3 Parkway rail line cross the study area but will not be directly impacted by the Proposed Development due to the proposed implementation of trenchless techniques at these particular crossing locations (HDD). For road and rail crossings, this means that there will be minimal impact as a machine bores under the road that the cable is then pulled through with operation of these roads unaffected.

To assess the traffic and transport impacts, the proposed cable route has been split into 30 Temporary Traffic Management (TTM) sections, as shown in Figure 14.1 in Volume 4 of this EIAR. For 18 of these TTM Sections, which comprise a length of approximately 24.4km (kilometres), the proposed cable route will run in-road. The remaining 12 TTM Sections, comprising approximately 13.2km of the proposed cable route, will be off-road and will run predominantly through agricultural land. There will be 19 sections of road that will be affected by TTM, most of which are regional roads, and are listed in Table 14.1. Diversion routes associated with the full road closures are shown in Figure 14.2 in Volume 4 of this EIAR.

In terms of public transport, 34 bus routes interact with these TTM impacted roads. These services, and the likely potential impacts resulting from the Construction Phase of the Proposed Development are outlined in more detail in Section 14.4.2.1.13 and in the Temporary Traffic Management Plan (included as Appendix A to Appendix B (CTMP) of the CEMP (included as standalone documents in the planning application pack). The likely potential impacts of the Operational Phase of the Proposed Development are discussed in Section 14.4.3.

Table 14.1: Summary of Lane and Road Closures due to Proposed TTM

TTM Sections	Length (km)	Road	Joint Bay	Position	Road Width (m)	Phase 1 (Joint Bay and Passing Bay Installation) and Phase 3 (Installation and Jointing of Cables)		Phase 2 (Excavation and Cable Duct Installation)		Diversion Route Length (km)
						Traffic Measures	Approximate Duration – Phase 1 / Phase 3 (days)	Traffic Measure	Approximate Duration (days)	
1.02	7.2	R156 Regional Road (west of R157 Regional Road)	JB5	In-road	6.5	Passing Bay – two lane closures	23 / 47	Full road closure	134	24.1
			JB6	In-verge	6.5	Single lane closure	10 / 45			
			JB7	In-verge	7.0	n/a	12 / 47			
			JB8	In-verge	6.7	Single lane closure	22 / 46			
			JB9	In-road	6.5	Full Road closure	5 / 51			
			JB10	In-road	7.0	Passing Bay – two lane closures	13 / 42			
			JB11	In-road	6.3	Full Road Closure	7 / 42			
			JB12	In-verge	6.9	Single lane closure	12 / 48			
			JB13	In-verge	6.5	Single lane closure	14 / 46			
			JB14	In-verge	8.0	n/a	15 / 47			
1.03	1.5	R157 Regional Road (south-west of M3 Motorway Junction 5 (J5))	JB15	In-verge	15.0	Hard shoulder closure	15 / 48	Hard Shoulder Closure	44	n/a
1.05	0.3	R147 Regional Road (north-west of M3 Motorway J5)	n/a	n/a	14.5	n/a	n/a	Two lanes closure	9	n/a
1.06	1.6	L5026 Pace (east of R147 Regional Road)	JB18	In-road	12.0	Two lane closures	7 / 48	Full road closure	50	3.3
			JB19	In-road	3.6	Full road closure	5 / 48			
1.07	0.7	L1010 Nuttstown Road (south of Newbridge)	JB20	In-road	5.0	Full road closure	9 / 46	Full road closure	19	20.9
1.09	0.3	L1010 Nuttstown Road (west of Nuttstown Crossroads)	JB22	In-road	5.3	Full road closure	5 / 50	Full road closure	11	21.3
1.10	1.4	L1010 Nuttstown Road (west of Belgree Court)	JB23	In-road	5.3	Full road closure	7 / 48	Full road closure	42	20.2
1.12	0.9	Priestown Road (west of Kilbride Road)	JB24	In-road	5.5	Passing Bay – two lane closures	15 / 49	Full road closure	26	20.7

TTM Sections	Length (km)	Road	Joint Bay	Position	Road Width (m)	Phase 1 (Joint Bay and Passing Bay Installation) and Phase 3 (Installation and Jointing of Cables)		Phase 2 (Excavation and Cable Duct Installation)		Diversion Route Length (km)
						Traffic Measures	Approximate Duration – Phase 1 / Phase 3 (days)	Traffic Measure	Approximate Duration (days)	
			JB25	In-road	5.3	Passing Bay – two lane closures	15 / 46			
1.14	1.1	Kilbride Road (south of Priestown Road)	JB26	In-verge	5.8	Single lane closure	14 / 56	Full road closure	34	13.8
1.16	0.7	Kilbride Road (north of Kilmartin Lane)	JB27	In-road	5.7	Passing Bay – two lane closures	17 / 56	Full road closure	20	14.2
1.18	0.7	R121 Regional Road (north-east of Kilnamonagh)	n/a	n/a	5.8	n/a	n/a	Full road closure	20	6.5
1.20	0.9	R121 Regional Road (west of R135 Regional Road)	JB32	In-road	6.5	Full road closure	7 / 47	Full road closure	36	6.3
1.21	1.6	R121 Regional Road (east of R135 Regional Road)	JB33	In-road	5.9	Passing Bay – two lane closures	15 / 45	Full road closure	50	8.5
			JB34	In-road	4.8	Passing Bay – two lane closures	18 / 48			
1.23	0.8	R121 Regional Road (west of R122 Regional Road)	JB35	In-road	5.3	Passing Bay – two lane closures	15 / 45	Full road closure	24	9.2
1.24	1.2	R122 Regional Road (south of R121 Regional Road)	JB36	In-verge	6.5	n/a	12 / 49	Full road closure	37	8.7
			JB37	In-verge	5.8	Single lane closure	15 / 42			
1.25	0.05	Kilreesk Lane	n/a	n/a	6.5	n/a	n/a	Full road closure	2	2.5
1.27	1.6	R108 Regional Road (west of Naul Road)	JB39	In-road	7.4	Passing Bay – two lane closures	15 / 46	Single lane closure	55	11.7
			JB40	In-road	7.4	Passing Bay – two lane closures	15 / 44			
1.28	2.5	Naul Road (east of R108 Regional Road)	JB41	In-road	7.4	Passing Bay – two lane closures	15 / 45	Single lane closure	56	10.9
			JB42	In-road	8.0	Passing Bay – two lane closures	14 / 46			
			JB43	In-road	7.5	Passing Bay – two lane closures	13 / 45			

TTM Sections	Length (km)	Road	Joint Bay	Position	Road Width (m)	Phase 1 (Joint Bay and Passing Bay Installation) and Phase 3 (Installation and Jointing of Cables)		Phase 2 (Excavation and Cable Duct Installation)		Diversion Route Length (km)
						Traffic Measures	Approximate Duration – Phase 1 / Phase 3 (days)	Traffic Measure	Approximate Duration (days)	
			JB44	In-verge	7.5	n/a	14 / 45			
1.29	0.8	Stockhole Lane (east of R132 Regional Road)	JB45	In-road	7.6	Passing Bay – two lane closures	15 / 48	Single lane closure	28	11.7

14.2.2 Relevant Guidelines, Policy and Legislation

Table 14.2 outlines the relevant policies and guidance which have been applied in the assessment of the traffic and transport effects of the Proposed Development. They are referenced where they are applied throughout this Chapter.

Table 14.2: Relevant Transport Policies and Guidance

Guidance Document	Source and Year	Guidance Detail
Fingal Draft Development Plan 2023-2029, Chapter 14: Development Management Standards	Fingal County Council 2022	Guidance states that *"developments shall have regard to the TII Traffic and Transport Assessment Guidelines, 2014 and any subsequent updated guidelines, where applicable."* Requirement for *"…the provision of a Traffic and Transport Assessment where new development is likely to have a significant effect on travel demand and the capacity of the surrounding transport network including the road network and public transport services network."* Securing access onto the road network is a key issue, particularly in rural areas therefore the use of existing access is normally preferable to the creation of new access onto a rural road. *"Where new entrances are necessary, the relevant road design standards will be applied (DMRB in rural situations and DMURS in urban situations)."* *"Promote road safety measures in conjunction with relevant stakeholders and avoid creating traffic hazards."*
Meath Adopted County Development Plan 2021-2027, Chapter 11: Development Management Standards and Land Use Zoning Objectives	Meath County Council 2021	*"Traffic and Transport Assessment (TTA), Road Safety Audits and Road Safety Impact Assessments are required to accompany planning applications for major developments with significant potential to generate traffic and or which could create a significant hazard or safety performance impact on a major road, particularly national roads. When preparing the TTA's regard should be had to the provision of the 'Design Manual for Urban Roads and Streets and the 'Traffic Management Guidelines, 2012'."* *"The requirement for a TTA is at the discretion of the Council but the following thresholds can be used for guidance purposes only:* • *Traffic to and from the proposed development exceeds 10% of the traffic flow on the adjoining road;* • *Traffic to and from the proposed development exceeds 5% of the traffic flow on the adjoining road where congestion exists;* • *Residential development in excess of 100 dwellings (Applications for 100 or more dwellings are decided by An Bord Pleanála as an SHD);* • *Retail and leisure development in excess of 1,000 sq.m;* • *Industrial development in excess of 5,000 sq.m, and; and* • *Distribution and warehousing in excess of 10,000 sq.m"*
Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines)	Environmental Protection Agency (EPA) 2022	The EPA Guidelines provide advice of best practice and principles for those developing an environmental impact assessment. Specific reference to transportation includes: *"The provision of new access facilities (e.g., links to motorways) or the upgrading of existing roads (e.g., road widths, bridges and junctions) carried out by other parties can give rise to significant environmental effects".*
Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report	European Commission (EC) 2017	This guidance provides a checklist of what should be covered in environmental impact assessment, including the following relating to traffic and transport: • Description of traffic flows, type, volume, temporal pattern and geographical distribution generated or diverted as a result of the Proposed Development; • Description of transportation of resources (including natural resources) and raw materials to the Proposed Development site, and the number of traffic movements involved; • Description of access arrangements and estimate of the number of traffic movements involved in bringing workers and visitors to the Proposed Development site; • Description of risks associated with the Proposed Development, including risks of traffic accidents; and • Description of the effects on the environment caused by activities ancillary to the main Proposed Development.

Guidance Document	Source and Year	Guidance Detail
Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Traffic and Movement (hereafter referred to as the IEMA Guidelines)	IEMA 2023	Description of transportation of resources (including natural resources) and raw materials to the Proposed Development site, and the number of traffic movements involved.
Transport Infrastructure Ireland (TII) Traffic and Transport Assessment Guidelines (PE-PDV-02045) (hereafter referred to as the TII Guidelines)	TII 2014	Description of traffic flows, type, volume, temporal pattern and geographical distribution generated or diverted as a result of the Proposed Development.
Transport Infrastructure Ireland (TII) Rural Road Link Design (DN-GEO-03031)	TII 2017	Description of road definitions and design standards applying to single and dual carriageway roads (including motorways) in rural areas and single and dual carriage way roads (not including urban roads and streets) in urban areas.
Traffic Signs Manual	Department of Transport (DoT) 2019	Chapter 8 (Temporary Traffic Measures and Signs for Roadworks) outlines the TTM to be used at work sites on public roads to warn, instruct and guide road users safely.
United Kingdom (UK) Design Manual for Roads and Bridges (DMRB)	Standards for Highways various dates	The UK DMRB sets out current design standards relating to the design, assessment and operation of motorway and trunk roads in the UK. The DMRB may also be applied to local authority roads. This UK based document is used as guidance due to the withdrawal of any Irish specific DMRB. The now withdrawn National Roads Authority (NRA) DMRB guidance was an adapted version of the UK guidance.
The National Transport Model (NTpM) Update, Travel Demand Forecasting Report (NTpM Volume 3)	TII 2019	A detailed discussion on the background data and methodologies used to inform the estimates of future travel demand. Provides growth rates for Ireland.
Project Appraisal Guidelines for National Roads (hereafter referred to as PAG)	Unit 5.2: TII 2023 Unit 5.3: TII 2021 Unit 16.0: TII 2016a Unit 16.1: TII 2016b	Various units of the PAG were used to provide guidance on data collection, processing and factoring survey data, and the preparation of future travel demand projections. The PAG is applicable for the modelling and appraisal of national road schemes, although the guidance is equally applicable to traffic on regional and local road schemes.

14.2.3 Data Collection and Collation

A desk-based study was undertaken using Google Earth (Google Earth 2023) and Google Maps (Google Maps 2023) to review traffic conditions within the study area. This process also determined the potential construction and operational access routes to the Proposed Development and the locations that traffic count surveys would be required. Sensitive road sections and constraints were identified, such as locations that are likely to be more vulnerable to change in traffic flow or profile (e.g., areas in close proximity to schools or areas with traffic restrictions).

Information on existing traffic volumes in the study area was obtained through both Automatic Traffic Count (ATC) and Junction Turning Count (JTC) traffic surveys commissioned by Jacobs and undertaken by Nationwide Data Collection (NDC). Figure 14.3 in Volume 4 of this EIAR shows the location of these counters. These traffic surveys were commissioned to gain an understanding of baseline traffic conditions within the study area and along the proposed diversion routes.

A total of 28 JTCs and 32 ATCs were completed by NDC between Tuesday, 6 May 2023 and Thursday, 1 June 2023. The traffic on these survey days is representative of neutral traffic conditions, as defined by PAG Unit 5.2 (TII 2023), since there were no public holidays, school holidays or special events in the area during this period.

Three additional JTCs (no ATCs) were completed on Tuesday, 20 June 2023, and an additional eight JTCs and five ATCs were undertaken between Thursday, 10 August 2023 and Wednesday, 16 August 2023. Although undertaken during a period not defined as neutral, the application of monthly factors, as defined in PAG Unit 16.1 (TII 2016b), ensured that these counts remain representative of typical traffic flows.

The observed traffic data was factored to Annual Average Daily Traffic (AADT) in line with the PAG Unit 16.0 (TII 2016a) and PAG Unit 16.1 (TII 2016b) for baseline and future year reporting. This data is presented in Section 14.3.2.

14.2.4 Appraisal Method for the Assessment of Impacts

14.2.4.1 Overview

The following key tasks were undertaken to facilitate the assessment of key issues and potential impacts:

- A review of the relevant transport policies (Section 14.2.2);
- Determining the baseline traffic and transport conditions via:
  - The collection of traffic data (Section 14.2.3);
  - Construction access route review (Section 14.3.1);
  - Public transport review (Section 14.3.4); and
  - Active travel review (Section 14.3.5).
- Determining construction traffic volumes, in consultation with the wider design team, for use in the assessment (Section 14.3.2);
- Identifying sensitive receptors (Section 14.3.3);
- Establishing the need for a cumulative assessment with any nearby committed developments, and the determination of committed development traffic flows (refer to Chapter 20 (Cumulative Impacts and Environmental Interactions) in Volume 2 of this EIAR);
- An assessment of the potential magnitude of impacts and significance of impacts on identified receptors in accordance with the methodology described in Section 3 of the IEMA Guidelines (IEMA 2023) (Section 14.4);
- A proposal of mitigation works where necessary (Section 14.5); and
- An assessment of predicted residual impacts, following the implementation of the proposed mitigation measures (Section 14.6).

14.2.4.2 Impact Assessment

The EPA Guidelines (EPA 2022) and IEMA Guidelines (IEMA 2023) are used to assess the environmental impact of road traffic associated with major new developments, excluding projects such as new trunk roads or railways which have separate and established procedures. These guidelines are intended to complement professional judgement and the experience of trained assessors, as the perception of changes in traffic is dependent upon a wide range of factors including volume, speed, function, and composition, (e.g., percentage of heavy goods vehicles (HGVs)). It is important to acknowledge that the significance of impact associated with certain traffic loads can vary depending on the location and characteristics of the Proposed Development.

The assessment of the environmental impacts of traffic involved a staged approach including:

- Determining existing and forecast traffic levels and characteristics;
- Determining the period suitable for assessment;
- Determining the year of assessment; and
- Identifying the geographical boundaries of assessment study area.

The predicted construction vehicle trips were generated from the programme for the Proposed Development, a summary of which is included in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. These have been compared to baseline traffic flows to identify if there are likely to be periods where the increase in traffic exceeds standard thresholds.

The following IEMA Guidelines rules were used as a screening framework to define the roads identified within the study area that were considered further in the impact assessment:

- Rule 1 – include road links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2 – include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more (IEMA Guidelines: Sensitive areas include 'accident blackspots, conservation areas, hospitals, and links with pedestrian flows').

Based on the EPA Guidelines, IEMA Guidelines and best practice, it is considered that Major and Moderate magnitude of impacts are 'Significant', whereas Minor and Negligible magnitude of impacts are 'Not Significant'. Based on this, the criteria for identifying the roads within the study area that may be impacted by increases in traffic volumes as a result of the Proposed Development has been categorised in Table 14.3.

Table 14.3: Traffic Impact Significance

Significance of Impact	Percentage Increase in General Traffic
Major (Significant)	Above 90%
Moderate (Significant)	Between 60% and 90%
Minor (Not Significant)	Between 30% and 60%
Negligible (Not Significant)	Below 30%

Where existing traffic levels are exceptionally low, on some unclassified roads for example, any increase in traffic flow may result in a predicted increase in traffic levels which equals or exceeds these Moderate or Major thresholds. Where this situation is identified, it is important to consider any increase, both in terms of its relative increase in respect of existing traffic flows, as well as the overall total flow in respect of the available capacity of the section of road being considered.

For example, a 30% increase in traffic flow on a road which currently only carries 1,000 vehicles AADT flow could potentially indicate a major significant impact if it was considered simply in terms of the IEMA Guidelines rules. However, a 7.3m wide single carriageway road can accommodate an average of up to approximately 11,600 vehicles per day (AADT), as indicated by the thresholds contained in the TII Rural Road Link Design (DN-GEO-03031) (TII 2017), and as summarised in Table 14.4. Therefore, an element of professional judgement is also applied as good practice regarding the carrying capacity of the roads being considered, which is an acceptable and well utilised approach for this type of assessment, as such an increase in this example would be unlikely to have a significant impact, given the road's overall capacity.

Table 14.4: Road Types / Capacities (Two-Way AADT)

Type of Road	Edge Treatment	Capacity (AADT) for Level of Service D
Type 3 Single (6.0m) Carriageway (National Secondary Roads Only)	0.5m hard strip. Cycle Facilities/Footways	5,000
Type 2 Single (7.0m) Carriageway	0.5m hard strips. Cycle Facilities/Footways	8,600
Type 1 Single (7.3m) Carriageway	2.5m hard shoulders	11,600
Type 3 Dual Divided 2+1 Lanes (7.0m + 3.5m) Carriageways	0.5m hard strips. Cycle Facilities/Footways where required.	14,000
Type 2 Dual Divided 2+2 Lanes (2x7.0m) Carriageways	0.5m hard strips Cycle Facilities/Footways	20,000
Type 1 Dual Divided 2+2 Lanes (2x7.0m) Carriageways	2.5m hard shoulders	42,000
Motorway Divided 2+2 Lanes (2x7.0m)	2.5m hard shoulders	52,000
Wide Motorway Divided 2+2 Lanes (2x7.5m)	3m hard shoulders	55,500

The vehicle flows represent the approximate two-way flows corresponding to Level of Service (LoS) D in reasonably level terrain. At LoS D, speeds begin to decline slightly with a slight increase of flows and density beginning to increase somewhat more quickly. Freedom to manoeuvre within the traffic stream is more noticeably limited, and the driver experiences reduced comfort levels.

The impact of traffic management, in particular full road closures, have been determined in conjunction with the duration of effects outlined in the EPA Guidelines, as outlined in Section 14.2.4.2.2.

The potential impact of the Proposed Development's Construction Phase and Operational Phase on public transport routes is also estimated. The bus routes which run through the study area have been collected along with the service frequency and operator information. Any overlaps with the in-road portions of the proposed cable route were then identified. Where there are overlaps, TTM measures along the relevant road section are identified.

Train services are also reviewed by finding railway lines that the proposed cable route will traverse or stations within close proximity to the Proposed Development that could be used by workers. The train services are identified, and the potential impacts to them are assessed on an individual basis; the chosen construction methods to facilitate the cable crossing across the railway line determines how, if at all, train services would be affected.

In addition, any potential environmental impacts, including severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation, and road safety, are considered on a case-by-case basis using professional judgement and reasoned argument. The following sub-sections describe the impacts of potential importance outlined in the IEMA Guidelines.

14.2.4.2.1 Severance

Severance is the perceived division that can occur within a community and access to the services and facilities therein (e.g., separation by impacts associated with construction and improvement projects resulting from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself).

Changes in journey times and amenity for pedestrians and cyclists may be such that they affect, adversely or beneficially, the degree to which a locality is subject to 'community severance'. In considering the impacts of the Proposed Development, community severance is defined as the separation of residents from facilities and services they use within their community caused by changes in traffic flows. However, the correlation between the degree of severance and the physical barrier of the road and its traffic is not straightforward.

Factors that need to be considered in determining whether severance is likely to be an important issue include road width, traffic flow and composition, traffic speeds, the availability of crossing facilities and the number of movements that are likely to cross the affected route. Different groups may also be more impacted, specifically vulnerable groups such as older age, younger age, and health issues, as they may be more sensitive to traffic conditions than others.

Table 14.5 outlines, in line with the traffic impact significance highlighted in Table 14.3, that the IEMA Guidelines (IEMA 2023) identify that *"changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and substantial' changes in severance respectively"*.

Table 14.5: Severance Significance

Significance of Severance	Percentage Increase in General Traffic
Major (Significant)	Above 90%
Moderate (Significant)	Between 60% and 90%
Minor (Not Significant)	Between 30% and 60%
Negligible (Not Significant)	Below 30%

14.2.4.2.2 Driver Delay

Driver delay impacts are likely to be significant when the traffic on the network surrounding the Proposed Development is already at, or close to, the capacity of the system. To inform the assessment of driver delay, the total vehicles during of the Construction Phase or Operational Phase, as well as the theoretical capacity of the roads, has been considered by referencing the capacity information presented in Table 14.4.

Identifying the TTM measures along the relevant road sections is also an important part of this assessment and has been assessed separately in Section 14.4.2.1.12. The effect of lane closures and full road closures are different, and their impact on traffic depends on the number of days these TTM measures are active:

- Hard shoulder closures are unlikely to cause any delay effect on traffic, as traffic will still be free-flowing and existing traffic lane widths will be maintained;
- Single lane closures have a potential delay effect on traffic: a stop-and-go or traffic light system will be implemented at the single lane closures and queues may form at these locations if traffic levels are sufficiently high;
- Two-lane closures with Passing Bays have a potential delay effect on traffic: a stop-and-go or traffic light system will be implemented at the Passing Bays and queues may form at these locations if traffic levels are sufficiently high; and
- Full road closures will require traffic to temporarily follow a diversion route, increasing journey time. The diversions taken are assumed to be that identified in Appendix A (Temporary Traffic Management Plan) to Appendix B (CTMP) of the CEMP, which are included as standalone documents in the planning application pack) and as shown on Figure 14.2 in Volume 4 of this EIAR.

The IEMA Guidelines (IEMA 2023) and EPA Guidelines(EPA 2022) do not give specific thresholds to determine significance associated with driver delay due to both construction traffic and traffic management diversions, and as such, professional judgement has been applied, and Driver Delay Impact Significance thresholds have been developed as outlined in Table 14.6.

Table 14.6: Driver Delay Impact Significance Matrix

Significance of Impact	Increase in Journey Time
Major (Significant)	31-40 minutes
Moderate (Significant)	21-30 minutes
Minor (Not Significant)	11-20 minutes
Negligible (Not Significant)	0-10 minutes

14.2.4.2.3 Pedestrian Delay (Incorporating Delay to all Non-Motorised Users)

Pedestrian delay, as with driver delay, is likely to be significant when the traffic on the network surrounding the Proposed Development is already at, or close to, the capacity of the system. To inform the assessment of pedestrian delay, the theoretical capacity of the roads has been considered by referencing the capacity information presented in Table 14.4.

Pedestrian Delay (Incorporating Delay to all Non-Motorised Users) and severance are closely related effects. Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads. In general, increases in traffic levels are likely to lead to greater increases in delay. Delays will also depend on the general level of pedestrian activity, visibility, and the general physical conditions within the study area.

As part of this assessment, it has been noted where the construction of the Proposed Development has the potential to affect leisure routes, including hiking paths, cycle lanes, and greenways.

The IEMA Guidelines (IEMA 2023) and EPA Guidelines(EPA 2022) do not give specific thresholds to determine significance associated with driver delay due to both construction traffic and traffic management diversions, and as such, professional judgement has been applied, and Pedestrian Delay Impact Significance thresholds have been developed as outlined in Table 14.7.

Table 14.7: Pedestrian Delay Impact Significance Matrix

Significance of Impact	Percentage Increase in General Traffic
Major (Significant)	Above 90%
Moderate (Significant)	Between 60% and 90%
Minor (Not Significant)	Between 30% and 60%
Negligible (Not Significant)	Below 30%

14.2.4.2.4 Pedestrian Amenity (Incorporating Non-Motorised User Amenity)

Pedestrian amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width / separation from traffic. The magnitude of the impact on pedestrian amenity is considered in terms of the ‘threshold’ described in the IEMA Guidelines (IEMA 2023), which suggests that a meaningful change in amenity would be where traffic flow (or its HGV component) is halved or doubled.

As part of this assessment, it has been noted where the construction of the Proposed Development has the potential to affect leisure routes, including hiking paths, cycle lanes, and greenways.

14.2.4.2.5 Fear and Intimidation

The magnitude of the impact on fear and intimidation has been considered in reference to the IEMA Guidelines (IEMA 2023), which advise that any impact is dependent on the total volume of traffic, the HGV composition, vehicle speeds, proximity of traffic to people or the lack of protection caused by such factors as narrow pavement widths, and conclude that there are no commonly agreed thresholds for estimating levels of danger, or fear and intimidation from known traffic and physical conditions. Professional judgement has therefore been used to determine the impact of construction and operational traffic based on these factors.

14.2.4.2.6 Road Safety

The increase in traffic volume associated with the Proposed Development is the main factor in the potential increase in risk regarding accidents and safety, as is the transfer of dirt and debris from the site and associated vehicles onto the surrounding road network.

The IEMA Guidelines (IEMA 2023) state that through calculating the expected increase in vehicle-kilometres on different classes of road, it will be possible to make an initial simple statistical assessment of the likely increase (or decrease) in the number of accidents resulting from changes in traffic flows and composition. The following impact criteria set out in Table 14.8 is based on IEMA Guidelines and good practice.

Table 14.8: Road Safety Impact Significance Matrix

Significance of Impact	Change in Annual Collision Rate and Percentage Increase in General Traffic
Major (Significant)	A change in annual collision rate of at least one collision and above 90% increase in general traffic
Moderate (Significant)	A change in annual collision rate of at least one collision and between 60% and 90% increase in general traffic
Minor (Not Significant)	A change in annual collision rate of at least one collision and between 30% and 60% increase in general traffic
Negligible (Not Significant)	A change in annual collision rate of less than one collision and below 30% increase in general traffic

However, the IEMA Guidelines also state that where a development is expected to produce a change in the character of the traffic (e.g., HGV movements on rural roads), then data on existing accident levels may not be sufficient. As such, professional judgement is needed to assess the implications on the local road network.

Impacts that may arise for transport users affected by changes in traffic flows could be, for example, frustration associated with delays that may arise because of potential large increases in traffic movements or changes in route.

The Road Safety Authority (RSA) road traffic collision data (RSA 2023) is currently unavailable (last checked 22 February 2024) with their website stating:

> *"We are in the process of reviewing our road traffic collision (RTC) data sharing policies and procedures. Record-level RTC data can't be shared until this review is complete but we expect this to be finalised in the coming months".*

As the RSA has removed all accident data from its website while it reviews its data privacy guidelines, a baseline review of relevant collision data, and the corresponding analysis of potential increases in collisions related to the Construction Phase of the Proposed Development, cannot be undertaken. Professional judgement will therefore be used to make a final determination on the impacts to road safety during the Construction Phase and Operational Phase.

14.2.4.2.7 Public Transport Impacts

The potential impact of the Proposed Development's Construction Phase and Operational Phase on public transport routes has also been estimated. The bus routes which run through the study area were collated along with the service frequency and operator information. Any overlaps with the in-road portions of the proposed cable route were then identified. Where there are overlaps, TTM measures along the relevant road section are identified. The effect of lane closures and full road closures are different, and their impact on bus routes depends on the number of days these TTM measures are active:

- Hard shoulder closures are unlikely to cause any delay effect on traffic as traffic will still be free-flowing and existing traffic lane widths will be maintained;
- Single lane closures have a potential delay effect on the buses: a stop-and-go system will be implemented at the single lane closures and queues may form at these locations if traffic levels are sufficiently high;
- Two-lane closures with Passing Bays have a potential delay effect on traffic: a stop-and-go or traffic light system will be implemented at the Passing Bays and queues may form at these locations if traffic levels are sufficiently high; and
- Full road closures will require the bus route to temporarily follow a diversion route, which may affect the bus route by causing a cessation of service to some bus stops and increasing journey

time. The diversion taken by the bus is assumed to be that identified in the Temporary Traffic Management Plan in the CTMP (Appendix B of the CEMP, which is included as a standalone document in the planning application pack) and shown in Figure 14.2 in Volume 4 of this EIAR. The impact of full road closures has been determined in conjunction with the duration of effects outlined in the in Section 14.2.4.2.2.

Train services are also reviewed by finding railway lines that the proposed cable route will traverse or stations within close proximity to the Proposed Development that could be used by workers. The train services are identified, and the potential impacts to them are assessed on an individual basis; the proposed construction methods selected to facilitate the cable crossing across the railway line determines how, if at all, train services will be affected.

14.2.4.3 Assessment of Impacts

The method for identifying the sensitivity or importance of receptors, the impact magnitude and the assessment of significant impacts is set out in this Section and is based on best practice and professional judgement.

14.2.4.3.1 Sensitivity / Importance

The receptors that may be affected by traffic effects arising from the construction and / or operation of the Proposed Development are likely to exist within the study area as identified in Section 14.2.1. The sensitivity of these receptors is typically classified in accordance with good practice and professional judgement by size and function (in terms of settlements, the presence of school and community facilities, traffic calming or traffic management measures, vehicle speed limits and position on the roads hierarchy) using criteria identified in Table 14.9. The classification is based upon professional judgement and relative sensitivity to the potential traffic effects of the Proposed Development.

Table 14.9: Receptor Sensitivity

Sensitivity	Description
High	Receptors of high importance at the international or national scale and with limited potential for substitution. Includes large rural settlements containing a high number of community and public services and facilities, areas with traffic control signals, waiting and loading restrictions, traffic calming measures and minor rural roads, not constructed to accommodate frequent use by HGVs.
Medium	Receptors with high or medium importance at the regional scale and with limited potential for substitution. To include intermediate sized rural settlements containing some community or public facilities and services, areas with some traffic calming or traffic management measures and local A or B class roads, capable of regular use by HGV traffic.
Low	Receptors with low or medium importance and rarity on a local scale (on-site or neighbouring the site). To include small rural settlements with few community or public facilities or services, areas with little or no traffic calming or traffic management measures and trunk or A-class roads, constructed to accommodate significant HGV composition.
Negligible	Receptors with little importance. To include roads with no adjacent settlements including new strategic trunk roads or motorways that would be hardly affected by additional traffic and are suitable for abnormal loads.

14.2.4.3.2 Significance of Impact

To determine the overall significance of the impacts, the results from the receptor sensitivity, identified in Table 14.9, and impact magnitude classifications are correlated and classified using the scale summarised in Table 14.10.

The matrix provides a best practice guide subject to professional judgement. The significance of the impacts ascribed within the matrix are defined as follows:

- **Negligible –** impact is only very slightly detectable / noticeable or is undetectable and of no significance;

- **Minor –** impact is slightly detectable / noticeable; likely to be of temporary duration; local influence;
- **Moderate –** impact is easily detectable / noticeable; could have either a temporary or permanent duration; unlikely to exceed local influence; and
- **Major –** impact is easily detectable / noticeable; likely to be of a long-term or permanent duration; could have irreversible implications; influence exceeds the local area.

Table 14.10: Significance of Impacts Matrix

		Sensitivity			
		Negligible	**Low**	**Medium**	**High**
Magnitude	**Major**	Minor	Moderate	Major	Major
	Moderate	Negligible	Minor	Moderate	Major
	Minor	Negligible	Negligible	Minor	Moderate
	Negligible	Negligible	Negligible	Negligible	Minor

14.2.4.3.3 Duration of Effect

It should be noted that the likely duration of an effect is also a relevant consideration and the EPA Guidelines have categorised duration of effects (EPA 2022). Of relevance in respect to the Proposed Development are the following categories:

- Brief Effects – Effects lasting less than a day;
- Temporary Effects – Effects lasting less than a year; and
- Short-Term Effects – Effects lasting one to seven years.

The analysis conducted in this Chapter is based on data sourced from the construction programme and proposed operational / maintenance activities for the Proposed Development, the proposed cable route, and traffic surveys conducted at a series of key locations within the study area as outlined in Section 14.2.3.

14.2.4.3.4 Assumptions

Until contractors have been appointed and materials sources have been identified, it is not possible to determine exactly how many vehicles would reach the site using the proposed construction access routes. Hence in the interests of robustness, the assessment has assumed a precautionary approach to determine construction traffic and the routes they will use. If, for example, two routes were identified to the desired destination based on whether the origin was from the north or south, then both routes were assessed for all traffic. Once contractors have been appointed and materials sourced, it is expected that generated construction traffic will be within the parameters assessed in this EIAR and will arrive at site using various construction access routes, and would disperse prior to reaching some of the sensitive receptors, and is not predicted to adversely affect the assessed levels of significance. Consequently, the information presented in this Section is deemed robust and in accordance with good practice and professional judgement. The proposed construction access routes, vehicles and other arrangements provided are based on the study area assessment, baseline assessment, current construction projections, the CEMP for this Proposed Development and Jacobs' experience of construction and operation of similar projects.

For the purposes of this EIAR, the key parameters set out in Table 14.11 were applied, taking a precautionary approach. These items should be read in conjunction with the assumptions and methodology outlined in the Temporary Traffic Management Plan and Abnormal Load Assessment, which are included as Appendix A and B to the CTMP, which itself is included as Appendix B to the CEMP and are included as standalone documents in the planning application pack.

Table 14.11: Key Parameters of the Proposed Development

Item		Assumptions
1.	Construction activities included in traffic demand.	All construction activities for the development site and supporting infrastructure including utilities, site offices and welfare facilities.
2.	Duration of construction works.	Estimated to be 42 months in line with Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.
3.	Requirement for Abnormal Loads.	Abnormal loads are anticipated for the delivery of some large components (e.g., cable drums). An Abnormal Load Assessment has been completed separately and included as Appendix B within the CTMP (Appendix B of the CEMP).
4.	Working hours	Precise working hours will be subject to agreement with the local planning authority. It is anticipated that construction will occur during normal working hours (i.e., Monday to Friday: 07:00 – 19:00 and Saturday: 08:00 – 14:00) in line with Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. Sunday working may be required; environmental mitigation and plant maintenance only. No civils works without prior agreement with the local planning authority. Where impact to local receptors (i.e., residents, wildlife etc.) is anticipated, there may be a requirement for 24hour working. The ability to work 24hours would minimise impact during construction of the Proposed Development and facilitate more efficient operations. The ability for 24hour working would not affect the proposed Traffic Management, but rather reduce the implementation duration, reducing in turn disruption to the road network. This would only be recommended under a full road closure scenario. A full environmental impact assessment will be required if this strategy is to be taken forward, as well as necessary consents to the extra disruption caused to neighbouring properties by working overnight.
5.	Hourly profile of traffic.	It is anticipated that construction workers will arrive in the hour before the working day and depart in the hour after the working day. All other traffic will be spread approximately evenly throughout the working day.
6.	Interaction of traffic between TCCs, HDD Compounds and substations/working areas along the public highway.	It is predicted that this will primarily be transport of crew in site/minibus vehicles and HGVs transporting construction materials. Construction materials will be transported directly to where they are required as far as practicable to avoid double handling.
7.	Location of workforce.	Both local resource and with people housed in temporary accommodation (rented houses and hotel spaces).
8.	Construction access route principles.	It is the proposed that routes will look to avoid/minimise time spent on the local road network, routing via national and regional roads as much as possible.
9.	Construction worker travel.	Anticipated to be by car and van. Car sharing will be encouraged where it is practicable.
10.	Use of car parks for construction activities (e.g., TCCs).	Worker vehicles will park on site at the nearest TCCs to working area, avoiding use of local roads/car parks.
11.	Transport of workers to work sites (TTM Sections).	Transport of workers from main TCCs to the work sites has been proposed to be by minibus (assumed six workers per minibus).
12.	Length of cable trench dug per day when along the highway (duration of required temporary traffic management along a length of highway).	Estimated to be 50 metres per day as agreed with EirGrid based on previous projects of a similar nature.
13.	Cable duct laid per day when along the highway (duration of required temporary traffic management along a length of highway).	Estimated to be 50 metres per day as agreed with EirGrid based on previous projects of a similar nature.
14.	Definition of an HGV.	Any vehicle exceeding 3.5 tonnes gross weight.
15.	Definition of Abnormal loads.	Any vehicle exceeding a width of 2.75 metres, exceeding a length of 16.5 metres, exceeding a height of 4.65m, or exceeding a weight of 44 tonnes.

14.2.4.3.5 Limitations

As mentioned in Section 14.2.4.2.6, all detailed road traffic collision data has been removed from public access, including historic road traffic collision data. Therefore, quantitative analysis of this data will not be conducted.

Notwithstanding this, professional judgement is used to determine the magnitude of impact to road safety based on the level of construction and operational traffic impact and so while a limitation of a complete assessment it will be sufficient to draw the required conclusions and opinions needed to complete this EIAR.

Additionally, as mentioned in the CTMP (refer to Appendix B of the CEMP), the appointed contractor of the Proposed Development will carry out a Road Safety Audit of the CTMP prior to the commencement of works, if the Proposed Development has been consented. This will ensure a high safety standard in relation to the traffic management measures implemented.

14.3 Baseline Environment

The identification of appropriate baseline conditions for the traffic, transport and access assessment is defined by the approach adopted in Section 14.2. The baseline traffic and transport conditions have been formed based on a desk-based assessment, the collection of baseline traffic data, construction access route review, public transport review and active travel review.

14.3.1 Construction Access Routes

It was important to identify the likely construction access routes that construction traffic will use to / from the TCCs, HDD Compounds and working areas during the Construction Phase of the Proposed Development so that potential impacts and sensitive receptors could be defined. Based on a desk-based review of the surrounding road network and professional judgement, routing predictions have been identified and relied upon for the purpose of this assessment. The extent of this indicative construction access route network is illustrated in Figure 14.4 in Volume 4 of this EIAR.

Standard procurement practice means that a contractor and supply-chain for materials will not be selected prior to the Proposed Development being consented. Given that material sources are unknown at this time, the construction access routes are not definitive, but professional judgement and a precautionary approach has been used to select the most likely routes. It is predicated that all traffic will arrive via the primary and secondary road network and exit via the nearest junction to the local road network for access to the relevant working areas, HDD Compounds and TCCs.

Each construction access route has been reviewed through a desk-based study for constraints such as weight restrictions, low bridges, and HGV restrictions. All proposed construction access routes are based on the routing principles set out in the CTMP (refer to Appendix B of the CEMP), which includes the Abnormal Load Assessment. This assessment engages with a specialist abnormal load supplier and considers routes from both Belview Port and Dublin Port to facilitate the transportation and installation of the reactors, transformers, and cable. It is noted that an element of engagement works will be required such as vegetation trimming and raising low hanging overhead cables. Once the abnormal loads reach the study area via the national road network, they will utilise the same construction routes as identified for general construction traffic (LGVs and HGVs). The delivery of the 400kV transformer directly from port to Belcamp Substation may require an escort along the motorway network, subject to local authority and / or ministerial authorisation, due to its length (40m), although this will only be a one-off delivery. Any additional traffic management requirements / restrictions will be in place for abnormal loads upon agreement with the appointed contractor and consenting authority.

In practice, light vehicles are likely to be more widely distributed and the approach that they use a defined set of construction access routes means that the assessment provides a robust approach.

14.3.2 Traffic Volumes

The traffic volumes from the commissioned 2023 ATC and JTC traffic surveys, as described in Section 14.2.3, are reported in Table 14.13 and Table 14.14, The Construction Phase is expected to last from Q2 2026 until Q4 2029, which gives four possible future forecast years. Given the duration of the proposed Construction

Phase, baseline traffic flows have not been projected beyond the anticipated commencement of the Construction Phase. To maintain a precautionary approach to the assessment, 2026 is chosen as the forecast year for the Construction Phase and Operational Phase assessments.

Since the forecast traffic during the Construction Phase will be lowest during 2026, the percentage impact of construction traffic against forecast traffic will be highest in this year and therefore showcase the largest relative impact that has the potential to occur. Operational traffic generated from planned and committed developments has also been excluded from the assessment. Consideration of these elements would reduce the assessed impacts by increasing the baseline traffic flows, and therefore, reducing the percentage impacts. As such, the adopted assessment methodology is considered robust. The cumulative impacts of construction traffic from other nearby proposed developments have been considered in Chapter 20 (Cumulative Impacts and Environmental Interactions) in Volume 2 of this EIAR.

The future year traffic volumes have been forecast using growth rates from Table 7.4 of the NTpM Volume 3 Travel Demand Forecasting Report (TII 2019). These growth rates are applied to the traffic on each link, because the network is sufficiently small and any significant changes in flow distribution are only expected to be localised. This is in line with the Section 5 of PAG Unit 5.3 (TII 2021).

PAG Unit 5.3 requires the application of the 'Central Growth Scenario' for project appraisal, which is therefore taken as the correct scenario for this assessment. This is in line with professional judgement of the nature of traffic growth in the study area: albeit generally rural, the roads considered here are in close enough proximity to Dublin, particularly towards the eastern section of the study area, that somewhat elevated, but not high, traffic growth is a reasonable expectation.

The growth rates from the Travel Demand Forecasting Report used in this Chapter, are shown in Table 14.12.

Table 14.12: Traffic Growth Rates vs 2023

Year	Growth vs 2023
2024	1.50%
2025	3.02%
2026	4.57%
2027	6.14%
2028	7.73%
2029	9.35%

The recorded and forecast AADT values for each location are provided in Table 14.13 and Table 14.14, where the ATCs are the sum of two-way traffic, and the JTCs are the sum of two-way traffic on each arm of the junction.

Table 14.13: Recorded and Projected Automatic Traffic Counts (AADT)

Count	Location	2023	2026
ATC 1	R125 Regional Road, between R154 and R156 Regional Roads	1,417	1,482
ATC 2	R156 Regional Road, east of R125 Regional Road	3,762	3,934
ATC 3	The Red Road, south of R154 Regional Road	214	223
ATC 4	R154 Regional Road, east of Batterstown	5,562	5,816
ATC 5	R156 Regional Road, east of L2215 Local Road	4,267	4,462
ATC 6	M3 Parkway	1,857	1,942
ATC 7	R155 Regional Road, at Fairyhouse Racecourse	8,175	8,549
ATC 8	L1007 Local Road, at Fidorfe Solar Farm	2,274	2,378
ATC 9	Nuttstown Road, west of Belgree Court	1,711	1,789
ATC 10	L1007 Local Road, at Forge Cross	3,729	3,899
ATC 11	L1007 Local Road, south of Kilbride Lane	3,476	3,635

Count	Location	2023	2026
ATC 12	Kilbride Lane, south of Sutton Farm Road	986	1,031
ATC 13	R135 Regional Road, north of L2023 Local Road	5,688	5,948
ATC 14	R130 Regional Road, south of R125 Regional Road	1,327	1,388
ATC 15	R125 Regional Road, between R122 and R130 Regional Roads	5,862	6,130
ATC 16	R122 Regional Road, south of Kilcoskan	1,459	1,526
ATC 17	R121 Regional Road, west of R122 Regional Road	2,351	2,458
ATC 18	R122 Regional Road, south of St. Margaret's Golf and Country Club	2,881	3,013
ATC 19	Kilreesk Lane	2,120	2,217
ATC 20	R122 Regional Road, north of Kilreesk Lane	1,105	1,156
ATC 21	R122 Regional Road, west of L3132 Local Road	4,267	4,462
ATC 22	R108 Regional Road, south of R125 Regional Road	4,912	5,136
ATC 23	R125 Regional Road, east of Rowlestown	6,307	6,596
ATC 24	R125 Regional Road, west of New Dairy Lane	7,405	7,743
ATC 25	R132 Regional Road, north of R106 Regional Road	29,910	31,278
ATC 26	R106 Regional Road, east of M1 Motorway	16,942	17,717
ATC 27	R107 Regional Road, north of Feltrim Road	9,828	10,278
ATC 28	R107 Regional Road, south of Feltrim Road	15,079	15,769
ATC 29	Baskin Lane, west of Rahulk Lane	7,398	7,736
ATC 30	Stockhole Lane, north of Baskin Lane	8,888	9,294
ATC 31	Stockhole Lane, north of R139 Regional Road	9,157	9,778
ATC 32	R139 Regional Road, east of Clonshaugh Road	39,507	39,371
ATC 33	Hollywood, west of Chapelwood Drive	849	887
ATC 34	R135, south of Broughan Lane	6,180	6,462
ATC 35	R122, north of R108	11,895	12,439
ATC 36	R108, north of Harristown Road	8,153	8,525
ATC 37	R132, north of Old Airport Road	23,600	24,679

Table 14.14: Recorded and Projected Junction Turning Counts (AADT)

Count	Arm	2023	2026
JTC 1	Drumree Road (N)	720	753
	R154 Regional Road (NW)	9,212	9,634
	R154 Regional Road (SE)	5,376	5,622
	R125 Regional Road (NE)	6,630	6,934
JTC 2	R154 Regional Road (NW)	7,880	8,240
	R125 Regional Road (SW)	2,033	2,126
	R154 Regional Road (SE)	9,259	9,683
JTC 3	R156 Regional Road (NW)	3,390	3,545
	R125 Regional Road (SW)	939	982
	R156 Regional Road (SE)	3,914	4,093
	R125 Regional Road (NE)	1,456	1,523
JTC 4	R157 Regional Road (NE)	13,710	14,337
	R156 Regional Road (NW)	5,225	5,463
	R157 Regional Road (SW)	8,484	8,872
	L2228 Local Road(E)	5,672	5,932
JTC 5	M3 Motorway On/Off Slips (N)	2,309	2,414
	R157 Regional Road (W)	14,547	15,212
	M3 Motorway On/Off Slips (S)	19,678	20,578

Count	Arm	2023	2026
	R157 Regional Road (E)	17,779	18,592
JTC 6	R147 Regional Road (N)	20,530	21,469
	R157 Regional Road (W)	17,695	18,504
	R147 Regional Road (S)	6,551	6,850
JTC 7	R147 Regional Road (N)	18,706	19,562
	R147 Regional Road (S)	20,498	21,435
	L5026 Local Road Piercetown (E)	3,072	3,213
JTC 8	R147 Regional Road (NW)	8,521	8,910
	R154 Regional Road (W)	5,668	5,927
	R147 Regional Road (SE)	17,934	18,754
	R155 Regional Road (NE)	7,202	7,531
JTC 9	Woodland Road (NW)	5,039	5,269
	Somerville (SW)	1,529	1,599
	R155 Regional Road (S)	8,626	9,020
	R155 Regional Road (NE)	4,389	4,590
JTC 10	R125 Regional Road (W)	7,779	8,134
	R155 Regional Road (S)	4,359	4,559
	R125 Regional Road (E)	10,210	10,677
JTC 11	Skryne Road (NW)	5,067	5,299
	R125 Regional Road (W)	8,511	8,900
	R125 Regional Road (S)	12,468	13,038
	Glebe Lane (NE)	101	106
JTC 12	Main Street (NW)	12,905	13,495
	The Avenue (SW)	7,446	7,787
	Ratoath Childcare Access (SE)	338	353
	R125 Regional Road (E)	16,909	17,682
JTC 13	R125 Regional Road (W)	11,175	11,686
	Kilbride Road (E)	2,585	2,703
	Main Street (S)	9,083	9,498
JTC 14	R135 Regional Road (N)	6,337	6,627
	R135 Regional Road (S)	7,348	7,683
	R130 Regional Road (NE)	3,266	3,416
JTC 15	R135 Regional Road (N)	7,298	7,632
	R121 Regional Road (W)	2,968	3,104
	R135 Regional Road (S)	6,081	6,359
	R121 Regional Road (E)	2,819	2,948
JTC 16	R121 Regional Road (N)	2,711	2,835
	Kilbride Road (W)	6,212	6,496
	R121 Regional Road (S)	3,191	3,337
	Kilbride Road (E)	5,269	5,510
JTC 17	Kilbride Road (NW)	5,638	5,895
	Roundabout Link Road (W)	5,710	5,971
	Corduff Road (S)	13,142	13,743
	Roundabout Link Road (NE)	12,924	13,514
JTC 18	N2 National Road On/Off Slip (NW)	5,738	6,001
	Roundabout Link Road (SW)	14,234	14,884
	N2 National Road On/Off Slip (SE)	10,636	11,122

Count	Arm	2023	2026
	Roundabout Link Road (NE)	6,171	6,454
JTC 19	R135 Regional Road (N)	5,804	6,069
	Roundabout Link Road (W)	6,183	6,465
	R135 Regional Road (S)	6,108	6,387
JTC 20	R108 Regional Road (N)	13,467	14,083
	Kilreesk Road (W)	3,297	3,448
	L3132 Local Road (S)	12,423	12,991
	R108 Regional Road (E)	1,050	1,098
JTC 21	R108 Regional Road (N)	10,956	11,456
	R108 Regional Road (SW)	13,691	14,317
	Naul Road (E)	11,093	11,600
JTC 22	R132 Regional Road (NE)	22,917	23,964
	Naul Road (NW)	14,991	15,676
	N132 National Road (S)	28,252	29,543
	Stockhole Lane (SE)	9,619	10,059
JTC 23	R836 Regional Road (N)	12,666	13,245
	R132 Regional Road (SW)	18,246	19,080
	R125 Regional Road (S)	17,428	18,225
	R132 Regional Road (E)	26,307	27,509
JTC 24	R125 Regional Road (N)	7,118	7,443
	R125 Regional Road (W)	14,460	15,121
	Rathbeale Road (E)	11,402	11,923
JTC 25	Balheary Road (N)	16,104	16,841
	Castlegrange Green (W)	942	985
	R125 Regional Road (S)	7,661	8,011
	R125 Regional Road (E)	17,863	18,680
JTC 26	R132 Regional Road (N)	34,589	36,170
	R125 Regional Road (W)	22,562	23,593
	R132 Regional Road (S)	31,462	32,900
	Local Road (E)	3,995	4,178
JTC 27	R132 Regional Road (N)	31,402	32,838
	Seatown Road (W)	8,524	8,914
	R132 Regional Road (S)	30,556	31,953
	Seatown Road (E)	9,548	9,985
JTC 28	R132 Regional Road (N)	30,573	31,971
	R106 Regional Road (W)	14,336	14,992
	R132 Regional Road (SW)	25,705	26,880
	Drynam Road (S)	4,204	4,396
	R106 Regional Road (E)	17,976	18,798
JTC 29	Applegreen Access (N)	4,031	4,215
	R106 Regional Road (W)	17,794	18,608
	Mountgorry Way (S)	16,422	17,173
	R106 Regional Road (E)	18,140	18,969
JTC 30	R106 Regional Road (N)	11,051	11,556
	R106 Regional Road (W)	12,817	13,403
	R107 Regional Road (S)	11,112	11,620
JTC 31	Clonshaugh Road (N)	12,685	13,265

Count	Arm	2023	2026
	R139 Regional Road (W)	52,387	54,782
	Unused Arm (S)	7	8
	R139 Regional Road (E)	52,311	54,702
JTC 32	R147(N)	5,265	5,424
	R147(S)	4,367	4,499
	Bracetown Business Park	2,702	2,783
JTC 33	R135(N)	6,814	7,021
	L3120(W)	9,967	10,268
	R135(S)	8,871	9,139
	L3120(E)	11,856	12,214
JTC 34	R122	12,856	13,245
	L3120	10,538	10,857
	R108(S)	11,505	11,853
	R108(E)	866	892
JTC 35	R108(N)	12,463	12,840
	R122	9,144	9,421
	R108(E)	6,862	7,069
JTC 36	R108	8,538	8,796
	Harristown Road	5,619	5,789
	R108	18,362	18,917
	Old Airport Road	16,000	16,484
JTC 37	R132	25,284	26,049
	Old Airport Road	17,160	17,679
	Swords Road	19,925	20,528
	Cemetery	1,164	1,199
JTC 38	R132(N)	22,440	23,118
	Corballis Road S	14,678	15,122
	R132(S)	25,265	26,029
	Eastland's Road	10,471	10,788
JTC 39	R132(N)	32,661	33,649
	Airport Exit	23,659	24,375
	Airport Access	21,172	21,813
	R132(S)	23,502	24,213
	M1 Link Road	56,521	58,231

14.3.3 Sensitive Receptors

The potential sensitive receptors that have been identified, because of the traffic and transport impacts associated with the Proposed Development, include the following:

- Road network and the people using it, most importantly the emergency services, but also including those using public transport – potential delay, severance, and disruption impacts;
- Pedestrians and cyclists on surrounding footways and cycleways – potential delay, severance, and disruption impacts;
- Residents – potential disruption due to local intrusion, dust, and dirt;
- Local businesses and employees – potential disruption due to potential temporary road closures, local intrusion, dust, and dirt;
- Construction vehicle drivers – potential safety concerns; and

- Meath County Council, Fingal County Council, daa, TII and/or their agents, and other landowners – potential deterioration of local road surfaces.

14.3.4 Public Transport

Figure 14.5 in Volume 4 of this EIAR shows the rail and bus services that have the potential to be impacted by the Construction Phase and Operational Phase of the Proposed Development.

14.3.4.1 Bus Services

Bus services that have the potential to be directly impacted by Construction Phase or Operational Phase traffic, or that have the potential to be used by construction or operational staff, are listed in Table 14.15.

Table 14.15: Bus Service Overview

Service Number	Route Summary	Service Operator	Daily Services
33	Lower Abbey Street – Balbriggan	Dublin Bus	• 22 services per day from Dublin to Skerries (12 of which continue to Balbriggan); and • 25 services per day from Skerries (13 of which originate from Balbriggan) to Dublin.
33A	Dublin Airport – Balbriggan	Go-Ahead Ireland	• 25 services per day from Swords to Skerries (13 of which originate at Dublin Airport and 12 which continue to Balbriggan); and • 25 services per day from Skerries to Swords (12 of which originate at Balbriggan and 12 which continue to Dublin Airport)
33E	Lower Abbey Street – Portrane – Skerries	Dublin Bus	• One morning service per day from Dublin to Skerries
33n	Dublin City South, Westmoreland Street – Balbriggan	Dublin Bus	• Four late night services from Dublin to Balbriggan (Saturday and Sunday only)
40B	Parnell Street – Toberburr	Dublin Bus	• Six services per day from Dublin to Kilsallaghan; and • Six services per day from Kilsallaghan to Dublin.
41	Lower Abbey Street – Swords Manor	Dublin Bus	• 63 services per day from Dublin to Swords; and • 67 services per day from Swords to Dublin.
41B	Rolestown – Lower Abbey Street	Dublin Bus	• Five services per day from Dublin to Rolestown (one late night service also serves Swords); and • Four services per day from Rowlestown to Dublin.
41C	Lower Abbey Street – Swords Manor	Dublin Bus	• 43 services per day from Dublin to Swords; and • 42 services per day from Swords to Dublin.
41D	Swords Business Park – Lower Abbey Street	Dublin Bus	• Two morning services from Dublin to Swords Business Park; and • One morning and one evening service from Swords Business Park to Dublin.
41X	Swords – UCD Belfield	Dublin Bus	• Seven morning services from Swords to UCD Bellfield; and • Three evening services from Bellfield UCD to Swords.
88n	Dublin City South, Westmoreland Street – Ashbourne	Dublin Bus	• Three late night services from Dublin to Ashbourne (Saturday and Sunday only).
101	Dublin – Airport – Drogheda	Bus Éireann	• 46 services per day from Dublin to Drogheda; and • 45 services per day from Drogheda to Dublin.
101X	Wilton Terrace – Drogheda – Termon Abbey	Bus Éireann	• Five early morning services from Drogheda to Dublin; and • Four PM services from Dublin to Drogheda.
102	Dublin Airport – Sutton Station	Bus Éireann	• 37 services per day from Dublin Airport to Sutton Station; and • 37 services per day from Sutton Station to Dublin Airport.
103	Dublin – Ashbourne – Ratoath – Emerald Park	Bus Éireann	• 52 services per day from Dublin to Ratoath (four of which continue to Emerald Park) ; and

Service Number	Route Summary	Service Operator	Daily Services
			• 53 services per day from Ratoath (four of which originate from Emerald Park) to Dublin.
105	Blanchardstown – Ashbourne – Drogheda	Bus Éireann	• 30 services per day from Blanchardstown to Drogheda; and • 33 services per day from Drogheda to Blanchardstown.
105X	UCD – M3 – Ratoath – Ashbourne	Bus Éireann	• Three evening services per day from Dublin to Ratoath (one of which originates from University College Dublin (UCD) Bellfield) ; and • Three morning services per day from Ratoath to Dublin (one of which continues to UCD Bellfield).
109	Dublin – Navan – Kells – Cavan	Bus Éireann	• 29 services per day from Dublin to Kells (one of which continues to Virginia); and • 30 services from Dunshaughlin to Dublin (21 of which originate from Kells and one that continues to UCD Belfield).
109A	DCU – Airport –Ratoath – Navan	Bus Éireann	• 24 services per day from Dublin Airport (six of which originate from Dublin Bus Station) to Kells; and • 24 services per day from Kells to Dublin Airport (six of which continue to Dublin Bus Station).
109B	Dublin – Dunshaughlin – Trim	Bus Éireann	• Seven services per day from Dublin to Trim; and • Seven services per day from trim to Dublin.
111	Wilton Terrace – Trim – Granard – Cavan	Bus Éireann	• 19 services per day from Dublin to Athboy (three of which continue to Delvin); and • 19 services per day from Athboy to Dublin (three of which originate from Delvin and one that continues to UCD Belfield).
111X	Dublin Express – Athboy – Clonmellon	Bus Éireann	• Two evening services per day from Dublin to Clonmellon and one evening service per day from Dublin to Trim; and • Two morning services per day from Clonmellon to Dublin and one evening service per day from Trim to Dublin.
196	Knocksedan – Swords	Transport For Ireland (TFI) Local Link Louth Meath Fingal	• 14 services per day eastbound within Swords (four of which originate in St. Margaret's) ; and • 14 services per day westbound within Swords (four of which continue to St. Margaret's).
501X	Swords Shopping Centre – Dublin	Swords Express	• Two services per day from Swords to Dublin.
505X	Dublin, Eden Quay – Malahide Road	Swords Express	• Seven evening services per day from Dublin to Swords.
506X	Broadmeadow – Dublin	Swords Express	• Three morning services per day from Swords to Dublin.
741	Dublin Airport – Swords	Ashbourne Connect	• 36 services per day from Dublin Airport to Swords; and • 39 services per day from Swords to Dublin Airport.
DY01	Navan – Bennetstown, Dunboyne College	McCaffrey Coaches Limited	• One morning service per day from Navan to Dunboyne College; and • One evening service per day from Dunboyne College to Navan.
KL01	Phibsborough – Dunbro Keelings Retail	Keelings Retail	• Five services per day from Pitsborough to Dunbro Keelings Retail; and • Five services per day from Dunbro Keelings Retail to Pitsborough.
KL02	Briarleas – Dunbro Keelings Retail	Keelings Retail	• Three services per day from Briarleas to Dunbro Keelings Retail; and • Three services per day from Dunbro Keelings Retail to Briarleas.
KL03	Santry Hazelwood – Dunbro Keelings Retail	Keelings Retail	• Three services per day from Santry Hazelwood to Dunbro Keelings Retail; and • Three services per day from Dunbro Keelings Retail to Santry Hazelwood.
UM03	Dundalk – Maynooth University	Streamline Coaches	• One service per day from Dundalk to Maynooth University and one service per day from Drogheda to Maynooth University; and • One service per day from Maynooth University to Dundalk and one service per day from Maynooth University to Drogheda.

Service Number	Route Summary	Service Operator	Daily Services
UM05	Cathedral – University Campus	Streamline Coaches	• One service per day from Lavey to Maynooth University and one service per day from Kells to Maynooth University; and • One service per day from Maynooth University to Kells and one service per day from Maynooth University to Cavan.
UM10	Carrickmacross - College	Streamline Coaches	• One morning service per day from Carrickmacross to Maynooth University; and • One evening service per day from Maynooth University to Carrickmacross.

14.3.4.2 Rail Services

The only railway station within the study area is M3 Parkway, located towards the western extent of the Proposed Development. The railway siding to the north of the M3 Parkway Service railway line will be crossed by the proposed cable route through trenchless techniques (HDD).

The railway station is served by trains to and from both Clonsilla and the Docklands, operating approximately hourly or half hourly, dependant on the time of day. The M3 Parkway is the current terminus station of the railway line and although a future extension to Navan is proposed in the Greater Dublin Area Transport Strategy 2022-2042 (NTA 2023a), this work is not expected to begin until 2031 at the earliest (Meath Chronicle 2023).

The railway station could serve as a means of travel to the Proposed Development if a shuttle bus service was provided between the M3 Parkway and TCCs.

14.3.5 Active Travel

The construction access routes will be largely rural in nature, and therefore, the roads do not generally have footways. However, it is noted that there is the potential for conflict with vulnerable non-motorised users on rural lanes where, for example, children may use them for walking or cycling to school.

Figure 14.6 in Volume 4 of this EIAR shows the existing cycling network within the study area although it is sparse within the County Meath and Fingal regions. However, there is a comprehensive proposed cycling network, as set out in The National Cycle Network (TII 2022) and the 2022 Greater Dublin Area Cycle Network Plan (NTA 2023b). These routes have gone through several public consultations and various design iterations. However, it highlights the desire to create many additional interconnected routes between Dublin and the surrounding rural areas. Horse riders may use rural lanes and walking / cycling routes, but these would be in small numbers.

Table 14.16 highlights the existing and proposed routes that have the potential to be affected by the implementation of the Proposed Development.

Table 14.16: Local Walking and Cycling Routes

Route Type	Route Description / Location	Existing / Proposed
Walking / Cycling	Stockhole Lane Shared-use path / Inter-Urban Route (GDA Cycle Network)	Existing / Proposed
Cycling	R157 Inter-Urban / Feeder Route (GDA Cycle Network)	Proposed
Cycling	R147 Inter-Urban Route (GDA Cycle Network)	Proposed
Cycling	R155 Secondary Route (GDA Cycle Network)	Proposed
Cycling	R125 Secondary Route (GDA Cycle Network)	Existing / Proposed
Walking / Cycling	Woodland Road Feeder Route (Meath County Council / NTA Pedestrian and Cycle Network)	Proposed
Walking / Cycling	Meadowbank Hill / The Avenue Feeder Route (Meath County Council / NTA Pedestrian and Cycle Network)	Proposed
Walking / Cycling	Ratoath Road Shared-use path / Feeder Route (GDA Cycle Network)	Existing / Proposed
Walking / Cycling	Cherryhound Tyrrelstown Secondary Route (GDA Cycle Network)	Existing / Proposed
Cycling	R121 Inter-Urban Route (GDA Cycle Network)	Proposed
Cycling	R135 Secondary Route (GDA Cycle Network)	Proposed
Cycling	N2 junction 2 to R122 Secondary Route (GDA Cycle Network)	Proposed
Cycling	R122 Inter-Urban Route (GDA Cycle Network)	Proposed
Cycling	Kilshane Road Secondary Route (GDA Cycle Network)	Proposed
Cycling	Kilreesk Lane Inter-Urban Route (GDA Cycle Network)	Proposed
Cycling	Kilreesk Road Inter-Urban Route (GDA Cycle Network)	Proposed
Cycling	L3132 Secondary Route (GDA Cycle Network)	Proposed
Cycling	R108 Secondary Route (GDA Cycle Network)	Proposed
Cycling	Naul Road Secondary Route (GDA Cycle Network)	Proposed
Cycling	Forrest Road Secondary Route (GDA Cycle Network)	Proposed
Cycling	Old Airport Road Secondary Route (GDA Cycle Network)	Proposed
Cycling	R132 Primary Route (GDA Cycle Network)	Proposed
Cycling	R106 Swords Road Primary Orbital Route (GDA Cycle Network)	Proposed
Cycling	R106 Dublin Road Secondary Route (GDA Cycle Network)	Proposed
Cycling	R107 Malahide Road Primary Route (GDA Cycle Network)	Proposed
Walking / Cycling	Malahide Park and Castle Loop / Malahide Castle and Gardens Greenway (GDA Cycle Network)	Existing / Proposed
Cycling	Back Road Secondary Route (GDA Cycle Network)	Proposed
Cycling	Feltrim Road Secondary Route (GDA Cycle Network)	Proposed
Cycling	Chapel Road Secondary Route (GDA Cycle Network)	Proposed
Cycling	Clonshaugh Road Secondary / Greenway / Feeder (GDA Cycle Network)	Proposed
Cycling	R139 Greenway Route (GDA Cycle Network)	Proposed
Walking / Cycling	R156 Summerhill Road Feeder Route (Meath County Council Dunboyne and Clonee Pedestrian and Cycle Network)	Proposed
Walking / Cycling	L2228 Summerhill Road Primary Route (Meath County Council Dunboyne and Clonee Pedestrian and Cycle Network)	Proposed
Walking / Cycling	Maynooth Road / Main Street Primary Route (Meath County Council Dunboyne and Clonee Pedestrian and Cycle Network)	Proposed
Walking / Cycling	Navan Road Primary Route (Meath County Council Dunboyne and Clonee Pedestrian and Cycle Network)	Proposed
Walking / Cycling	R157 Greenway (Meath County Council Dunboyne and Clonee Pedestrian and Cycle Network)	Proposed

14.3.6 Road Safety

As mentioned in Section 14.2.4.2.6 and Section 14.2.4.3.5, all detailed road traffic collision data has been removed from public access, including historic road traffic collision data.

For the purposes of this assessment, a desk-based review alongside professional judgement has been used when reviewing the proposed TCCs, HDD Compounds, Joint Bay, and Passing Bay and access locations to ensure cognisance of road location, composition, visibility, and sensitive receptor locations. A desk-based review was also performed to assess the suitability of the predicted construction access routes, as highlighted in Section 14.3.1, to ensure that vehicle access will avoid sensitive receptors, vehicle restrictions, pinch points, and congested areas.

While professional judgement is utilised to draw conclusions for this EIAR for the time being to determine the effect on road safety from the level of construction and operational traffic impact, analysis of accident data will be conducted once available, in line with the methodology presented in Section 14.2.4.2.6.

14.3.7 Trip Generators / Attractors

Within the vicinity of the Proposed Development and associated construction access routes, key trip generators / attractors include travel between residential areas, retail centres, public transport stops / hubs, active travel routes, local services, education sites, health / medical care sites and local amenities.

The main residential areas within the study area include Dunboyne, Hollystown, Hollywoodrath, Kinsealy, Mountgorry, Ratoath, Swords, and Yellow Walls.

More specific trip generators and attractors are illustrated in Figure 14.7 in Volume 4 of this EIAR.

14.4 Potential Impacts

14.4.1 'Do Nothing' Scenario

If the Proposed Development does not go ahead, traffic volumes are expected to increase along existing roads due to natural traffic growth, as demonstrated in Section 14.3.2. Additional impacts due to the Proposed Development will, however, be avoided and the impact in this case will be Neutral.

14.4.2 Construction Phase

14.4.2.1 Road Traffic

The road traffic impact of the Proposed Development will be as a result of temporary additional traffic volumes associated with the construction activities (both staff and HGV movements), on the existing road network, and affecting users of that road network (including drivers, and those walking, wheeling, cycling, or travelling by public transport).

Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR includes the estimated works timetable for the proposed construction programme.

14.4.2.1.1 Staff Movements

Construction of the Proposed Development will require the movement of workers to and from various points along the proposed cable route, throughout the entire Construction Phase. Due to the general rural nature of the study area, it is expected that all workers will use private vehicles to travel to and park at a TCC. It is predicted that from here they will generally consolidate to a smaller number of LGVs to travel to specific construction locations. The appointed contractor will also be required to ensure that their staff may not park on public roads (except within the work areas).

Summing projections for required personnel for the entire Construction Phase of the Proposed Development, the total average estimated number of daily workers at any time does not exceed 215, as shown in Table 14.17. The workforce attracted by any of the TCCs is highest at TCC3, with an estimated 80 workers.

Table 14.17: Average Daily Workforce Numbers

TCC	2026		2027				2028				2029			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
TCC0	0	0	0	0	0	0	0	0	6	33	45	14	8	0
TCC1	32	50	46	22	24	30	13	5	5	5	5	5	5	8
TCC2	20	7	27	54	6	5	7	16	16	7	5	5	5	8
TCC3	45	80	20	34	52	5	5	7	11	15	17	16	9	8
TCC4	24	25	54	26	19	21	16	17	5	5	5	5	5	8
TCC5	25	17	5	55	48	14	5	7	17	16	17	20	7	8
TCC6	12	5	5	24	45	45	45	45	24	6	5	5	5	8
Total	158	184	157	215	194	120	91	97	84	87	99	70	44	48

The movement of workers and HGVs will have minimal overlap since the workers generally need to arrive and depart at their respective locations before and after goods vehicles are in use at the TCCs or working areas.

Due to the very low number of vehicles expected to be required for the movement of construction workers, and the dispersed locations of the work sites, the traffic resulting from worker movements is relatively insignificant when compared to the numbers of HGVs, and therefore, deemed to have a minimal impact on their own.

14.4.2.1.2 Construction Traffic

The Construction Phase of the Proposed Development will require the delivery and removal of various construction materials and equipment including excavated material, asphalt, engineered fill, concrete and facility equipment. The vehicles used for this purpose will be HGVs and ready mixed trucks, and their volumes are estimated based on the Construction Phase programme requirements to deliver and remove these various materials from along the proposed cable route. Table 14.18 shows the peak construction traffic associated with each of the TTM Sections.

Table 14.18: Peak Construction Traffic at Each TTM Section

TTM Sections	HGV Movements	LGV Movements	Total Movements	Number of Peak Days
1.01	75	134	209	2
1.02	107	117	224	2
1.03	55	7	62	2
1.04	77	5	82	2
1.05	14	1	15	13
1.06	64	9	73	6
1.07	22	5	27	3
1.08	64	7	71	2
1.09	24	2	26	16
1.10	37	6	43	3
1.11	20	3	23	4
1.12	71	7	78	6
1.13	13	3	16	3
1.14	31	4	35	2
1.15	40	0	40	40
1.16	62	6	68	3
1.17	52	153	205	2
1.18	14	1	15	16
1.19	94	9	103	5
1.20	23	2	25	18
1.21	86	8	94	6
1.22	14	1	15	13
1.23	49	10	59	1
1.24	74	8	82	4
1.25	12	1	13	17
1.26	41	4	45	2
1.27	89	9	98	6
1.28	117	11	128	6
1.29	56	7	63	3
1.30	155	177	332	3

Standard procurement practice means that a contractor and supply-chain for materials will not be selected prior to the Proposed Development being consented. Given that material sources are unknown at this time, the proposed construction access routes are not definitive, but professional judgement and a precautionary approach has been used to select the most likely routes. It is predicted that all traffic will arrive via the national primary and secondary road network and exit via the nearest junction to the local road network for access to the relevant construction working area and TCCs.

The routing predictions for construction workers, other light vehicles and HGVs are provided in Section 14.3.1. Each proposed construction access route has been reviewed through a desk-based study for constraints such as weight restrictions, low bridges, and HGV restrictions. In practice, light vehicles are likely to be more widely distributed and the assumption that they use a more concentrated set of construction access routes means that the assessment provides a precautionary approach.

14.4.2.1.3 Impact Assessment

During the peak period of the Construction Phase programme, it is forecast that a total of 634 (273 HGV) construction vehicle trips will be made per day associated with the following TTM Sections:

- TTM Section 1.01;
- TTM Section 1.11;
- TTM Section 1.12;
- TTM Section 1.13;
- TTM Section 1.14;
- TTM Section 1.19; and
- TTM Section 1.30.

In order to undertake as comprehensive an assessment of the traffic impacts as possible, the impact of construction vehicles at each traffic counter during its peak Construction Phase has been assessed, rather than only assessing the overall peak Construction Phase when not every TTM Section and proposed construction access route is being impacted. This is a very robust approach and ensures that the peak construction impacts at each counter location within the study area are considered.

Construction vehicles associated with each of these sites have been collectively distributed across the study area network with the absolute and percentage increases when compared with the baseline, as outlined in Table 14.19 and Table 14.20 for each of the traffic survey locations in the study area.

Table 14.19: Peak Construction Phase Traffic at Each ATC Location

Count	2026 Base		Peak Two-Way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic (% Increase)		Estimated Number of Peak Days
	Total	HGV	Total	HGV	Total	HGV	Total	HGV	
ATC 1	1,482	177	161	77	1,643	254	10.85%	**43.41%**	6
ATC 2	3,934	566	173	77	4,107	643	4.40%	13.57%	6
ATC 3	223	25	92	2	315	27	**41.25%**	7.97%	15
ATC 4	5,816	641	92	2	5,908	643	1.58%	0.31%	15
ATC 5	4,462	578	204	119	4,666	697	4.57%	20.63%	3
ATC 6	1,942	122	0	0	1,942	122	0.00%	0.00%	-
ATC 7	8,549	788	0	0	8,549	788	0.00%	0.00%	-
ATC 8	2,378	206	0	0	2,378	206	0.00%	0.00%	-
ATC 9	1,789	204	110	99	1,899	303	6.14%	**48.64%**	2
ATC 10	3,899	305	20	2	3,919	307	0.51%	0.75%	33
ATC 11	3,635	312	71	71	3,706	383	1.96%	22.89%	6
ATC 12	1,031	113	71	71	1,102	184	6.93%	**63.20%**	6
ATC 13	5,948	845	71	71	6,019	916	1.20%	8.45%	6
ATC 14	1,388	221	0	0	1,388	221	0.00%	0.00%	-
ATC 15	6,130	725	0	0	6,130	725	0.00%	0.00%	-
ATC 16	1,526	277	0	0	1,526	277	0.00%	0.00%	-
ATC 17	2,458	300	198	113	2,656	413	8.06%	**37.80%**	6
ATC 18	3,013	274	108	98	3,121	372	3.59%	**35.63%**	4
ATC 19	2,217	192	102	98	2,319	290	4.58%	**50.85%**	4
ATC 20	1,156	122	98	98	1,254	220	8.45%	**80.03%**	4
ATC 21	4,462	578	98	98	4,560	676	2.19%	16.89%	4
ATC 22	5,136	650	0	0	5,136	650	0.00%	0.00%	-

Count	2026 Base		Peak Two-Way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic (% Increase)		Estimated Number of Peak Days
	Total	HGV	Total	HGV	Total	HGV	Total	HGV	
ATC 23	6,596	698	0	0	6,596	698	0.00%	0.00%	-
ATC 24	7,743	727	0	0	7,743	727	0.00%	0.00%	-
ATC 25	31,278	3,247	0	0	31,278	3,247	0.00%	0.00%	-
ATC 26	17,717	922	0	0	17,717	922	0.00%	0.00%	-
ATC 27	10,278	655	0	0	10,278	655	0.00%	0.00%	-
ATC 28	15,769	1,033	0	0	15,769	1,033	0.00%	0.00%	-
ATC 29	7,736	612	55	47	7,791	659	0.71%	7.68%	15
ATC 30	9,294	654	171	77	9,465	731	1.84%	11.76%	1
ATC 31	9,778	672	248	77	10,026	749	2.53.%	11.44%	3
ATC 32	39,371	4,087	41	41	39,412	4,128	0.10%	1.00%	50
ATC 33	887	78	210	76	1,097	154	23.62%	**97.29%**	2
ATC 34	6,462	1,457	111	111	6,573	1,568	1.72%	7.65%	2
ATC 35	12,439	2,032	111	111	12,550	2,143	0.90%	5.48%	2
ATC 36	8,525	1,805	0	0	8,525	1,805	0.00%	0.00%	-
ATC 37	24,679	3,622	0	0	24,679	3,622	0.00%	0.00%	-

Table 14.20: Peak Construction Phase Traffic at Each JTC Location

Count	Arm	2026 Base		Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic (% Increase)		Estimated Number of Peak Days
		Total	HGV	Total	HGV	Total	HGV	Total	HGV	
JTC 1	Drumree Road (N)	753	54	0	0	753	54	0.00%	0.00%	-
	R154 Regional Road (NW)	9,634	724	161	77	9,795	801	1.67%	10.61%	6
	R154 Regional Road (SE)	5,622	404	92	2	5,714	406	1.64%	0.49%	15
	R125 Regional Road (NE)	6,934	430	161	77	7,095	507	2.32%	17.87%	6
JTC 2	R154 Regional Road (NW)	8,240	629	0	0	8,240	629	0.00%	0.00%	-
	R125 Regional Road (SW)	2,126	150	161	77	2,287	227	7.56%	**51.22%**	6
	R154 Regional Road (SE)	9,683	723	161	77	9,844	800	1.66%	10.63%	6
JTC 3	R156 Regional Road (NW)	3,545	278	0	0	3,545	278	0.00%	0.00%	-
	R125 Regional Road (SW)	982	74	0	0	982	74	0.00%	0.00%	-
	R156 Regional Road (SE)	4,093	287	161	77	4,254	364	3.93%	26.77%	6
	R125 Regional Road (NE)	1,523	83	161	77	1,684	160	10.56%	**92.57%**	6
JTC 4	R157 Regional Road (NE)	14,337	955	282	119	14,619	1,074	1.97%	12.49%	3
	R156 Regional Road (NW)	5,463	390	258	119	5,721	509	4.72%	**30.57%**	3
	R157 Regional Road (SW)	8,872	475	0	0	8,872	475	0.00%	0.00%	-
	L2228 Local Road(E)	5,932	373	0	0	5,932	373	0.00%	0.00%	-
JTC 5	M3 Motorway On/Off Slips (N)	2,414	126	310	158	2,724	284	12.84%	**125.34%**	2
	R157 Regional Road (W)	15,212	795	300	144	15,512	939	1.97%	18.14%	2
	M3 Motorway On/Off Slips (S)	20,578	1,543	310	158	20,888	1,701	1.51%	10.24%	2
	R157 Regional Road (E)	18,592	1,404	189	99	18,781	1,503	1.02%	7.07%	2
JTC 6	R147 Regional Road (N)	21,469	1,425	189	99	21,658	1,524	0.88%	6.96%	2
	R157 Regional Road (W)	18,504	1,401	189	99	18,693	1,500	1.02%	7.08%	2
	R147 Regional Road (S)	6,850	560	99	99	6,949	659	1.45%	17.72%	2
JTC 7	R147 Regional Road (N)	19,562	1,174	92	2	19,654	1,176	0.47%	0.17%	15
	R147 Regional Road (S)	21,435	1,424	189	99	21,624	1,523	0.88%	6.97%	2
	L5026 Local Road Piercetown (E)	3,213	328	99	99	3,312	427	3.09%	**30.25%**	2

Count	Arm	2026 Base		Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic (% Increase)		Estimated Number of Peak Days
		Total	HGV	Total	HGV	Total	HGV	Total	HGV	
JTC 8	R147 Regional Road (NW)	8,910	512	0	0	8,910	512	0.00%	0.00%	-
	R154 Regional Road (W)	5,927	413	92	2	6,019	415	1.55%	0.48%	15
	R147 Regional Road (SE)	18,754	1,140	92	2	18,846	1,142	0.49%	0.17%	15
	R155 Regional Road (NE)	7,531	408	0	0	7,531	408	0.00%	0.00%	-
JTC 9	Woodland Road (NW)	5,269	173	0	0	5,269	173	0.00%	0.00%	-
	Somerville (SW)	1,599	30	0	0	1,599	30	0.00%	0.00%	-
	R155 Regional Road (S)	9,020	238	0	0	9,020	238	0.00%	0.00%	-
	R155 Regional Road (NE)	4,590	91	0	0	4,590	91	0.00%	0.00%	-
JTC 10	R125 Regional Road (W)	8,134	197	0	0	8,134	197	0.00%	0.00%	-
	R155 Regional Road (S)	4,559	91	0	0	4,559	91	0.00%	0.00%	-
	R125 Regional Road (E)	10,677	225	0	0	10,677	225	0.00%	0.00%	-
JTC 11	Skryne Road (NW)	5,299	236	0	0	5,299	236	0.00%	0.00%	-
	R125 Regional Road (W)	8,900	198	0	0	8,900	198	0.00%	0.00%	-
	R125 Regional Road (S)	13,038	423	0	0	13,038	423	0.00%	0.00%	-
	Glebe Lane (NE)	106	16	0	0	106	16	0.00%	0.00%	-
JTC 12	Main Street (NW)	13,495	431	0	0	13,495	431	0.00%	0.00%	-
	The Avenue (SW)	7,787	209	0	0	7,787	209	0.00%	0.00%	-
	Ratoath Childcare Access (SE)	353	4	0	0	353	4	0.00%	0.00%	-
	R125 Regional Road (E)	17,682	615	0	0	17,682	615	0.00%	0.00%	-
JTC 13	R125 Regional Road (W)	11,686	378	0	0	11,686	378	0.00%	0.00%	-
	Kilbride Road (E)	2,703	61	0	0	2,703	61	0.00%	0.00%	-
	Main Street (S)	9,498	344	0	0	9,498	344	0.00%	0.00%	-
JTC 14	R135 Regional Road (N)	6,627	621	0	0	6,627	621	0.00%	0.00%	-
	R135 Regional Road (S)	7,683	759	0	0	7,683	759	0.00%	0.00%	-
	R130 Regional Road (NE)	3,416	243	0	0	3,416	243	0.00%	0.00%	-
JTC 15	R135 Regional Road (N)	7,632	755	0	0	7,632	755	0.00%	0.00%	-

Count	Arm	2026 Base		Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic (% Increase)		Estimated Number of Peak Days
		Total	HGV	Total	HGV	Total	HGV	Total	HGV	
	R121 Regional Road (W)	3,104	169	143	136	3,247	305	4.61%	**80.67%**	5
	R135 Regional Road (S)	6,359	796	210	136	6,569	932	3.31%	17.13%	5
	R121 Regional Road (E)	2,948	206	194	113	3,142	319	6.58%	**55.04%**	6
JTC 16	R121 Regional Road (N)	2,835	159	257	75	3,092	234	9.08%	**46.93%**	9
	Kilbride Road (W)	6,496	204	191	191	6,687	395	2.93%	**93.45%**	2
	R121 Regional Road (S)	3,337	179	198	40	3,535	219	5.93%	22.29%	40
	Kilbride Road (E)	5,510	284	201	191	5,711	475	3.65%	**67.12%**	2
JTC 17	Kilbride Road (NW)	5,895	283	349	191	6,244	474	5.91%	**67.36%**	2
	Roundabout Link Road (W)	5,971	421	0	0	5,971	421	0.00%	0.00%	-
	Corduff Road (S)	13,743	2,062	0	0	13,743	2,062	0.00%	0.00%	-
	Roundabout Link Road (NE)	13,514	2,201	349	191	13,863	2,392	2.58%	8.66%	2
JTC 18	N2 National Road On/Off Slip (NW)	6,001	1,003	369	191	6,370	1,194	6.14%	19.01%	2
	Roundabout Link Road (SW)	14,884	2,571	349	191	15,233	2,762	2.34%	7.41%	2
	N2 National Road On/Off Slip (SE)	11,122	1,914	369	191	11,491	2,105	3.31%	9.96%	2
	Roundabout Link Road (NE)	6,454	1,143	210	136	6,664	1,279	3.26%	11.93%	5
JTC 19	R135 Regional Road (N)	6,069	767	210	136	6,279	903	3.47%	17.78%	5
	Roundabout Link Road (W)	6,465	1,153	210	136	6,675	1,289	3.25%	11.82%	5
	R135 Regional Road (S)	6,387	1,087	0	0	6,387	1,087	0.00%	0.00%	-
JTC 20	R108 Regional Road (N)	14,083	1,472	122	111	14,205	1,583	0.87%	7.57%	2
	Kilreesk Road (W)	3,448	238	111	111	3,559	349	3.23%	**46.82%**	2
	L3132 Local Road (S)	12,991	1,427	111	111	13,102	1,538	0.86%	7.81%	2
	R108 Regional Road (E)	1,098	82	0	0	1,098	82	0.00%	0.00%	-
JTC 21	R108 Regional Road (N)	11,456	755	0	0	11,456	755	0.00%	0.00%	-
	R108 Regional Road (SW)	14,317	1,349	122	111	14,439	1,460	0.85%	8.26%	2
	Naul Road (E)	11,600	1,149	128	117	11,728	1,266	1.10%	10.20%	6
JTC 22	R132 Regional Road (NE)	23,964	1,364	0	0	23,964	1,364	0.00%	0.00%	-

Count	Arm	2026 Base		Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic (% Increase)		Estimated Number of Peak Days
		Total	HGV	Total	HGV	Total	HGV	Total	HGV	
	Naul Road (NW)	15,676	1,584	128	117	15,804	1,701	0.82%	7.40%	6
	N132 National Road (S)	29,543	2,196	279	173	29,822	2,369	0.94%	7.88%	1
	Stockhole Lane (SE)	10,059	262	173	91	10,232	353	1.72%	**34.62%**	4
JTC 23	R836 Regional Road (N)	13,245	382	0	0	13,245	382	0.00%	0.00%	-
	R132 Regional Road (SW)	19,080	980	0	0	19,080	980	0.00%	0.00%	-
	R125 Regional Road (S)	18,225	433	0	0	18,225	433	0.00%	0.00%	-
	R132 Regional Road (E)	27,509	1,092	0	0	27,509	1,092	0.00%	0.00%	-
JTC 24	R125 Regional Road (N)	7,443	193	0	0	7,443	193	0.00%	0.00%	-
	R125 Regional Road (W)	15,121	450	0	0	15,121	450	0.00%	0.00%	-
	Rathbeale Road (E)	11,923	333	0	0	11,923	333	0.00%	0.00%	-
JTC 25	Balheary Road (N)	16,841	581	0	0	16,841	581	0.00%	0.00%	-
	Castlegrange Green (W)	985	31	0	0	985	31	0.00%	0.00%	-
	R125 Regional Road (S)	8,011	334	0	0	8,011	334	0.00%	0.00%	-
	R125 Regional Road (E)	18,680	848	0	0	18,680	848	0.00%	0.00%	-
JTC 26	R132 Regional Road (N)	36,170	1,780	0	0	36,170	1,780	0.00%	0.00%	-
	R125 Regional Road (W)	23,593	1,116	0	0	23,593	1,116	0.00%	0.00%	-
	R132 Regional Road (S)	32,900	1,632	0	0	32,900	1,632	0.00%	0.00%	-
	Local Road (E)	4,178	74	0	0	4,178	74	0.00%	0.00%	-
JTC 27	R132 Regional Road (N)	32,838	1,622	0	0	32,838	1,622	0.00%	0.00%	-
	Seatown Road (W)	8,914	122	0	0	8,914	122	0.00%	0.00%	-
	R132 Regional Road (S)	31,953	1,417	0	0	31,953	1,417	0.00%	0.00%	-
	Seatown Road (E)	9,985	748	0	0	9,985	748	0.00%	0.00%	-
JTC 28	R132 Regional Road (N)	31,971	1,407	0	0	31,971	1,407	0.00%	0.00%	-
	R106 Regional Road (W)	14,992	513	0	0	14,992	513	0.00%	0.00%	-
	R132 Regional Road (SW)	26,880	1,045	0	0	26,880	1,045	0.00%	0.00%	-
	Drynam Road (S)	4,396	97	0	0	4,396	97	0.00%	0.00%	-

Count	Arm	2026 Base		Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic (% Increase)		Estimated Number of Peak Days
		Total	HGV	Total	HGV	Total	HGV	Total	HGV	
	R106 Regional Road (E)	18,798	727	0	0	18,798	727	0.00%	0.00%	-
JTC 29	Applegreen Access (N)	4,215	79	0	0	4,215	79	0.00%	0.00%	-
	R106 Regional Road (W)	18,608	754	0	0	18,608	754	0.00%	0.00%	-
	Mountgorry Way (S)	17,173	729	0	0	17,173	729	0.00%	0.00%	-
	R106 Regional Road (E)	18,969	558	0	0	18,969	558	0.00%	0.00%	-
JTC 30	R106 Regional Road (N)	11,556	405	0	0	11,556	405	0.00%	0.00%	-
	R106 Regional Road (W)	13,403	461	0	0	13,403	461	0.00%	0.00%	-
	R107 Regional Road (S)	11,620	353	0	0	11,620	353	0.00%	0.00%	-
JTC 31	Clonshaugh Road (N)	13,265	868	244	77	13,509	945	1.84%	8.86%	3
	R139 Regional Road (W)	54,782	3,209	282	118	55,064	3,327	0.51%	3.67%	3
	Unused Arm (S)	8	-	0	0	8	-	0.00%	0.00%	-
	R139 Regional Road (E)	54,702	2,784	41	41	54,743	2,825	0.07%	1.47%	50
JTC 32	R147(N)	5,853	602	99	99	5,952	701	1.70%	16.48%	2
	R147(S)	4,855	284	0	0	4,855	284	0.00%	0.00%	-
	Bracetown Business Park	3,003	481	99	99	3,102	580	3.30%	20.63%	2
JTC 33	R135(N)	6,209	1,133	0	0	6,209	1,133	0.00%	0.00%	-
	L3120(W)	9,082	1,835	0	0	9,082	1,835	0.00%	0.00%	-
	R135(S)	8,083	2,059	111	111	8,194	2,170	1.38%	5.41%	2
	L3120(E)	10,803	1,710	111	111	10,914	1,821	1.03%	6.52%	2
JTC 34	R122	12,728	1,465	111	111	12,839	1,576	0.88%	7.61%	2
	L3120	10,433	1,597	111	111	10,544	1,708	1.07%	6.98%	2
	R108(S)	11,391	1,147	0	0	11,391	1,147	0.00%	0.00%	-
	R108(E)	857	104	0	0	857	104	0.00%	0.00%	-
JTC 35	R108(N)	11,350	1,145	0	0	11,350	1,145	0.00%	0.00%	-
	R122	8,328	982	0	0	8,328	982	0.00%	0.00%	-
	R108(E)	6,249	1,188	0	0	6,249	1,188	0.00%	0.00%	-

Count	Arm	2026 Base		Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic		2026 Base + Peak Two-way Daily Construction Traffic (% Increase)		Estimated Number of Peak Days
		Total	HGV	Total	HGV	Total	HGV	Total	HGV	
JTC 36	R108	7,182	1,305	0	0	7,182	1,305	0.00%	0.00%	-
	Harristown Road	4,727	1,541	0	0	4,727	1,541	0.00%	0.00%	-
	R108	15,445	2,166	0	0	15,445	2,166	0.00%	0.00%	-
	Old Airport Road	13,458	1,580	0	0	13,458	1,580	0.00%	0.00%	-
JTC 37	R132	20,011	1,776	0	0	20,011	1,776	0.00%	0.00%	-
	Old Airport Road	13,581	1,575	0	0	13,581	1,575	0.00%	0.00%	-
	Swords Road	15,769	2,075	0	0	15,769	2,075	0.00%	0.00%	-
	Cemetery	921	10	0	0	921	10	0.00%	0.00%	-
JTC 38	R132(N)	17,759	1,427	0	0	17,759	1,427	0.00%	0.00%	-
	Corballis Road S	11,617	1,645	0	0	11,617	1,645	0.00%	0.00%	-
	R132(S)	19,995	1,774	0	0	19,995	1,774	0.00%	0.00%	-
	Eastland's Road	8,287	542	0	0	8,287	542	0.00%	0.00%	-
JTC 39	R132(N)	25,849	2,091	279	173	26,128	2,264	1.08%	8.28%	1
	Airport Exit	18,725	951	0	0	18,725	951	0.00%	0.00%	-
	Airport Access	16,757	748	0	0	16,757	748	0.00%	0.00%	-
	R132(S)	18,600	1,472	0	0	18,600	1,472	0.00%	0.00%	-
	M1 Link Road	44,733	2,855	279	173	45,012	3,028	0.62%	6.06%	1

The following points have been considered when assessing the potential impact of these increases:

- The predicted daily average increase in traffic has been based on the estimated maximum Construction Phase traffic at each counter location on the proposed construction access routes to that TTM Section or TCC. This situation would not realistically occur as the peak construction traffic is only programmed to ever occur simultaneously at two or three counter locations rather than at all of them at once. This approach is therefore extremely robust;
- No traffic growth or additional traffic as a result of future development has been applied to the baseline traffic used in the assessment. Therefore, through best practice, the assessment can be deemed to be robust (i.e., if the existing traffic flows were factored to future year levels, the calculated percentage increases would be less (e.g., an increase of 100 vehicles to a nominal existing flow of 5,000 vehicles means a percentage increase of 2%, whereas an increase of 100 vehicles to a nominal future year flow of 6,000 vehicles means a percentage increase of 1.7%);
- The increase in traffic during the Construction Phase is temporary;
- The one instance where a high percentage increase in total traffic is highlighted in bold is due to the low number of existing traffic on the proposed construction access route recorded at the count location;
- All instances where a high percentage increase in HGV traffic is highlighted in bold are due to the low number of existing HGVs on the proposed construction access routes recorded at the count locations;
- The predicted temporary percentage of HGV proportion is still relatively comparable with existing HGV proportions at each location;
- The maximum estimated increase in HGVs is a total of 191, on average, per day, where some construction activities overlap. This is equivalent to approximately 19 HGV movements per hour (averaged over an assumed 10-hour delivery period); and
- The maximum estimated increase in all traffic is a total of 369 vehicles, on average, per day. This is equivalent to approximately 37 vehicle movements per hour (averaged over an assumed 10-hour delivery period).

The percentage increase in total traffic flows as a result of the additional construction traffic is below the 30% threshold value at all survey locations in the study area, with the exception of one in close proximity to Woodland Substation and TCC0. It is acknowledged that there may be occasions when there are localised impacts during periods of construction which are linked to other TTM Sections which this robust approach of assessing each counter location at its peak has intended to capture.

It should also be noted that the maximum number of construction vehicle trips made on the network (i.e., 634 trips per day) projected under the Construction Phase programme, will only last for a period of two days. The total daily volume of construction vehicles on the network on any other day over the course of the construction programme is projected to be less than this volume. Based on the assessment above it is apparent that the maximum number of total construction vehicles impacting a particular location is 369, and for a period of only two days. It is therefore considered that this assessment represents a precautionary approach in terms of the potential network-wide construction vehicle impacts. In addition, these impacts are considered to be Negligible / Minor (Not Significant) and Temporary.

14.4.2.1.4 Receptor Sensitivity

Consideration has been given to the existing condition, ability to accommodate HGV traffic and characteristics identified during the desk-based study, for the roads identified in Section 14.4.2.1.2 as experiencing either a Minor, Moderate or Major impact (based on Table 14.3) for Total or HGV construction traffic and are summarised in Table 14.21.

Table 14.21: Receptor Sensitivity

Ref.	Receptor Description	Receptor Sensitivity	Rationale
ATC 1	R125 Regional Road, between R154 and R156 Regional Roads	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
ATC 3	The Red Road, south of R154 Regional Road	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
ATC 9	Nuttstown Road, west of Belgree Court	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
ATC 12	Kilbride Lane, south of Sutton Farm Road	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
ATC 17	R121 Regional Road, west of R122 Regional Road	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
ATC 18	R122 Regional Road, south of St. Margaret's Golf and Country Club	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
ATC 19	Kilreesk Lane	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
ATC 20	R122 Regional Road, north of Kilreesk Lane	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
ATC 33	Hollywood, west of Chapelwood Drive	Low	• Small rural settlement with few community or public facilities or services. • Route which has fallen into disuse through past severance, or which is scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes.
JTC 2	R125 Regional Road (SW)	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
JTC 3	R125 Regional Road (NE)	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
JTC 4	R156 Regional Road (NW)	Medium	• Receptors with high or medium importance at the regional scale and with limited potential for substitution. • Intermediate sized settlements containing some community or public facilities and services, areas with some traffic calming or traffic management measures and local A or B class roads, capable of regular use by HGV traffic. • Public rights of way and other routes close to communities which are used for recreational purposes (e.g., dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys. Surfaced. • Rights of way for WCH crossing roads at grade with >4000-8000 vehicles per day.
JTC 5	M3 Motorway On/Off Slips (N)	High	• Receptor of high importance at the international or national scale and with limited potential for substitution. • Motorway junction. • Close proximity and access to transport hub – M3 Parkway railway station with large park and ride capacity.
JTC 7	L5026 Local Road Piercetown (E)	Low	• Receptors with low or medium importance and rarity on a local scale.

Ref.	Receptor Description	Receptor Sensitivity	Rationale
			• Small settlements with few community or public facilities or services, areas with little or no traffic calming or traffic management measures and trunk or A-class roads, constructed to accommodate significant HGV composition. • WCH crossing road at grade and low number of vehicles per day (<4,000). • Bus route with a service frequency of fewer than one bus every 30 minutes.
JTC 15	R121 Regional Road (W)	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
	R121 Regional Road (E)	Negligible	• Receptors with very low importance and rarity. • Roads with no adjacent settlements.
JTC 16	R121 Regional Road (N)	Low	• Receptors with low or medium importance and rarity on a local scale. • Small settlements with few community or public facilities or services, areas with little or no traffic calming or traffic management measures and trunk or A-class roads, constructed to accommodate significant HGV composition. • Minor arm of junction. • WCH crossing road at grade and low number of vehicles per day (<4,000).
	Kilbride Road (W)	Medium	• Receptors with high or medium importance at the regional scale and with limited potential for substitution. • Intermediate sized settlements containing some community or public facilities and services, areas with some traffic calming or traffic management measures and local A or B class roads, capable of regular use by HGV traffic. • Public rights of way and other routes close to communities which are used for recreational purposes (e.g., dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys. Surfaced. • Rights of way for WCH crossing roads at grade with >4000-8000 vehicles per day.
	Kilbride Road (E)	Medium	• Receptors with high or medium importance at the regional scale and with limited potential for substitution. • Intermediate sized settlements containing some community or public facilities and services, areas with some traffic calming or traffic management measures and local A or B class roads, capable of regular use by HGV traffic. • Public rights of way and other routes close to communities which are used for recreational purposes (e.g., dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys. Surfaced. • Rights of way for WCH crossing roads at grade with >4000-8000 vehicles per day.
JTC 17	Kilbride Road (NW)	Medium	• Receptors with high or medium importance at the regional scale and with limited potential for substitution.

Ref.	Receptor Description	Receptor Sensitivity	Rationale
			• Intermediate sized settlements containing some community or public facilities and services, areas with some traffic calming or traffic management measures and local A or B class roads, capable of regular use by HGV traffic. • Public rights of way and other routes close to communities which are used for recreational purposes (e.g., dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys. Surfaced. • Rights of way for WCH crossing roads at grade with >4000-8000 vehicles per day.
JTC 20	Kilreesk Road (W)	Low	• Receptors with low or medium importance and rarity on a local scale. • Small settlements with few community or public facilities or services, areas with little or no traffic calming or traffic management measures and trunk or A-class roads, constructed to accommodate significant HGV composition. • Minor arm of junction. • WCH crossing road at grade and low number of vehicles per day (<4,000).
JTC 22	Stockhole Lane (SE)	Medium	• Receptors with high or medium importance at the regional scale and with limited potential for substitution. • Intermediate sized settlements containing some community or public facilities and services, areas with some traffic calming or traffic management measures and local A or B class roads, capable of regular use by HGV traffic. • Public rights of way and other routes close to communities which are used for recreational purposes (e.g., dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys. Surfaced. • Rights of way for WCH crossing roads at grade with >4000-8000 vehicles per day.

14.4.2.1.5 Severance

The IEMA Guidelines (IEMA 2023) note that *"severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery"*. The assessed magnitude of the severance impact is presented in Table 14.22 based on the methodology outlined in Section 14.2.4.2.1. This considers that a temporary increase of up to 191 HGV two-way movements and up to 183 non-HGV two-way movements (i.e., equivalent to approximately 19 HGV movements and 18 non-HGV movements per hour), at these locations will only have Negligible or Minor (Not Significant) impact on severance and a Temporary duration.

Table 14.22: Significance of Impact on Severance at Receptor Locations

Counter	Description	2026 Base + Peak Two-way Daily Construction Traffic (% increase)	Significance of Impact on Severance
ATC 1	R125 Regional Road, between R154 and R156 Regional Roads	**10.85%**	Negligible (Not Significant)
ATC 3	The Red Road, south of R154 Regional Road	**41.25%**	Minor (Not Significant)
ATC 9	Nuttstown Road, west of Belgree Court	**6.14%**	Negligible (Not Significant)
ATC 12	Kilbride Lane, south of Sutton Farm Road	**6.93%**	Negligible (Not Significant)
ATC 17	R121 Regional Road, west of R122 Regional Road	**8.06%**	Negligible (Not Significant)
ATC 18	R122 Regional Road, south of St. Margaret's Golf and Country Club	**3.59%**	Negligible (Not Significant)
ATC 19	Kilreesk Lane	**4.58%**	Negligible (Not Significant)
ATC 20	R122 Regional Road, north of Kilreesk Lane	**8.45%**	Negligible (Not Significant)
ATC 33	Hollywood, west of Chapelwood Drive	**23.62%**	Negligible (Not Significant)
JTC 2	R125 Regional Road (SW)	**7.56%**	Negligible (Not Significant)
JTC 3	R125 Regional Road (NE)	**10.56%**	Negligible (Not Significant)
JTC 4	R156 Regional Road (NW)	**4.72%**	Negligible (Not Significant)
JTC 5	M3 Motorway On/Off Slips (N)	**12.84%**	Negligible (Not Significant)
JTC 7	L5026 Local Road Piercetown (E)	**3.09%**	Negligible (Not Significant)
JTC 15	R121 Regional Road (W)	**4.61%**	Negligible (Not Significant)
	R121 Regional Road (E)	**6.58%**	Negligible (Not Significant)
JTC 16	R121 Regional Road (N)	**9.08%**	Negligible (Not Significant)
	Kilbride Road (W)	**2.93%**	Negligible (Not Significant)
	Kilbride Road (E)	**3.65%**	Negligible (Not Significant)
JTC 17	Kilbride Road (NW)	**5.91%**	Negligible (Not Significant)
JTC 20	Kilreesk Road (W)	**3.23%**	Negligible (Not Significant)
JTC 22	Stockhole Lane (SE)	**1.72%**	Negligible (Not Significant)

14.4.2.1.6 Driver Delay

Traffic delays caused by construction vehicles have the potential to occur along the chosen construction access routes. The IEMA Guidelines (IEMA 2023) note that *"these delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system"*.

The road network surrounding the work sites / TCCs are operating comfortably within capacity, which is confirmed when comparing the baseline AADT flows in Table 14.13 with the anticipated capacity outlined within Table 14.4. For example, it is estimated that Kilreesk Road is theoretically capable of accommodating 8,600 two-way vehicle movements per day. The estimated maximum increase in traffic movements associated with the Proposed Development at this location is 111 vehicles per day in addition to a two-way baseline flow of 3,448 per day. As such, the road is currently operating below its capacity and will continue to do so with the addition of Construction Phase traffic flows. The assessed significance of impact on driver delay at these locations is presented in Table 14.23. All locations have been assessed to have a Negligible (Not Significant) impact on driver delay and a Temporary duration.

Table 14.23: Significance of Impact on Driver Delay at Receptor Locations

Counter	Description	Assumed Road Capacity	2026 Base + Construction Traffic	Significance of Impact on Driver Delay
ATC 1	R125 Regional Road, between R154 and R156 Regional Roads	**5,000**	**1,643**	Negligible (Not Significant)
ATC 3	The Red Road, south of R154 Regional Road	**5,000**	**315**	Negligible (Not Significant)
ATC 9	Nuttstown Road, west of Belgree Court	**5,000**	**1,899**	Negligible (Not Significant)
ATC 12	Kilbride Lane, south of Sutton Farm Road	**5,000**	**1,102**	Negligible (Not Significant)
ATC 17	R121 Regional Road, west of R122 Regional Road	**5,000**	**2,656**	Negligible (Not Significant)
ATC 18	R122 Regional Road, south of St. Margaret's Golf and Country Club	**5,000**	**3,121**	Negligible (Not Significant)
ATC 19	Kilreesk Lane	**5,000**	**2,319**	Negligible (Not Significant)
ATC 20	R122 Regional Road, north of Kilreesk Lane	**5,000**	**1,254**	Negligible (Not Significant)
ATC 33	Hollywood, west of Chapelwood Drive	**5,000**	**1,097**	Negligible (Not Significant)
JTC 2	R125 Regional Road (SW)	**5,000**	**2,287**	Negligible (Not Significant)
JTC 3	R125 Regional Road (NE)	**5,000**	**1,684**	Negligible (Not Significant)
JTC 4	R156 Regional Road (NW)	**8,600**	**5,721**	Negligible (Not Significant)
JTC 5	M3 Motorway On/Off Slips (N)	**8,600**	**2,724**	Negligible (Not Significant)
JTC 7	L5026 Local Road Piercetown (E)	**5,000**	**3,312**	Negligible (Not Significant)
JTC 15	R121 Regional Road (W)	**5,000**	**3,247**	Negligible (Not Significant)
	R121 Regional Road (E)	**5,000**	**3,142**	Negligible (Not Significant)
JTC 16	R121 Regional Road (N)	**5,000**	**3,092**	Negligible (Not Significant)
	Kilbride Road (W)	**8,600**	**6,687**	Negligible (Not Significant)
	Kilbride Road (E)	**8,600**	**5,711**	Negligible (Not Significant)
JTC 17	Kilbride Road (NW)	**8,600**	**6,244**	Negligible (Not Significant)
JTC 20	Kilreesk Road (W)	**8,600**	**3,559**	Negligible (Not Significant)
JTC 22	Stockhole Lane (SE)	**11,600**	**10,232**	Negligible (Not Significant)

14.4.2.1.7 Pedestrian Delay

While there is the potential for an increase in traffic flow at all locations assessed, the level of increase up to approximately 191 HGV movements and 183 non-HGV movements per hour is such that the significance of impact on pedestrian delays is anticipated to be Negligible or Minor (Not Significant) and Temporary in duration, reflecting the methodology outlined in Section 14.2, at the receptor locations shown in Table 14.24.

Table 14.24: Significance of Impact on Pedestrian Delay at Receptor Locations

Counter	Description	2026 Base + Peak Two-way Daily Construction Traffic (% increase)	Significance of Impact on Pedestrian Delay
ATC 1	R125 Regional Road, between R154 and R156 Regional Roads	10.85%	Negligible (Not Significant)
ATC 3	The Red Road, south of R154 Regional Road	41.25%	Minor (Not Significant)
ATC 9	Nuttstown Road, west of Belgree Court	6.14%	Negligible (Not Significant)
ATC 12	Kilbride Lane, south of Sutton Farm Road	6.93%	Negligible (Not Significant)
ATC 17	R121 Regional Road, west of R122 Regional Road	8.06%	Negligible (Not Significant)
ATC 18	R122 Regional Road, south of St. Margaret's Golf and Country Club	3.59%	Negligible (Not Significant)
ATC 19	Kilreesk Lane	4.58%	Negligible (Not Significant)
ATC 20	R122 Regional Road, north of Kilreesk Lane	8.45%	Negligible (Not Significant)
ATC 33	Hollywood, west of Chapelwood Drive	23.62%	Negligible (Not Significant)
JTC 2	R125 Regional Road (SW)	7.56%	Negligible (Not Significant)
JTC 3	R125 Regional Road (NE)	10.56%	Negligible (Not Significant)
JTC 4	R156 Regional Road (NW)	4.72%	Negligible (Not Significant)
JTC 5	M3 Motorway On/Off Slips (N)	12.84%	Negligible (Not Significant)
JTC 7	L5026 Local Road Piercetown (E)	3.09%	Negligible (Not Significant)
JTC 15	R121 Regional Road (W)	4.61%	Negligible (Not Significant)
	R121 Regional Road (E)	6.58%	Negligible (Not Significant)
JTC 16	R121 Regional Road (N)	9.08%	Negligible (Not Significant)
	Kilbride Road (W)	2.93%	Negligible (Not Significant)
	Kilbride Road (E)	3.65%	Negligible (Not Significant)
JTC 17	Kilbride Road (NW)	5.91%	Negligible (Not Significant)
JTC 20	Kilreesk Road (W)	3.23%	Negligible (Not Significant)
JTC 22	Stockhole Lane (SE)	1.72%	Negligible (Not Significant)

14.4.2.1.8 Pedestrian Amenity

Amenity is defined as the relative pleasantness of a journey. The volume and composition of traffic are very important determinants of amenity, as are other factors (e.g., footpath width and distance from traffic; any barriers between pedestrians and cyclists and vehicle traffic; the quality of any street furniture, route signing and planting, and presences of crossings).

For this assessment, based on the available information, the magnitude of the impact on pedestrian amenity has been considered in terms of the IEMA Guidelines (IEMA 2023), which suggests that *"a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or HGV component) is halved or doubled"*. Based on the estimated two-way average daily percentage increase in Construction Phase traffic and the estimated two-way average daily percentage increase in HGV traffic, summarised in Table 14.19 and Table 14.20, it is anticipated that the Proposed Development Construction Phase traffic could see more than a two-fold increase in HGV traffic on the roads under consideration at one of the locations as identified in Table 14.25.

However, given the temporary nature of the impact, the low percentage of overall traffic increase, and the spare capacity on the roads at these receptor locations, professional judgement has been used to determine an adverse, Minor (Not Significant) significance of impact on pedestrian amenity, as shown in Table 14.25, and Temporary in duration.

Table 14.25: Significance of Impact on Pedestrian Amenity at Receptor Locations

Counter	Description	2026 Base + Peak Two-way Daily Construction Traffic (% increase)		Significance of Impact on Pedestrian Amenity
		Total	HGV	
ATC 1	R125 Regional Road, between R154 and R156 Regional Roads	10.85%	**43.41%**	Minor (Not Significant)
ATC 3	The Red Road, south of R154 Regional Road	41.25%	**7.97%**	Minor (Not Significant)
ATC 9	Nuttstown Road, west of Belgree Court	6.14%	**48.64%**	Minor (Not Significant)
ATC 12	Kilbride Lane, south of Sutton Farm Road	6.93%	**63.20%**	Minor (Not Significant)
ATC 17	R121 Regional Road, west of R122 Regional Road	8.06%	**37.80%**	Minor (Not Significant)
ATC 18	R122 Regional Road, south of St. Margaret's Golf and Country Club	3.59%	**35.63%**	Minor (Not Significant)
ATC 19	Kilreesk Lane	4.58%	**50.85%**	Minor (Not Significant)
ATC 20	R122 Regional Road, north of Kilreesk Lane	8.45%	**80.03%**	Minor (Not Significant)
ATC 33	Hollywood, west of Chapelwood Drive	23.62%	**97.29%**	Minor (Not Significant)
JTC 2	R125 Regional Road (SW)	7.56%	**51.22%**	Minor (Not Significant)
JTC 3	R125 Regional Road (NE)	10.56%	**92.57%**	Minor (Not Significant)
JTC 4	R156 Regional Road (NW)	4.72%	**30.57%**	Minor (Not Significant)
JTC 5	M3 Motorway On/Off Slips (N)	12.84%	**125.34%**	Minor (Not Significant)
JTC 7	L5026 Local Road Piercetown (E)	3.09%	**30.25%**	Minor (Not Significant)
JTC 15	R121 Regional Road (W)	4.61%	**80.67%**	Minor (Not Significant)
	R121 Regional Road (E)	6.58%	**55.04%**	Minor (Not Significant)
JTC 16	R121 Regional Road (N)	9.08%	**46.93%**	Minor (Not Significant)
	Kilbride Road (W)	2.93%	**93.45%**	Minor (Not Significant)
	Kilbride Road (E)	3.65%	**67.12%**	Minor (Not Significant)
JTC 17	Kilbride Road (NW)	5.91%	**67.36%**	Minor (Not Significant)
JTC 20	Kilreesk Road (W)	3.23%	**46.82%**	Minor (Not Significant)
JTC 22	Stockhole Lane (SE)	1.72%	**34.62%**	Minor (Not Significant)

14.4.2.1.9 Fear and Intimidation

Traffic volume, composition and speeds, pedestrian footways and crossings all contribute to the level of general pleasantness, fear, and intimidation experienced by pedestrians and other vulnerable road users.

The identified receptor locations can accommodate regular use by HGV traffic, and as such, up to an additional 191 HGVs per day on these roads will not have a significant impact on pedestrians and other road users. Furthermore, given that these roads are operating comfortably within capacity at these receptor locations, the thresholds outlined in Table 14.4, and the Temporary duration of the impact, professional judgement has been used to determine a Negligible (Not Significant) impact on pedestrian fear and intimidation at these locations, as shown in Table 14.26.

Table 14.26: Significance of Impact on Fear and Intimidation at Receptor Locations

Counter	Description	Assumed Road Capacity	2026 Base + Construction Traffic	%HGV Change with Construction	Significance of Impact on Fear and Intimidation
ATC 1	R125 Regional Road, between R154 and R156 Regional Roads	**5,000**	**1,643**	**3.51%**	Negligible (Not Significant)
ATC 3	The Red Road, south of R154 Regional Road	**5,000**	**315**	**-2.64%**	Negligible (Not Significant)
ATC 9	Nuttstown Road, west of Belgree Court	**5,000**	**1,899**	**4.57%**	Negligible (Not Significant)
ATC 12	Kilbride Lane, south of Sutton Farm Road	**5,000**	**1,102**	**5.77%**	Negligible (Not Significant)
ATC 17	R121 Regional Road, west of R122 Regional Road	**5,000**	**2,656**	**3.36%**	Negligible (Not Significant)
ATC 18	R122 Regional Road, south of St. Margaret's Golf and Country Club	**5,000**	**3,121**	**2.81%**	Negligible (Not Significant)
ATC 19	Kilreesk Lane	**5,000**	**2,319**	**3.83%**	Negligible (Not Significant)
ATC 20	R122 Regional Road, north of Kilreesk Lane	**5,000**	**1,254**	**6.97%**	Negligible (Not Significant)
ATC 33	Hollywood, west of Chapelwood Drive	**5,000**	**1,097**	**5.24%**	Negligible (Not Significant)
JTC 2	R125 Regional Road (SW)	**5,000**	**2,287**	**2.86%**	Negligible (Not Significant)
JTC 3	R125 Regional Road (NE)	**5,000**	**1,684**	**4.04%**	Negligible (Not Significant)
JTC 4	R156 Regional Road (NW)	**8,600**	**5,721**	**1.76%**	Negligible (Not Significant)
JTC 5	M3 Motorway On/Off Slips (N)	**8,600**	**2,724**	**5.20%**	Negligible (Not Significant)
JTC 7	L5026 Local Road Piercetown (E)	**5,000**	**3,312**	**2.69%**	Negligible (Not Significant)
JTC 15	R121 Regional Road (W)	**5,000**	**3,247**	**3.96%**	Negligible (Not Significant)
	R121 Regional Road (E)	**5,000**	**3,142**	**3.18%**	Negligible (Not Significant)
JTC 16	R121 Regional Road (N)	**5,000**	**3,092**	**1.95%**	Negligible (Not Significant)
	Kilbride Road (W)	**8,600**	**6,687**	**2.76%**	Negligible (Not Significant)
	Kilbride Road (E)	**8,600**	**5,711**	**3.16%**	Negligible (Not Significant)
JTC 17	Kilbride Road (NW)	**8,600**	**6,244**	**2.79%**	Negligible (Not Significant)
JTC 20	Kilreesk Road (W)	**8,600**	**3,559**	**2.91%**	Negligible (Not Significant)
JTC 22	Stockhole Lane (SE)	**11,600**	**10,232**	**0.84%**	Negligible (Not Significant)

14.4.2.1.10 Road Safety

As mentioned in Section 14.2.4.2.6, all detailed road traffic collision data has been removed from public access, including historic road traffic collision data. Therefore, quantitative analysis of this data will not be conducted.

Irrespective of this, the assessed cumulative peak scenario across the Proposed Development assumes up to 369 (191 HGV) movements per day and is considered to have a Minor magnitude impact on accidents and safety. Furthermore, the roads forming the core of the proposed construction access route network are either well-established haulage routes that can accommodate significant HGV composition or are routes capable of regular use by HGV traffic. As outlined in the CTMP (refer to Appendix B of the CEMP which is included as a standalone document in the planning application pack), access to TCCs, HDD Compounds, and working areas will be designed to safely accommodate the existing road and active travel users, and the type of construction traffic that will use these accesses during the Construction Phase. The appointed contractor will provide advanced warning signs, in accordance with the Traffic Signs Manual (DoT 2019), on approach to the proposed access locations, and entry and exit points throughout the live working area.

Given that anticipated construction traffic increases will be temporary and managed through the implementation of a CTMP, it is concluded that there will not be a long-term determinable increase on the risk of accidents. As mentioned in the CTMP, the appointed contractor of the Proposed Development will carry out a Road Safety Audit of the CTMP prior to the commencement of works, subject to the Proposed Development being consented. This will ensure a high safety standard in relation to the traffic management measures implemented.

Professional judgement has been used to determine that the magnitude of the accidents and safety impact is, at worst, Minor (i.e., a Not Significant impact) at the receptor locations identified, as summarised in Table 14.27, and is of a Temporary duration.

Table 14.27: Significance of Impact on Road Safety at Receptor Locations

Counter	Description	Significance of Impact on Road Safety
ATC 1	R125 Regional Road, between R154 and R156 Regional Roads	Minor (Not Significant)
ATC 9	Nuttstown Road, west of Belgree Court	Minor (Not Significant)
ATC 12	Kilbride Lane, south of Sutton Farm Road	Minor (Not Significant)
ATC 17	R121 Regional Road, west of R122 Regional Road	Minor (Not Significant)
ATC 18	R122 Regional Road, south of St. Margaret's Golf and Country Club	Minor (Not Significant)
ATC 19	Kilreesk Lane	Minor (Not Significant)
ATC 20	R122 Regional Road, north of Kilreesk Lane	Minor (Not Significant)
ATC 33	Hollywood, west of Chapelwood Drive	Minor (Not Significant)
JTC 2	R125 Regional Road (SW)	Minor (Not Significant)
JTC 3	R125 Regional Road (NE)	Minor (Not Significant)
JTC 4	R156 Regional Road (NW)	Minor (Not Significant)
JTC 5	M3 Motorway On/Off Slips (N)	Minor (Not Significant)
JTC 7	L5026 Local Road Piercetown (E)	Minor (Not Significant)
JTC 15	R121 Regional Road (W)	Minor (Not Significant)
	R121 Regional Road (E)	Minor (Not Significant)
JTC 16	R121 Regional Road (N)	Minor (Not Significant)
	Kilbride Road (W)	Minor (Not Significant)
	Kilbride Road (E)	Minor (Not Significant)
JTC 17	Kilbride Road (NW)	Minor (Not Significant)
JTC 20	Kilreesk Road (W)	Minor (Not Significant)
JTC 22	Stockhole Lane (SE)	Minor (Not Significant)

14.4.2.1.11 Significance of Impacts Assessment

The significance of the impacts of Construction Phase traffic on the identified sensitive receptors has been assessed based on traffic volumes and professional judgement and is summarised in Table 14.28.

Table 14.28: Summary of Receptor Sensitivity and Magnitude of Impacts

Counter	Description	Receptor Sensitivity	Magnitude of Impact					
			Severance	Driver Delay	Pedestrian Delay	Pedestrian Amenity	Fear and Intimidation	Road Safety
ATC 1	R125 Regional Road, between R154 and R156 Regional Roads	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
ATC 3	The Red Road, south of R154 Regional Road	Negligible	Minor	Minor	Minor	Minor	Negligible	Minor
ATC 9	Nuttstown Road, west of Belgree Court	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
ATC 12	Kilbride Lane, south of Sutton Farm Road	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
ATC 17	R121 Regional Road, west of R122 Regional Road	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
ATC 18	R122 Regional Road, south of St. Margaret's Golf and Country Club	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
ATC 19	Kilreesk Lane	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
ATC 20	R122 Regional Road, north of Kilreesk Lane	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
ATC 33	Hollywood, west of Chapelwood Drive	Low	Negligible	Negligible	Negligible	Minor	Negligible	Minor
JTC 2	R125 Regional Road (SW)	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
JTC 3	R125 Regional Road (NE)	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
JTC 4	R156 Regional Road (NW)	Medium	Negligible	Negligible	Negligible	Minor	Negligible	Minor
JTC 5	M3 Motorway On/Off Slips (N)	High	Negligible	Negligible	Negligible	Minor	Negligible	Minor
JTC 7	L5026 Local Road Piercetown (E)	Low	Negligible	Negligible	Negligible	Minor	Negligible	Minor
JTC 15	R121 Regional Road (W)	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
	R121 Regional Road (E)	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Minor
JTC 16	R121 Regional Road (N)	Low	Negligible	Negligible	Negligible	Minor	Negligible	Minor
	Kilbride Road (W)	Medium	Negligible	Negligible	Negligible	Minor	Negligible	Minor

Counter	Description	Receptor Sensitivity	Magnitude of Impact					
			Severance	Driver Delay	Pedestrian Delay	Pedestrian Amenity	Fear and Intimidation	Road Safety
	Kilbride Road (E)	Medium	Negligible	Negligible	Negligible	Minor	Negligible	Minor
JTC 17	Kilbride Road (NW)	Medium	Negligible	Negligible	Negligible	Minor	Negligible	Minor
JTC 20	Kilreesk Road (W)	Low	Negligible	Negligible	Negligible	Minor	Negligible	Minor
JTC 22	Stockhole Lane (SE)	Medium	Negligible	Negligible	Negligible	Minor	Negligible	Minor

Based on the sensitivity of the receptors and the summary of magnitude of impacts (Table 14.28), the significance of impacts of the additional traffic movements during the Construction Phase are provided in Table 14.29, classified using the significance of impacts matrix shown in Table 14.10.

Table 14.29: Significance of Construction Phase Traffic Impacts

Counter	Description	Severance	Driver Delay	Pedestrian Delay	Pedestrian Amenity	Fear and Intimidation	Road Safety
ATC 1	R125 Regional Road, between R154 and R156 Regional Roads	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
ATC 3	The Red Road, south of R154 Regional Road	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
ATC 9	Nuttstown Road, west of Belgree Court	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
ATC 12	Kilbride Lane, south of Sutton Farm Road	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
ATC 17	R121 Regional Road, west of R122 Regional Road	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
ATC 18	R122 Regional Road, south of St. Margaret's Golf and Country Club	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
ATC 19	Kilreesk Lane	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
ATC 20	R122 Regional Road, north of Kilreesk Lane	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
ATC 33	Hollywood, west of Chapelwood Drive	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
JTC 2	R125 Regional Road (SW)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
JTC 3	R125 Regional Road (NE)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
JTC 4	R156 Regional Road (NW)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
JTC 5	M3 Motorway On/Off Slips (N)	Not Significant	Not Significant	Not Significant	Significant	Not Significant	Significant

Counter	Description	Severance	Driver Delay	Pedestrian Delay	Pedestrian Amenity	Fear and Intimidation	Road Safety
JTC 7	L5026 Local Road Piercetown (E)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
JTC 15	R121 Regional Road (W)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
	R121 Regional Road (E)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
JTC 16	R121 Regional Road (N)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
	Kilbride Road (W)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
	Kilbride Road (E)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
JTC 17	Kilbride Road (NW)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
JTC 20	Kilreesk Road (W)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
JTC 22	Stockhole Lane (SE)	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Note: Negligible and Minor are considered Not Significant impacts							

The predicted increase in traffic caused by the activities for the Proposed Development during the Construction Phase will result in increases of traffic flows on the surrounding roads leading to the work sites, HDD Compounds and TCCs. Overall, on the basis that the predicted traffic increases are peak values of Temporary duration, the assessment is deemed to be robust with a precautionary approach, the general traffic volume increases are assessed to have a Negligible / Minor magnitude of impact, and based on professional judgement, the estimated increases in traffic increases are assessed to have a Moderate (Significant) or Negligible / Minor (Not Significant) impact on the identified sensitive receptors.

14.4.2.1.12 Temporary Traffic Management Assessment

Approximately 26km of the proposed cable route length will run in the road network. The CTMP (refer to Appendix B of the CEMP which is included as a standalone document in the planning application pack) has identified a series of lane and full road closures throughout the construction process with the proposed cable route split into a series of TTM Sections. The closures planned for each TTM Section (in-road) during the three phases of the Construction Phase will still allow for local access and are summarised in Table 14.1. Each full road closure has an associated diversion route that is identified in the CTMP and shown in Figure 14.2 in Volume 4 of this EIAR. The expected journey time impacts, and diversion route lengths are summarised in Table 14.30. It should be noted that the durations quoted are the total days across the Construction Phase and are not necessarily concurrent days.

The diversion routes identified are in accordance with Chapter 8 of the TII Guidelines (Temporary Traffic Measures and Signs for Roadworks) (TII 2014), which states in Section 8.2.4.6:

> *"Characteristics of the roads on the diversion route should be similar to the road to be closed. If this is not achievable, then it may be appropriate to consider the use of a single lane diversion for one direction of traffic only or two separate diversions for the traffic in each direction."*

In each case, where a diversion is required, there are suitable alternative routes available.

Table 14.30: Summary of Lane and Road Closures with Associated Diversions

TTM Sections	TTM Length (km)	Position of Works	Phase 1 and 3 Traffic Measures	Phase 2 Traffic Measures	Diversion Route Length (km)	Diversion Journey Time Increase	Driver Delay Significance	Diversion Duration (Days)
1.02	7.2	In-road and in-verge	Two-lane closures with Passing Bay and single lane closure	Full road closure	24.1	22 minutes	Moderate (Significant)	227
1.03	1.5	In-verge	Hard shoulder closure	Hard shoulder closure	n/a	n/a	n/a	n/a
1.05	0.3	In-road	n/a	Two-lane closures	n/a	n/a	n/a	n/a
1.06	1.6	In-road	Full road closure and two-lane closures with Passing Bay	Full road closure	3.3	4 minutes	Negligible (Not Significant)	98
1.07	0.7	In-road	Full road closure	Full road closure	20.9	21 minutes	Moderate (Significant)	65
1.09	0.3	In-road	Full road closure	Full road closure	21.3	21 minutes	Moderate (Significant)	61
1.10	1.4	In-road	Full road closure	Full road closure	20.2	20 minutes	Minor (Not Significant)	90
1.12	0.9	In-road	Two-lane closures with Passing Bay	Full road closure	20.7	21 minutes	Moderate (Significant)	26
1.14	1.9	In-road and in-verge	Single lane closure	Full road closure	13.8	15 minutes	Minor (Not Significant)	34
1.16	0.7	In-road	Two-lane closures with Passing Bay	Full road closure	14.2	15 minutes	Minor (Not Significant)	20
1.18	0.7	In-road	n/a	Full road closure	6.5	7 minutes	Negligible (Not Significant)	20
1.20	0.9	In-road	Full road closure	Full road closure	6.3	7 minutes	Negligible (Not Significant)	83
1.21	1.6	In-road	Two-lane closures with Passing Bay	Full road closure	8.5	9 minutes	Negligible (Not Significant)	50
1.23	0.8	In-road	Two-lane closures with Passing Bay	Full road closure	9.2	10 minutes	Negligible (Not Significant)	24
1.24	1.2	In-road and in-verge	Single lane closure	Full road closure	8.7	10 minutes	Negligible (Not Significant)	37
1.25	0.05	In-road	n/a	Full road closure	2.5	2 minutes	Negligible (Not Significant)	2
1.27	1.6	In-road	Two-lane closures with Passing Bay	Single lane closure	n/a	n/a	n/a	n/a
1.28	2.5	In-road and in-verge	Two-lane closures with Passing Bay	Single lane closure	n/a	n/a	n/a	n/a
1.29	0.8	In-road	Two-lane closures with Passing Bay	Single lane closure	n/a	n/a	n/a	n/a

The in-road TTM Sections will have impacts of driver's route choice and cause a degree of delay to diverted traffic.

To circumvent the full road closures where they are implemented, drivers can follow the diversions outlined in Table 14.30. These are routed in accordance with TII Guidelines, and as such, ensure that the diversion routes follow roads of an appropriate standard. The driver delay impact is assessed as a Negligible and Minor (Not Significant) for most diversions and all of these will be either of Brief or Temporary duration. For four TTM Sections, the potential impact is assessed as a Moderate (Significant). However, this impact will be of Temporary duration, with only extreme cases expected when the full length of the diversion route would be required for travel. It is likely that a significant proportion of diverted traffic will only use portions of each diversion route and will dissipate throughout several alternative localised routes.

14.4.2.1.13 Public Transport Assessment

Within the vicinity of the Proposed Development, several public transport routes have been identified, as outlined in Section 14.3.4. Many of the routes are local routes only since the study area is generally rural. The routes identified within or near the study area are predominantly bus routes but there is also one railway station (M3 Parkway) and associated section of railway line.

The M3 Parkway is a Park and Ride railway station, located on the R157 Regional Road adjacent to Junction 5 of the M3 Motorway, between TTM Sections 1.03 and 1.04. Closure of the hard shoulder on TTM Section 1.03, south of the car park access, for a total duration of 92 days, will occur across all three phases of the Construction Phase, which combined, may slightly impact journey times to and from the station. However, access will still be maintained throughout the Construction Phase.

To the north of the M3 Parkway railway station, between the M3 Motorway and R157 Regional Road, off-road TTM Section 1.04 will involve the use of HDD to route the cables underneath the track. This section of track is railway siding beyond the current line terminus at M3 Parkway, and combined with the use of trenchless techniques and the scheduling of these works to occur when trains are not in service, will ensure that there will be no disruption to operational services.

Table 14.31 outlines potential impacts to the bus / coach routes identified within or in close proximity to the proposed cable route.

Table 14.31: Construction Impacts to Local Bus Routes

Service Number	Route Summary	Service Operator	TTM Sections	Phases 1 and 3 Impacts	Phase 2 Impact
33	Lower Abbey Street – Balbriggan	Dublin Bus	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
33A	Dublin Airport – Balbriggan	Go-Ahead Ireland	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
33E	Lower Abbey Street – Portrane – Skerries	Dublin Bus	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
33n	Dublin City South, Westmoreland Street – Balbriggan	Dublin Bus	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
40B	Parnell Street – Toberburr	Dublin Bus	1.25	No impact.	Full road closure will require diversion of bus routing.

Service Number	Route Summary	Service Operator	TTM Sections	Phases 1 and 3 Impacts	Phase 2 Impact
41	Lower Abbey Street – Swords Manor	Dublin Bus	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
41B	Rolestown – Lower Abbey Street	Dublin Bus	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
41C	Lower Abbey Street – Swords Manor	Dublin Bus	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
41D	Swords Business Park – Lower Abbey Street	Dublin Bus	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
41X	Swords – UCD Belfield	Dublin Bus	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
88n	Dublin City South, Westmoreland Street – Ashbourne	Dublin Bus	1.20 / 1.21	Bus route cuts across sections with full road closure (TTM 1.20) / two lane closures (TTM 1.21). The R125/R135 junction will be kept open to through traffic, if possible, with single lane closures of roundabout – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with full road closures. The R125/R135 junction will be kept open to through traffic, if possible, with single lane closures of roundabout – bus routing maintained, potential impact to journey times.
101	Dublin – Airport – Drogheda	Bus Éireann	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
101X	Wilton Terrace – Drogheda – Termon Abbey	Bus Éireann	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
102	Dublin Airport – Sutton Station	Bus Éireann	1.28 / 1.29	Single lane closures – bus routing maintained, potential impact to journey times.	Single lane closures – bus routing maintained, potential impact to journey times.
103	Dublin – Ashbourne – Ratoath – Emerald Park	Bus Éireann	1.20 / 1.21	Bus route cuts across sections with full road closure (TTM 1.20) / two lane closures (TTM 1.21). The R125/R135 junction will be kept open to through traffic, if possible, with single lane closures of roundabout – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with full road closures. The R125/R135 junction will be kept open to through traffic, if possible, with single lane closures of roundabout – bus routing maintained, potential impact to journey times.
105	Blanchardstown – Ashbourne – Drogheda	Bus Éireann	1.03 and 1.05	Hard shoulder closure – bus routing maintained, unlikely impact to journey times (TTM 1.03).	Hard shoulder closure (TTM 1.03) and single lane closure (TTM 1.05) – bus routing maintained, potential impact to journey times.
105X	UCD – M3 – Ratoath – Ashbourne	Bus Éireann	1.20 / 1.21	Bus route cuts across sections with full road closure (TTM 1.20) / two lane closures (TTM 1.21). The R125/R135 junction will be kept open to through traffic, if possible, with single lane closures of	Bus route cuts across sections with full road closures. The R125/R135 junction will be kept open to through traffic, if possible, with single lane closures of roundabout

Service Number	Route Summary	Service Operator	TTM Sections	Phases 1 and 3 Impacts	Phase 2 Impact
				roundabout – bus routing maintained, potential impact to journey times.	– bus routing maintained, potential impact to journey times.
109	Dublin – Navan – Kells – Cavan	Bus Éireann	1.05	No impact.	Single lane closure – bus routing maintained, potential impact to journey times.
109A	DCU – Airport – Ratoath – Navan	Bus Éireann	1.20, 1.21, 1.27 and 1.28	Bus route cuts across sections with full road closures (1.20 and 1.21) and follows sections of two-lane closures with passing places (1.27 and 1.28) – bus routing maintained, potential impact to journey times.	Single lane closures – bus routing maintained, potential impact to journey times.
109B	Dublin – Dunshaughlin – Trim	Bus Éireann	1.05	No impact.	Single lane closure – bus routing maintained, potential impact to journey times.
111	Wilton Terrace – Trim – Granard – Cavan	Bus Éireann	1.05	No impact.	Single lane closure – bus routing maintained, potential impact to journey times.
111X	Dublin Express – Athboy – Clonmellon	Bus Éireann	1.05	No impact.	Single lane closure – bus routing maintained, potential impact to journey times.
196	Knocksedan – Swords	TFI Local Link Louth Meath Fingal	1.25	No impact.	Bus route cuts across off-road section – bus routing maintained, potential impact to journey times.
501X	Swords Shopping Centre – Dublin	Swords Express	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
505X	Dublin, Eden Quay – Malahide Road	Swords Express	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
506X	Broadmeadow – Dublin	Swords Express	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
741	Dublin Airport – Swords	Ashbourne Connect	1.28 / 1.29	Bus route cuts across sections of two-lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Bus route cuts across sections with single lane closures – bus routing maintained, potential impact to journey times.
DY01	Navan – Bennetstown, Dunboyne College	McCaffrey Coaches Limited	1.03	Bus route cuts across section with hard shoulder closure – bus routing maintained, potential impact to journey times.	Bus route cuts across section with hard shoulder closure – bus routing maintained, potential impact to journey times.
KL01	Phibsborough – Dunbro Keelings Retail	Keelings Retail	1.27	Two lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Single lane closure – bus routing maintained, potential impact to journey times.
KL02	Briarleas – Dunbro Keelings Retail	Keelings Retail	1.27	Two lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Single lane closure – bus routing maintained, potential impact to journey times.
KL03	Santry Hazelwood – Dunbro Keelings Retail	Keelings Retail	1.27 and 1.28	Two lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	Single lane closures – bus routing maintained, potential impact to journey times.
UM03	Dundalk – Maynooth University	Streamline Coaches	1.02	One section of work will require a full road closure and will require diversion of bus routing. Other	Full road closure will require diversion of bus routing.

Service Number	Route Summary	Service Operator	TTM Sections	Phases 1 and 3 Impacts	Phase 2 Impact
				works will require single lane closure / two lane closures with Passing Bays – bus routing maintained, potential impact to journey times.	
UM05	Cathedral – University Campus	Streamline Coaches	1.03	Hard shoulder closure – bus routing maintained, unlikely impact to journey times.	Hard shoulder closure – bus routing maintained, unlikely impact to journey times.
UM10	Carrickmacross - College	Streamline Coaches	1.03 and 1.05	Hard shoulder closure – bus routing maintained, potential impact to journey times (TTM 1.03).	Hard shoulder closure (TTM 1.03) and single lane closure (TTM 1.05) – bus routing maintained, potential impact to journey times.

The majority of bus routes will be affected only by lane closures. A stop-and-go or traffic light system will be active at the single lane and two-lane (with Passing Bay) closures which may cause delays depending on the traffic flows attempting to traverse this point at the time. Buses are expected to continue to serve the same routes, although some existing stop locations may be temporarily relocated to accommodate the construction works. The impact of this and single lane closures, potentially affecting bus journey times is assessed as Negligible (Not Significant) with a Temporary duration.

The summary table shows that two bus routes (40B and UM03) will be impacted by full road closures and will be required to follow the diversions identified in Section 14.4.2.1.12. The impact of the diversions identified for each of the TTM Sections that affect the 40B bus route is assessed to be at worst, a Minor (Not Significant) impact, in terms of diversion significance, whereas the diversion identified for the UM03 service is assessed to be a Moderate (Significant) impact. The following increases in journey time and closure durations are expected for each of these services:

- 40B – two-minute diversion at TTM Section 1.25, where a road closure will be active for approximately 2 days; and
- UM03 – 22-minute diversion at TTM Section 1.02, where a road closure will be active for approximately 227 days.

The closure / diversion durations are based on the current understanding of the Proposed Development.

The UM03 bus service, the only one initially deemed to experience a Moderate (Significant) impact, operates twice per day in both directions between Dundalk / Drogheda and Maynooth University. Based on a desk-based review, this service is only impacted by the closure of a partial length of TTM Section 1.02 meaning that the length of impact is likely to be shorter than the 227 days quoted, as local access arrangements will be maintained as much as possible. Additionally, there are no stops served by this route on the section of the R156 Regional Road experiencing closure and based on the current service route it is anticipated that the bus would take a more informal / direct route than the full length of the recommended diversion route. As a result, along with the impact being of Temporary duration, based on professional judgement, the UM03 service will experience a Minor (Not Significant) impact.

The closures in all cases will be temporary, and according to the EPA Guidelines (EPA 2022), as presented in Section 14.2.4.2.2, all impacts are assessed as Temporary in duration, as the closures will not exceed one year.

As outlined in the CTMP (refer to Appendix B of the CEMP included as a standalone document in this planning application pack), the appointed contractor will liaise with public bus operators in relation to lane and road closures and create a communication plan for this purpose which will outline any independent decisions made by the bus operators.

14.4.2.2 Active Travel Assessment

The potential direct impacts on existing active travel routes have been assessed to determine any locations where a route is temporarily closed to accommodate construction works.

Increased traffic also has the potential to impact communities, especially where urban streets become busier and have the potential to increase severance. Section 14.2.4.2.1, Section 14.2.4.2.3 and Section 14.2.4.2.4 have previously assessed the impacts of the Construction Phase on severance, non-motorised user delay and amenity, respectively.

There may also be impacts on recognised cycle and pedestrian routes caused by construction and diversion routes. A desk-based study was conducted within the study area to identify such instances. Table 14.32 highlights the walking / cycling facilities that may be temporarily affected by the construction of the Proposed Development.

Table 14.32: Affected Walking and Cycling Facilities

TTM Section	Location	Description
1.02	R156	Road closure of TTM Section that runs parallel to proposed Feeder cycle / pedestrian facilities along the eastern side (R156). TTM Section runs adjacent to proposed Primary (L2228 Summerhill Road) and Greenway (R157) cycle / pedestrian facilities. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.03	R157	Northern part of TTM Section runs parallel to proposed Inter-Urban and Feeder cycle facilities. TTM Section also runs adjacent to proposed Primary (L2228 Summerhill Road), Feeder (R156) and Greenway (R157) cycle / pedestrian facilities. Potential for increased traffic, particularly HGVs, on routes.
1.04	R147 / R157	Off-road TTM Section adjacent to proposed Inter-Urban and Feeder cycle facilities. Potential for increased traffic, particularly HGVs, on routes.
1.05	R147	TTM Section runs parallel to proposed Inter-Urban cycle facilities. Potential for increased traffic, particularly HGVs, on routes.
1.06	R147	TTM Section runs adjacent to proposed Inter-Urban cycle facilities. Road closure will lead to additional traffic on R147 due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.07	R147 / R125 / R155	Road closure of TTM Section will likely lead to additional traffic on R147 (proposed Inter-Urban / Feeder cycle facilities), R155 (proposed Secondary cycle facilities), and R125 (existing / proposed Secondary cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.09	R147 / R125 / R155	Road closure of TTM Section will likely lead to additional traffic on R147 (proposed Inter-Urban / Feeder cycle facilities), R155 (proposed Secondary cycle facilities), and R125 (existing / proposed Secondary cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.10	R147 / R125 / R155	Road closure of TTM Section will likely lead to additional traffic on R147 (proposed Inter-Urban / Feeder cycle facilities), R155 (proposed Secondary cycle facilities), and R125 (existing / proposed Secondary cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.12	R147 / R125 / R155	Road closure of TTM Section will likely lead to additional traffic on R147 (proposed Inter-Urban / Feeder cycle facilities), R155 (proposed Secondary cycle facilities), and R125 (existing / proposed Secondary cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.14	R121 / R135	Road closure of TTM Section will likely lead to additional traffic on R121 (proposed Inter-Urban cycle facilities), and R135 (proposed Secondary cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.16	R121 / R135	Road closure of TTM Section will likely lead to additional traffic on R121 (proposed Inter-Urban cycle facilities), and R135 (proposed Secondary cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.17	R121	Off-road TTM Section adjacent to proposed Inter-Urban cycle facilities. Potential for increased traffic, particularly HGVs, on routes.
1.18	R121 / R135 / Ratoath Road	Road closure of TTM Section that runs parallel to proposed Inter-Urban cycle facilities (R121). Road closure also likely to lead to additional traffic on R135 (proposed Secondary cycle facilities), Ratoath

TTM Section	Location	Description
	/ Cherryhound Tyrrelstown	Road (existing shared-use path / proposed Feeder cycle facilities), and Cherryhound Tyrrelstown (existing / proposed Secondary cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.19	R121	Off-road TTM Section adjacent to proposed Inter-Urban cycle facilities.
1.20	R121 / R135 / Ratoath Road / Cherryhound Tyrrelstown	Road closure of TTM Section that runs parallel to proposed Inter-Urban cycle facilities (R121). Road closure also likely to lead to additional traffic on R135 (proposed Secondary cycle facilities), Ratoath Road (existing shared-use path / proposed Feeder cycle facilities), and Cherryhound Tyrrelstown (existing / proposed Secondary cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.21	R121 / R122 / R135 / Kilshane Road / N2 junction 2 to R122	Road closure of TTM Section that runs parallel to proposed Inter-Urban cycle facilities (R121). Road closure also likely to lead to additional traffic on R122 (proposed Secondary / Inter-Urban cycle facilities), R135 (proposed Secondary cycle facilities), and Kilshane Road (proposed Secondary cycle facilities) due to diversion. The diversion route also cuts across the N2 junction 2 to R122 (proposed Secondary cycle facilities). Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.22	R121	Off-road TTM Section adjacent to proposed Inter-Urban cycle facilities. Potential for increased traffic, particularly HGVs, on routes.
1.23	R121 / R122 / R135 / Kilshane Road / N2 junction 2 to R122	Road closure of TTM Section that runs parallel to proposed Inter-Urban cycle facilities (R121). Road closure also likely to lead to additional traffic on R122 (proposed Secondary / Inter-Urban cycle facilities), R135 (proposed Secondary cycle facilities), and Kilshane Road (proposed Secondary cycle facilities) due to diversion. The diversion route also cuts across the N2 junction 2 to R122 (proposed Secondary cycle facilities). Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.24	R121 / R122 / R135 / Kilshane Road / N2 junction 2 to R122	Road closure of TTM Section that runs parallel to proposed Inter-Urban cycle facilities (R122). Road closure also likely to lead to additional traffic on R121 (proposed Inter-Urban cycle facilities), R122 (proposed Secondary cycle facilities), R135 (proposed Inter-Urban cycle facilities), and Kilshane Road (proposed Inter-Urban cycle facilities) due to diversion. The diversion route also cuts across the N2 junction 2 to R122 (proposed Secondary cycle facilities). Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.25	R122 / L3132 / Kilreesk Road / Kilreesk Lane	Road closure of TTM Section that runs parallel to proposed Inter-Urban cycle facilities (Kilreesk Lane). Road closure also likely to lead to additional traffic on R122 (proposed Secondary cycle facilities), L3132 (proposed Secondary cycle facilities), and Kilreesk Road (proposed Inter-Urban cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.26	R108 / Kilreesk Road / Kilreesk Lane	Off-road TTM Section adjacent to proposed Secondary (R108) and Inter-Urban cycle facilities (Kilreesk Lane) and crossing proposed Inter-Urban cycle facilities (Kilreesk Road). Potential for increased traffic, particularly HGVs, on routes.
1.27	R108 / R122 / R132 / L3132 / Naul Road / Old Airport Road	Road closure of TTM Section that runs parallel to proposed Secondary cycle facilities (R108). Road closure also likely to lead to additional traffic on R122 (proposed Secondary cycle facilities), R132 (proposed Primary cycle facilities), L3132 (proposed Secondary cycle facilities), Naul Road (proposed Secondary cycle facilities), and Old Airport Road (proposed Secondary cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.28	R108 / R122 / R132 / L3132 / Naul Road / Forrest Road / Old Airport Road	Road closure of TTM Section that runs parallel to proposed Secondary cycle facilities (Naul Road) and crosses proposed Secondary cycle facilities (Forrest Road). Road closure also likely to lead to additional traffic on R122 (proposed Secondary cycle facilities), R132 (proposed Primary cycle facilities), L3132 (proposed Secondary cycle facilities), R108 (proposed Secondary cycle facilities), and Old Airport Road (proposed Secondary cycle facilities) due to diversion. Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.29	R106 / R107 / R132 / Stockhole Lane	Road closure of TTM Section that runs parallel to existing walking / cycling facilities and proposed Inter-Urban cycle facilities (Stockhole Lane). Road closure also likely to lead to additional traffic on R106 Swords Road (proposed Primary Orbital cycle facilities), R106 Dublin Road (proposed Secondary cycle facilities), R107 (proposed Primary cycle facilities), and R132 (proposed Primary cycle facilities) due to diversion. There are also accesses to several Secondary and Greenway cycle facilities along the diversion route including access to the Malahide Park and Castle Loop walking / cycle facilities). Potential for delay due to diversion and increased traffic, particularly HGVs, on routes.
1.30	Stockhole Lane / Clonshaugh Road	Off-road TTM Section adjacent to existing walking / cycle facilities (Stockhole Lane), proposed Inter-Urban cycle facilities (Stockhole Lane), and proposed Secondary / Feeder / Greenway cycle facilities (Clonshaugh Road). Potential for increased traffic, particularly HGVs, on routes.

There are no closures of walking / cycling facilities anticipated during the Construction Phase. Whilst there are still several pedestrian and cycle routes that have been identified as being potentially impacted within the study area, most of these routes are still only proposed and due to the low construction volumes and the temporary nature of the impacts, the impact is not considered to be significant. As shown in Table 14.18 and the detailed construction traffic analysis in Section 14.4.2.1.3, the levels of construction traffic are not expected to double the total traffic flow anywhere in the study area. On this basis, and in relation to the IEMA Guidelines (IEMA 2023), the impact on active travel is concluded to be Negligible / Minor (Not Significant) impact and of Temporary duration.

Notwithstanding, the CTMP (Appendix B of the CEMP) includes a commitment to provide advance warning of diversions and roadworks, as well as clear signage and physical barriers for walkers, cyclists, and horse riders to reduce risk of incursion within work zones or live traffic lanes.

14.4.3 Operational Phase

The IEMA Guidelines (IEMA 2023) state that it should *"be assumed that projected changes in traffic of less than 10% create no discernible environmental impact"*. An assessment of the Operational Phase for potential impacts is therefore not considered necessary as the level of traffic resulting from the Operational Phase will result in a Negligible (Not Significant) impact and will be limited to minor regular maintenance requirements.

The Operational Phase of the Proposed Development will not result in any impacts on traffic since all roads will be restored to their original state after construction is finished, and the presence of the Proposed Development along some portions of the road in the study area will not affect traffic flows.

Where maintenance is required along the proposed cable route, or where maintenance works are undertaken at Woodland or Belcamp Substations, the traffic impacts have been assessed based on the specific circumstances of the maintenance activity. The Joint Bays and associated link boxes and communication chambers will require periodic inspection, for which, localised, temporary traffic management will be devised by the contractor that carries out the inspection, in consultation with the road authorities. Any maintenance-based traffic is therefore considered to be not significant given its Brief duration and Negligible (Not Significant) impact.

14.5 Mitigation and Monitoring Measures

14.5.1 Construction Phase

14.5.1.1 Traffic Management Measures

The temporary impacts that construction will have on traffic and movement through the study area will be mitigated through the adoption of a regulated and approved CTMP.

The CTMP is included as Appendix B of the CEMP (which is a standalone document in the planning application pack). It should be noted that in this regard both the CTMP and CEMP are included herewith for the purposes of this application and assessment. However, they will comprise 'live' documents insofar as they are subject to ongoing future refinement by the appointed contractor in collaboration and agreement with the Roads Authorities. However, all such refinement will occur in the context of the CTMP (and CEMP) included in this planning application pack for approval, and therefore, the subject of the assessment of the consenting authority.

In this context, the assessment of post mitigation impacts has been undertaken on the assumption that key measures set out in the CTMP will be developed as appropriate by the appointed contractor and will be implemented during the Construction Phase of the Proposed Development.

The appointed contractor will agree temporary traffic measures, and will then adopt and monitor an appropriate way of working, in consultation with Meath County Council, Fingal County Council, daa, TII and / or their agents, and An Garda Síochána, as appropriate.

Construction activity generated vehicles will travel on predefined construction access routes to and from the relevant working areas to reduce the effects on local traffic.

The CTMP will document measures to promote the efficient transportation of components and materials to site, whilst reducing congestion and disruption which might impact negatively on local communities or general traffic and in particular emergency services.

Signed diversion routes will be provided to mitigate journey disruption and to minimise potential driver delay. These are outlined in this Chapter but will be subject to final agreement with the Roads Authorities. Where practically achievable, diversion routes will not apply outside of the working area hours of operation.

During the Construction Phase, signage will be installed to warn road and recreational route users to the presence of the works access and the associated likely presence of large or slow-moving construction traffic.

To minimise inconvenience to the local community in terms of obstructive parking, adequate car parking for permanent site personnel, visitors and deliveries will be provided within the TCCs. Adequate vehicle parking is available on-site at either substation, and car parking will not be permitted on any of the public road network that bounds the respective TCC or work site, so that sight lines will be maintained and to minimise the potential for obstruction and delay for other road users.

Furthermore, only vehicles essentially required to facilitate construction will be permitted to attend proposed cable route worksites. Car sharing will be promoted to construction personnel by the appointed contractor during the induction process.

The appointed contractor will nominate a person to be responsible for the co-ordination of all elements of traffic and transport during the construction process (liaison officer). This person will liaise with the local community so that the community has a direct point of contact within the contractor organisation who they can contact for information purposes or to discuss matters pertaining to the traffic management.

14.5.1.2 Railway Monitoring

The appointed contractor that will undertake the HDD at the M3 Parkway railway will use track monitoring equipment. A detailed methodology will be determined by the appointed contractor in consultation with Irish Rail. However, it is anticipated that rail track monitoring will involve the use of survey equipment and target sights before, during and immediately following HDD operations to monitor any movements accurately. As this section of track is used as siding, beyond the terminus, there will be no disruption to rail passenger services.

There may also be the need for asset inspections before and after works take place and similarly no disruption to rail passenger services are predicted.

14.5.1.3 Construction Access Arrangements

Transportation, including deliveries to and from the Construction Phase working areas, will be on the existing public road network with access to off-road locations gained through both existing and constructed accesses and haul roads. Given the nature of construction of the proposed cable route, there will be multiple working areas along the proposed cable route throughout the Construction Phase programme. The proposed programme of working area locations will be confirmed by the appointed contractor as an integral part of their adopted CTMP. All construction vehicle drivers will be instructed to access their destination worksite via an approved construction access route.

A wheel wash facility and road sweeper will be provided to minimise any mud and debris on the surrounding public road network and to prevent the introduction and spread of non-native or invasive plant material onto the site.

14.5.2 Operational Phase

The impacts associated with the Operational Phase will be Negligible (Not Significant) and limited to minor regular maintenance requirements. This will be done in consultation with the road authorities, with localised, temporary traffic management used where deemed necessary, and will only have a Brief duration of impact.

To minimise inconvenience to the local community in terms of obstructive parking, adequate vehicle parking space is available on-site at Woodland and Belcamp Substations. For cable inspection, car parking will not be permitted on any part of the public road network for inspection of link boxes at each Joint Bay location, for example. Any localised, temporary traffic management will be devised by the contractor that carries out the inspection in consultation with the road authorities with consideration that sight lines will be maintained and to minimise the potential for obstruction and delay for other road users.

14.6 Residual Impacts

14.6.1 Construction Phase

There will be a Negligible / Minor magnitude of residual traffic and transport impact (i.e., Not Significant) during the Construction Phase with the successful implementation of the required mitigation measures described in Section 14.5.1 and contained within the CTMP (Appendix B of the CEMP).

It is acknowledged that inconveniencies will be caused in some areas due to the diversion routes and construction of the proposed cable route. However, whilst the overall construction period will be over several months, all construction access routes will only be affected during certain periods, and therefore, any impacts will be of a Temporary duration.

Four other TTM Sections (1.02, 1.07, 1.09, and 1.12) of 9.1km in length will experience a Moderate (Significant) residual impact because of associated diversion lengths due to road closures rather than due to the volume of construction traffic. These sections along the R156 Regional Road, L1010 Nuttstown Road, and Priestown Road in County Meath will have a Moderate impact as a result of between approximately 21 and 22-minute diversions that will be signposted from the affected regional road to alternative roads of similar or better standard. While the impact will be Moderate, the impacts will be limited to the construction of the proposed cable trench, which will be a Temporary duration (typically 40m to 50m of cable trench is proposed to be constructed in one day, meaning these impacts are predicted to last for between 26 and 227 days, although not consecutively). The other sections of affected roads have been assessed to only experience a Negligible or Minor (Not Significant) residual impact.

14.6.2 Operational Phase

There will be a Negligible magnitude of residual traffic and transport impact (i.e., Not Significant) during the Operational Phase. The Operational Phase of the Proposed Development will not result in any significant impacts on traffic since all roads will be restored to their original state after the construction is finished, and the presence of the Proposed Development along some portions of road in the study area will not affect traffic flows.

It is expected that the only additional operational traffic associated with the Proposed Development will result from occasional maintenance at substations and monitoring of the cable at link boxes next to the installed Joint Bays (i.e., one light vehicle when required). This will be undertaken in consultation with the road authorities, with localised, temporary traffic management used where required, and will only have a Brief duration.

14.7 Conclusion

Traffic surveys were completed in the study area in May, June and August 2023, and these were used to inform the assessment of the Construction Phase. A full assessment has been made of the roads affected by the Proposed Development and is presented in the CTMP (Appendix B of the CEMP). This assessment of the Proposed Development comprises the works associated with Woodland and Belcamp Substations, the TCCs, HDD Compounds and the proposed cable route which has been broken down into TTM Sections and identifies how the construction works will affect each section of road (e.g., lane closures, diversions, and / or road closures with local access). The potential disruption to road users has been considered.

Of the 30 numbered TTM Sections along the approximately 37.5km proposed cable route, there is only one TTM Section that has been assessed to experience any Moderate (i.e., Significant) impact, pre-mitigation, namely for pedestrian amenity and road safety as a result of a location sensitivity of 'High' due to it being an important motorway junction (M3 Motorway Junction 5 – northern on / off slips). The impacts for pedestrian amenity and road safety were, however, both assessed as Minor (Not Significant) and in reality, the traffic increase is unlikely to have a noticeable impact and there is also unlikely to be a high number of pedestrians in this area. These effects will, however, also be mitigated as outlined in Section 14.5, particularly through the measures outlined in the CTMP.

Four other TTM Sections (1.02, 1.07, 1.09, and 1.12) of 9.1km in length will experience a Moderate (Significant) residual impact because of associated diversion lengths due to road closures rather than due to the volume of construction traffic. These sections along the R156 Regional Road, L1010 Nuttstown Road, and Priestown Road in County Meath will have a Moderate impact as a result of between approximately 21 and 22-minute diversions that will be signposted from the affected regional road to alternative roads of similar or better standard. While the impact will be Moderate, the impacts will be limited to the construction of the proposed cable trench, which will be a Temporary duration (typically 40m to 50m of cable trench is proposed to be constructed in one day, meaning these impacts are predicted to last for between 26 and 227 days, although not consecutively). The other sections of affected roads have been assessed to only experience a Negligible or Minor (Not Significant) impact. Other effects to public transport and active travel users have been assessed to also be a Negligible or Minor (Not Significant) impact.

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 15 – Agronomy and Equine

EirGrid

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Contents

15. Agronomy and Equine

15.1 Introduction

This Chapter presents the assessment of the potential impacts of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) on agronomy and equine during the Construction and Operational Phases. A full description of the Proposed Development is included in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

15.2 Methodology

The following sections outline the legislation and guidelines complied with, and the adopted methodology for defining the baseline environment and undertaking the assessment of the likely impacts of the Proposed Development on agronomy and equine.

The author has used the standard approach to environmental impact assessment set out in the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) published by the Environmental Protection Agency (EPA) in May 2022 (EPA 2022). Using the EPA Guidelines, the potential impacts of the Proposed Development on agronomy and equine have been assessed by classifying the importance of the relevant receptors and quantifying the likely magnitude of any impact on these receptors. The assessment of agronomy and equine impacts considers the changes that would occur to the agronomy and equine environment as a result of constructing and operating the Proposed Development.

15.2.1 Study Area

The study area for this assessment includes agricultural and equine land parcels that are directly affected by the Proposed Development. Direct effects occur where the works associated with the construction and operation of the Proposed Development occur within the boundary of the land parcel. There are 40 agricultural land parcels where direct effects will arise from temporary or permanent land take and easements. The location of these land parcels is shown in Figure 15.1 in Volume 4 of this EIAR.

15.2.2 Relevant Guidelines

In the absence of specific guidelines for the assessment of agricultural and equine impacts, the author has followed the guidance for environmental impact assessment contained in the EPA Guidelines (EPA 2022). The appraisal methodology used is set out in Section 15.2.4 and the EPA guidance on assessing significance of impact is adapted, as shown in Table 15.1.

15.2.3 Data Collection and Collation

Background information was gathered on all farm types and sizes within the study area from the following data sources:

- Central Statistics Office (CSO) Census of Agriculture 2020 (CSO 2020). The average size and type of farms County Meath and County Dublin was determined from the Census of Agriculture 2020;
- Your Grid, Your Views, Your Tomorrow – Responding to Equine Concerns (EirGrid 2014);
- Land Registry mapping available on the Property Registration Authority (PRA) website (PRA 2023) was used to determine land ownership boundaries of farms along the Proposed Development;

- Baseline information gathered from roadside surveys conducted by the author on 11 July 2022 and 13 June 2023 was used to assess impacts on individual farms;
- Information gathered from meeting with EirGrid's Agricultural Liaison Officers (ALOs) in February 2024, based on their professional experience and engagement with affected landowners; and
- Google Earth aerial photography and mapping, accessed in August 2023 to December 2023 was used as an aid in examining farm layout and land quality (Google Earth 2023).

Baseline crops and grass yield data referred to in Section 15.2.4 is derived from average crop yields from 2008 to 2022 which is available from the CSO Crops and Livestock Survey Final Results June 2022 (CSO 2023). Baseline grass yields and trends are derived from Teagasc Ballyhaise Agricultural College 2008 to 2021 and University College Dublin (UCD) from 2016 to 2022 (UCD 2022) (see Section 15.8 for information sources). This information is used to determine baseline trends as outlined in Section 15.2.4.2 when assessing magnitude of impact.

15.2.4 Appraisal Method for the Assessment of Impacts

The assessment of agronomy and equine impacts considers the changes that would occur to the agronomy and equine environment and involves the following three steps:

1. Evaluation of the baseline environment, the types of farms and the sensitivity of farms and equine facilities within the study area;
2. Evaluation of the nature and magnitude of the impacts on farms within the study area and the effects on agriculture within County Meath and County Dublin (i.e. regional effects); and
3. Having considered the sensitivity of the baseline agronomy and equine environment and the magnitude of effects, the potential impact significance is predicted for:
    - Each directly affected land parcel identified as likely to be directly affected by the Proposed Development;
    - Agronomy and equine within the study area (i.e. locally); and
    - Agronomy and equine within County Meath and County Dublin (i.e. regionally).

These three elements of the methodology are described in Section 15.2.4.1, Section 15.2.4.2 and Section 15.2.4.3.

15.2.4.1 Evaluation of the Baseline Environment

The baseline environment is described in Section 15.3. The information was gathered from engagement with EirGrid ALOs, roadside surveys conducted in July 2022 and June 2023, and examination of aerial photography (Google Earth 2023). The sensitivity of the land parcels along the Proposed Development is determined by reference to the criteria in Table 15.1. The main criterion relied upon is the type of farm enterprise. For example, equine farms are generally of high or very high sensitivity, due to the fact that horses are sensitive to construction noise and movement of unfamiliar construction machinery. Dairy farms are high sensitivity due to the fact that it is critical that the movement of cows between the grazing plots and the milking parlour is not interrupted (this could be caused where there is severance of access). Other criteria assessed on a case-by-case basis is the size of the land parcels (small land parcels may be unviable and have a low sensitivity), land quality (poor land quality indicates low sensitivity) and development status (e.g., land owned by public bodies such as the IDA or building development companies is likely to be used for non-agricultural purposes, and is therefore not as sensitive as land owned by farmers). The criteria for farm enterprise sensitivity is based on the author's professional judgement and knowledge of how the operation of farms are affected by various types of infrastructure projects.

Table 15.1: Criteria for the Assessment of Sensitivity

Farm Enterprise	Sensitivity
Stud farm, equestrian centre, racehorse training enterprise, horticultural / nursery enterprise, pig / poultry farm	High to Very High
Dairy farm, Intensive equine enterprise	High
Non-dairy livestock enterprises, including beef cattle and sheep, land used primarily for hay / silage, small non-intensive equine enterprise	Medium
Tillage and mixed tillage and livestock (beef, cattle and sheep)	Medium
Small livestock enterprises, rough grazing land, scrub plots and woodland / forestry	Low

15.2.4.2 Evaluation of the Magnitude of Impacts

The magnitude of the potential impacts is assessed by predicting the degree of change in the physical nature of the affected land parcel or on agriculture within the study area. For example, if the Proposed Development takes 10% of an affected agricultural land parcel, and provided the farm enterprise can continue during the Operational Phase of the Proposed Development, it is possible to predict that the yield from the land parcel will be reduced by approximately 10%.

In order to quantify the magnitude of the impact, typical baseline trends in the agricultural environment are examined and interpreted using professional judgement. Crop yield data referred to in Section 15.2.3 is used to establish typical trends and yield variations. According to CSO data from 2008 to 2022, the trend in yield of spring barley and winter wheat varies each year by approximately 7.9% and 9%, respectively, from the average mean yield. According to Teagasc and UCD data, the trend in yield of grass at Ballyhaise Agricultural College (2008 – 2021) and UCD (2016 – 2022) varies on average by 6.5% and 6.2% respectively from the average yields. These figures give an indication of the natural trends in yields. Therefore, the author concludes that impacts which result in a 2.5% to 5% variation in yield are considered to create a low magnitude impact on the farm and are similar to natural baseline trends in yield. Between 5% and 10%, the magnitude of yield loss is starting to exceed the natural baseline trends and is considered a medium magnitude. Yield effects which exceed 10% are considered to be high magnitude. Other factors affect the magnitude of impacts, such as severance or separation of land, the duration of the impact, the quality of land affected and the impact on farmyards and other farm facilities. Table 15.2 shows the criteria which are used to indicate the magnitude of impact. These indicative criteria are based on analysis of baseline trends in crop yields and professional judgment.

Table 15.2: Criteria for the Assessment of Magnitude of Impacts

Indicative Criteria	Magnitude of Impacts
A high proportion of the land permanently taken (>10%) A high proportion of farm permanently separated (> 15 %) Farm buildings or water sources may be affected permanently	High to Very High
A medium proportion of the farm permanently taken (5% -10%) A medium proportion of farm permanently separated (e7 % -15%) Farm buildings or water sources may be affected but can be replaced Temporary (construction) impacts which have long term impacts	Medium
A small proportion of the farm permanently taken (2.5% - 5%) A small proportion of farm separated or no separation (2.5% - 7%) Farm buildings or water sources generally not affected but if affected can be replaced Temporary (construction) impacts which have short – medium term impacts	Low
A very small proportion of the farm taken (<2.5%). A very small proportion of farm separated or no separation (<2.5% of the farm) Temporary (construction) impacts which do not have residual impacts	Negligible to Very Low

The duration of the impact will affect the magnitude (i.e., the longer the impact, the higher the magnitude). Impacts that occur during the Construction Phase (e.g., construction noise and vibration) will generally be of shorter duration, and therefore lower magnitude, than residual impacts which occur during the Operational Phase (e.g., permanent land take). Damage to land due to excavation and construction traffic is generally not permanent and is assumed to be medium-term duration (7 to 15 years), except at the proposed Temporary Construction Compounds (TCCs) where the damage to land is assumed to be medium to long-term.

15.2.4.3 Evaluation of the Significance of Impacts

Once the description of the impact, including magnitude, character, duration etc. has been identified, this can be cross-referenced with the sensitivity of the receptor to derive the overall significance of the impact, as per Section 3.7.3 of the EPA Guidelines (EPA 2022). An impact which affects a farm with a low sensitivity will not be as significant as a similar magnitude of impact which affects a farm with a high sensitivity. In Table 15.3, the author has used his professional judgement to adapt the EPA Guidelines (May 2022) for assessing significance, with minor adjustments that are appropriate for agricultural impact assessment. In general, the potential impacts resulting from the Proposed Development on agriculture will be adverse in nature.

Table 15.3: Comparison of Significance of Impact Criteria Used in this Assessment with the EPA Guidelines (EPA 2022)

Significance of Impacts as per EPA Guidelines	Significance of Impact used in this Assessment
Imperceptible An effect capable of measurement but without significant consequences **Not Significant** An effect which causes noticeable changes in the character of the environment without significant consequences	**Not Significant Effect** An impact which may result in measurable effects and / or noticeable changes but the consequences are not significant.
Slight An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.	**Slight Adverse Effect** An effect which causes noticeable changes in the character and management of a farm in a minor way. The farm enterprise experiences inconvenience as a result of the proposed road development.
Moderate An effect that alters the character of the environment in a manner that is consistent with existing emerging trends.	**Moderate Adverse Effect** An effect which alters the character of a farm in a manner that requires moderate changes in the management and operation of the farm. The farm enterprise can be continued as before but with increased management or operational difficulties.
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 alters most of a sensitive aspect of the environment.	**Significant Adverse Effect** An effect which by its character, magnitude, duration or intensity alters a sensitive aspect of the farm. The farm enterprise can be continued but will require major changes in management and operation of the farm. This would typically occur where the farm was split in two due to separation but where access between the separated portions and the farm buildings could still be achieved effectively.
Very Significant An effect which by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment.	**Very Significant Adverse Effect** An effect which by its character, magnitude, duration or intensity alters a sensitive aspect of the farm. The effect is similar to a Significant Adverse effect, however due **to** factors such as the sensitivity of the receptor or the magnitude of impact the effect is categorised as Very Significant Adverse.
Profound An effect which obliterates sensitive characteristics.	**Profound Adverse** An effect which obliterates sensitive characteristics of the farm. The farm enterprise cannot be continued as a result of the Proposed Development. This would occur where land-take was of such a scale that the remaining land would not form a viable unit or where separation was of such a nature to make the holding unworkable or where important farm buildings and facilities were removed and could not be replaced. In some situations the farm enterprise may continue but will require dramatic changes in the future management

Significance of Impacts as per EPA Guidelines	Significance of Impact used in this Assessment
	and operation of the farm, such that the scale and operation of the enterprise is changed dramatically.

When assessing significance of impacts, the basic principle which applies is, as sensitivity increases, so does the significance of impact, at any one level of magnitude. This assessment is subject to variation due to professional judgement and on a case-by-case basis.

15.2.4.4 Difficulties Encountered in Data Collection

When gathering information for this assessment, no difficulties were encountered which could affect the assessment.

15.3 Baseline Environment

15.3.1 Land Quality and Soil Types

Digital soils data and maps sourced from the Irish Soils Information System (Teagasc 2023), along with roadside windshield survey, were used to describe the soil types along the Proposed Development. The soils along the Proposed Development consist mainly of Surface Water Gleys, Luvisols and Alluvial soils. Surface Water Gleys are heavy clay soils associated with low lying landscapes and generally have poor drainage characteristics. When effective drainage outfalls are achieved, these soils can be highly productive. Surface Water Gleys are more suited to grass production than arable cropping. However, in the east of the country these soils are often used for tillage due to the low rainfall. Luvisols are deep soils with clay enrichment in the lower layers of the soil profile. These are associated with undulating landscapes and are more versatile being suited to arable cropping and grassland. Interspersed with these two main soil types are Alluvial soils which occur along rivers and streams. These soils account for less than 5% of the study area and can be productive, but agricultural productivity is often seasonal due to the high water tables in the winter period.

The occurrence of soil types along the Proposed Development is as follows:

- From Woodland Substation to Chainage 10,850, the main soil type is Surface Water Gley. The cropping is a mixture of grassland and tillage (cereals). The land quality is generally good. Small areas of alluvial soils also occur along this part of the Proposed Development;
- From Chainage 10,850 to 13,650, there is a mixture of Surface Water Gleys, Luvisols and Alluvial soils. The cropping is a mixture of grassland and tillage (cereals). The land quality is generally good;
- From Chainage 13,650 to 18,000, the dominant soil type is Luvisol with a minority mixture of Surface Water Gleys and Alluvial soils. The cropping is a mixture of grassland and tillage (cereals). The land quality is generally good;
- From Chainage 18,000 to 30,000, the main soil type is Surface Water Gley. The cropping is a mixture of grassland and tillage (cereals). There is mixed cereals and horticultural cropping north of Dublin Airport. The land quality is generally good; and
- From Chainage 30,000 to 37,200, the dominant soil type is Luvisol. The cropping is a mixture of grassland and tillage (cereals). The land quality is generally good.

The land quality is suitable to support very high sensitivity enterprises such as stud farms, and high sensitivity enterprises such as dairy and horticultural enterprises.

Farm types and their sensitivity are provided in Table 15.1, and further information specific to the Proposed Development is provided in Table 15.4 and Table 15.5.

15.3.2 Farm Types

Table 15.4: Comparison of Farm Types and Sensitivity Within County Meath and County Dublin and Within the Study Area

Enterprise Type (Note 1)	County Meath (Note 1)	County Dublin (Note 1)	Within the Study Area (Note 2)	National (Note 1)	Sensitivity
Average farm size (ha)	43.8	47.3	45.4 (Note 3)	33.4	-
Tillage / beef / sheep / mixed / grass cropping (%)	88	93	92.5	85	Medium
Dairy (%)	11	3.5	2.5	11	High
Other (equine and horticultural) (%)	1	3.5	5	1	Medium to Very High
No. of horses / km^2 (Note 4)	2.4	1.9	-	2.3	-

Note 1: Based on Census of Agriculture 2020 (CSO 2020).
Note 2: These figures relate to the 40 land holdings where there are direct impacts from the Proposed Development (i.e. either temporary or permanent land-take or easements).
Note 3: The average size of directly affected land parcels is 32ha. However, when outlying lands remote from the Proposed Development are included, the author assumes that the average size of directly affected farms is similar to the county averages (i.e. 45.4ha (55% and 45% of the Proposed Development is within County Meath and County Dublin respectively).
Note 4: Census of Agriculture 2010 (CSO 2010); area based on Table 1, number of equines based on Table 8D; equine data only available from 2010 data at time of publication.

The average size of farms within the study area is likely to be reflective of the County Meath and County Dublin averages, and therefore, is larger than the national average (approximately 45.4ha versus 33.4ha). The majority of the farm enterprises within the study area are of medium sensitivity (i.e., beef / sheep / tillage / grass cropping). A comparison to the national statistics shows that within County Meath (approximately 55% of the Proposed Development will be within County Meath), the number of dairy farms and number of 'Other' enterprises (i.e., equine and horticultural) is similar to the national average. Within County Dublin (approximately 45% of the Proposed Development will be within County Dublin), the number of dairy farms is much lower than the national average and the number of ‘Other’ enterprises (i.e., equine and horticultural) is 3.5% compared to the national average of 1%.

Within the study area comprised of 40 agricultural and equine land parcels, there are three equine enterprises (7.5%). Land parcel No. 22 (see Figure 15.1 in Volume 4 of this EIAR) is a high sensitivity equine land parcel. There are two equine enterprises (Ref No. 30 and No. 31) (see Figure 15.1 in Volume 4 of this EIAR) which are of medium sensitivity as there are no specialised equine facilities present (e.g., tracks and sand arenas etc.). There is one high sensitivity dairy farm (2.5%) (Ref No. 29) (see Figure 15.1 in Volume 4 of this EIAR). Overall, the sensitivity of the study area is medium.

Table 15.5: Farm Types and Sensitivity Within the Study Area

Enterprise Type	Number and Percentage within the Study Area	Sensitivity
Beef / sheep / mixed / grass cropping	18 (45%)	Medium (17) Low (1)
Tillage (and Tillage and Livestock)	18 (45%)	Medium (17) Low (1)
Dairy	1 (2.5%)	High
Equine	2 (5%)	Medium
Scrub	1 (2.5%)	Low

15.4 Potential Impacts

15.4.1 'Do Nothing' Scenario

In the Do Nothing scenario (i.e., in the absence of the Proposed Development), there would be no adverse impacts on agronomy and equine from the Proposed Development. The impact in the absence of the Proposed Development itself will be Neutral.

15.4.2 Construction Phase

A detailed description of the proposed construction works is provided in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.

15.4.2.1 Potential Construction Phase Impacts Where Works are Entirely In-Road

The installation of the proposed underground cable circuit in-road will have potential impact on farms adjoining these works for a period of two to three months. This is based on a rate of construction of 40m to 50m per day. During the Construction Phase, the following potential impacts are likely to arise for the in-road sections:

- Construction dust, noise and movement:
  - The potential noise and dust impacts will arise from the movement of construction machinery and excavation and handling of soil materials. Deliveries of materials and construction machinery noises and movements have the potential to startle livestock in adjoining agricultural land. The likely impacts resulting from dust from in-road construction sites will result in very low magnitude impacts which will not have significant impacts on grazing livestock (including equines). Livestock (including equines) habituate to machinery and construction noises on farms without adverse impacts. Therefore, before mitigation, the magnitude of impact is assessed as very low and the potential impact from construction noise and movement is also assessed as Not Significant.
- Disturbance to land access in relation to farm machinery and livestock movements:
  - The potential impact will result from disturbance and delays caused to local traffic during the Construction Phase. This has the potential to change how farmers access their lands to carry out essential activities such as spreading of fertilisers and slurry and harvesting crops. There may be disturbance to the movement of livestock using transport vehicles and by walking along country roads (in order to access outlying grazing land or housing). This disturbance may arise more frequently on some dairy farms where cows may cross a public road to gain access to the milking parlour. While it is envisaged that there will be disturbance and inconvenience for several months due to traffic management on the public road network, the Construction Traffic Management Plan will commit to maintain effective access to agricultural land by farm machinery, transport lorries and livestock transport and movement. Therefore, before mitigation, the magnitude of impact is assessed as very low and the potential impact due to disturbance of land access is assessed as Not Significant.
- Disturbance to land drainage and water quality:
  - There is the potential for impacts to arise as a result of construction activities interfering with surface water runoff from or to adjoining agricultural lands. There is the potential to cause flooding if drainage is impeded. Where there is sediment or construction material runoff from the construction site, it has the potential to pollute water sources for livestock and potable water sources for farmyards and dwellings. Before mitigation, this potential impact is assessed as Not Significant. The risk from construction impacts on

potable and livestock water sources is very low. Intersection of land drains from adjoining agricultural land is unlikely during in-road construction.

- Other potential disturbance issues:
    - Where soil has been stored in heaps, there is the potential for weed propagation on the heaps and the spread of these weeds to adjoining agricultural land. This potential impact is assessed Not Significant and Short to Medium-Term; and
    - The removal of trees and hedgerow, at Passing Bays and along working areas, during the Construction Phase, will result in a reduction in available shelter. Removal of relatively short lengths of hedgerow across the working area (typically 30m in width) will result in potential impacts due to loss of shelter which are Not Significant.

Where the proposed cable installation and associated works is confined to in-road, there is no potential for impacts on agricultural land due to land take. Having assessed the effects of the works that are to be carried out entirely within the public road, there is no potential for significant pre mitigation impacts on agronomy and equine.

15.4.2.2 Potential Construction Phase Impacts Where Works are Off-Road and Located on Agricultural Land

The entire Construction Phase of the Proposed Development is expected to take three and a half years. During this period there will be construction activity for 60 to 90 days on any single land parcel. This is based on a rate of construction of 40m to 50m per day, with additional time required for the construction of proposed construction access tracks, cable jointing and energisation. During the Construction Phase, there is the potential for direct impacts to arise in 40 land parcels along the Proposed Development ,where works will be carried out in agricultural land (see Figure 15.1 in Volume 4 of this EIAR). In 29 of the land parcels identified in Appendix A15.1 in Volume 3 of this EIAR, there will be a permanent easement (ranging from 5m to 30m). The particular elements of the Proposed Development which will be constructed on agricultural land are as follows:

- A temporary construction working area will be in place across agricultural land. The width of this temporary construction working area (also referred to as a temporary construction swathe) will vary depending on the off-road section, and will range from 20m to 70m. Within this area there will be a proposed construction access route along the proposed cable trench. Where directional drilling is required (e.g. at some road crossings), additional working areas will be required. Temporary lay-down areas will be required for the delivery of material to the construction site;
- An underground cable trench, approximately 1.5m in width and 1.8m in depth containing the proposed underground cable circuit, will be excavated and back-filled. Joint Bays, communication chambers and link boxes will be located at average intervals of approximately 750m along the proposed cable route. These elements will be contained in co-located precast concrete boxes. The Joint Bay box will measure approximately 10m long, 2.5m wide and 2.5m deep. The communication chamber and link boxes will be approximately 2m long and 2m wide. Permanent access tracks (4m wide) will be constructed to access Joint Bays in 13 land parcels (Ref No 2, 3, 4, 11, 12, 20, 22, 23, 33, 34, 37, 39 and 40). Within the working areas, temporary access tracks (5m wide) will be constructed adjoining the trench in agricultural land;
- Six temporary Horizontal Directional Drilling (HDD) Compounds will be constructed for storage of machinery and materials at the three motorway crossing points (M3, M3 and M1 Motorways) in land parcel Ref No. 10, 11, 23, 24, 31 and 33;
- TCCs (six to be located in agricultural land parcels (Ref No. 4, 9, 21, 27, 33 and 40) (see Figure 15.1 in Volume 4 of the EIAR) are required for storage of construction materials, plant and equipment, in addition to office accommodation, vehicle parking and welfare facilities for the duration of the Construction Phase (approximately 39 months); and

- There will be Passing Bays located on agricultural land in land parcel Ref No. 5, 7, 15, 19, 25, 26, 28 and 30 (see Figure 15.1 in Volume 4 of the EIAR). These are areas adjoining the public road adjacent to the location of a Joint Bay in the road. A road surface is constructed on this area to maintain traffic movements along the road when it would otherwise be closed to traffic as a result of Joint Bay construction, cable pulling and jointing at the Joint Bay. These areas will be used for the Construction Phase after which they will be reinstated and returned to agricultural use.

During the Construction Phase, the following impacts will arise for off-road sections:

- Disturbance and damage to land:
    - Temporary land take will be required along the working area and at the sites of the TCCs and HDD Compounds, at stream, river and road crossings, and at traffic Passing Bays. The temporary construction working area and Passing Bays are proposed to be fenced off for a maximum period of three and a half years, potentially impacting on five cropping years and reducing land available for grazing, forage production and cropping. The TCCs and HDD Compounds will be fenced off for a period of approximately 39 months, potentially impacting on five cropping years. The excavation of a 1.5m wide trench, stripping of topsoil and movement of heavy machinery will disturb the soil structure and natural drainage. It is likely that the trench will intersect with land drains from adjoining agricultural land and this will interfere with land drainage. Without mitigation, the damage to land will have a medium to long-term impact (i.e. greater than 15 years) on areas that are directly disturbed. Based on the small areas of land parcels affected by the Proposed Development and the medium to long-term duration of the impact, the potential impacts, before mitigation, due to damage to land and soil structure range from Not Significant to Slight Adverse;
    - Where the working areas cross agricultural land, severance of services such as pasture water pipes and power cables (electric fencing) may necessarily occur. Such severance of services will be temporary and the likely impacts, before mitigation, are anticipated to range from Not Significant to Slight Adverse; and
    - Before mitigation, there is the potential for the spread of soil borne diseases and noxious weeds due to excavation, movement and storage of topsoil. Where construction machinery will cross farm boundaries, there is the potential for the spread of farm diseases (e.g. Tuberculosis). Before mitigation, these likely impacts are assessed as Not Significant.
- Construction dust, noise and movement:
    - There is the potential for noise and dust impacts to arise from the movement of construction machinery and excavation and handling of soil materials. Deliveries of materials and construction machinery noises and movements have the potential to startle livestock in adjoining agricultural land. The likely potential impacts resulting from dust from off-road construction sites will not have a significant impact on grazing livestock (including equines). Livestock (including equines) habituate to machinery and construction noises on farms without adverse effects. Therefore, before mitigation, the potential impact from construction dust, noise and movement is assessed as Not Significant.
- Disturbance to land access in relation to farm machinery and livestock movements:
    - In addition to disturbance on the local road network, the construction of the proposed underground cable circuit on agricultural land will interfere with access within farms. The working areas will be fenced off for a maximum period of three and a half years and this will result in potential severance of land in 12 land parcels (Ref No. 4, 9, 13, 15, 20, 33, 34, 36, 37, 38, 39 and 40). This will potentially impact how farmers move livestock and access their lands to transport farm produce and inputs, and to carry out essential

activities such as spreading of fertilisers and slurry and harvesting crops. Parts of fields adjoining the proposed working areas (e.g., the corners of fields) may be too small to farm effectively with large farm machinery. Before mitigation, this disturbance to land access will result in impacts that range from Not Significant to Significant Adverse.

- A reduction in farmed areas during the Construction Phase will impact on farmer's ability to adhere to the terms and conditions of Department of Agriculture, Food and the Marine area-based schemes. For example, a reduction in area farmed is likely to increase the organic nitrogen stocking rate on a farm potentially resulting in non-compliance with nitrates regulations and resulting in financial penalties. A reduction in area in land assigned to environmental scheme options is likely to result in financial penalties.
- Disturbance to land drainage and water quality:
    - There is the potential for impacts to arise as a result of construction activities interfering with surface water runoff from or to adjoining agricultural lands and interference with land drainage. Severing land drains would impede drainage and possibly cause flooding in adjoining land. Where there is sediment or construction material runoff from the construction site, it has the potential to pollute water sources for livestock and potable water sources for farmyards and dwellings. The construction of Joint Bays on agricultural land may potentially sever or block land drainage systems. The intersection of land drains from adjoining agricultural land is likely during off-road construction. The risk from construction impacts on potable and livestock water sources is very low as in the majority of cases livestock with drink water from piped water sources and from water troughs. Before mitigation, the potential impact is assessed as Not Significant to Moderate Adverse.

Before mitigation, the Construction Phase impacts range from Not Significant to Significant Adverse, as follows:

- There is one Significant Adverse impact assessed on land parcel No. 33 (medium sensitivity) This impact will arise as the access from the farmyard to the remainder of the farm will be severed by a TCC (TCC5) and damage to land will occur on 25% of the land parcel due to working areas and TCC5;
- There are six Moderate Adverse impacts assessed in land parcel No. 9, 35, 36, 37, 38 and 40. These are medium sensitivity land parcels, except for No. 40 which is low sensitivity. There will be TCCs on land parcels No. 9 and 40 (TCC2 and TCC6). The Moderate Adverse impacts will arise due to severance of agricultural land and damage to land and soil, except in land parcel No. 35 where there will be no severance and only damage to land and soil;
- There are 12 Slight Adverse impacts assessed in land parcels No. 4, 7, 12, 13, 20, 21, 22, 24, 26, 32, 34 and 39. Land parcel No. 21 is low sensitivity and the remainder are medium sensitivity. There will be TCCs in land parcels No. 4 and 21 (TCC1 and TCC3). There will be severance of land in land parcel No. 4, 13, 20, 34 and 39; and
- There are 21 Not Significant impacts assessed for land parcels No. 1, 2, 3, 5, 6, 8, 10, 11, 14, 15, 16, 17, 18, 19, 23, 25, 27, 28, 29, 30 and 31.

The detailed assessments of land parcels is provided in Appendix A15.1 in Volume 3 of this EIAR.

15.4.3 Operational Phase

During the Operational Phase, there is the potential for impacts to arise as a result of the following:

- Permanent easement and land take:
    - Where the proposed cables will occur on agricultural land, there will generally be a permanent 5m wide easement above the cable trench (a wider easement will be required on certain land holdings for proposed permanent access tracks and Joint Bays, HDD splayed sections and other features, specifically extended to 15m wide in the Woodland

Corridor (between Woodland Substation and the R156 Regional Road) and 30m wide between the M1 Motorway and Belcamp Substation). This easement will cross agricultural land (29 land parcels, as outlined in Appendix A15.1 in Volume 3 of this EIAR), for approximately 10km, directly affecting an estimated 18.7ha of land at the following locations; approximate Chainage 300 to Chainage 3,650, Chainage12,550 to Chainage 13,200, Chainage 15,800 to Ch16,450, Chainage 18,175 to Chainage18,250, Chainage 19,150 to Chainage 19,350, Chainage 19,725 to Chainage 19,775, Chainage 20,500 to Chainage 20,575, Chainage 21,300 to Chainage 22,600, Chainage 23,300 to Chainage 23,650 , Chainage 26,150 to Chainage 26,250, and Chainage 34,100 to Chainage 37,650 (see Figure 15.1 in Volume 4 of the EIAR);

  - The cover of the Joint Bay will be located at the surface of the field and will restrict activities such as ploughing and agricultural production at the site of the Joint Bay. There will also be a hardstanding area around each Joint Bay which will permanently restrict agricultural production and interfere with field operations such as mowing of grass and ploughing. There will be 15 Joint Bays located on 13 agricultural land parcels (Ref No. 2, 3, 4, 11, 12, 17, 20, 22, 23, 33, 34, 37 and 39). Each Joint Bay and surrounding hard standing area will have a maximum footprint of approximately 0.025ha of land;
  - Trees and hedgerow will be permanently removed during the Construction Phase along the temporary working area (ranging from 20m to 70m), at Passing Bays and adjoining in-road construction areas. Before mitigation, this will have an impact on shelter during the Operational Phase which is Not Significant; and
  - An estimated 4km of permanent access tracks (4m wide equalling 1.6ha) will be located at the following locations (refer also to Figure 15.1 in Volume 4 of this EIAR); Chainage 800 to Chainage 3,650, Chainage 13,100 to Chainage 13,200, Chainage 15,800 to Chainage 15,900, Chainage 21,300 to Chainage 21,400, Chainage 22,050 to Chainage 22,125, Chainage 22,600, Chainage 23,300, Chainage 34,650 to Chainage 34,850, Chainage 35,450 to Chainage 35,500, Chainage 36,150, Chainage 36,950 to Chainage 37,650. These will be located in 13 land parcels (Ref No. 2, 3, 4, 11, 12, 20, 22, 23, 33, 34, 37, 39 and 40) where the tracks will interfere with field operations such as mowing of grass and ploughing. Before mitigation, the impacts from the proposed permanent access tracks will be Not Significant to Slight Adverse. The permanent easement will not be fenced off. Farmers will therefore still be able to use the land within the easement for agricultural purposes, with the exception of relatively small areas associated with the Joint Bays and permanent access tracks. The pre mitigation impact of permanent easement and land take are assessed as Not Significant to Slight Adverse.
- Permanent disturbance:
  - The presence of the proposed cable circuit below-ground level will potentially impede activities such as land drainage. There will be at least 1,000mm of soil above the proposed underground cable circuit. This will facilitate activities such as ploughing. The proposed underground cable circuit will be housed in concrete structures and will potentially impact on the productivity of land at their locations. There will be approximately 10km of proposed underground cable circuit located on agricultural land with a below the surface footprint of approximately 1.5ha of land;
  - While the proposed cable route will not cross existing commercial forestry, future land use such as commercial forestry and tree planting will be set back from the proposed cable route. The set back distances will be agreed between EirGrid and the ESB and affected landowners on a case-by-case basis depending on what tree species are planted. Please see Chapter 18 (Landscape and Visual) in Volume 2 of this EIAR for further details on tree and hedgerow planting;
  - Building agricultural buildings in close proximity to the proposed cable circuit will also be subject to restrictions and agreement from the ESB;

  - The proposed cable circuit will require routine maintenance along its entire length. Inspection vehicles and personnel will access Joint Bays, link boxes and communications chambers on an annual basis for inspection and for any necessary maintenance. This has the potential to cause damage to field surfaces and disturbance to livestock; and
  - There will be cable markers located in field boundaries crossed by the Proposed Development. This has the potential to disturb hedgerow trimming / cutting operations. Before mitigation, the impact from permanent disturbance discussed above will range from Not Significant to Slight Adverse.
- Electric and Magnetic Fields (EMF):
  - The food quality standards written by Bord Bia for Beef and Lamb (Sustainable Beef and Lamb Quality Assurance Scheme), Milk (Sustainable Dairy Assurance Scheme) and Cereals (Irish Grain Assurance Scheme) and Farm Animal Welfare Advisory Council Guidelines for calf, dairy herds, cattle, sheep horses and pigs (Department of Agriculture, Food and the Marine 2020) do not refer to EMF, and therefore, EMF are not likely to have significant impacts on food quality. Before mitigation, the potential impact as a result of EMF is therefore assessed as Not Significant.

The following Operational Phase potential impacts are likely to arise, before the implementation of mitigation measures:

- There are two Moderate Adverse impacts assessed in land parcel No. 33 and 40 (No. 33 is a medium sensitivity land parcel and No. 40 is a low sensitivity land parcel). The Moderate impact will arise in land parcel No. 33 due to the medium to long-term damage to land and soil due to the presence of the TCC (TCC5) during the Construction Phase and due to the high degree of land take in land parcel No. 40;
- There are seven Slight Adverse impacts assessed in land parcel No. 3, 4, 9, 21, 22, 35 and 37. Land parcel No. 21 is low sensitivity, land parcel No. 22 is high sensitivity (equine) and the remainder of land parcels are medium sensitivity. These impacts will arise due to the damage to land and soil at the site of TCCs (TCC1, TCC2 and TCC3) and along the working areas during the Construction Phase in land parcel No. 4, 9 and 21. In the case of land parcel No. 3, 22, 35 and 37, the Slight Adverse impacts will arise from the permanent land take / easement; and
- There will be 31 Not Significant impacts for land parcels No. 1, 2, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 36, 38 and 39.

15.5 Mitigation and Monitoring Measures

15.5.1 Construction Phase

The following mitigation measures will be implemented during the Construction Phase to address the impacts on agronomy and equine:

- The appointed contractor will be required to maintain close liaison with local community representatives and landowners and farmers to provide them with adequate progress information and advance notice of works. This will ensure that construction activities are planned around the reasonable access needs of the landowner, so that access is maintained when required by the landowner for farming activities, such as for example, forage and crop harvesting, fertiliser spreading, slurry spreading, and herding of livestock etc. Scheduling of works will be agreed with each landowner to facilitate the operation of the farm and minimise disturbance. Where it is necessary to move livestock along public roads or across the working area, this will be facilitated by the appointed contractor;
- Landowners with lands adjoining sites, if rock breaking is required to take place, will be notified in advance of these activities;

- Traffic mitigation measures outlined in Chapter 14 (Traffic and Transport) in Volume 2 of this EIAR and any associated traffic management plans will be implemented to ensure that farmers and agri-business owners have adequate access to farmyards and land so that the transport of farm inputs and produce is not significantly affected;
- Mitigation measures for the control of dust, as set out in Chapter 7 (Air Quality) in Volume 2 of this EIAR will be implemented by the appointed contractor;
- Mitigation measures for the control and monitoring of noise and vibration as set out in Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR will be implemented by the appointed contractor;
- Mitigation measures for the control and monitoring of water quality, as set out in Chapter 12 (Hydrology) in Volume 2 of this EIAR will be implemented by the appointed contractor;
- The appointed contractor will comply with any regulations pertaining to the control of farm diseases as specified by the Department of Agriculture, Food and the Marine and will employ reasonable precautions against spreading any such farm disease. The appointed contractor will operate a biosecurity plan where machinery and personnel that are moving between farms will have adequate available disinfection facilities and equipment to ensure that disinfection can take place as required. The ESB and / or its appointed contractor will also take due notice and consideration of reasonable concerns expressed by landowners or occupiers prior to entry;
- Where field boundaries are to be affected, replanting and fencing will be used to ensure that the boundaries are maintained between landowners and within existing field systems. Therefore, no permanent restructuring will occur. Hedgerows will be replanted with species-rich varieties and with suitable fit for purpose fencing in-line with Teagasc and the Department of Agriculture, Food and the Marine guidelines. However, technical considerations may limit planting above the proposed underground cable circuit. Where replanting is not feasible, suitable fit for purpose stockproof fencing will be provided with standard agricultural gates provided where required. Access between landowners will not be provided except where required on the joint bay access tracks (e.g. between Chainage 700 and 3,400 for the permanent access track to Joint Bay 1 to 4). Double gates will be provided at field boundaries between landowners on these permanent access tracks. The gates will be locked and maintained by ESB with no access provided to the landowner. Double fencing will be provided between separate landowners to maintain biosecurity between adjoining farms;
- Where the working area severs land access or access to farmyards, the appointed contractor will ensure that there is adequate access provided to facilitate the farmer to effectively farm severed land; and
- The appointed contractor will adhere to the mitigation specified in this EIAR (refer to Chapter 21 (Summary of Mitigation and Monitoring Measures) in Volume 2 of the EIAR, and the Construction Environmental Management Plan (CEMP) which is included as a standalone document in this planning application pack. Following the mitigation measures employed for the reinstatement of land (bullet points hereunder) the potential long-term (>15 years) damage to soil at the working areas will be reduced to medium-term (7-15 years), and the damage to land and soil at the TCCs and HDD Compounds will remain long-term. The appointed contractor will:
    - Maintain pre-entry records;
    - Erect fit for purpose livestock proof fencing to prevent straying livestock;
    - Maintain and repair existing field drainage systems to restore the drainage of land to the condition that prevailed before the proposed works;
    - Store soil separate from the works traffic ensuring minimum amount of damage and disturbance to excavated soil material;
    - Reinstate the land so that it is level and surface is free of stones and weeds; and

    - Treat soil compaction by breaking up the soil to the required depth to address such compaction.

Once construction works are complete, the appointed contractor will implement the following mitigation measures:

- The drainage reinstatement will not impede the drainage of surrounding agricultural lands, and where land drains have been intersected or blocked during construction, these will be reconnected or diverted to a suitable outflow; and
- Field boundaries (hedgerows and fencing) removed during the Construction Phase will be replaced with fit for purpose stock proof fencing and hedgerows. However, hedgerows will not be replaced directly along the easement where they are permanently removed.

15.5.2 Operational Phase

The following mitigation and compensatory measures will be implemented during the Operational Phase to address the impacts on agronomy and equine:

- The loss of agricultural land due to the construction of the Proposed Development will be a permanent loss which cannot be mitigated, except through compensation. Restriction of Common Agricultural Policy (CAP) payments, farmyard building, commercial forestry and commercial tree planting will be addressed by compensation, where applicable; and
- Routine maintenance and inspection of cable infrastructure will be notified in advance to minimise disturbance to livestock and farm enterprises, where possible. If faults occur, excavation of soil may be required, resulting in disturbance and crop loss. The risk of such faults is low, and therefore, the frequency of this type of disturbance is very low.

15.6 Residual Impacts

The Construction and Operational Phases of the Proposed Development which will be located entirely in-road (i.e., within the public road network) will not significantly affect agronomy (including equine). Therefore, there is only the potential for significant impacts to arise on the 40 land parcels where the Construction Phase of the Proposed Development will occur off-road (see Figure 15.1 in Volume 3 of this EIAR).

15.6.1 Construction Phase

As discussed in Section 15.4.2.2, before mitigation, there will be one Significant Adverse impact, six Moderate Adverse impacts, 12 Slight Adverse impacts and 21 Not Significant impacts due to the Construction Phase.

Following mitigation, residual impacts will remain as a result of disturbance impacts due to temporary severance and damage to land and soils. Damage to soil structure will occur in the medium-term (7 to 15 years) in the working areas used to lay the proposed underground cable circuit, and in the medium to long-term (>15 years) at the sites of six TCCs (TCC1, TCC2, TCC3, TCC4, TCC5 and TCC6). These residual impacts, which have been assessed following the implementation of mitigation measures, will occur during the Construction Phase and are as follows:

- There are two Moderate Adverse impacts on land parcel No. 33 and 40, due to the anticipated large area of damage to land and soil at the sites of the TCCs (TCC5 and TCC6) and working areas. The pre-mitigation impact was also Moderate Adverse;
- There will be five Slight Adverse impacts that will arise from the Construction Phase, due to remaining disturbance impacts due to severance and damage to land and soils. These residual impacts will occur in land parcel No. 9, 21, 22, 35 and 37; and

- There will be 33 Not Significant residual impacts due to the Construction Phase on land parcel No. 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 36, 38 and 39.

These impacts are also summarised in Table 15.6.

Table 15.6: Summary of Residual Construction Phase Impacts on Land Parcels within the Study Area

Impact Level	No. Within the Study Area		No. Within the Study Area with Permanent Easements or Land Take (Post-Mitigation)
	Pre-Mitigation	Post-Mitigation	
Not Significant	21 (50%)	33 (825%)	23 Ref No. 1, 2, 3, 4, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24, 27, 31, 34, 36, 38, 39
Slight Adverse	12 (30%) Ref No. 4, 7, 12, 13, 20, 21, 22, 24, 26, 32, 34, 39	5 (12.5%) Ref No. 9, 21, 22, 35, 37	4 Ref No. 21, 22, 35, 37
Moderate Adverse	6 (17.5%) Ref No. 9, 35, 36, 37, 38, 40	2 (5%) Ref No. 33, 40	2 Ref No. 33, 40
Significant Adverse	1 (2.5%) Ref No 33	-	-
Very Significant Adverse	-	-	-
Profound Adverse	-	-	-
Total	40	40	29

There are two high sensitivity land parcels in the study area (Ref No. 22 is equine and Ref No 29 is dairy). The residual impact from the Construction Phase on Ref No. 29 is assessed as Not Significant and the residual impact on Ref No. 22 is assessed as Slight Adverse, due to damage to land and soil. A more detailed assessment of individual land parcel residual impacts is provided in Appendix A15.1 in Volume 3 of this EIAR.

15.6.2 Operational Phase

As discussed in Section 15.4.3, before mitigation, there will be two Moderate Adverse impacts, seven Slight Adverse impacts and 31 Not Significant impacts due to the Operational Phase of the Proposed Development.

Following mitigation, residual impacts will remain due the presence of the permanent easement, permanent land take and permanent access tracks, and long-term damage to land at the construction sites. These residual impacts will occur during the Operational Phase and are as follows:

- There are two Moderate Adverse impacts assessed due to the long-term damage caused to land and soil in land parcel Ref No. 33 and 40;
- There will be seven Slight Adverse impacts arising from permanent land take, permanent access tracks, and long-term damage to land and soils. These residual impacts will occur in land parcel Ref No. 3, 4, 9, 21, 22, 35 and 37; and
- There will be 31 Not Significant residual impacts due to the Construction Phase on land parcel No. 1, 2, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 36, 38 and 39.

These impacts are also summarised in Table 15.7 .

Table 15.7: Summary of Residual Operational Phase Impacts on Land Parcels within the Study Area

Impact Level	No. Within the Study Area		No. Within the Study Area with Permanent Easements or Land Take (Post-Mitigation)
	Pre-Mitigation	Post-Mitigation	
Not Significant	31 (77.5%)	31 (77.5%)	21 Ref No 1, 2, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24, 27, 31, 34, 36, 38, 39
Slight Adverse	7 (17.5%) Ref No 3, 4, 9, 21, 22, 35, 37	7 (17.5%) Ref No 3, 4, 9, 21, 22, 35, 37	6 Ref No 3, 4, 21, 22, 35, 37
Moderate Adverse	2 (5%) Ref No 33, 40	2 (5%) Ref No 33, 40	2 Ref No 33, 40
Significant Adverse	-	-	-
Very Significant Adverse	-	-	-
Profound Adverse	-	-	-
Total	40	40	29

15.6.3 Residual Impacts on the Study Area and Regional Effects

Forty agricultural land parcels will be directly affected by the Proposed Development, as shown in Figure 15.1 in Volume 4 of this EIAR. These land parcels have a combined area of 1,278ha (this is the sum of the areas of land parcels presented in Appendix A15.1 in Volume 3 of this EIAR). The total area required for the construction of the Proposed Development will be approximately 58.5ha of temporary land take for the construction duration of approximately 42 months. Within this temporary area there will be a permanent easement of approximately 18.7ha, approximately 1.6ha of permanent access tracks and approximately 0.4ha of new concrete surface (Joint Bays). The area of concrete structures beneath the soil surface (i.e., the proposed underground cable circuit) will be approximately 1.5ha. The temporary land take represents approximately 4.6% of the study area and the permanent easement and areas where there is a permanent restriction on agricultural productivity represent approximately 1.5% of the study area. These area reductions represent a low magnitude of impact. The majority of individual residual impacts are within the Not Significant and Slight Adverse impact categories (95% as outlined in Table 15.7), indicating a low level of impact on the study area overall. Therefore, the overall impact on the study area agronomy and equine along the Proposed Development will be Not Significant.

The agricultural land take required for the entire Proposed Development will be approximately 58.5ha and the majority of this will be temporary land take with medium-term impacts. The total area (permanent and temporary) represents 0.02% of the combined agricultural area of County Meath (197,366ha) and County Dublin (33,041ha) (CSO 2020). Impacts on these small areas are therefore assessed as Not Significant at a regional level.

15.7 Conclusion

There are no Significant, Very Significant Adverse or Profound impacts assessed as a result of the Construction or Operational Phases of the Proposed Development.

Significant impacts on agronomy and equine will not arise during the Construction Phase where the Proposed Development is constructed in-road. The study area is comprised of 40 land parcels, where construction will take place on agricultural land and where there will be permanent easements or land take required for the proposed underground cable circuit, access roads, TCCs and HDD Compounds, Passing Bays and Joint Bays. Of these 40 land parcels, Significant Adverse impacts are only likely to arise during the Construction Phase. The permanent disturbance impacts due to the operation of the Proposed Development are assessed as Not

Significant. The residual impacts, following the implementation of applicable mitigation measures, are summarised as follows:

- Thirty- one land parcels are assessed as having a Not Significant residual impact;
- Seven land parcels are assessed as having Slight Adverse residual impacts. These impacts will arise due to medium and long-term damage caused to soil structure and permanent land take and temporary disturbance on relatively small areas of the affected land parcels;
- Two land parcels are assessed as having an Moderate Adverse residual impact (Ref No. 33 and 40). These impacts will arise due to permanent land take and temporary disturbance on small areas of the land parcels and the long-term damage to soil structure caused at TCCs (TCC5 and TCC6); and

There are two high sensitivity enterprises within the study area (No. 22 and 29).The residual impact on land parcel No. 22 is assessed as Slight Adverse due to permanent land take, and disturbance and the impact on land parcel No. 29 is assessed as Not Significant. The overall residual impact on the agronomy and equine study area is assessed as Not Significant due to 77.5% of all directly affected land parcels having a Not Significant residual impact and 17.5% of all directly affected land parcels having a Slight Adverse residual impact. The Proposed Development construction works will affect less than 4.6% of the area of these land parcels.

The Proposed Development will have direct impacts on 0.02% of the agricultural area of County Meath and County Dublin. The residual impact on agriculture within this region is therefore assessed as Not Significant.

15.8 References

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Jacobs

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 16 – Waste

EirGrid

March 2024

Contents

16. Waste

16.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) has considered the likely waste and resource impacts associated with the Construction and Operational Phases of the East Meath to North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). A full description of the Proposed Development is presented in Chapter 4 (Proposed Development Description) of this EIAR.

The likely impacts associated with the Proposed Development during the Construction and Operational Phase have been assessed (see Section 16.4). Site clearance, excavation and construction are activities which will take place during the Construction Phase which are likely to generate surplus materials. In recent years there has been a shift in focus on best practice waste management and waste minimisation in construction and an increase in the reuse of construction by-products in projects.

The assessment has been carried out according to best practice and guidelines relating to waste and resources assessment (as listed in Section 16.2.2) and having regard to other similar scale projects.

The following aspects of the Proposed Development are particularly relevant to the resource and waste assessment:

- Throughout the design of the Proposed Development, consideration has been given to the minimisation of resource usage and to the generation of waste through retention of material on site and re-use;
- During construction, material usage will be minimised and material will be reused where possible. Waste will be generated from site clearance and excavation; and
- During operation, maintenance waste is likely to be generated from maintenance works associated with the Proposed Development.

The use of resources and the potential for waste and surplus materials to be generated during site clearance, excavation, construction and operation of the Proposed Development are assessed. The potential environmental effects of the use of resources and the generation and management of waste arising are examined in the context of the existing local and regional waste management environment. Mitigation measures are identified, where necessary, to reduce the impact of the use of resources and generation of waste by the Proposed Development during the Construction and Operational Phases.

16.2 Methodology

16.2.1 Study Area

The study area with regards to waste and resources comprises all areas and activities within the Planning Application Boundary, including both permanent and temporary land take boundaries.

Waste from the Proposed Development could be accepted at sites nationally and internationally (that are suitably licensed or permitted for the waste volume and type), for treatment, recovery and disposal. However, given that waste management planning in Ireland takes place on a regional basis, the study area for waste treatment, recovery and disposal comprises the Eastern-Midlands Waste Region (EMWR), and is broadened out to a national study area as required.

16.2.2 Relevant Guidelines, Policy and Legislation

The following guidelines and policy documents were considered and complied with when undertaking the waste and resources assessment:

- The Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022);
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017);
- Institute of Environmental Management and Assessment (IEMA) Guide to: Materials and Waste in Environmental Impact Assessment – Guidance for a Proportionate Approach (hereafter referred to as the IEMA Guidelines) (IEMA 2020);
- Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects (EPA 2021a);
- The Circular Economy Programme 2021-2027 (EPA 2021b);
- A Waste Action Plan for a Circular Economy – Ireland's National Waste Policy 2020-2025 (draft) (hereafter referred to as the National Waste Action Plan) (Department of Communications, Climate Action and Environment (DCCAE) 2020);
- National Waste Management Plan for a Circular Economy 2024-2030 (Regional Waste Management Offices 2024);
- Eastern – Midlands Region Waste Management Plan 2015-2021 (EMWR 2015);
- Construction & Demolition Waste - Soil and Stone Recovery / Disposal Capacity – Update Report 2020 (Regional Waste Management Offices 2020);
- EU Construction & Demolition Waste Protocol and Guidelines (European Commission 2018);
- Transport Infrastructure Ireland (TII) The Management of Waste from National Road Construction Projects. GE-ENV-01101 (TII 2017);
- The Use of Road Tar in Ireland and Research of Treatment Protocols. RE-PAV-00002 (TII 2023);
- Guidance on Soil and Stone By-Products in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011 (EPA 2019);
- A New Circular Economy Action Plan for a Cleaner and More Competitive Europe (European Commissions 2020); and
- Waste Classification – List of Waste and Determining if Waste is Hazardous or non-Hazardous EPA (EPA 2018).

The following directives and legislation were applied when undertaking the waste and resources assessment:

- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (hereafter referred to as the Waste Framework Directive);
- S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020 (hereafter referred to as the Waste Directive Regulations);
- S.I. No. 86/2008 - Waste Management (Facility Permit and Registration) Regulations 2008, as amended;
- S.I. No. 821/2007 - Waste Management (Facility Permit and Registration) Regulations 2007;
- S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007, as amended;
- S.I. No. 419/2007 - Waste Management (Shipments of Waste) Regulations 2007;
- Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste (hereafter referred to as the Landfill Directive);
- Number 26 of 2022 – Circular Economy and Miscellaneous Provisions Act 2022; and

- Number 10 of 1996 - Waste Management Act 1996 Revised (hereafter referred to as the Waste Management Act 1996 (as amended)).

16.2.2.1 Sustainable Resource and Waste Management Principles

16.2.2.1.1 Circular Economy

More efficient use of resources is the primary goal of sustainable resource and waste management. In order to achieve this goal there is a need to move away from the traditional linear economy model to a circular economy model, where the value of products, material and resources is maintained in the economy for as long as possible, such that the generation of waste is minimised. Image 16.1 illustrates the circular economy model.

The National Waste Action Plan (DCCAE 2020) notes that:

> *'In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimised, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value.'*

The European Union (EU) Circular Economy Action Plan (European Commission 2020) notes that:

> '*the EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than it takes, advance towards keeping its resource consumption within planetary boundaries, and therefore strive to reduce its consumption footprint and double its circular material use rate in the coming decade*.'

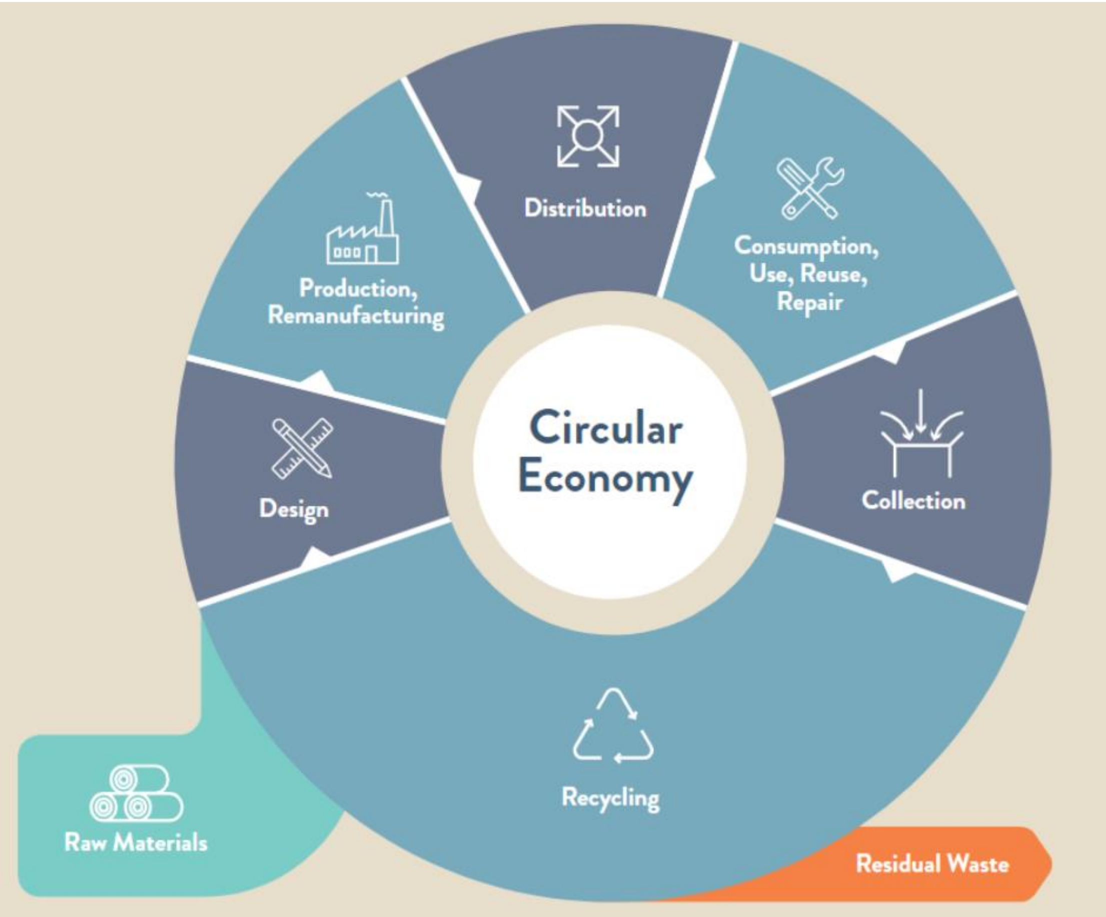

Image 16.1: The Circular Economy (DCCAE 2020)

16.2.2.1.2 Waste Hierarchy

Where residual waste generation is unavoidable it will be dealt with in a way that follows the waste hierarchy, as set out in the Waste Framework Directive and illustrated in Image 16.2. The waste hierarchy supports the need to achieve efficient use of material resources, minimise the amount of waste produced (or otherwise increase its value as a resource), and reduce as far as possible, the amount of waste that is disposed to landfill.

The consideration of resources in the context of this assessment includes a review of the potential beneficial reuse of materials arising from the construction of the Proposed Development (e.g. excavated soil and stone or concrete).

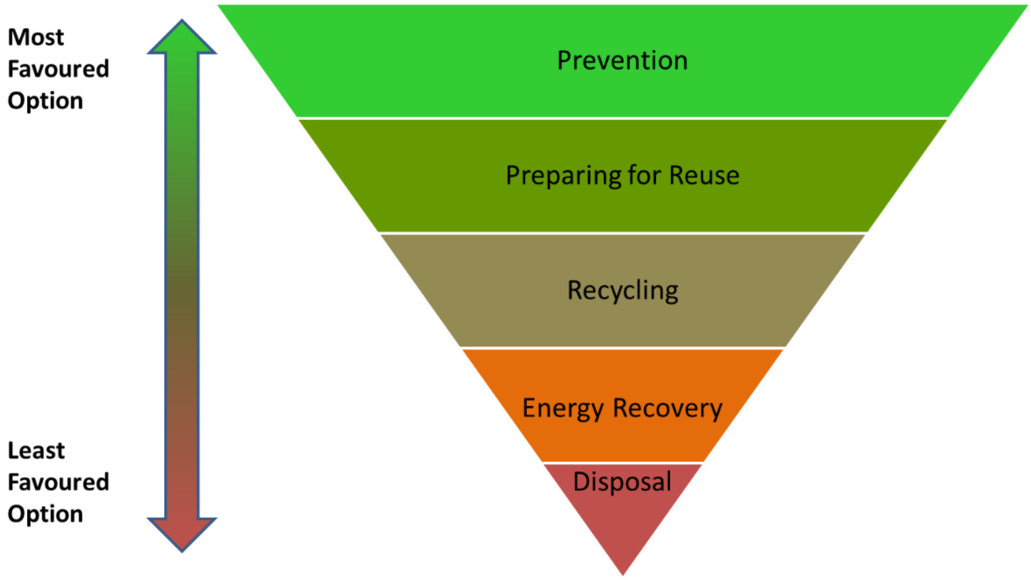

Image 16.2: Waste Hierarchy

Prevention and reuse are the most desirable options for the management of waste. Waste prevention / minimisation is inherent in the design of the Proposed Development, where surplus materials will be reused within the Proposed Development as far as reasonably practicable. Where material cannot be reused within the Proposed Development, options for reuse offsite will be considered where appropriate to the type and condition of the material.

Where reuse of surplus material is not possible, the material will be sent to recycling or recovery facilities as appropriate and where feasible. Only where there is no option to recycle or recover the material, will disposal of it to a landfill be considered.

16.2.3 Data Collection and Collation

A desk study was undertaken which comprised the following tasks:

- Review of relevant policy and legislation which creates the legal framework for waste and resource management in Ireland;
- Review of the estimated surplus materials and by-product generation for the Construction Phase of the Proposed Development and subsequently incorporated into the development of the EIAR;
- Review of the estimated imported material required for the construction of the Proposed Development;
- Types, quantities and management of construction and demolition (C&D) waste arisings generated in Ireland, the relevant local authority and EMWR jurisdictions were reviewed;

- Types, quantities and management of commercial and industrial waste generated in Ireland and EMWR jurisdictions were reviewed; and
- Availability (type and capacity) of waste infrastructure within the EMWR was reviewed.

16.2.4 Appraisal Method for the Assessment of Impacts

The potential environmental impacts of waste and resource generation and management associated with the Proposed Development were assessed for both the Construction and Operational Phases. These impacts may be neutral, positive or adverse and are dependent on the measures employed to prevent and / or manage the waste generated and materials used.

The following factors were considered when determining the significance of the impacts of the Proposed Development on the various aspects of the baseline environment:

- Desk study of current waste and by-product management practices in Ireland;
- Estimates of the types and quantities of waste and by-product generation and management from the Proposed Development, and of the imported materials required to construct the Proposed Development. This is compared with the established baseline set out in Section 16.2.4.1;
- An assessment of the likely environmental impacts that may arise from the quantity of waste requiring disposal to landfill;
- An assessment of the likely environmental impacts that may arise from the use of imported material during the Construction Phase;
- The surplus materials arising and waste infrastructure capacity in the Eastern-Midlands Region in which the Proposed Development will be located; and
- A review of the Proposed Development in the context of the waste hierarchy and circular economy principles to determine the mitigation measures required.

The criteria used to categorise the significance of waste and resource impacts is based on and compliant with both the EPA Guidelines (EPA 2022) and the IEMA Guidelines (IEMA 2020). The EPA Guidelines are complemented by the more detailed approach set out in the IEMA Guidelines with respect to materials and waste.

With respect to waste generation and management, the IEMA Guidelines set out the criteria to assess the sensitivity of waste management capacity regionally or nationally (as relevant) for both inert / non-hazardous and hazardous waste (Table 16.1), and sets out the magnitude of impact as a result of the consumption of that void space (Table 16.2).

Table 16.1: Sensitivity Criteria for Waste (IEMA 2020)

Value	Description	
	Inert / Non-Hazardous	Hazardous
	Across the Construction and/or Operational Phases, the baseline landfill void capacity is expected to…	
Negligible	...remain unchanged, or is expected to increase through a committed change in capacity.	...remain unchanged, or is expected to increase through a committed change in capacity.
Low	...reduce minimally: by <1% as a result of wastes forecast.	...reduce minimally: by <0.1% as a result of wastes forecast
Medium	...reduce noticeably: by 1-5% as a result of wastes forecast.	...reduce noticeably: by 0.1- 0.5% as a result of wastes forecast.
High	...reduce considerably: by 6-10% as a result of wastes forecast.	...reduce considerably: by 0.5-1% as a result of wastes forecast.
Very High	... reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.	... reduce very considerably (by >1%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.

Table 16.2: Assessing Magnitude of Impact for Waste (IEMA 2020)

Value	Description	
	Inert / Non-Hazardous	Hazardous
No Change	Zero waste generation and disposal from the development	Zero waste generation and disposal from development
Negligible	Waste generated by the development will reduce regional* landfill void capacity baseline# by <1%.	Waste generated by the development will reduce national landfill void capacity baseline # by <0.1%
Minor	Waste generated by the development will reduce regional* landfill void capacity baseline# by 1-5%.	Waste generated by the development will reduce national landfill void capacity baseline # by <0.1-0.5%
Moderate	Waste generated by the development will reduce regional* landfill void capacity baseline# by 6-10%.	Waste generated by the development will reduce national landfill void capacity baseline # by <0.5-1%
Major	Waste generated by the development will reduce regional* landfill void capacity baseline# by >10%.	Waste generated by the development will reduce national landfill void capacity baseline # by >1%
* Or where justified, national. # Forecast as the worst-case scenario, during a defined construction and/or operational phase		

With respect to imported materials for the construction of the Proposed Development, the IEMA Guidelines set out the criteria to assess the sensitivity of materials (Table 16.3), and sets out the magnitude of impact as a result of the use of materials (Table 16.4).

Table 16.3: Sensitivity Criteria for Materials (IEMA 2020)

Value	Description
	On balance, the key materials required for construction of a development …
Negligible	Are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock; and/or Are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials.*
Low	Are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock; and/or Are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials*.
Medium	Are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock; and/or Are available comprising some sustainable features and benefits compared to industry-standard materials*
High	Are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock; and/or Comprise little or no sustainable features and benefits compared to industry-standard materials*
Very High	Are known to be insufficient in terms of production, supply and/or stock; and/or Comprise no sustainable features and benefits compared to industry-standard materials*
*Subject to supporting evidence, sustainable features and benefits could include, for example, materials or products that: comprise reused, secondary or recycled content (including excavated and other arisings); support the drive to a circular economy; or in some other way reduce lifetime environmental impacts.	

Table 16.4: Assessing Magnitude of Impact for Materials (IEMA 2020)

Value	Description
	The assessment is made by determining whether through a development, the consumption of …
No change	...no material is required.
Negligible	...no individual material type is equal to or greater than 1% by volume of the regional* baseline availability.
Minor	...one or more materials is between 1-5% by volume of the regional* baseline availability.
Moderate	...one or more materials is between 6-10% by volume of the regional* baseline availability.
Major	...one or more materials is >10% by volume of the regional* baseline availability.
* or where justified, national.	

For both waste and materials, the determination of significance of the impact follows the matrix within the IEMA Guidelines. As the significance levels differ from the EPA Guidelines, the IEMA Guidelines have been adapted to use the EPA significance rating names (Table 16.5). For the duration of the impact for both waste and materials, the definitions as per the EPA Guidelines are used (refer to Table 1.3 in Chapter 1 (Introduction and Environmental Impact Assessment Process).

Table 16.5: Determining Significance (IEMA Guidelines adapted to reflect the EPA Guidelines Significance Ratings)

Sensitivity (or Value) of the Receptor	Magnitude of Impact					
		No Change	**Negligible**	**Minor**	**Moderate**	**Major**
	Very High	Neutral	Not Significant	Significant	Very Significant	Profound
	High	Neutral	Not Significant	Slight	Significant	Very Significant
	Medium	Neutral	Imperceptible	Not Significant	Moderate	Significant
	Low	Neutral	Imperceptible	Imperceptible	Not Significant	Slight
	Negligible	Neutral	Neutral	Imperceptible	Imperceptible	Not Significant

16.2.4.1 Assumptions and Limitations

There were no limitations in the writing of this Chapter that affected the assessment. At this stage, it is not possible to accurately estimate the volume of waste generated and materials required during the Operational Phase of the Proposed Development. The main source of operational waste would arise during maintenance activities and would be generated from broken equipment, while the main requirement for materials would be from the replacement equipment. All equipment will be professionally manufactured and installed, and will be maintained in accordance with the manufacturer's, EirGrid's and ESB's relevant guidelines. Based on professional judgment, the risk of broken equipment is assessed to be extremely low and so it is not anticipated to result in any significant environmental impacts.

16.3 Baseline Environment

The baseline environment for materials, waste and by-products management in Ireland is described in this Section.

16.3.1 Waste and By-Products

16.3.1.1 Construction Waste

Construction waste, including excavation waste, will be the main type of waste generated as a result of the Proposed Development. There will also be small quantities of municipal-type waste generated during construction and operation (i.e. associated with maintenance activities).

The EPA publishes statistics on waste generation and management for Ireland. The most recent statistics available were published in August 2023 and concern the year 2021. With respect to construction and demolition (C&D) waste, the EPA data states that there were 9 million tonnes of C&D waste generated in Ireland in 2021, an approximate 10% increase on 2020, with 96% undergoing final treatment in Ireland and only 4% being exported abroad for final treatment (EPA 2023a). Table 16.6 provides the breakdown of C&D waste in Ireland in 2021. The majority of the C&D waste (85%) was backfilled with only 8% recycled and 7% sent for disposal in 2021. The EPA reported that Ireland achieved 85% material recovery in 2021, surpassing the 70% EU target.

Table 16.6: C&D Waste Quantities Collected in Ireland in 2021 (EPA 2023a)

Waste Type	Quantity (Tonnes)	Proportion of Total C&D Waste
Soils, Stones & Dredging Spoil	7,696,287	85.1%
Concrete, Brick, Tile & Gypsum	608,235	6.7%
Mixed C&D Waste	362,380	4.0%
Metal	257,558	2.8%
Bituminous Mixtures	87,343	1.0%
Segregated Wood, Glass & Plastic	31,946	0.4%
Total	**9,043,749**	**100%**

16.3.1.1.1 Hazardous Waste

Hazardous waste will be generated during the Construction Phase of the Proposed Development (potentially including oils, batteries, asbestos, asphalt (bituminous mixtures containing coal tar) and contaminated soils and materials). According to the EPA statistics for 2021 (EPA 2023b), there was a total of 466,941 tonnes generated in Ireland in 2021, which was a decrease of approximately 16% on 2020. 52% of the hazardous waste generated in Ireland was treated in-country, with the other 48% exported to other countries (mainly the United Kingdom and within the EU) for treatment. Specifically with respect to C&D hazardous waste, there were 106,664 tonnes generated in 2021, of which approximately 33,000 tonnes were contaminated soils (99% of which were treated in Ireland).

16.3.1.1.2 Municipal Waste

Municipal waste will be generated in small quantities during the Construction and Operational Phases of the Proposed Development (e.g. canteen, office and staff welfare waste). According to the EPA statistics for 2021

(EPA 2023c) Ireland generated 3.17 million tonnes of municipal waste in 2021, which represents a decrease of one percent on the 2020 quantities. This breaks down as 57% from household sources and 43% from commercial and public service sources. Approximately 1.3 million tonnes were recycled in 2021, equating to a recycling rate of 41%. 42% of Ireland's municipal waste went for incineration for energy recovery, with 16% going to landfill. An estimated 38% of all municipal waste generated was exported.

16.3.1.1.3 Waste Management Facilities

With respect to waste management in Ireland, there are three operational EPA licensed landfills and two incinerators in Ireland, and these are all located within the EMWR (Table 16.7). Together, in accordance with their EPA authorisations, these facilities have a total annual disposal capacity of 1,660,000 tonnes (EPA 2023d; EPA 2024).

Table 16.7: EPA Licensed Landfill / Incinerator Capacity Per Annum (EPA 2023d; EPA 2024)

Facility Name	Authorisation Number	Maximum Capacity per Annum (tonnes)	C&D / Inert Waste Acceptance Limit per Annum (tonnes)
Landfills			
Knockharley Landfill, Co. Meath	W0146	440,000	Up to 285,000
Ballynagran Residual Landfill, Co. Wicklow	W0165	175,000	28,000
Drehid Waste Management Facility, Co. Kildare	W0201	120,000	No limit for inert waste where used in landfill engineering
Incinerators			
Indaver Ireland Ltd.	W0167	235,000	50,000
Dublin Waste to Energy Ltd.	W0232	690,000	N/A
	Total	**1,660,000**	**>363,000**

In addition to landfills and incinerators, there are 16 soil recovery facilities licensed by the EPA within Ireland (EPA 2024d). Of these, eight are operational (or due to commence operations) within the EMWR, with four of those located within County Meath and County Dublin. The eight facilities located within the EMWR are listed in Table 16.8.

Table 16.8: EPA Licensed Soil Recovery Facility Capacity Per Annum in the Eastern-Midlands Region (EPA 2024)

Facility Name	Authorisation Number	Operational?	Maximum Capacity per Annum (tonnes)
Blackhall Soil Recovery Facility, Naas, Co. Kildare	W0247	Yes	400,000
Clashford Recovery Facilities Ltd., Naul, Co. Meath	W0265	Yes	190,000
Milverton Waste Recovery Facility, Skerries, Co. Dublin	W0272	Yes	400,000
Huntstown Quarry, Finglas, Dublin 11	W0277	Yes	1,595,000
Mullaghrone Quarry, Donore, Co. Meath	W0278	Not yet commenced	100,000
N&C Enterprises Limited, The Pit, Naas, Co. Kildare	W0292	Yes	345,000
Calary Quarry, Kilmacanogue, Co. Wicklow	W0293	Yes	300,000
Kildare Sand & Gravel Limited, Rathangan, Co. Kildare	W0295	Yes	225,000
	Total		**3,555,000**

In addition to EPA licensed waste facilities, local authorities have the power to grant Waste Facility Permits and Certificates of Registration for waste management activities within their jurisdiction. There are permitted and certified waste facilities located throughout Ireland. A summary of the number of facilities currently authorised within the EMWR is provided in Table 16.9, with an estimate of the approximate annual capacity for soil and stone (the most common C&D waste) provided based on the permits / registrations available from the National Waste Collection Permit Office (NWCPO).

Table 16.9: Summary of Waste Facility Permits / Certificates of Registration within the Eastern-Midlands Region (NWCPO 2024 – Accessed February 2024)

Local Authority within the EMWR	Total Number of Facilities	Total Number which Accept Soil and Stone Waste	Approximate Annual Capacity for Soil & Stone
Local Authority Areas in which the Proposed Development is Located:			
Meath	65	22	530,000
Fingal	21	9	375,000
Local Authority Areas in the Wider EMWR:			
Dublin City	32	5	110,000
Dún Laoghaire – Rathdown	2	0	0
South Dublin	46	12	217,000
Kildare	40	23	1,071,000
Laois	20	7	120,000
Longford	23	15	120,000
Louth	25	10	440,000
Offaly	18	11	310,000
Westmeath	24	16	307,000
Wicklow	30	18	400,000
Total	**346**	**148**	**4,000,000**

A summary of the estimated annual capacity for C&D waste (soil and stone in particular) within the Eastern-Midlands Region is provided in Table 16.10.

Table 16.10: Summary of Approximate Annual Capacity for Soil and Stone Waste within the Eastern-Midlands Region (EPA 2023d; EPA 2024; NWCPO 2024)

Facility Name	Number of Facilities (November 2023)	Approximate Maximum Capacity per Annum C&D / Soil and Stone Waste (tonnes)
Landfills	3	363,000
Incinerators	2	50,000
Soil Recovery Facilities	8	3,555,000
Local Authority Waste Facility Permits / Certificates of Registration	148	4,000,000
Total	**161**	**7,968,000**

For forecasting the capacity into the future, there are no statistics available for the EMWR or for Ireland. The capacity within the state (and therefore in the EMWR) however is currently largely static and is forecast to reduce in the medium-term. The IEMA Guidance provides data for England, Scotland and Wales, with the landfill capacity for all waste types reducing by an average of 12% per annum over the period between 2014-2018. Given the lack of specific forecasting data available for Ireland, it is considered that a similar fall to that in England, Scotland and Wales in landfill capacity is broadly acceptable. Therefore, the sensitivity of the waste management capacity within the EMWR is Very High based on the sensitivity ratings in Table 16.1.

16.3.1.2 By-Products (Article 27)

With respect to material generated as a by-product of the Construction Phase (e.g. surplus excavated soil and stone), Article 27 of the Waste Directive Regulations allows for this material to be treated as a by-product instead of a waste, as long as the material satisfies the following requirements:

> *"(a) further use of the substance or object is certain;*
>
> *(b) the substance or object can be used directly without further processing other than normal industrial practice;*

(c) the substance or object is produced as an integral part of a production process; and

(d) further use is lawful in that the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts."

The material producer must notify the EPA of their determination that the material is a by-product and not a waste. On receipt of an Article 27 notification, the EPA can determine that the material is a waste or a by-product. Where the EPA does not make a determination, the material has not been determined as a waste. Where the material has not been determined to be a waste, the material is available for reuse within the industry.

According to the EPA waste statistics (EPA 2023a), there were 123 by-product notifications assessed totalling 12,526,137 tonnes of material. Of this quantity, the EPA determined that 459,836 tonnes were a by-product, 600 tonnes were a waste, and the notifications for 152,400 tonnes of material were withdrawn. The EPA made no determination with respect to the remaining 11,913,301 tonnes.

16.3.2 Imported Materials

The quantities of material which are currently imported to the study area under baseline conditions are low. Currently material is only imported as part of maintenance activities which are undertaken on the existing infrastructure such as roadways, footpaths, utilities, substations and verges. These activities would largely involve repair of surfaces and general roadworks, drainage maintenance and repair, utility works, landscaping and winter maintenance.

A report entitled Essential Aggregates: Providing for Ireland's Needs to 2040 (Irish Concrete Federation 2019) was published in 2019 which details and quantifies Ireland's natural aggregate reserves. At the time of publication of that report, Ireland had approximately 500 active large commercial quarries, approximately 220 ready mixed concrete plants, 20 large scale precast concrete plants and 40 plants producing bitumen bound road surfacing materials.

The Irish Concrete Federation quantifies the annual production of these materials in Ireland on their website, with the 2022 figures (the most recent available) being as follows:

- Five million cubic metres of ready-mixed concrete;
- 135 million concrete blocks;
- 38 million tonnes of aggregates;
- Two million tonnes of bituminous road surfacing materials; and
- Two million square metres of paving products.

16.4 Potential Impacts

This Section presents potential impacts that may occur due to the Proposed Development, in the absence of mitigation, but taking into account the best practice measure set out in Section 16.5. predicted residual impacts are then presented in Section 16.6.

16.4.1 'Do Nothing' Scenario

In the Do Nothing scenario the Proposed Development would not be constructed and therefore the surplus materials would not be generated, and the required construction materials would not be consumed. Therefore, the Do Nothing impact with respect to waste and resources would be Neutral.

16.4.2 Construction Phase

16.4.2.1 Waste

Waste will arise during the Construction Phase largely as a result of excavation activities, as well as from surplus construction materials and damaged materials. Construction works areas, site offices and temporary facilities are also likely to generate waste during the Construction Phase (e.g. municipal type wastes by construction employees, packaging, food waste, etc.). Hazardous wastes which are likely to arise include small quantities of waste electrical and electronic equipment, batteries, oil / fuel residues and oil contaminated items.

The most likely types of waste to be generated during the Construction Phase of the Proposed Development are listed in Table 16.11, with their accompanying List of Waste (LoW) code (EPA 2018).

Table 16.11: Main Waste Types Likely to be Generated during Construction

Waste Type	LoW Code
Concrete	17 01 01
Wood, glass and plastic	17 02 01 – 17 02 04*
Bituminous mixtures	17 03 01* - 17 03 03*
Metals	17 04 01 – 17 04 11
Soil and Stones	17 05 04
Wastes of liquid fuels	13 07 01* – 13 07 03*
Absorbents, filter materials, wiping cloths and protective clothing	15 02 02* – 15 02 03
Batteries and accumulators	16 06 01* – 16 06 06*
Vegetation	20 02 01
Waste packaging	15 01 01 – 15 01 11*
Municipal waste (separately collected fractions)	20 01 01 – 02 01 99
Mixed municipal waste	20 03 01
Note: Numbers with an * are hazardous waste types	

The likely quantities of surplus materials / waste which will require removal during the Construction Phase have been estimated and are provided in Table 16.12. The estimate has been undertaken by the authors of Chapter 4 (Proposed Development Description) based on the Proposed Development dimensions, the construction techniques as described in that Chapter, professional judgment, and consultation with EirGrid and ESB.

Table 16.12: Estimate of Waste Quantities During the Construction Phase

Location	Waste / Surplus Material Type	Quantity (m^3)	Quantity (tonnes)	
Cable Route				
In-Carriageway	Asphalt*	3,666	8,432	
	Engineered Fill	14,663	32,259	
	Subsoil	31,160	46,740	
Off-Road / In-Verge	Subsoil	16,848	25,272	
	Engineered Fill (Haul Roads)	20,992	46,182	
Permanent Access Tracks	Top Soil	3,192	4,469	
Belcamp Substation				
Permanent Access Tracks	Topsoil	80	112	
Earthworks	Subsoil	11,200	16,800	
Woodland Substation				
Earthworks	Subsoil	50	75	
Enabling Works				
Passing Bays	Asphalt*	578	1,329	
	Engineered Fill	2,310	5,082	
	Subsoil	1,733	2,600	
Construction Platforms	Engineered Fill	4,050	8,910	
	Subsoil	1,350	2,025	
Compounds	Engineered Fill	25,200	55,440	
Totals By Material				**Proportion of Total (%)**
	Asphalt*	4,243	9,761	3.1
	Topsoil	3,272	4,581	2.4
	Subsoil	62,341	93,512	45.5
	Engineered Fill	67,215	147,873	49.0
	Total	**137,072**	**255,727**	**100**

As shown, soils and fill material will make up the majority of the Construction Phase surplus material at 96.9% of the total estimated quantities requiring removal during the Construction Phase. The estimated total C&D waste to be generated during the Construction Phase is 255,727 tonnes, which is equivalent to approximately 3% of the C&D waste management baseline for the EMWR as set out in Table 16.10.

As outlined in Section 16.3.1.1.3, the sensitivity of the waste management capacity within the EMWR is Very High, while the magnitude of the impact is Minor. Therefore, in accordance with Table 16.5, the potential impact prior to mitigation is assessed as Negative, Significant and Short-Term. It should be noted that this is based on a conservative assessment approach, where all estimated waste has been assumed to arise in a single year with all going to landfill for disposal.

With specific regard to asphalt / bituminous waste, while the overall quantity is relatively small, this material may contain coal tar which would be categorised as Hazardous Waste. Coal tar was variously used in road surfacing in Ireland up to the late 1970s, and TII's The Use of Road Tar in Ireland and Research Treatment Protocols (TII 2023) categorises the likely presence of coal tar by road type, ranging from "never" for motorways and dual carriageways to "sometimes" in urban areas and legacy single carriageway roads. In the absence of details or dates of road construction along the route of the Proposed Development, it is conservatively assumed at this stage that 50% of road surface material could contain coal tar and would be categorised as Hazardous Waste. This would result in a potential hazardous waste quantity of 5,019 tonnes. Typically, hazardous waste generated in Ireland is transported to and disposed of at facilities in England or it is diverted from landfill through cold recycling applications. The Hazardous Waste capacity in England in 2022 was 11,882,411 tonnes (UK Government Waste Statistics 2022). In the worst-case scenario of all potential coal tar waste going to landfill from the Proposed Development, this would represent c.0.0004% of capacity. Consequently, the magnitude of the impact would be Negligible. In accordance with Table 16.5, the potential impact prior to mitigation is assessed as Negative, Not Significant and Short-Term.

In addition to the above potential waste materials, there will be small quantities of mixed municipal waste arising from the construction staff, and from the offices, canteens and welfare facilities, which will constitute well less than 1% of total existing waste management capacity of the EMWR. The potential impact of this waste stream during the Construction Phase is Negative, Not Significant and Short-Term.

16.4.2.2 Imported Materials

The Construction Phase will require the importation of a number of key construction materials for the Proposed Development works. This material will include items such as engineering fill, concrete and asphalt. For a full description of the Construction Phase, please refer to Chapter 4 (Proposed Development Description).

Table 16.13 provides an estimate of the quantities of the major materials required to complete the Construction Phase of the Proposed Development.

Table 16.13: Estimate of Material Quantities Required for the Construction Phase

Location	Imported Material Type	Quantity (m^3)	Quantity (tonnes)
Cable Route			
In-Carriageway	Asphalt	3,666	8,431
	Engineered Fill	21,079	46,373
	Concrete / CGBM B	20,546	-
Off-Road / In-Verge	Engineered Fill (Haul Roads)	20,992	46,182
	Concrete / CBGM B	11,085	-
Permanent Access Tracks	Engineered Fill	4,788	10,534
Joint Bays	Concrete	796	-
Belcamp Substation			
Permanent Access Tracks	Engineered Fill	120	264
Civils & Foundations	Concrete	1,964	4,714
400kV GIS Hall	Steel	-	127
Woodland Substation			
Civils & Foundations	Concrete	107	257
Enabling Works			
Passing Bays	Asphalt	578	1,328
	Engineered Fill	2,310	5,082
	Subsoil	1,733	2,599
Construction Platforms	Engineered Fill	4,050	8,910
	Subsoil	1,350	2,025
Compounds	Engineered Fill	25,200	55,440

The quantities of material listed in Table 16.13 represent a very small proportion of the Irish quantities manufactured per year, as outlined in Section 16.3.2, summarised below:

- Estimated quantity of asphalt required represents less than 1% of the total quantity of bituminous road surfacing materials produced in Ireland per annum (approximately 0.5%);

- Estimated quantity of concrete required represents less than 1% (approximately 0.7%) of the total quantity produced in Ireland per annum; and
- Similarly, assuming the aggregate composition of asphalt is 90% to 95% and concrete is 60% to 80%, the estimated total aggregate quantity required by the Proposed Development represents less than 1% (approximately 0.7%) of the total aggregate quantity produced in Ireland per annum.

In addition to the quantities outlined in Table 16.13 there will be equipment and plant required for the substations, such as shunt reactors, transformers (current and voltage), cable sealing ends, surge arrestors, gantries, post insulators, disconnectors, circuit breakers, GIS bushings, bulk head lighting and lighting masts. There will also be approximately 150 drums of insulated copper cabling (37.5km multiplied by three phases) required for the cable route. These items will be acquired for the project pre-fabricated from specialist manufacturers.

Importation of material to the Proposed Development will be carried out throughout the Construction Phase, with different materials being required at different times. The main direct impacts associated with the importation of construction materials will arise from the gathering / manufacture of the materials, and once the materials are used within the Proposed Development, they will no longer be available for other uses. There will also be impacts associated with the importation of materials through the requirement of heavy goods vehicles (HGVs) for the delivery of the material and the use of materials. Impacts associated with transport of materials are covered in more detail in Chapter 7 (Air Quality), Chapter 8 (Climate), Chapter 9 (Noise and Vibration) and Chapter 14 (Traffic and Transport) of this EIAR, where relevant.

As the materials required for the Construction Phase of the Proposed Development are generally readily available as outlined in Section 16.3.2, the sensitivity of the imported material will be Low. As the quantities of the materials required constitute less than 1% of the quantities produced per annum in Ireland, the magnitude of the impact will be Negligible. Therefore, as per Table 16.5, the potential impact associated with the imported materials will be Negative, Imperceptible and Short-Term.

16.4.3 Operational Phase

16.4.3.1 Waste

It is not anticipated that any significant amounts of waste will be generated during the Operational Phase of the Proposed Development. The routine maintenance of the Proposed Development is described in Chapter 4 (Proposed Development Description). Should equipment need to be replaced, the broken equipment will be managed during the Operational Phase in-line with ESB waste management plans and procedures. As outlined in ESB Networks' most recent Environmental Performance Report (ESB Networks 2022), *"ESB Networks are committed to being at the forefront of the sustainable and circular economy, and the effective management of waste is a fundamental part of this environmental management goal"*. This waste will be managed in accordance with all relevant waste management legislation. At this stage, it is not possible to estimate the volume of waste that will be generated from broken equipment. All equipment will be professionally manufactured and installed, and will be maintained in-line with the manufacturer's and ESB guidelines. Based on professional judgment, the risk of broken equipment is assessed to be extremely low and so it is not anticipated to result in any significant environmental impacts.

16.4.3.2 Imported Materials

It is not anticipated that any significant amounts of material will be required during the Operational Phase of the Proposed Development. The routine maintenance of the Proposed Development is described in Chapter 4 (Proposed Development Description). Should equipment need to be replaced, the new equipment will be professionally manufactured and installed, and will be maintained in-line with the manufacturer's and ESB guidelines. Based on professional judgment, the risk of replacement equipment is assessed to be extremely low and so it is not anticipated to result in any significant environmental impacts.

16.5 Mitigation and Monitoring Measures

16.5.1 Construction Phase

16.5.1.1 Waste

There will be a potential Negative, Significant and Short-Term impact as a result of the generation of waste by the Proposed Development during the Construction Phase. Additionally, there will be a potential Negative, Not Significant and Short-Term impact as a result of the generation of hazardous waste. In order to mitigate the impact, the following outlines the mitigation measures to be applied during the Construction Phase.

A Construction Resource and Waste Management Plan (CRWMP) has been prepared (included as Appendix C to the Construction Environmental Management Plan (CEMP) included as a standalone document in this planning application). The appointed contractor will implement and update this document (as necessary) in accordance with best practice as described in Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (EPA 2021).

The appointed contractor(s) will be responsible for reviewing and updating the CRWMP prior to the commencement of construction and will undertake periodic reviews, updating as necessary throughout the Construction Phase in agreement with the planning authorities. The CRWMP outlines how waste arising during the C&D Phases of the Proposed Development will be managed in a way that ensures compliance with the provisions of the Waste Management Act 1996 (as amended).

All operations will be managed and programmed in such a manner as to prevent / minimise waste production. All waste material will be managed in accordance with the waste hierarchy (Image 16.2), with an emphasis on reuse, recycling and recovery of material over disposal where feasible.

In order to minimise the creation of waste, opportunities for reuse of excavated material within the Proposed Development (e.g. as fill) will be sought. Where possible, excavated materials will be re-used for backfill subject to the results of testing, whereby representative samples will be retrieved from each material type (allow one per 100m^3) submitted for laboratory analysis and the results of analysis assessed to assess whether it is inert. If material is not inert, it will be disposed of at a suitable facility in line with waste management legislation and guidance.

Where there is no reuse potential within the Proposed Development of such material, either due to the material being unsuitable or due to the quantity being in excess of requirements, the potential for reuse as a by-product in accordance with Article 27 will be investigated by the appointed contractor(s). Where this option is technically / economically feasible, the appointed contractor(s) will be responsible for the EPA Article 27 notification and the associated requirements. Any material which is to be managed as a by-product will be appropriately stored on-site and will be kept separate from any waste storage to avoid cross contamination.

Where waste is created it will be managed on-site in accordance with good practice and applicable waste legislation as follows:

- Waste excavated material will be appropriately stockpiled;
- Waste will be segregated at source to prevent cross contamination;
- Where relevant (e.g. excavated fill material), wastes will be sampled and tested to allow classification prior to disposal;

- Waste receptacles will be appropriate to the waste streams using them, and covered or netted where practicable to prevent wind-blown debris emanating from them;
- Any hazardous wastes will be stored in segregated waste containers which are appropriately labelled;
- All waste will be collected by a suitable contractor in possession of a valid and appropriate Waste Collection Permit, and will only be transported to suitably licensed or permitted waste facilities (i.e. facilities in possession of a valid EPA Licence, Waste Facility Permit or Certificate of Registration);
- Regular site inspections and cleaning will be done in order to minimise the potential for litter in the surrounding area;
- Waste records will be maintained throughout the Construction Phase of the Proposed Development; and
- Waste auditing against the CRWMP will be carried out.

The quantity and type of waste and materials leaving site during the Construction Phase will be recorded by the appointed contractor. The name, address and authorisation details of all facilities and locations which waste and materials will be delivered to will be recorded along with the quantity for each facility. Records will show which material is recovered, which is recycled and which is disposed of.

Any off site interim storage or waste management facilities for excavated material will have the appropriate EPA Licence, Waste Facility Permit or Certificate of Registration, as appropriate, in place.

Excavated materials from within roadways (e.g. capping, subbase and bituminous materials) will be reused or recycled in line with TII specifications where reasonably practicable:

- Capping, subbase, bituminous and concrete materials could be reused or recycled in fill and capping materials providing they comply with the Specification for Road Works Series 600 – Earthworks (CC-SPW-00600) (TII 2013a);
- Subbase, bituminous and concrete materials could be reused or recycled in subbase or base materials providing they comply with the Specification for Road Works Series 800 – Unbound and Cement Bound Mixtures (CC-SPW-00800) (TII 2013b); and
- Subbase and bituminous materials could be recycled in base or binder materials providing they comply with Road Pavements – Bituminous Materials (CC-SPW-00900) (TII 2015).

With respect to the potential to encounter coal tar within road planings, this will be managed in alignment with TII's The Use of Road Tar in Ireland and Research Treatment Protocols (TII 2023). The contractor will test all road planings for the presence of coal tar to ensure accurate classification of all arisings prior to disposal, thus minimising the quantity being disposed of as hazardous waste. Furthermore, the contractor will seek recycling options for any coal tar to divert it from landfill.

Following the best practice measures outlined above, the quantity of waste material requiring disposal will be reduced and the post-mitigation impact will be Negative, Not Significant and Short-Term for all waste streams.

16.5.1.2 Imported Materials

There will be a potential Negative, Imperceptible and Short-Term impact associated with the importation of materials for the construction of the Proposed Development.

The Proposed Development has been designed to minimise the quantities of construction materials required. It is likely that all engineering backfill materials (i.e. engineering fill, thermal sand, cement bound granular material) will be imported to site. Where possible, excavated materials will be re-used for backfill subject to the results of testing (as outlined in Section 16.5.1.1).

Consideration will be given by the appointed contractor to the sustainability of material being sourced for the construction of the Proposed Development. As far as is reasonably practicable, materials required for the construction of the Proposed Development will be sourced locally to reduce the amount of travelling required to get the material to the site. Key issues to be considered when sourcing materials for the Construction Phase will include the source, the material specification, production and transport costs, and the availability of the material. For quarried material sourced within the State, only quarries which are included in local authority quarry registers will be used by the appointed contractor to source any quarried material.

Construction materials will be managed on-site by the appointed contractor in such a way to prevent overordering and waste. Materials will be stored in appropriate storage areas or receptacles to reduce the potential for damage requiring replacement. 'Just-In-Time' ordering principles will be implemented by the appointed contractor, where practicable, to reduce the potential for over-ordering.

16.5.2 Operational Phase

As there are no anticipated significant Operational Phase impacts, no additional mitigation or monitoring measures are considered necessary. Waste will be managed during the Operational Phase in line with ESB waste management plans and procedures.

16.6 Residual Impacts

No significant residual impacts have been identified for the Construction or Operational Phase of the Proposed Development.

16.7 Conclusion

There will be a potential Negative, Significant and Short-Term impact as a result of the generation of waste by the Proposed Development during the Construction Phase, while there will be a potential Negative, Imperceptible and Short-Term impact associated with the importation of materials for the construction of the Proposed Development. The significance of these impacts will be reduced by the mitigation measures outlined within Section 16.5.1, particularly with respect to construction waste which will reduce to Negative, Not Significant and Short-Term following the diversion of waste from landfill. There are no significant impacts anticipated as a result of the Operational Phase of the Proposed Development. There are no significant residual impacts predicted as a result of the Proposed Development, either during the Construction Phase or the Operational Phase.

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TII (2017). The Management of Waste from National Road Construction Projects. Standard GE-ENV-01101

TII (2023). The Use of Road Tar in Ireland and Research of Treatment Protocols. RE-PAV-00002

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Directives and Legislation

Directive 1999/31/EC of 26 April 1999 on the landfill of waste

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

Directive 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC

Regulation (EC) No. 1013/2006 of the European Parliament and of the Council of 14 June 2006 on Shipments of Waste

Number 10 of 1996 - Waste Management Act 1996 (as amended)

Number 26 of 2022 – Circular Economy and Miscellaneous Provisions Act 2022

S.I. No. 419/2007 - Waste Management (Shipments of Waste) Regulations 2007

S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007 (as amended)

S.I. No. 821/2007 - Waste Management (Facility Permit and Registration) Regulations 2007

S.I. No. 86/2008 - Waste Management (Facility Permit and Registration) Regulations 2008 (as amended)

S.I. No. 126 of 2011 – European Communities (Waste Directive) Regulations 2011 (as amended)

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 17 – Material Assets

EirGrid

March 2024

Contents

17. Material Assets

17.1 Introduction

This Chapter presents the assessment of the likely potential impacts of the East Meath - North Dublin Grid Upgrade Project (hereafter referred to as the Proposed Development) on material assets during the Construction and Operational Phases. A full description of the Proposed Development is presented in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

Material assets are resources of both natural and human origin that have intrinsic value. The Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022) discuss material assets as follows:

> *"In Directive 2011/92/EU this factor included architectural and archaeological heritages. Directive 2014/52/EU includes those heritage assets 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 and quarrying potential come under the factors of land and soils."*

The EPA Guidelines specifically list built services, roads and traffic, and waste management as topics which fall into the category of material assets. Further to this, the Environmental Impact Assessment of Projects - Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017) references buildings, other structures, mineral resources and water resources as material assets. This EIAR includes separate chapters covering a number of those listed material assets and other material assets, as follows:

- Property and land use assets – Chapter 5 (Population);
- Ecological assets – Chapter 10 (Biodiversity);
- Soils, geology and mining or quarrying potential – Chapter 11 (Soils, Geology and Hydrogeology);
- Waterways, rivers and streams – Chapter 12 (Hydrology);
- Cultural heritage assets – Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage);
- Roads and transport assets – Chapter 14 (Traffic and Transport);
- Agricultural assets – Chapter 15 (Agronomy and Equine);
- Materials and waste management – Chapter 16 (Waste); and
- Visual amenity assets - Chapter 18 (Landscape and Visual).

This Chapter records the assessment of the potential impacts on the surrounding environment arising from the Construction and Operational Phases of the Proposed Development and, where appropriate, specifies mitigation measures based on the information presented in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.

This Chapter focuses on both the direct and indirect likely potential impacts of the Proposed Development on existing built services and major infrastructure comprising:

- Electricity infrastructure;
- Telecommunications infrastructure;
- Gas infrastructure;
- Water supply infrastructure; and

- Sewer network and drainage infrastructure.

17.2 Methodology

17.2.1 Study Area

The study area, for the purpose of the assessment described in this Chapter, comprises the area within the Planning Application Boundary.

17.2.2 Relevant Guidelines, Policy and Legislation

This Chapter has been prepared in accordance with the following guidance:

- EPA Guidelines (EPA 2022); and
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017).

17.2.3 Data Collection and Collation

A desk-based study has been carried out to identify existing utility services and infrastructure within the study area. This has been based on publicly available datasets and mapping, consultation with utility providers (as listed below) and targeted investigations. It is possible that some utility services located in proximity to the works may not have been identified. However, the mitigation detailed and proposed as part of this EIAR applies to all potential utility diversions and will be implemented when dealing with any such unidentified features.

All major infrastructure and utilities which may be impacted by the Proposed Development have been assessed as follows:

- Electricity;
- Water / wastewater;
- Gas;
- Telecommunications; and
- Other major infrastructure which interfaces with the Proposed Development (i.e., the sections of the aviation fuel pipeline to Dublin Airport that has been progressed to-date) and has not been addressed in the EIAR chapters listed in Section 17.1.

Existing utility information was requested from utility companies and service providers in 2023. In addition, as part of the design development, the potential for diversions and change being required to existing utility infrastructure have been considered. The following service providers provided utility information for the study area of the Proposed Development:

- Fingal County Council (FCC);
- Meath County Council (MCC);
- Electricity Supply Board (ESB) Networks / EirGrid;
- Uisce Éireann (formerly Irish Water) (for foul and water networks);
- Gas Networks Ireland (GNI);
- Telecommunication providers;
- AirNav Ireland;
- Irish Rail; and
- daa (formerly Dublin Airport Authority) for any potential infrastructure associated with the airfield along the R108 Barberstown Road or L3132 Naul Road.

In addition, cross-sectional Ground Penetrating Radar (GPR) surveys were undertaken in Q3 / Q4 2023 at selected locations along the proposed cable route to identify potential utility crossings.

17.2.4 Appraisal Method for the Assessment of Impacts

The assessment of the potential impact of the Proposed Development on material assets has been undertaken based on professional judgement and having regard to the EPA Guidelines (EPA 2022). The following issues have been considered as part of the assessment of impacts:

- Potential for impacts on major infrastructure and public utilities and the need to divert or adequately protect them in place during the Construction Phase, and to ensure ongoing protection into the Operational Phase; and
- Requirement for connections to public utilities by the Proposed Development during both the Construction and Operational Phases.

Each impact has been categorised based on:

- The quality of the impact arising from the Proposed Development;
- The significance of the impact; and
- The duration of the impact.

The definition of these impact characteristics is as per the EPA Guidelines is provided in Table 1.3 in Chapter 1 (Introduction and the Environmental Impact Assessment Process) in Volume 2 of this EIAR. These characteristics have been used to determine the quality and duration of the impacts.

The likely significant impacts of the Proposed Development on major infrastructure and utilities have been assessed using the significance criteria set out in Table 17.1, which has been adapted from the criteria in the EPA Guidelines.

For the purposes of assessing the impacts on major infrastructure and utilities, an impact is deemed to be not significant from a rating of Imperceptible to Moderate, and significant from Significant to Profound.

Table 17.1: Significance Criteria for Utilities

Significance Level	Criteria
Profound	Where there is a continuous utility interruption of more than a week; or Where additional demand on a utility would consume all remaining capacity.
Very Significant	Where there is a continuous utility interruption of more than 48 hours; or Where additional demand on a utility would significantly reduce the available capacity of that utility.
Significant	Where there is a continuous utility interruption of more than 24 hours; or Where there is significant additional demand on a utility.
Moderate	Where there are discrete utility interruptions of no more than eight hours for up to seven consecutive days; or Where the additional demand on a utility is relatively large.
Slight	Where there are discrete utility interruptions of no more than eight hours for up to three consecutive days; or Where additional demand on a utility is relatively small.
Not Significant	Where there is a utility interruption of no more than eight hours on a single day; or Where additional demand on a utility is quantifiable but is too small to have any impact on capacity.
Imperceptible	Where there is no utility interruption during diversion works; or Where additional demand on a utility has no material change.

17.3 Baseline Environment

The following provides an overview of the existing conditions within the study area with respect to material assets, utilising the information sources as outlined in Section 17.2. As outlined, this information has been based on publicly available datasets and mapping, consultation with utility providers, and targeted investigations. It reflects the available information at the time of undertaking this assessment. However, there is the potential that there may be unknown utilities within the study area or the available data may have incorrect location information. These data limitations however do not affect the assessment conclusions and any differences will be managed as per the mitigation set out in Section 17.5.

Approximately 26 kilometres (km) (70%) of the approximate 37.5km proposed cable route will be sited along existing roads, with the remainder (30%) to be located in private lands to avoid location-specific constraints. The proposed cable route will be in a cable trench, generally 1.5m in width and approximately 1.3m in depth in the public road (approximately 26km), and approximately 1.8m in depth in private lands and will run the full length of the Proposed Development between Woodland and Belcamp Substations. There are a number of existing utility services of varying diameters and depths along and crossing the Proposed Development.

The following existing utilities are located within the study area for the Proposed Development:

- Electricity lines, ducts and cabling and associated infrastructure;
- Potable watermains and associated infrastructure;
- Sewer lines and associated infrastructure;
- Gas mains (high and medium pressure);
- Telecommunications lines and associated infrastructure for multiple providers; and
- Infrastructure associated with Dublin Airport including the Aviation Fuel Pipeline.

Known utilities within the study area of the Proposed Development are summarised in Table 17.2 and utility crossings are listed in Appendix A4.1 (Utility Crossings) in Volume 3 of this EIAR.

Table 17.2: Summary of Utilities Within the Study Area

Utility Provider	Service Type	Description
ESB	High Voltage Electricity	Underground 400kV lines.
		Overhead and underground 220kV lines and cables.
		Overhead and underground 110kV lines and cables.
		Overhead 38kV lines.
	Medium Voltage Electricity	Underground cables.
		Overhead three phase Lines.
		Overhead single phase lines.
	Low Voltage Electricity	Underground cables.
		Overhead three phase lines.
		Overhead single phase lines.
Uisce Éireann	Potable Water	Trunk and distribution mains at various diameters and materials, with supporting infrastructure such as valves and hydrants.
	Sewer Lines	Foul sewer lines and associated infrastructure.
		Combined sewer lines and associated infrastructure.
Gas Networks Ireland	High Pressure Gas	900 millimetre (mm) steel main at 70bar.
		450mm steel main at 70bar.
	Medium Pressure Gas	250mm polyethylene mains at 4bar.
Telecommunications	National Broadband Ireland	Underground cables and associated infrastructure.
	Eir Network	Underground cables and associated infrastructure.
	Aurora Telecoms	Underground cables and associated infrastructure.
MSD	Electricity	20kV underground cable and associated infrastructure which overlaps with the Proposed Development for a section between approximate Chainage 13,550 and Chainage18,150.
Independent Pipeline Company Ltd.	Aviation Fuel	The Aviation Fuel Pipeline is currently under construction and once completed, will connect Dublin Airport and Dublin Port, allowing aviation fuel to be piped from the port to the airport. The Proposed Development will overlap with the pipeline for a short section along Stockhole Lane.
AirNav Ireland	Air Navigation Services	Infrastructure associated with air navigation services at Dublin Airport at Naul Road.
daa	Landing Lights	Infrastructure associated with the runway landing lights at Dublin Airport.

17.4 Potential Impacts

This Section sets out the assessment of potential impacts that are predicted to occur due to the Proposed Development, in the absence of mitigation. This informs the need for mitigation or monitoring to be proposed (Section 17.5). Predicted residual impacts taking into account any proposed mitigation are presented in Section 17.6.

17.4.1 'Do Nothing' Scenario

In the Do Nothing scenario, the Proposed Development would not be implemented and there would be no changes to existing infrastructure or utilities as a result of the Proposed Development. Therefore, there would be a Neutral impact on infrastructure and utilities under the Do Nothing scenario.

17.4.2 Construction Phase

This Section outlines the key potential impacts on major infrastructure and utilities as a result of the Construction Phase of the Proposed Development. Chapter 19 (Risk of Major Accidents and / or Disasters) in Volume 2 of this EIAR presents an assessment of the impacts associated with major accidents involving utilities. Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR should also be referenced for additional detail on the Construction Phase of the Proposed Development.

The main potential for impacts on utilities associated with the Construction Phase of the Proposed Development will be as a result of:

- The potential to require diversion or protection in place of any of the existing utility infrastructure where there may be a direct interface with aspects of the Proposed Development; and
- Utility usage by Temporary Construction Compounds and Horizontal Directional Drilling (HDD) Compounds, and construction equipment (i.e. powering site offices and equipment, water and wastewater for construction activities and welfare facilities, and telecommunications connections for site offices and equipment).

17.4.2.1 Utility Interfaces

A number of potential interfaces between existing utility infrastructure and the Proposed Development have been identified but these will need to be confirmed prior to commencement of the Construction Phase. Such interfaces may necessitate diversion of the existing infrastructure. These potential diversions are listed in Table 17.3.

Table 17.3: Utility Interfaces with Potential to Require Diversions

Name of Utility	Description	Approximate Chainage
Electricity	Medium voltage underground cable (if located on southern side of carriageway)	32,530
Water	125mm HDPE water distribution main in the verge to the north	4,587
	150mm HDPE water distribution main in the verge to the north	9,088
	150mm HDPE water distribution main in the verge to the north	9,935
	100mm uPVC water distribution main in the verge to the north	
	75mm uPVC water main	13,600 – 18,200 (various individual locations)
	2 x 450mm ductile iron trunk water mains in middle of carriageway	24,215
	2 x abandoned water pipes in both verges	
Wastewater	350mm Ductile Iron Pumped Foul in the verge to the southwest	19,750

Diversion of utilities and services, as outlined in Table 17.3, may require planned service outages. These will generally be limited in duration (generally minutes to hours, and not over multiple days, as far as reasonably practicable), occurring only where absolutely necessary in order to facilitate the construction of the Proposed Development. Given that the exact duration of each potential service outage cannot be ascertained at this stage, a conservative scenario of brief disruptions over the course of a week has been assumed. Using the criteria as outlined in Section 17.2.4 and the conservative scenario for disruptions, where a diversion of a service / utility will result in a planned interruption in provision, the potential impact will be Negative, Moderate and Temporary.

17.4.2.2 Utility Use

There is the potential for impacts as a result of the need to access utilities for carrying out construction works. During the Construction Phase, Temporary Construction Compounds and HDD Compounds will be required along the Proposed Development, as described in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR, and will require electricity, welfare facilities, and telecommunications, as described below:

- Temporary Construction Compounds and HDD Compounds will require electricity to power any temporary office and welfare facilities during the Construction Phase. Power for the Temporary Construction Compounds and HDD Compounds will be supplied through a connection into the electricity network, or where this is unavailable, via generators. Temporary electricity provision for works areas along the Proposed Development to power items such as temporary lighting, temporary traffic signals and other construction equipment will be provided through generators, as required;

- Telecommunications access will be required at the temporary Construction Compounds and HDD Compounds, which will be supplied through local networks as appropriate;
- Temporary Construction Compounds, HDD Compounds and construction areas will require a water supply for welfare facilities and will be connected into the local mains water supply, where possible. Where a connection is not possible, water tankers will be used; and
- Wastewater and surface water runoff will be created by the Temporary Construction Compounds, HDD Compounds and construction areas. Wastewater will be created by welfare facilities within the Temporary Construction Compounds, and surface water runoff will emanate from any areas of the Construction Compounds and construction areas which are paved. The Construction Compounds will be connected into the local foul / combined sewers where possible, or where not possible, will have on-site tanks for the collection of foul water which will be emptied by means of a suction tanker and the wastewater shall be disposed of to a licensed wastewater treatment plant. Where required, temporary welfare facilities (for example portable toilets) will be used, which will be collected as required for offsite disposal of the wastewater to a suitably licensed facility.

Given that the demand on local services and utilities as a result of the above connection requirements will be minimal (i.e., will be quantifiable but will not impact on existing capacities) and temporary / short-term, it is anticipated that the demand on electricity, water, wastewater and telecommunications services during the Construction Phase will result in a Negative, Not Significant, Short-Term impact as per the criteria set out in Table 17.1.

17.4.3 Operational Phase

All utility connections and works on the required utility infrastructure will be finished prior to the Operational Phase. Routine maintenance will be required along the proposed cable route during the Operational Phase. Should there be utility requirements associated with maintenance activities, this will generally be for brief periods and therefore the impact as a result of demand on any utilities or service disruptions impacting the surrounding residential, social and commercial properties will be Negative, Imperceptible and Brief as per Table 17.1. No impacts on other existing utilities in close proximity to the Proposed Development are anticipated during maintenance activities as any diversions or protection measures required to facilitate the Proposed Development will have been completed during the Construction Phase.

The improvement of the electricity infrastructure of the region once the Proposed Development is operational, will result in a Positive, Significant and Long-Term impact.

17.5 Mitigation and Monitoring Measures

This Section outlines the mitigation measures which will be adhered to for material assets during the Construction and Operational Phases of the Proposed Development. No monitoring measures are considered to be required for material assets.

17.5.1 Construction Phase

The Proposed Development has been designed to minimise the impact on major utility infrastructure. This includes the avoidance of interactions with major utility infrastructure, as far as is possible. Where there are interfaces with existing utility infrastructure, protection in place or diversion as necessary is proposed to prevent long-term interruption to the provision of the affected services, which will be based on applicable minimum safety clearances and design standards.

All measures set out in this Section will be taken to avoid unplanned disruptions to any services during the Construction Phase. Potential utility diversions as per Table 17.3 are based on available records, and preliminary site investigations. Prior to excavation works commencing, localised confirmatory surveys will be undertaken by the appointed contractor to verify the results of the pre-construction assessments undertaken and reported in this EIAR and to ensure any unknown utilities are identified. Where works are required in and around known utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances, where possible, isolation of the section of infrastructure during works in the immediate vicinity.

All utility companies for which diversions are potentially required will continue to be consulted when designing any diversions to ensure that the proposed diversions conform to the utility provider's requirements and to ensure that service interruptions are kept to a minimum.

Where diversion, or modifications, are required to utility infrastructure, service interruptions and disturbance to the surrounding residential, commercial and / or community property may be unavoidable. Where this is the case, it will be planned in advance by the appointed contractor. Required service interruptions will generally only occur for a set period of time per day (a set number of hours not exceeding eight hours where reasonably practicable) and generally will not be continuous for a full day at a time. Prior notification of disruptions will be given to all impacted properties. This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruptions. Any required works will be carefully planned by the appointed contractor to ensure that the duration of the interruptions is minimised, in as far as possible. Consultation with relevant neighbouring parties will be undertaken prior to any proposed disruptions.

The level of significance of impacts during the Construction Phase is not predicted to change even with implemented mitigation in place.

17.5.2 Operational Phase

Should maintenance measures necessitate it, service disruptions impacting the surrounding residential, social and commercial properties will be kept to a minimum only occurring where unavoidable. Prior notification of disruptions will be given to all impacted properties. This will include information on when disruptions are scheduled to occur and the duration of the disruption. Consultation with relevant neighbouring parties will be undertaken prior to any proposed disruption.

17.6 Residual Impacts

No significant negative residual impacts on major infrastructure or utilities are predicted either in the Construction or Operational Phase of the Proposed Development. Once operational, the Proposed Development will have a residual Positive, Significant and Long-Term impact on the electricity infrastructure in the region.

Future utility work (outside the scope of the Proposed Development) will ultimately be undertaken by the relevant utility company using their own statutory powers and will need to be done in consultation with ESB to ensure that any future development does not impact the Proposed Development. There are minimum safety clearances and design standards that will need to be maintained but it will be possible for future utilities to co-exist with the Proposed Development (see Chapter 4 (Proposed Development Description) for further detail).

17.7 Conclusion

This Chapter presented the results of the assessment for material assets arising from the Proposed Development. No significant negative residual impacts on major infrastructure or utilities are predicted either during construction or operation. Once operational, the Proposed Development will have a positive, significant impact on the electricity infrastructure in the region.

17.8 References

EPA (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

European Commission (2017). Environmental Impact Assessment of Projects - Guidance on the Preparation of the Environmental Impact Assessment Report

Directives and Legislation

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

Jacobs

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 18 – Landscape and Visual

EirGrid

March 2024

Contents

18. Landscape and Visual

18.1 Introduction

This Chapter presents the assessment of the likely potential landscape and visual impacts of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) during the Construction and Operational Phases. A full description of the Proposed Development is provided in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

Although closely linked, landscape and visual impacts are assessed separately.

Landscape Impact Assessment relates to assessing impacts of the Proposed Development on the landscape as a resource in its own right and is concerned with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character.

Visual Impact Assessment relates to assessing impacts of the Proposed Development on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and / or the introduction of new elements. Visual impacts may occur from visual obstruction (blocking of a view, be it full, partial, or intermittent) or visual intrusion (interruption of a view without blocking).

18.2 Methodology

The methodology employed for this EIAR assessment is as follows:

- A desk-based study to establish an appropriate study area, relevant landscape and visual designations in the appropriate County Development Plans, as well as other sensitive visual receptors. This stage culminates in the selection of a set of potential viewpoints from which to study the effects of the Proposed Development;
- Fieldwork to establish the landscape character of the baseline environment and to confirm and refine the set of viewpoints to be used for the visual assessment stage;
- Assessment of the significance of the landscape impact of the Proposed Development as a function of landscape sensitivity weighed against the magnitude of the landscape impact;
- Assessment of the significance of the visual impact of the Proposed Development as a function of visual receptor sensitivity weighed against the magnitude of the visual impact; and
- Assessment where mitigation measures are proposed to reduce potential impacts and an estimation of residual impacts once the mitigation planting has become established.

18.2.1 Study Area

According to the Landscape Institute and the Institute of Environmental Management and Assessment (IEMA) Guidelines for Landscape and Visual Impact Assessment 3rd edition (hereafter referred to as the GLVIA) (Landscape Institute and IEMA 2013), the first step in the process of landscape and visual impact assessment (LVIA) is to determine a bespoke study area which is appropriate to the combination of the development type and the receiving landscape and visual context. A 500m (metre) buffer study area was applied to either side of the proposed cable route, substation upgrades and Temporary Construction Compounds (TCCs) and Horizontal Directional Drilling (HDD) Compounds as, based on professional experience and judgement, it is anticipated that significant landscape or visual impacts are highly unlikely beyond this 1km (kilometre) wide swathe due to the nature of the proposed infrastructure and the transient nature of the proposed construction works (refer to Image 18.1 and Figure 18.1 in Volume 3 of this EIAR).

Image 18.1: Study Area

18.2.2 Relevant Guidelines, Policy and Legislation

This assessment was carried out in line with the GLVIA (Landscape Institute and IEMA 2013) and in compliance with the Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022). The Meath County Council (MCC) Meath County Development Plan 2021 – 2027 (MCC 2021) and the Fingal County Council (FCC) Fingal Development Plan 2023 – 2029 (FCC 2023) were also reviewed.

18.2.3 Data Collection and Collation

18.2.3.1 Desk Study

The desk-based study element of data collection involved a review of project documents and Geographical Information System (GIS) datasets for the Proposed Development. These were read against a backdrop of aerial photography and topographical information. GIS datasets included highly sensitive landscape area scenic designations, and these were cross-checked against the relevant County Development Plans, in the interest of thoroughness. This was undertaken on 18 May 2023 (noting there have been no amendments to the relevant development plans since this cross-check was undertaken).

Data to inform the assessment was extracted from the following data sources on 18 May 2023:

- Meath County Development Plan 2021 - 2027 (MCC 2021);
- Fingal Development Plan 2023 – 2029 (FCC 2023);
- National Parks and Wildlife Service mapping (NPWS 2023);
- The Heritage Council – Heritage mapping (Heritage Council 2023);
- Ordnance Survey Ireland (OSI) maps (OSI 2023);
- Coillte Recreation map (Coillte 2023);
- Discover Ireland (Discover Ireland 2023) ;
- The National Inventory of Architectural Heritage (NIAH) survey data (NIAH 2021); and
- Sport Ireland Trails (Sport Ireland 2023).

18.2.3.2 Field Survey

Fieldwork was undertaken on 29 May 2023 as part of the preparation of this assessment. This involved reviewing and recording aspects of landscape character within the study area and at selected locations in relation to the visual baseline. This was undertaken to establish an understanding of the landscape and visual context of the Proposed Development and to validate the County Landscape Character Assessments. Fieldwork was undertaken from publicly accessible roads / land. High resolution photography for the verified photomontages was captured at each of the selected viewshed reference points on this date, apart from VP4. VP4 was selected as a viewpoint location within the LVIA undertaken by Macro Works of the Greater Dublin Drainage Project. The location of VP4 was not accessible on 29 May 2023, so the photography captured on 12 June 2018 was used as the basis of the photomontage to represent the Proposed Development from there.

18.2.4 Appraisal Method for the Assessment of Impacts

Assessment of impacts was undertaken in accordance with the GLVIA (Landscape Institute and IEMA 2013), from which the methodology is derived and described herein.

18.2.4.1 Landscape Impact Assessment Criteria

When assessing the potential impacts on the landscape resulting from the Proposed Development, the following criteria were considered:

- Landscape character, value and sensitivity;
- Magnitude of likely impacts; and
- Significance of landscape impacts.

The sensitivity of the landscape to change is the degree to which a particular landscape receptor (Landscape Character Area or landscape element) can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. Landscape value and sensitivity are classified using the criteria set out in Table 18.1.

Table 18.1: Landscape Value and Sensitivity

Sensitivity	Description
Very High	Areas where the landscape character exhibits a very low capacity for change in the form of development. Examples of which are high value landscapes, protected at an International or National level (World Heritage Site/National Park), where the principal management objectives are likely to be protection of the existing character.
High	Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national or regional level, where the principal management objectives are likely to be considered conservation of the existing character.
Medium	Areas where the landscape character exhibits some capacity and scope for development. Examples of which are landscapes which have a designation of protection at a County level, or at non-designated Local level, where there is evidence of local value and use.
Low	Areas where the landscape character exhibits a higher capacity for change from development. Typically this would include lower value, non-designated landscapes that may also have some elements or features of recognisable quality, where landscape management objectives include enhancement, repair and restoration.
Negligible	Areas of landscape character that include derelict, mining, industrial land, or are part of the urban fringe, where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and / or restoration to realise a higher landscape value.

The magnitude of a potential landscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the Proposed Development. The magnitude accounts for whether there is a direct physical impact resulting from the loss of landscape components and / or a change that extends beyond the application site boundary that may have an effect on the landscape character of the area. The magnitude of landscape impacts is classified in Table 18.2.

Table 18.2: Magnitude of Landscape Impacts

Magnitude	Description
Very High	Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality.
High	Change that would be more limited in extent and scale with the loss of important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality.
Medium	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in landscape character, and quality.
Low	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements.
Negligible	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable.

The significance of a landscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the matrix set out in Table 18.3.

Table 18.3: Impact Significance Matrix

Sensitivity of Receptor					
Scale / Magnitude	**Very High**	**High**	**Medium**	**Low**	**Negligible**
Very High	Profound	Profound – Substantial	Substantial	Moderate	Slight
High	Profound-substantial	Substantial	Substantial – Moderate	Moderate – Slight	Slight – Imperceptible
Medium	Substantial	Substantial – Moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate – Slight	Slight	Slight – Imperceptible	Imperceptible
Negligible	Slight	Slight – Imperceptible	Imperceptible	Imperceptible	Imperceptible
Note: For the purposes of this Chapter, judgements deemed 'substantial' and above are considered to be equivalent to or greater than 'significant impacts'.					

18.2.4.2 Visual Impact Assessment Criteria

As with the landscape impact, the visual impact of the Proposed Development will be assessed as a function of sensitivity versus magnitude. In this instance, the sensitivity of the visual receptor, weighed against the magnitude of the visual impact.

18.2.4.2.1 Sensitivity of Visual Receptors

Unlike landscape sensitivity, the sensitivity of visual receptors has an anthropocentric basis. It considers factors such as the perceived quality and values associated with the view, the landscape context of the viewer, the likely activity they are engaged in and whether this heightens their awareness of the surrounding landscape. A list of the factors considered by the assessor in estimating the level of sensitivity for a particular visual receptor is outlined below:

1. Susceptibility of receptors - In accordance with the GLVIA (Landscape Institute and IEMA 2013), visual receptors most susceptible to changes in views and visual amenity are:
    - Residents at home;
    - People, whether residents or visitors, who are engaged in outdoor recreation, including the use of public rights of way, whose attention or interest is likely to be focused on the landscape and on particular views;
    - Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;
    - Communities where views contribute to the landscape setting enjoyed by residents in the area; and
    - People travelling on road, rail or other transport routes, where such travel involves recognised scenic routes and awareness of views, is likely to be heightened.
2. Visual receptors that are less susceptible to changes in views and visual amenity include:
    - People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape; and
    - People at their place of work whose attention may be focused on their work or activity, not their surroundings, and where the setting is not important to the quality of working life.
3. Recognised scenic value of the view (County Development Plan designations, guidebooks, touring maps, postcards etc.). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Developments Plans, for example, a public consultation process is required;
4. Views from within highly sensitive landscape areas. Again, highly sensitive landscape designations are usually part of a County's Landscape Character Assessment, which is then

incorporated within the County Development Plan and is therefore subject to a public consultation process. Viewers within such areas are likely to be highly attuned to the landscape around them;

5. Primary views from dwellings. A proposed development might be seen from anywhere within a particular residential property with varying degrees of sensitivity. Therefore, this category is reserved for those instances in which the design of dwellings or housing estates has been influenced by the desire to take in a particular view. This might involve the use of a slope or the specific orientation of a house and / or its internal social rooms and exterior spaces;
6. Intensity of use, and popularity. This relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at a County or Regional scale;
7. Connection with the landscape. This considers whether or not receptors are likely to be highly attuned to views of the landscape (i.e. commuters hurriedly driving on a busy national route versus hill walkers directly engaged with the landscape enjoying changing sequential views over it);
8. Provision of elevated panoramic views. This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas;
9. Sense of remoteness and / or tranquillity. Receptors taking in a remote and tranquil scene, which is likely to be fairly static, are likely to be more receptive to changes in the view than those taking in the view of a busy street scene, for example;
10. Degree of perceived naturalness. Where a view is valued for the sense of naturalness of the surrounding landscape, it is likely to be highly sensitive to visual intrusion by distinctly manmade features;
11. Presence of striking or noteworthy features. A view might be strongly valued because it contains a distinctive and memorable landscape feature such as a promontory headland, lough or castle;
12. Historical, cultural and / or spiritual significance. Such attributes may be evident or sensed by receptors at certain viewing locations, which may attract visitors for the purposes of contemplation or reflection, heightening the sense of their surroundings;
13. Rarity or uniqueness of the view. This might include the noteworthy representativeness of a certain landscape type and considers whether the receptor could take in similar views anywhere in the broader region or the country;
14. Integrity of the landscape character. This looks at the condition and intactness of the landscape in view and whether the landscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;
15. Sense of place. This considers whether there is a special sense of wholeness and harmony at the viewing location; and
16. Sense of awe. This considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations which are deemed to satisfy many of the above criteria are likely to be of higher sensitivity. Overall sensitivity may be a result of a number of these factors or, alternatively, a strong association with one or two in particular.

18.2.4.2.2 Visual Impact Assessment Magnitude

The magnitude of visual impacts is determined based on two factors: the proposal's visual presence (relative visual dominance), and its effect on visual amenity. The magnitude of visual impacts is classified in Table 18.4.

Table 18.4: Magnitude of Visual Impact

Magnitude of Impact	Description
Very High	The proposal obstructs or intrudes into a large proportion or critical part of the available vista and is without question the most noticeable element. An extensive degree of visual change will occur within the scene completely altering its character, composition and associated visual amenity.
High	The proposal obstructs or intrudes into a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual change will occur within the scene substantially altering its character, composition and associated visual amenity.
Medium	The proposal represents a moderate intrusion into the available vista and is a readily noticeable element. A noticeable degree of visual change will occur within the scene perceptibly altering its character, composition and associated visual amenity.
Low	The proposal intrudes to a minor extent into the available vista and may not be noticed by a casual observer and / or the proposal would not have a marked effect on the visual amenity of the scene.
Negligible	The proposal would be barely discernible within the available vista and / or it would not influence the visual amenity of the scene.

18.2.4.2.3 Visual Impact Significance

As stated in Section 18.2.4.2, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix and applies the same EPA Guidelines' definitions (EPA 2022) of significance, as used earlier in respect of landscape impacts (Table 18.3).

18.2.4.3 Quality and Timescale Impacts

In addition to assessing the significance of landscape impacts and visual impacts, the EPA Guidelines (EPA 2022) require that the quality of the impacts is also determined. This could be negative / adverse, neutral, or positive.

Landscape and visual impacts are also categorised according to their duration:

- Temporary – Lasting for one year or less;
- Short Term – Lasting one to seven years;
- Medium Term – Lasting seven to 15 years;
- Long Term – Lasting 15 years to 60 years; and
- Permanent – Lasting over 60 years.

18.3 Baseline Environment

18.3.1 Extent of Study Area

The landscape is the visible environment in its entirety, comprised of both natural and built elements including topography, water bodies, vegetation, wildlife habitats, open spaces, buildings and structures. Landscape and visual sensitivities considered include statutory and non-statutory landscape designations, natural features, Landscape Character Areas, notable deciduous trees of woodland, amenities and historic landscapes. Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR presents a full description of the Proposed Development.

The proposed cable route will commence at the existing Woodland Substation near Batterstown, County Meath, and will terminate at the extension to the existing Belcamp Substation, in the townlands of Clonshagh and Belcamp in Fingal in County Dublin. A portion of the proposed cable route between Woodland and Belcamp Substations will be located within County Meath and will fall under the remit of the Meath County

Development Plan 2021 – 2027 (MCC 2021), and the remaining portion of the proposed cable route will be located within Fingal in County Dublin and will fall under the remit of the Fingal Development Plan 2023 – 2029 (FCC 2023). Therefore, these County Development Plans were reviewed for this assessment. The review of these County Development Plans considered Landscape Character Areas, landscape elements and scenic designations.

In general, the Proposed Development will be located within a robust, modified landscape that is partially contained in well-developed peri-urban areas, alongside low rolling pastoral fields. Due to the location of the study area, on the peripheries of Dublin City and its hinterland, it presents as a highly modified landscape, with a slight pastoral aesthetic, which is more apparent toward the western and north-western portions of the study area within County Meath. The sections of the proposed cable route that will be located within County Dublin read as a typical modified landscape under anthropogenic influence, whilst the sections of the proposed cable route that will be located within County Meath read as a typical productive rural landscape that is not particularly rare or distinctive at a National or Regional scale.

18.3.2 Landform and Drainage

The study area has a gently undulating topography that is slightly more elevated to the west of Dublin Airport, and gradually increases toward the more inland areas (west / north-west). Watercourses in the area generally drain in an easterly direction. The most notable watercourse in the study area is the River Tolka which flows through the western portion of the study area, through Dunboyne, then Mulhuddart, through North Dublin, and eventually into Dublin Bay.

18.3.3 Vegetation and Land Use

A large proportion of the study area is occupied by agricultural fields. Field patterns are generally composed of small to medium sized fields demarcated by mature hedgerows. Outside of agricultural land use, the predominant land use is urban, in the form of built-up residential areas, and industrial estates in and around Dublin Airport and surrounding Dunboyne Village.

18.3.4 Centres of Population and Houses

The greatest population densities within the study area are in the settlements of The Baskins, along Baskin Lane, to the east of Dublin Airport, and at Dunboyne Village. There are some smaller cross road settlements present, in the form of isolated housing estates, alongside one-off houses dispersed throughout the study area, generally spread along the local roads. It is also of note that there are numerous planning applications in the vicinity of the Proposed Development, as detailed in Chapter 21 (Cumulative Impacts and Environmental Interactions) in Volume 2 of the EIAR, and in the Planning Report, which is a standalone document in this planning application pack.

18.3.5 Transport Routes

The M1, M2 and M3 Motorways are the most significant transport routes that pass through the study area. Several regional roads also fall within the study area, namely the R156, R157, R122, R121 and R108 Regional Roads. The Dublin to M3 Parkway / Dunboyne rail line also passes through the study area. The proposed cable route will have varying levels of interaction with each of these transport routes, as well as several smaller local roads that traverse the study area.

18.3.6 Tourism, Heritage and Public Amenities

There are no notable landscape related tourism or heritage amenities within the study area. There are several public amenities, in the form of golf clubs and other sports recreation areas. St. Margaret's Golf and Country Club is located along the R122 Regional Road to the north-west of Dublin Airport and the Forrest Little Golf

Club is located immediately north of Dublin Airport, along the Naul Road. Additionally, there are several sports recreation grounds located throughout the study area, both within County Dublin and County Meath, namely AUL Complex in Clonshaugh, Craobh Chiaráin Hurling and Football Club pitches in Belcamp (although noting that this is not the main club facility for this club), Dublin Ward Cross Football Complex and St. Margaret's GAA in County Dublin, and Dunboyne AFC in County Meath.

18.3.7 Policy Context - Landscape

The Meath County Development Plan 2021 – 2027 (MCC 2021) and Fingal Development Plan 2023 – 2029 (FCC 2023) have identified Landscape Character Areas across each respective County. A map showing those that occur within the study area is presented in Image 18.2.

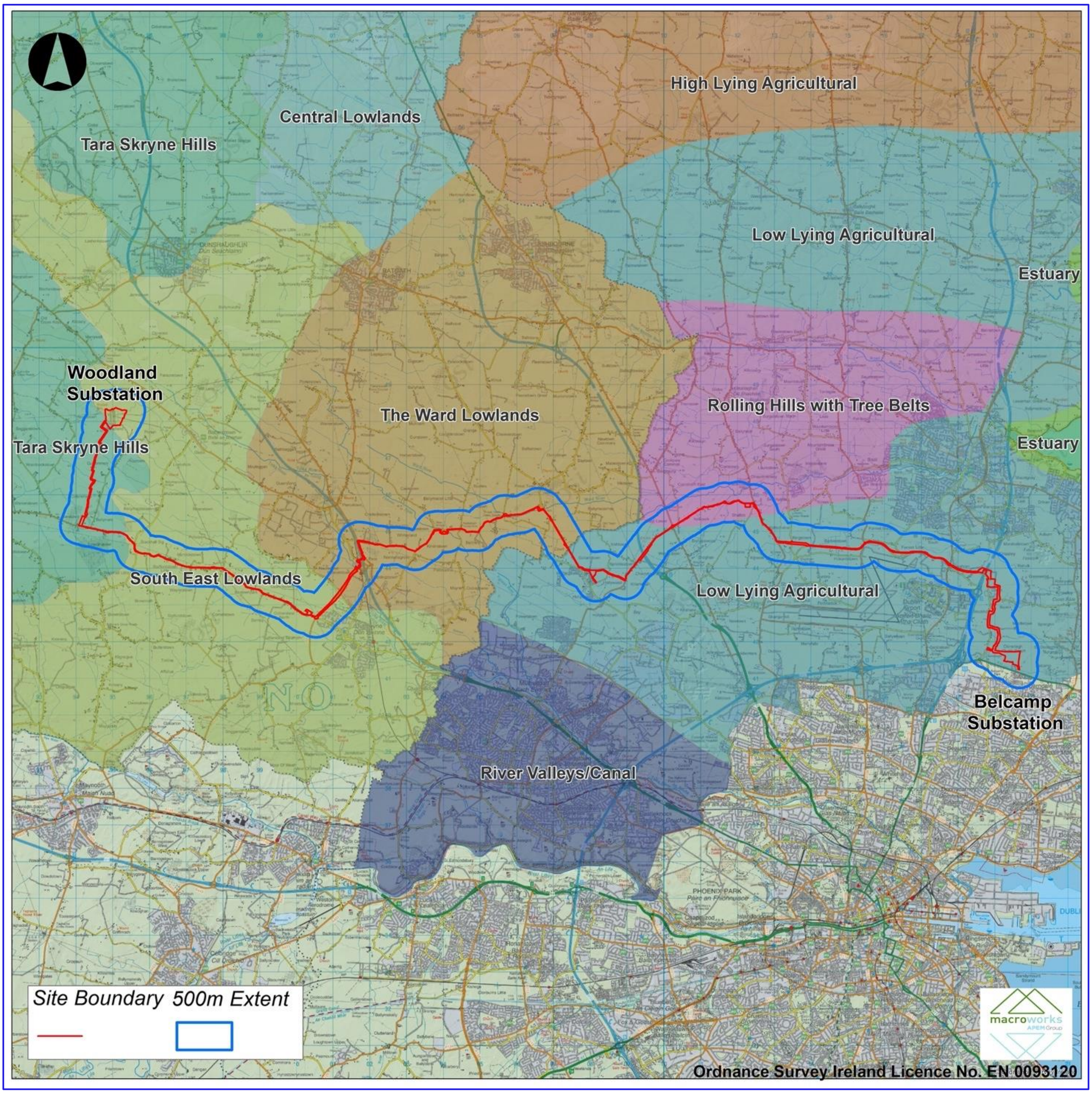

Image 18.2: Landscape Character Areas within the Study Area

18.3.7.1 County Meath

The Landscape Character Assessment for County Meath is contained in Appendix 7 of the Meath County Development Plan 2021 – 2027 (MCC 2021). There are three Landscape Character Areas within the study area; Tara Skryne Hills, South East Lowlands, and The Ward Lowlands. Each Landscape Character Area within County Meath is assigned a rating in relation to 'value', 'importance', 'sensitivity' and potential capacity to accommodate various forms of development. These are presented in Table 18.5, and are shown on Image 18.2.

Table 18.5: Summary of Landscape Character Areas

Landscape Character Area	Summary of Landscape Character Assessment in the County Development Plan
Meath: 12. Tara Skryne Hills	• Landscape Character Type: Hills and Upland Areas; • Value: Exceptional; • Importance: National / International; • Sensitivity: High; and • Potential capacity to accommodate development - underground services: Low. The south-east portion of this Landscape Character Area, where the Proposed Development will be located, does not encompass the Hill of Tara or Skryne Hill.
Meath: 11. South East Lowlands	• Landscape Character Type: Lowland Landscape; • Value: Very High; • Importance: Regional; and • Sensitivity: Medium. Potential capacity to accommodate development - underground services: Medium
Meath: 10. The Ward Lowlands	• Landscape Character Type: Lowland Landscape; • Value: Very High; • Importance: Regional; and • Sensitivity: Medium. Potential capacity to accommodate development - underground services: Medium.
Fingal: Rolling Hills with Tree Belts	• Landscape Character Type: Rolling Hills Type; • Value: Modest; and • Sensitivity: Medium.
Fingal: Low Lying Agricultural	• Landscape Character Type: Low Lying Type; • Value: Modest; and • Sensitivity: Low.

18.3.7.2 Fingal

The Fingal Development Plan 2023 – 2029 (FCC 2023) divides North County Dublin into various Landscape Character Areas. There are two Landscape Character Areas within the Fingal portion of the study area: Rolling Hills with Tree Belts, and Low Lying Agricultural, as presented in Table 18.5 and shown on Image 18.2. In the Fingal Development Plan 2023 – 2029, each Landscape Character Area is assigned a rating in relation to 'value' and 'sensitivity'.

Accompanying the Fingal Development Plan 2023 – 2029 are Sheets 14 to 16 which indicate the Green Infrastructure Maps. Sheet 14 includes 'Highly Sensitive Landscape' areas, 'Historic Landscape Characterisation (HLC) Areas' and 'Special Amenity Areas'. There are no 'Highly Sensitive Landscape' areas, nor 'Special Amenity Areas' located within the study area. However, a section of the proposed cable route will pass through a HLC Area, which encompasses Swords Village and surrounds, extending toward Dublin Airport.

With consideration of the nature and scale of the Proposed Development in respect of the Landscape Character Assessments for County Meath and Fingal, sensitivity ratings have been assigned to each Landscape Character Area and are indicated in Table 18.5. These judgements refer to material contained within the relevant County Development Plans but are independent judgements specifically in relation to the scale and context of the Proposed Development and are determined with respect to Table 18.1 and the descriptions of the baseline environment in Section 18.3.

18.3.8 Policy Context - Visual

Map 8.6 of the Meath County Development Plan 2021 - 2027 (MCC 2021) identifies 'views and prospects'. None of these designations are located within the study area.

Accompanying the Fingal Development Plan 2023 – 2029 (FCC 2023) is 'Sheet 14 – Green Infrastructure 1' which outlines routes with the objective to 'Preserve Views' typically pertaining to scenic sections of road. None of these routes with views to be preserved occur within the study area. Furthermore, it is outlined in the Fingal Development Plan 2023 – 2029 that:

> "*In assessing views and prospects it is not proposed that this should give rise to the prohibition of development along these routes, but development, where permitted, should not hinder or obstruct these views and prospects and should be designed and located to minimise their impact.*"

18.4 Potential Impacts

The following descriptions focus on those aspects of the Proposed Development that are most relevant to landscape and visual impacts and should be read in conjunction with Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. The greatest potential for significant impacts on landscape character and for visual impacts to occur in relation to the Proposed Development will be during the Construction Phase, as, apart from the proposed upgrade works at Woodland Substation and the proposed new Gas Insulated Switchgear (GIS) Hall and associated transformers at Belcamp Substation, there will only be very minor surface expression of the Proposed Development during the Operational Phase (i.e., permanent Joint Bays, marker posts, permanent access tracks and limited locations of permanent vegetation loss). However, as the Construction Phase will be temporary at any one location, its effects will be transient along the proposed cable route and almost fully reversible through reinstatement of the prevailing land cover. Therefore, there is limited potential for significant impacts to occur.

18.4.1 'Do Nothing' Scenario

With respect to landscape and visual, the 'Do Nothing' scenario means that the Proposed Development would not be implemented and associated changes to the landscape and visual environment as a result of the Proposed Development would not arise. Therefore, there would be a Neutral impact on landscape and visual under the Do Nothing scenario.

18.4.2 Sensitivity - Landscape

In terms of heritage and amenity, the study area comprises relatively typical features such as old churches, graveyards, local sports clubs and golf courses. It is not considered that the study area is highly synonymous with outdoor recreation, which is further reflected by the lack of any waymarked walking or cycling trails within the study area. Overall, the study area is primarily made up of peri-urban landscape, and typical working rural landscape. Parts of the study area within County Dublin and around Dunboyne in County Meath, have a stronger peri-urban character and are not considered to be highly susceptible to change as they are currently influenced by an array of anthropogenic land uses. Whilst other parts of the study area present with a pastoral aesthetic, the landscape throughout the study area is not considered to be highly rare or distinctive.

The proposed underground cable route will run within the existing road network and occasionally underground through private farmland from Woodland Substation to Belcamp Substation. Open cut trenching will be required to lay the cables during the Construction Phase generating temporary and transient effects. The prevailing road surface will be fully reinstated following the Construction Phase.

There will be limited material surface expression of the proposed cable route during the Operational Phase even at the sub-surface concrete Joint Bays, which will be covered in with dry fill and the prevailing surface reinstated. Stream crossings will be achieved using open cut trenching options and will not result in permanent surface expression during the Operational Phase. Above-ground infrastructure is proposed where the proposed cable route will connect into the existing Woodland Substation and into a new GIS Hall at the extended Belcamp Substation. The existing Woodland and Belcamp Substations contribute to a landscape character in their respective locations with a greater degree of complexity than would be generally associated with typical agricultural land uses. Furthermore, in terms of sensitivity, road corridors themselves are not considered to be a particularly sensitive element within the landscape, as they are a highly modified transport routes and works can be readily reinstated. For this reason, for the vast majority of the proposed underground cable route is designed to be laid under existing road surfaces where the sensitivity of the immediate landscape is deemed to be low. However, there is a greater degree of landscape sensitivity where the proposed underground cable route is being laid off-road. For the off-road sections, the Joint Bays (surrounded by a maintenance hard standing composed of crushed rock / stone) and marker posts will be visible at the surface level. Off-road Joint Bays will also be connected to the public road by permanent access tracks. Permanent access tracks will result in permanent vegetation removal. These tracks will be unbound, also made from crushed rock/stone. Off-road sections will result in the removal of vegetation which contributes to the hedgerow patterns and character of the receiving landscape. Industrial farm machinery is commonly present in these off-road sections, and while the intensity of construction activities would be greater than typical agricultural activities it would not be novel to have plant movement occurring. Taking the above factors into account, it is not considered that Construction or Operational Phase impacts are likely to be significant beyond 500m of the proposed cable route.

Table 18.6 presents a summary of the sensitivities of Landscape Character Areas of relevance to the Proposed Development.

Table 18.6: Summary of Landscape Character Area Sensitivity

Landscape Character Area	Sensitivity
Meath: 12. Tara Skryne Hills	High - Medium
Meath: 11. South East Lowlands	Medium - Low
Meath: 10. The Ward Lowlands	High - Medium
Fingal: Rolling Hills with Tree Belts	Medium - Low
Fingal: Low Lying Agricultural	Low
Woodland Substation	Low-negligible
Belcamp Substation	Low-negligible

18.4.3 Sensitivity - Visual

Views of the agricultural landscape are generally pleasant in terms of its rolling pastoral aesthetic and 'green', settled working character. The network of hedgerows and vegetation that occur throughout the landscape contribute to some sense of naturalness, and in combination with its undulating topography, generates a high degree of containment in many locations.

However, whilst the agricultural context forms the primary landscape and visual experience in the local landscape of the Proposed Development, this is interrupted by features and activity associated with the built area on the outskirts of Dunboyne and Darndale, residential development, major transport routes, light industry and Dublin Airport. Indeed, all parts of this landscape, including those areas in agricultural use, demonstrate longstanding human intervention in the landscape.

There are no scenic route designations within the study area that are applicable to sections of the local, regional and national level road network in the vicinity of the Proposed Development. Views towards the Proposed Development are not considered to be unique, or form a core part of any key views. Likewise, the integrity and quality of landscape features is not considered to contribute to, or generate any specific scenic value. Views within the study area tend to be typical and contained agricultural views rather than expansive and / or exceptional views.

Key differentials in terms of visual receptor sensitivity relate to the occupation of the visual receptor, and whether views of the surrounding landscape are an inherent part of the experience. Static residential receptors are considered generally more susceptible to changes in views over those where views are experienced transiently by those travelling through the landscape particularly on major transport routes where road infrastructure and traffic volume draw from visual amenity. Likewise, receptors located at closer proximity to the Proposed Development are considered more susceptible to changes in views over those where views are experienced at a distance.

Above-ground infrastructure is proposed where the proposed cable route will connect with the existing Woodland and Belcamp Substations. There will not be any new above-ground infrastructure along the proposed cable route that would have the potential for significant landscape of visual impacts, alone or cumulatively during the Operational Phase. There are no public roads within the study area around Woodland Substation. There are public roads in the vicinity of Belcamp Substation. Therefore, in accordance with the guidelines and the methodology of this assessment, it was deemed necessary to select representative viewpoints in relation to the latter only.

It is not warranted to include each and every location that provides a view of the Proposed Development. Instead, in accordance with GLVIA (Landscape Institute and IEMA 2013), a representative selection of viewpoint locations have been selected. One viewpoint can be representative of a range of receptors (see Table 18.7). The viewpoints selected in this instance are set out in Table 18.7 and Image 18.3. The existing (along with proposed) view from these viewpoints are presented in Appendix A18.1 (Verified Photomontages) in Volume 3 of this EIAR.

On the basis of the site-specific factors outlined above and in accordance with the general visual receptor sensitivity considerations contained in the methodology (Section 18.2.4.2.3 and Section 18.2.4.2.2), a visual receptor sensitivity judgement is provided for each representative viewpoint in Table 18.7.

Table 18.7: Outline Description of Selected Viewpoints

Viewpoint (VP)	Location	Representative of:	Direction of View	Receptor Sensitivity at this Location
VP1	Local Road, Clonshaugh	• Local community views (residents on and near Clonshaugh Road); and • Tourist site (Holiday Inn Dublin Airport and Clayton Hotel Dublin Airport).	South-East (SE)	Medium-Low
VP2	R139 Regional Road, Clonshaugh	• Local community views (St. Michael's House and Cara Park); • A major route (R139 Regional Road); and • A recreational site (Belcamp Park).	North-East (NE)	Low
VP3	R139 Regional Road, Belcamp	• Local community views (Tara Lawns and Cara Park); and • A major route (R139 Regional Road).	North-West (NW)	Low
VP4	Sports Ground adjacent to R139 Road	• A recreational site (Craobh Chiaráin Hurling and Football Club).	North-West (NW)	Low

Image 18.3: Map of Viewpoints with Respect to the Proposed Development

18.4.4 Construction Phase Impacts – Landscape

The degree of habitat loss as a result of the Proposed Development during the Construction Phase has been quantified in Chapter 10 (Biodiversity) in Volume 2 of this EIAR. The degree of tree loss as a result of the Proposed Development during the Construction Phase has been quantified using a variety of metrics in Appendix A18.2 (Arboricultural Assessment) in Volume 3 of this EIAR and shown on Figure 18.5 in Volume 4 of this EIAR. Proposed diversion routes are detailed in Chapter 14 (Traffic and Transport) in Volume 2 of this EIAR and shown on Figure 14.2 in Volume 4 of this EIAR. These resources were referenced while undertaking this assessment.

18.4.4.1 Magnitude of Landscape Impacts – Proposed Underground Cable Route

The impacts on the physical terrain of the Proposed Development will be restricted mainly to the vicinity of the proposed underground cable trench. These trenches will be excavated to allow for the conductors to be installed below the ground. There will be associated and ancillary development, including TCCs, permanent

Joint Bays (including associated hardstanding), temporary HDD Compounds, Passing Bays, temporary access tracks, permanent access tracks, site development, landscaping works, fencing and vegetation removal. The physical impact of the proposed cable trench on the landscape will be modest in scale and primarily contained within the already modified ground of the road network. There will be an increase in vehicle movements within the road network in the vicinity of the Proposed Development, which will be more noticeable along the smaller local roads within the study area.

Impacts on the land cover for the off-road portions of the proposed underground cable will be limited to the Planning Application Boundary, within which it is predominantly grassland and hedgerow vegetation that will need to be removed. Details are quantified in Chapter 10 (Biodiversity) in Volume 2 of this EIAR and Appendix A18.2 (Arboricultural Assessment) in Volume 3 of this EIAR. This includes a combination of temporary and permanent losses. The longest section of off-road track will be between Stockhole Lane and the connection point at Belcamp Substation (Chainage 36,300 to Chainage 37,600), where there will be vegetation removal to facilitate temporary and permanent access tracks that will access the Joint Bays along this section of the proposed cable route. During the Construction Phase, there may be a degree of impact at specific locations along the proposed cable route. However, it will not be at a scale that will have any material impact on the overall landscape fabric or on the broader landscape character along the proposed cable route. Although construction activity may alter the landscape character near to where the cable is being installed, it will be transitory and temporary. Impacts will predominantly occur in the road network where vehicular movements are already part of the existing character.

Open cut trenching and Joint Bay construction will involve localised vegetation removal and the felling of healthy mature trees will be unavoidable, but no Tree Preservation Order (TPO) or National Biodiversity Data Centre (NBDC) heritage trees will be removed. Details are quantified in Chapter 10 (Biodiversity) in Volume 2 of this EIAR and Appendix A18.2 (Arboricultural Assessment) in Volume 3 of this EIAR. There may be some instances where vegetation removal may open up views previously screened. Removed vegetation will be replanted insofar as possible, but there will be occasions where this is not practical such as within the easement area, along proposed permanent access tracks to Joint Bays or at the Joint Bays themselves, resulting in a permanent but very localised change. The proposed cable trench on off-road sections will be backfilled, then top soiled and re-seeded, having regard for agricultural land use.

Construction Phase works will be transient, reversible and, in terms of the overall duration, short-term. Works at individual locations will be temporary. The cable trench will be completed at approximately 40m to 50m per day so the construction area will pass receptors relatively quickly. Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR provides further details on the indicative preliminary construction programme. During the Construction Phase, the proposed underground cable route will result in a Low magnitude of impact along the sections of the proposed cable route that follow the existing road network. The magnitude of impact will be Medium-Low along the off-road sections of the proposed cable route. However, this quickly reduces to Low-Negligible in the periphery of the study area where visibility of construction activity is likely to be limited.

18.4.4.2 Magnitude of Landscape Impacts – Proposed Substation Works

Woodland and Belcamp Substations will require additional infrastructure and equipment to accommodate connections with the proposed underground cable route. Thus, with new structures and electrical apparatus to be installed for both substations. As a result, there will be an increase in construction-related activity within the substation sites and an increase in vehicular movements within the surrounding road network. However, these works will occur within the footprint of the existing Woodland Substation and the Belcamp Substation Extension (permitted as part of planning application reference F23A/0040). A new permanent physical impact on the landscape will not occur at the existing Woodland Substation. The proposed underground cable route to tie-in with the Belcamp Substation Extension (F23A/0040) at Chainage 37,624 and will consist of the provision of new electricity transmission infrastructure (refer to Figure 4.1 (Sheet 48) in Volume 4 of this EIAR for a graphic of the proposed works at Belcamp Substation). This will not result in a new physical impact on the landscape as this infrastructure will be located within the extension to the hardstand compound at Belcamp Substation which forms part of a planning application that has been recently granted permission (in December 2023) by Fingal County Council (planning reference F23A/0040). The proposed works at Belcamp Substation will not appear incongruous in this landscape context, instead will be perceived as part of a series of characteristic extensions to the existing Belcamp Substation facility. There may be some sense that electrical infrastructure is becoming a proportionally more dominant influence on the prevailing landscape character. However, this is in the context of a rapidly evolving urban hinterland where a broad range of land uses are being augmented with both new and familiar forms of development. Given the relative scale and aesthetic of the proposed works at Belcamp Substation, in relation to the adjoining consented Belcamp Substation Extension (F23A/0040), the adjacent proposed consented work by others and the adjacent existing Belcamp Substation, no new significant additional impacts on the landscape character are anticipated. TCC6 will facilitate the construction of the proposed Belcamp Substation works and will result in a negative change to land use within its extents but it will be Short-Term in nature. As a result, the magnitude of impact on the landscape due to the works at Woodland and Belcamp Substations is deemed to be Low-Negligible.

18.4.4.3 Significance of Construction Phase Landscape Impacts

Construction Phase landscape impacts as a result of the Proposed Development will be Negative.

The magnitude of landscape impacts during the Construction Phase is assessed to be Medium-Low within the immediate surrounds of the proposed underground cable route. Therefore, the significance of Construction Phase impacts is assessed to be Slight for both in-road and off-road sections. However, this quickly reduces to Slight-Imperceptible and Imperceptible within the periphery of the study area.

The Low-Negligible landscape sensitivity within the footprints of the two substations, in conjunction with the Low-Negligible magnitude of impacts, will result in a Construction Phase impact significance of Imperceptible.

The duration of the landscape impacts is deemed to be Short-Term for both the proposed underground cable route and the works at the two substations.

Impacts in relation to each Landscape Character Area are presented in Table 18.8.

Table 18.8: Summary of Construction Phase Impacts on Landscape Character Areas

Landscape Character Area	Sensitivity	Positive / Neutral / Negative	Magnitude of effect	Significance of Impact	Duration
Meath: 12. Tara Skryne Hills	High-Medium	Negative	Medium-Low	Slight	Short-Term
Meath: 11. South East Lowlands	Medium-Low	Negative	Medium-Low	Slight	Short-Term
Meath: 10. The Ward Lowlands	High-Medium	Negative	Medium-Low	Slight	Short-Term
Fingal: Rolling Hills with Tree Belts	Medium-Low	Negative	Medium-Low	Slight	Short-Term
Fingal: Low Lying Agricultural	Low	Negative	Medium-Low	Slight	Short-Term
Woodland Substation	Low-Negligible	Negative	Medium-Low	Imperceptible	Short-Term
Belcamp Substation	Low-Negligible	Negative	Medium-Low	Imperceptible	Short-Term

18.4.5 Construction Phase Impacts - Visual

Construction Phase visual impacts are an inevitable consequence of the Proposed Development being brought forward. The most notable influence will be as a result of the movement of construction related plant, and deliveries of materials within the study area and all temporary works such as Passing Bays, HDD

Compounds and TCCs, resulting in Negative impacts. The greatest potential for adverse visual impacts would be at the proposed Belcamp Substation, when the proposed substation is nearing completion because, at such time the visual change for nearby visual receptors will be at the greatest, as per the Operational Phase visual assessment at the selected viewpoints in Table 18.10, and associated photomontages, refer to Appendix A18.1 (Verified Photomontages) in Volume 3 of this EIAR), but with the construction related activity coinciding.

Given the limited degree of visibility, Construction Phase visual impacts will be localised to the immediate landscape of the proposed underground cable route and at Woodland Substation, relating primarily to the vehicle movement on the local road network during the Construction Phase.

In relation to the assessment viewpoints and residential receptors in the landscape to whom filtered views of construction activities may be possible, the change is deemed to be Negative and the magnitude is deemed to be Low. When combined with the Medium-Low sensitivity of the visual receptors, the overall significance of impact during construction is assessed to be Slight. The duration of the impacts is deemed to be Short-Term.

18.4.6 Operational Phase Impacts - Landscape

18.4.6.1 Magnitude of Landscape Impacts – Proposed Underground Cable Route

Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR provides comprehensive details on reinstatement and decommissioning. Once the Construction Phase is complete, the road surface / agricultural grassland will be reinstated along the proposed underground cable route. All temporary works such as Passing Bays, HDD Compounds and TCCs, and working areas within the Planning Application Boundary will be restored to their current land use Thus, any material surface expression of the underground features will be minimal. Although there will be permanent and temporary hedgerow and mature tree loss, no TPO or NBDC heritage trees will be removed. Planting will be provided where existing vegetation has been removed for temporary works areas. Vegetation removed during the Construction Phase at Passing Bays will be reinstated along their original alignment and will also be replanted with species-rich hedgerows which is likely to be more ecologically diverse than what was removed. Trees will also be provided, where it is appropriate, ensuring sufficient set-back from the proposed cable route.

The main identifiable features will be the Joint Bays and the proposed permanent access tracks, and hardstanding areas around the off-road Joint Bays. However, these will have minimal impact on the landform / physical landscape or on vegetation / land use when considered in the context of the wider landscape within the study area. Hedgerows / treelines within the permanent easement will not be replanted and thus, will result in a negative and permanent impact. Operational Phase impacts will mainly relate to the maintenance works for the proposed underground cable route, which will be infrequent and will be brief in nature. Maintenance operations will be less intensive than the activity at the Construction Phase. For these reasons, the proposed underground cable route is deemed to have a Negligible magnitude of impact on landscape character during the Operational Phase.

18.4.6.2 Magnitude of Landscape Impacts – Substations

The proposed changes to Woodland and Belcamp Substations will occur within or immediately adjacent to the existing substation footprints and, consequently, will be located where the landscape character is already influenced by electrical infrastructure. Thus, there will be no material change to the landscape character. For these reasons, the magnitude of impact on the landscape due to the proposed works at Woodland and Belcamp Substations is deemed to be Negligible.

18.4.6.3 Significance of Operational Phase Landscape Impacts

The quality of the Operational Phase impacts will be Negative for both the proposed underground cable route and the substations. The proposed underground cable route and the substations will both have a Negligible magnitude of impact on the landscape during the Operational Phase. This combined with the landscape sensitivity along the proposed underground cable route and the Low-Negligible landscape sensitivity at the substations, will result in an overall Operational Phase impact significance of Imperceptible for both. The duration of the impacts is deemed to be Permanent.

Impacts in relation to individual Landscape Character Areas are presented in Table 18.9.

Table 18.9: Summary of Operational Phase Impacts on Landscape Character Areas

Landscape Character Area	Sensitivity	Positive / Neutral / Negative	Magnitude of Impact	Significance of Impact	Duration
Meath: 12. Tara Skryne Hills	High-Medium	Negative	Negligible	Imperceptible	Permanent
Meath: 11. South East Lowlands	Medium-Low	Negative	Negligible	Imperceptible	Permanent
Meath: 10. The Ward Lowlands	High-Medium	Negative	Negligible	Imperceptible	Permanent
Fingal: Rolling Hills with Tree Belts	Medium-Low	Negative	Negligible	Imperceptible	Permanent
Fingal: Low Lying Agricultural	Low	Negative	Negligible	Imperceptible	Permanent
Woodland Substation	Low-Negligible	Negative	Negligible	Imperceptible	Permanent
Belcamp Substation	Low-Negligible	Negative	Negligible	Imperceptible	Permanent

18.4.7 Operational Phase Impacts - Visual

The assessment of visual impacts at each of the selected viewpoints is aided by photomontages of the Proposed Development (refer to Appendix A18.1 (Verified Photomontages) in Volume 3 of this EIAR). Photomontages are a 'photo-real' depiction of the Proposed Development within the view, utilising a rendered three-dimensional model of the development, which has been geo-referenced to allow accurate placement and scale. These were prepared in accordance with GLVIA (Landscape Institute and IEMA 2013) and the Technical Guidance Note TGN 06/19 on Visual Representation of development proposals (Landscape Institute 2019). Table 18.10 presents the Operational Phase visual impacts and resulting impact significance. All selected viewpoints are in the vicinity of the proposed Belcamp Substation works.

Table 18.10: Operational Phase Visual Impacts and Significance of Impact

Viewpoint	Existing View Context	Receptor Sensitivity	Description and Magnitude of Visual Impact	Quality / Significance / Duration
VP1	**Local Road, Clonshaugh** This is a heavily enclosed view from the side of a busy local road. There is a high degree of mature vegetation on both sides of this road. This view is uncharacteristic of the experience of the view afforded to users of this road as it affords views beyond the otherwise enclosed road corridor. Although views are afforded in both directions along the road corridor, roadside vegetation and a berm on the eastern side foreshortens the view to the south-east. A glimpse view of an agricultural field is afforded in the middle ground where vegetation partially screens the existing Belcamp Substation. In the background of the view, Howth Head forms a distant backcloth as it rises above intervening hedgerows.	Medium-Low	The proposed underground cable route will not be visible and there will not be any visible signs of its presence. The proposed Belcamp Substation works will appear to the fore of the existing Belcamp Substation and the consented Belcamp Substation Extension (F23A/0040). The proposed 400kV GIS Hall will be the largest new structure and will be of a similar scale, tone and texture as the existing Belcamp Substation and the consented Belcamp Substation Extension (F23A/0040). The proposed Air Insulated Switchgear (AIS) equipment will have a smaller massing and will not be as high. For these reasons, the visual change is deemed to be sub-dominant. The grey colour of the proposed Belcamp GIS Hall will help to visually integrate it with the colours of the existing Belcamp Substation and it will have a thematic link with this existing electrical infrastructure in the view. For these reasons, the magnitude of visual impact is deemed to be Low.	**Negative, Slight to Imperceptible and Permanent**
VP2	**R139 Regional Road, Clonshaugh** This is a channelled view from an urban regional road. There is a high degree of mature vegetation on both sides of this road. This view is uncharacteristic of the experience of the view afforded to users of this road as it affords views beyond the otherwise enclosed road corridor. In the foreground, the landform falls away from this viewpoint such that a view is afforded over a green palisade fence. The middle ground is occupied by land that is not under agricultural management and contains rough grass and scrub. There is a private access road with metal crash barriers in the left-hand side of the view. Views are foreshortened by a hedgerow with mature hedgerow trees in the background of the view. A portion of the existing Belcamp Substation is identifiable to the north-east through a gap in this vegetation.	Low	The proposed underground cable route will not be visible and there will not be any visible signs of its presence. The proposed Belcamp Substation works will be situated to the rear of the hedgerow with mature hedgerow trees in the background of the view which will screen a large proportion of the proposed Belcamp Substation works. The upper portions of the proposed 400kV GIS will be visible above the existing intervening vegetation in the middle ground of the view. The grey colour of the proposed Belcamp GIS Hall will help to visually integrate with the colours in the receiving landscape. The visible portions of the proposed Belcamp Substation works will be viewed within an already complex view characterised by industrial style elements and it has a thematic link with the existing electrical infrastructure in the view. For these reasons, the magnitude of visual impact is deemed to be Low.	**Negative, Slight to Imperceptible and Permanent**
VP3	**R139 Regional Road, Belcamp** This is a channelled view along the road corridor of a busy urban regional road. The fore to middle ground is occupied with the pavement of a wide (four lane) road flanked by crash barriers and lighting columns. The view to the north-west is foreshortened by a wall adorned	Low	The Proposed Development will be completely screened from view due to the intervening wall and the existing Belcamp Substation. By default, the magnitude of visual impact is deemed to be Negligible.	**Neutral, Imperceptible and Permanent**

Viewpoint	Existing View Context	Receptor Sensitivity	Description and Magnitude of Visual Impact	Quality / Significance / Duration
	with graffiti, over which it is possible to see tree canopies and the upper portions of the existing Belcamp Substation in the background.			
VP4	**Sports Ground adjacent to N32 (Craobh Chiaráin Hurling and Football Club)** This is a view to the north across a modest sports ground facility consisting of two pitches and a two-storey clubhouse. The existing Belcamp Substation is visible to the rear of the clubhouse. There is a minor degree of containment provided by surrounding tree lined hedgerows and these also limit more distant views to the north.	Low	The Proposed Development will be completely screened from view due to the existing clubhouse, the existing Belcamp Substation and the existing intervening vegetation. By default, the magnitude of visual impact is deemed to be Negligible.	**Neutral, Imperceptible and Permanent**

18.5 Mitigation and Monitoring Measures

The primary measure employed in respect of landscape and visual impacts for the Proposed Development was avoidance of impacts through design. The key embedded design measure relevant to landscape and visual, as well as many of the other environmental factors, is to place the proposed cable route underground, mainly within the existing road bed, in order to minimise the amount of vegetation loss (hedgerows and riparian). This has been applied in the design of the Proposed Development in so far as is feasible (i.e., for approximately 70% of the proposed cable route).

Appendix A18.2 (Arboricultural Assessment) in Volume 3 of this EIAR advises that there has been an effort at this current design phase to design out impact on trees, where possible. Mitigation of potential impacts on landscape and visual receptors is neither possible nor practicable, in some instances. For example, it is not possible to provide landscape mitigation for the loss of land from private properties, or to provide mitigation for the loss of mature trees in the short / medium-term until the proposed replacement planting becomes established.

18.5.1 Construction Phase

The following mitigation measures will be implemented during the detailed design stage:

- A Project Arboriculturalist will be appointed by the Electricity Supply Board (ESB) to provide relevant additional input to be addressed at appropriate points;
- The Generic Arboricultural Method Statement (AMS) (Appendix C of Appendix A18.2 in Volume 3 of this EIAR) will be reviewed and updated into a site-specific AMS to provide appointed contractors with details on how specific operations need to be performed to protect trees, including the use of exclusion zones and ground protection; and
- A Tree Protection Plan will be produced providing schematic details of how protective fencing will be installed and any other pre-planned targeted tree protection measures.

In addition, at the detailed design stage, a locally reduced separation between adjacent cable circuits (CP0966 development, under An Bord Pleanála planning reference number 316372, and the Proposed Development) will be considered at the following key locations to reduce the potential impact on adjacent trees:

- Chainage 950 to Chainage 1,100;
- Chainage 1,450 to Chainage 1,650;
- Chainage 2,350 to Chainage 2,500; and
- Chainage 3,050 to Chainage 3,150.

This will allow a greater setback between the Proposed Development cable circuit and the adjacent field boundary. Areas of land between the Proposed Development cable circuit and field boundary will also be fenced off and will not be trafficked by heavy plant or machinery.

The following mitigation measures will be implemented during the Construction Phase:

- The site-specific AMS and Tree Protection Plan produced during the detailed design stage will be implemented as soon as works begin on-site;
- As far is reasonably practicable, all cable installation works, particularly in the existing road surfaces will adhere to Volume 4 of the Guidance for The Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees is a widely adopted document within the utilities sector (National Joint Utilities Group (NJUG) 2007);
- The Project Arboriculturalist will be retained to advise and resolve any unforeseen tree related issue which might occur during the Construction Phase and to provide general tree related advice; and

- On-site monitoring will be undertaken at agreed intervals before and during the Construction Phase (this will be achieved through a combined effort between the ESB and the appointed contractor) to ensure protection measures and the site-specific AMS produced during the detailed design stage are being implemented correctly.

Once construction is complete, the road surface / agricultural grassland will be reinstated along the proposed underground cable route for all temporary works areas. Thus, any permanent material surface expression of the underground features will be minimal. Hedgerows removed for temporary works within the Planning Application Boundary will be replanted with a new species-rich hedgerow which is estimated to reach similar maturity in 30 years and is likely to be more ecologically diverse than what was removed. Where applicable, vegetation removed during the Construction Phase at temporary Passing Bays will be reinstated along the original alignment and will also be replanted with species-rich hedgerows, albeit immediately above the proposed underground cable route will remain absent of woody species to aid periodic maintenance. Additional specific landscape and visual mitigation measures are not considered necessary during the Construction Phase as all impacts will be either temporary or short-term and not considered 'significant'.

The avoidance measures outlined in the Generic AMS (Appendix C of Appendix A18.2 in Volume 3 of this EIAR) will be adopted in full and will help limit the impacts on the landscape and for visual receptors. However, this will not materially reduce the magnitude of impacts on landscape and visual during the Construction and Operational Phases.

18.5.2 Operational Phase

Specific additional landscape and visual mitigation and monitoring measures are not considered necessary in relation to the Proposed Development during the Operational Phase, as there is no potential for significant impacts. There are no anticipated direct impacts on the retained trees along the proposed cable route during the Operational Phase.

18.6 Residual Impacts

Residual landscape and visual impacts during the Construction and Operational Phases of the Proposed Development will not be any different to those determined in Section 18.4 and are summarised in Table 18.11 and Table 18.12. Significant impacts are not predicted.

Table 18.11: Summary of Residual Impacts on Landscape Character Areas

Landscape Character Area	Sensitivity	Positive / Neutral / Negative	Magnitude of Impact	Significance of Impact	Duration
Meath: 12. Tara Skryne Hills	High-Medium	Negative	Negligible	Imperceptible	Permanent
Meath: 11. South East Lowlands	Medium-Low	Negative	Negligible	Imperceptible	Permanent
Meath: 10. The Ward Lowlands	High-Medium	Negative	Negligible	Imperceptible	Permanent
Fingal: Rolling Hills with Tree Belts	Medium-Low	Negative	Negligible	Imperceptible	Permanent
Fingal: Low Lying Agricultural	Low	Negative	Negligible	Imperceptible	Permanent
Woodland Substation	Low-Negligible	Negative	Negligible	Imperceptible	Permanent
Belcamp Substation	Low-Negligible	Negative	Negligible	Imperceptible	Permanent

Table 18.12: Summary of Residual Visual Impacts

Viewpoint	Receptor Sensitivity	Positive / Neutral / Negative	Magnitude of Visual Impact	Significance	Duration
VP1	Medium-Low	Negative	Low	Slight to Imperceptible	Permanent
VP2	Low	Negative	Low	Slight to Imperceptible	Permanent
VP3	Low	Neutral	Negligible	Imperceptible	Permanent
VP4	Low	Neutral	Negligible	Imperceptible	Permanent

Potential tree removal required to deliver the Construction Phase of the Proposed Development is discussed in Appendix A18.2 (Arboricultural Assessment) in Volume 3 of this EIAR and shown on Figure 18.5 in Volume 4 in this EIAR. Out of a total of 9,103 trees within the study area, 512 will be required to be removed (5% of all the trees). A further 662 trees are at-risk in the study area (7% of all trees). Based on a precautionary approach scenario, where all at-risk trees will be required to be removed, 1,174 trees will need to be felled, representing 12% of the total trees within the study area. Of the five significant tree 'features' identified during the surveys (refer to Appendix A18.2 in Volume 3 of the EIAR for further detail), one can be retained, three are at-risk, and one requires partial removal. It is expected to be able to retain the at-risk 'features' with the implementation of mitigation measures during the Construction Phase. There will be limited opportunity for the replacement of trees lost, and therefore, losses identified in the Construction Phase are considered permanent.

18.7 Conclusion

Landscape and visual impacts have been considered in respect of the Proposed Development. There is the potential for adverse landscape and visual impacts during the Construction Phase which will be either Negative, Slight or Imperceptible and Short-Term.

Operational Phase impacts as a result of the Proposed Development will be limited. Apart from the proposed substations works, the Proposed Development will be predominantly below-ground with the land cover above reinstated insofar as possible, resulting in landscape and visual impacts that will be Negative, Imperceptible and Permanent. The proposed Belcamp Substation works will be visually identifiable, but the visual impacts are deemed to be Negative, Slight to Imperceptible and Permanent at VP1 and VP2, while at VP3 and VP4 they are deemed to be Neutral, Imperceptible and Permanent. As a result of the setback distance of the proposed Woodland Substation from the public roads, the visual impacts are deemed to be Negative, Imperceptible and Permanent. For the reasons outlined within this Chapter, it is considered that the Proposed Development will not give rise to any significant landscape or visual impacts.

Based on a precautionary approach scenario, where all at-risk trees will be required to be removed, 1,174 trees will need to be felled, representing 12% of the total trees within the study area. Of the five significant tree 'features' identified during the surveys (refer to Appendix A18.2 in Volume 3 of the EIAR for further detail), one can be retained, three are at-risk, and one requires partial removal. It is expected to be able to retain the at-risk 'features' with the implementation of mitigation measures during the Construction Phase. There will be limited opportunity for the replacement of trees lost, and therefore, losses identified in the Construction Phase are considered permanent. There are no anticipated direct impacts on retained trees along the proposed cable route during the Operational Phase.

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Jacobs

East Meath to North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 19 - Risk of Major Accidents and / or Disasters

EirGrid

March 2024

Contents

19. Risk of Major Accidents and / or Disasters

19.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) assesses the likely potential significant impacts of the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) on the environment, deriving from its vulnerability to risks of major accidents and / or disasters during the Construction Phase and Operational Phase.

The Proposed Development is described in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. The design of the Proposed Development has evolved through the application of a comprehensive design iteration process with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Development are maintained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and outline design development programme have been incorporated, where appropriate.

19.1.1 Risk of Major Accidents and/or Disasters

Article 3 of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the Environmental Impact Assessment (EIA) Directive) requires for the assessment of expected effects of major accidents and / or disasters within environmental impact assessment (EIA). Article 3(2) of the Directive states that the:

> '*effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned.*'

In addition, Annex IV of the EIA Directive states that the EIAR shall contain:

> '*A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies*'.

The Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022) elaborate on risk assessment further under Section 3.7.3:

> '*To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and / or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk)*'.

Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major accident hazards involving dangerous substances, amending and subsequently repealing Council Directive

96/82/EU (hereafter referred to as the Seveso III Directive) is also considered in this assessment. S.I. No. 209/2015 – Chemical Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (hereafter referred to as the COMAH Regulations) transposed the Seveso III Directive into Irish law. The Seveso III Directive and the COMAH Regulations outline the legal obligations for operators of industrial establishments where dangerous substances are stored. These establishments are referred to as Seveso sites and are classified as Upper Tier or Lower Tier establishments. As per Regulation 25 of the COMAH Regulations, Upper Tier establishments are required to submit information regarding their operations to the Health and Safety Authority (HSA). Each Seveso site has a consultation zone which is the 'area liable to be affected by a major accident' at the site, as outlined A Framework for Major Emergency Management. Guidance Document 1. A Guide to Risk Assessment in Major Emergency Management (DEHLG 2010). Therefore, if a development falls within the specified consultation zone of a Seveso site, the HSA must be consulted. The Proposed Development does not fall within the consultation zone for any Seveso sites. However, a review of the potential for impacts on emergency response accesses to Seveso sites from their respective nearest hospital and fire stations was also undertaken.

This Chapter identifies how risks of major accidents and / or disasters relevant to the Proposed Development have been identified and how those risks have been managed. This Chapter considers:

- Major accidents and / or disasters that the Proposed Development may be vulnerable to;
- Whether a major accident and / or disaster occurring could result in likely significant adverse environmental impacts, and if so, what these would be; and
- Existing and proposed mitigation measures to prevent or mitigate the likely significant adverse impacts of such events on the environment.

19.1.2 Definitions

At the time of undertaking this assessment, no clear definition of the term 'major accident and / or disaster' has been outlined in the context of the EIA Directive. For the purpose of this assessment, the following definitions from the Institute of Environmental Management and Assessment (IEMA) Major Accidents and Disasters in EIA: A Primer (hereafter referred to as the IEMA Primer) (IEMA 2020) and the EPA Guidelines (EPA 2022) have been adopted:

- Accident – something that happens by chance or without expectation;
- Disaster – a natural hazard (e.g. earthquake) or a man-made / external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident;
- Major Accident – events that threaten immediate or delayed serious environmental effects to human health, welfare and / or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events;
- Risk –the likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur;
- Risk event – an identified, unplanned event, which is considered relevant to the Proposed Development and has the potential to result in a major accident and / or disaster, subject to assessment of its potential to result in a significant adverse effect on an environmental receptor;
- Vulnerability – describes the potential for harm as a result of an event, for example due to sensitivity or value of receptors. In the context of the EIA Directive, the term refers to 'exposure and resilience' of the Proposed Development to the risk of a major accident and / or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact; and

- Significant environmental effect (in relation to a major accident and / or disaster assessment) – includes the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration. In addition, a 'Significant' impact resulting from major accidents and / or disasters is identified if it meets the criteria for 'Significant', 'Very Significant' or 'Profound' under the EPA Guidelines.

The assessment of major accidents and disasters in this Chapter considers the occurrence of major accidents and incidences. As such, it considers accident scenarios that would not reasonably be covered by the other topic assessments.

19.2 Methodology

19.2.1 Scope and Context

The identification, control and management of risk is an integral part of the design and assessment process throughout all stages of a project lifecycle. For example, a Flood Risk Assessment (Appendix A12.1 in Volume 3 of this EIAR) was carried out to assess the vulnerability of the Proposed Development to flooding in order to mitigate, where required. The elements of the Proposed Development that incorporate measures that are designed to eliminate, reduce, isolate and control the occurrence of major accidents have been described throughout the EIAR, where required. Measures to control risks associated with Construction Phase activities are incorporated into the Construction Environmental Management Plan (CEMP), and its associated appendices, which form standalone documents in this planning application pack.

The methodology for this risk assessment is as follows:

- Identify major accidents and / or disasters (i.e. unplanned incidents) that the Proposed Development may be vulnerable to; and
- Assess the consequent impacts and significance of such incidents in relation to the environmental, social and economic receptors that may be affected.

Such risks may be present at the Construction Phase and / or Operational Phase of the Proposed Development.

19.2.2 Relevant Guidelines, Policy and Legislation

The development of the risk assessment methodology has been prepared in accordance with the following guidelines and legislation:

- S.I. No. 291 of 2013 - Safety, Health and Welfare at Work (Construction) Regulations 2013, as amended by S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021 (hereafter referred to as the Safety, Health and Welfare (Construction) Regulations);
- Number 10 of 2005 - Safety, Health and Welfare at Work Act 2005 (hereafter referred to as the Safety, Health and Welfare at Work Act);
- S.I. No. 138/2012 - Building Regulations (Part A Amendment) Regulations 2012, as amended by S.I. No. 229 of 2021 - Building Control (Amendment) Regulations 2021;
- S.I. No. 299/2007 - Safety, Health and Welfare at Work (General Application) Regulations 2007, as amended by S.I. No. 255/2023 - Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2023 (hereafter referred to as the Safety, Health and Welfare at Work (General Application) Regulations);
- EPA Guidelines (EPA 2022);
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017);

- IEMA Primer (IEMA 2020);
- A National Risk Assessment for Ireland 2023 (Government of Ireland 2023);
- Strategic Emergency Management National Structures and Framework (Department of Defence 2020);
- Guidance on Assessing and Costing Environmental Liabilities (EPA 2014);
- Department of Housing, Local Government and Heritage (DHLGH) A Framework for Major Emergency Management (DHLGH 2021); and
- A Framework for Major Emergency Management. Guidance Document 1. A Guide to Risk Assessment in Major Emergency Management (DEHLG 2010).

The following external plans and assessments have also informed the assessment:

- Major Emergency Plan of Fingal County Council (FCC) (FCC 2023);
- Meath County Council (MCC) Major Emergency Plan (MCC 2019); and
- Maximum Aircraft Movement Data and the Calculation of Risk and PSZs: Dublin Airport (Department of Transport and DEHLG 2005).

The following development-specific documents have also informed the assessment:

- CEMP and its associated appendices which are included as standalone documents in this planning application pack, which address the following topics:
    - Construction Resource and Waste Management;
    - Construction Traffic Management;
    - Non-Native Invasive Species Management;
    - Surface Water Management; and
    - Environmental Incident Response.
- Flood Risk Assessment (refer to Appendix A12.1 in Volume 3 of the EIAR).

19.2.3 Risk Assessment Methodology

The risk assessment is set out in three stages:

- Identification and Screening;
- Risk Classification; and
- Risk Evaluation.

19.2.3.1 Identification and Screening

The first stage of the assessment is to identify potential unplanned risks that the Proposed Development may be vulnerable to. An initial list of relevant hazards which may make the Proposed Development vulnerable to major accidents and /or disasters was sourced through consultation with the engineering team for the Proposed Development, and by consulting the guidelines and reference documentation. These were grouped into 'risk events'.

The list of potential risk events that could lead to major accidents and / or disasters (refer to Appendix A19.1 (Hazard Identification Record) in Volume 3 of this EIAR) was subjected to an initial screening assessment to identify those that meet the scoping criteria. Where appropriate, risk events were screened out of the assessment according to the following scoping criteria:

- Major accidents and / or disasters associated with Construction Phase and Operational Phase activities that fall within the scope of health and safety legislation and associated obligations;

- Major accidents and / or disasters as a result of Seveso sites, for which the Proposed Development does not fall within the specified consultation distance for that Seveso site and for which the Proposed Development has no significant interaction with access to the designated hospital(s) and fire stations identified on a Seveso site's emergency plans;
- Risk events where no 'source-pathway-receptor' linkage exists to result in a major accident and / or disaster (i.e., an oil spill occurring at an oil depot that is not located near to a watercourse and for which there is no pathway from source to receptor);
- Major accidents and / or disasters where risk events are not applicable to that particular geographic location (e.g., volcanic activity, earthquakes and risk of nuclear accidents in Ireland);
- Risk events in relation to the operation of the Proposed Development infrastructure during the Operational Phase. The scope of this assessment for the Operational Phase relates to the provision of infrastructure only and not to the use of that infrastructure. The operation of the electricity infrastructure will be subject to EirGrid and Electricity Supply Board (ESB) management and protocol;
- Risk events that possess low likelihood / low consequence, as they do not meet the criteria to be brought forward for further consideration (i.e., they do not meet the definition of a major accident and / or disaster), for example the risk of traffic accidents on the wider road network causing delays to Construction Phase or Operational Phase vehicles;
- Risk events that possess high likelihood / high consequence, as these would be considered high risk and unacceptable for the development of the Proposed Development; and
- Risk events in relation to existing emergency access arrangements and response plans for facilities along the route of the Proposed Development. Emergency accesses along the route of the Proposed Development will be retained insofar as is possible throughout the Construction Phase. Where activities during the Construction Phase of the Proposed Development will interface with emergency access arrangements, the appointed contractor will consult with the affected landowners / site operators and the emergency services to agree, where required, alternative emergency access arrangements and changes to response plans for the duration of the works.

19.2.3.2 Risk Classification

Following the initial identification and screening process, the remaining major accidents and / or disasters risk events were evaluated with regard to the likelihood of occurrence and the potential impact. The rating criteria adopted for the assessment follows that used in A Guide to Risk Assessment in Major Emergency Management (DEHLG 2010). The EPA Guidelines (EPA 2022) state that the risk assessment must be based on a 'worst-case' approach. Therefore, the consequent rating assumes that all proposed mitigation measures and safety procedures have failed to prevent the occurrence of a major accident and / or disaster. The classification and rating of likelihood and consequence, as taken from A Guide to Risk Assessment in Major Emergency Management are provided in Table 19.1 and Table 19.2, respectively.

Table 19.1: Classification of Likelihood

Rating	Classification	Impact Description
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 or more years
2	Very Unlikely	Is not expected to occur; no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communicates; and/or little opportunity, reason or means to occur. May occur once every 100 to 500 years.
3	Unlikely	May occur at some time; and / or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity, reason or means to occur. May occur once every 10 to 100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence. Will probably occur once every one year to 10 years
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Table 19.2: Classification of Consequence

Rating	Classification	Impact	Description
1	Minor	Life, Health, Welfare, Environment, Infrastructure, Social	• Small number of people affected; no fatalities and small number of minor injuries with first aid treatment • No contamination, localised effects • <0.5 million euro • Minor localised disruption to community services or infrastructure (<6 hours)
2	Limited	Life, Health, Welfare, Environment, Infrastructure, Social	• Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements • Simple contamination, localised effects of short duration • 0.5 million to 3 million euro • Normal community functioning with some inconvenience
3	Serious	Life, Health, Welfare, Environment, Infrastructure, Social	• Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support. • Simple contamination, widespread effects or extended duration • 3 million to 10million euro • Community only partially functioning, some services available
4	Very Serious	Life, Health, Welfare, Environment, Infrastructure, Social	• 5 to 50 fatalities, up to 100 serious injuries, up to 2,000 evacuated • Heavy contamination, localised effects or extended duration • 10 million to 25 million euro • Community functioning poorly, minimal services available
5	Catastrophic	Life, Health. Welfare, Environment, Infrastructure, Social	• Large numbers of people impacted with a significant number of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. • Very heavy contamination, widespread effects of extended duration. • >25 million euro • Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support

19.2.3.3 Risk Evaluation

In accordance with A Guide to Risk Assessment in Major Emergency Management (DEHLG 2010), the evaluated major accidents and / or disasters risk events were compared to a risk matrix to determine the level of significance of each risk event.

These have been grouped according to three categories:

- High Risk – events that have an evaluation score of 15 to 25, as indicated by the Red Zones in Table 19.3;
- Medium Risk – events that have an evaluation score of 8 to 12, as indicated by the Amber Zone in Table 19.3; and
- Low Risk – events that have an evaluation score of 1 to 6, as indicated by the Green Zone in Table 19.3.

Table 19.3: Levels of Significance

Likelihood	5 – V. Likely					
	4 – Likely					
	3 – Unlikely					
	2 – V. Unlikely					
	1 – Ext. Unlikely					
		1 – Minor	2 – Limited	3 – Serious	4 – V. Serious	5 – Catastrophic
	Consequence of Impact					

Significant impacts resulting from major accidents and / or disasters are adverse impacts that are described as 'Significant', 'Very Significant' or 'Profound' under the EPA Guidelines (EPA 2022). Consequently, major accidents and / or disasters risk events that fall within the Amber or Red Zones ('Medium' or 'High' risk events) are considered to present risk of significant impacts and are brought forward for further consideration and assessment for mitigation.

19.3 Potential Impacts

19.3.1 'Do Nothing' Scenario

With respect to the risk of major accidents and / or disasters, the 'Do Nothing' scenario means that there would be no changes to existing infrastructure or utilities as a result of the Proposed Development. Therefore, there would be a Neutral impact on the risk of major accidents and / or disasters under the Do Nothing scenario.

19.3.2 Risk Evaluation

As mentioned in Section 19.2.3.2, the potential impacts in this Section assume a worst-case scenario, which does not consider the implementation of mitigation measures or emergency plans which would be put in place to reduce the likelihood and potential impact of any major accidents and / or disasters. A Risk Register has been developed which contains all the plausible scenarios identified during the Construction Phase and Operational Phase of the Proposed Development and has been evaluated using the criteria in Section 19.2.3.2 and Section 19.2.3.3. This is provided in Table 19.4.

Table 19.4: Risk of Major Accidents and Disasters in the Absence of Mitigation

Risk ID	Event	Proposed Development Element	Likelihood	Rating	Consequence	Rating	Resulting Risk Category
Construction Phase							
A	Utilities – Risk of gas explosion due to the strike of a gas mains during excavation works.	Proposed Underground Cable	Unlikely	3	Serious. Potential fatalities and injuries. Hazards associated with the explosion to neighbouring residents, businesses and activities. Potential to discharge deleterious material to adjacent watercourses.	3	Medium
B	Utilities – Risk of exposure to and release of untreated wastewater due to the strike of local sewers during excavation.	Proposed Underground Cable	Unlikely	3	Limited. Potential injury. Hazards associated with exposure to untreated wastewater (diseases etc.). Potential untreated wastewater to discharge to adjacent watercourse.	2	Low
C	Utilities – Risk of striking water mains supply.	Proposed Underground Cable	Unlikely	3	Minor. Potential injury for nearby personnel and potential displacement of local residences and business in the event of flooding. Clean mains water supply so no potential for contamination.	1	Low
D	Utilities – Risk of striking and damaging overhead lines (such as electricity, telecoms, fibre optics etc.) that cross the Proposed Development.	Throughout	Unlikely	3	Limited. Potential fatality and injuries. Potential localised disruption / inconvenience to community.	2	Low
E	Utilities – Risk of striking and damaging underground cables (such as electricity, telecoms, fibre optic etc.) during excavation.	Proposed Underground Cable	Unlikely	3	Limited. Potential fatality and injuries. Potential localised disruption/inconvenience to community.	2	Low
F	Contamination Event - Risk of encountering unknown contaminated ground and mobilisation during construction / hazardous pipe materials (i.e. asbestos pipes) and potential damage to brittle pipes during construction works.	Throughout	Unlikely	3	Limited. Potential injury from exposure to hazardous substances. Potential for a limited number of people to be affected and for short duration localised effects.	2	Low

Risk ID	Event	Proposed Development Element	Likelihood	Rating	Consequence	Rating	Resulting Risk Category
G	Contamination Event – Pollution event leading to environmental damage to watercourses or groundwater, particularly associated with the potential release of silt to the aquatic environment.	Works locations near watercourses	Unlikely	3	Serious. Potential to cause environmental damage to the aquatic environment and associated species and to ecologically designated areas.	3	Medium
H	Biosecurity – Risk of spread of invasive species during construction works.	Throughout	Likely	4	Serious. Potential for contamination over an extended duration and potential to lead to more widespread effects.	3	Medium
I	Ground Collapse - Risk of excavation works leading to subsidence of land / ground collapse / encountering unstable ground during construction.	Throughout	Unlikely	3	Limited. Potential for injuries. Potential disruption to the local road network.	2	Low
J	Horizontal Directional Drilling (HDD) during construction leading to subsidence of land, with the potential to lead to an accident, particularly on major roads and rail lines traversed by HDD.	HDD crossings at M1 Motorway, M2 Motorway and M3 Motorway and adjacent railway line.	Unlikely	3	Limited. Potential fatality and injuries. Potential disruption to the local road network.	2	Low
K	Transport Accident - Major road traffic accidents resulting from Construction Phase traffic and works taking place adjacent to live traffic.	Throughout	Unlikely	3	Limited. Potential fatality and injuries. Potential disruption to the local road network.	2	Low
L	Transport Accident - Aircraft related accident due to proximity of the Proposed Scheme to Dublin Airport and its associated flight paths.	Eastern extent of Proposed Development passing north of Dublin Airport and toward Belcamp Substation.	Extremely Unlikely	1	Very Serious. Potential for a significant number of fatalities and injuries, significant damage to infrastructure and disruption to the road network.	4	Low
M	Tree Stability - Risk of trees with unstable roots falling during surface and excavation works / potential for contact with overhead lines, residents, properties, pedestrians and road users.	Throughout	Unlikely	3	Limited. Potential fatality and injuries. Localised effects and short duration. Potential for some minor damage to local infrastructure.	2	Low

Risk ID	Event	Proposed Development Element	Likelihood	Rating	Consequence	Rating	Resulting Risk Category
N	Extreme Weather Event – Risk of extreme weather events such as prolonged flooding resulting in sediment load runoff during construction, storm damage, snowstorm, wildfire.	Throughout	Unlikely	3	Limited. Potential for injuries. Potential for contamination. Potential localised displacement of a small number of people and short duration and localised effects.	2	Low
O	Industrial Incident – Explosion / fire occurring at adjacent live and operational electricity substations.	Woodland and Belcamp Substations	Very Unlikely	2	Limited. Potential fatality and injuries. Localised effects and short duration. Potential for some damage to local infrastructure.	2	Low
Operational Phase							
P	Transport Accident - Aircraft related accident due to proximity of the Proposed Scheme to Dublin Airport and its associated flight paths.	Eastern extent of Proposed Development passing north of Dublin Airport and toward Belcamp Substation.	Extremely Unlikely	1	Very Serious. Potential for a significant number of fatalities and injuries, significant damage to infrastructure and disruption to the road network.	4	Low
Q	Extreme weather events – risk of extreme weather events such as prolonged flooding, resulting in sediment load runoff, storm damage etc.	Throughout	Unlikely	3	Limited. Potential fatality and injuries. Potential damage to infrastructure.	2	Low
R	Industrial Incident – Explosion / fire occurring at adjacent live and operational electricity substations.	Woodland and Belcamp Substations.	Very Unlikely	2	Limited. Potential fatality and injuries. Localised effects and short duration. Potential for some damage to local infrastructure.	2	Low

The results from the evaluation have been applied to Table 19.5.

Table 19.5: Evaluation of Level of Significance in the Absence of Mitigation

Likelihood	**5 – V. Likely**					
	4 – Likely			[H]		
	3 – Unlikely	[C]	[B] [D] [E] [F] [I] [J] [K] [M] [N] [Q]	[A] [G]		
	2 – V. Unlikely		[O] [R]			
	1 – Ext. Unlikely				[L] [P]	
		1 – Minor	**2 – Limited**	**3 – Serious**	**4 – V. Serious**	**5 – Catastrophic**
	Consequence of Impact					

From examining the plausible risks presented in Table 19.5, Risk IDs B, C, D, E, F, I, J, K, L, M, N, O, P, Q and R are considered as being below the threshold of significance set for the purposes of this assessment (Green Zone or 'Low' risk event). No risks have been assessed to fall within the Red Zone ('High' risk scenario) and Risk IDs A, G and H fall within the Amber Zone ('Medium' risk event) and are therefore brought forward for further consideration and assessment of mitigation measures. These three Risk IDs fall within the Construction Phase. No Operational Phase risks fell within the Amber Zone and are therefore not considered further. The scenario with the highest risk score relates to risk H associated with the Proposed Development.

19.3.3 Seveso Sites

A review of the Upper Tier and Lower Tier sites in County Meath and County Dublin (HSA 2024a; 2024b), and their respective distances from the Proposed Development was undertaken. No Seveso sites are located within 1 kilometre of the Proposed Development, and therefore, the Proposed Development does not fall within the maximum consultation zone for any Seveso sites. The Proposed Development also does not interface with any potential emergency service response routes for any Seveso sites. Therefore, the Proposed Development is not vulnerable to or does not present a risk to any Seveso sites and no impact is anticipated as a result of the Proposed Development.

19.4 Mitigation and Monitoring Measures

19.4.1 Inherent Design

As mentioned in Section 19.1, the design of the Proposed Development has evolved through comprehensive design iteration, with particular emphasis on avoiding or reducing the potential for environmental impacts, where practicable.

Regulation 15 of the Safety, Health and Welfare at Work (Construction) Regulations places a duty on designers carrying out work related to the design of a project to take account of the 'General Principles of Prevention' as listed in Schedule 3 of the Safety, Health and Welfare at Work Act. In addition to the duties imposed by Regulation 15 of the Safety, Health and Welfare at Work (Construction) Regulations, designers must comply with Section 17(2) of the Safety, Health and Welfare at Work Act which requires persons who design a project for construction work to ensure, so far as is reasonably practicable, that the project is designed and is capable of being constructed to be safe and without risk to health, can be maintained safely and without risk to health during use, and complies in all respects, as appropriate, with other relevant legislation. This includes S.I. No. 138/2012 - Building Regulations (Part A Amendment) Regulations 2012 (as amended) and, if the works being designed are intended for use as a workplace, the relevant parts of the Safety, Health and Welfare at Work (General Application) Regulations. In accordance with these requirements, the engineering design team established a consistent and appropriate means of assessing the risks that may arise from design decisions using a Design Risk Assessment and Hazard Elimination Risk Reduction Register, and of applying the General Principles of Prevention, measures that are to be embedded into the design of the Proposed Development.

19.4.2 Plans and Procedures

19.4.2.1 Construction Phase

The plans outlined in this Section have been developed to effectively manage and minimise risk by ensuring that every reasonable effort will be made to ensure that environmental impacts during construction will be avoided or reduced, where possible. Specific mitigation measures are also included in the relevant chapters of this EIAR, and summarised in Chapter 21 (Summary of Mitigation and Monitoring Measures).

19.4.2.1.1 Construction Environmental Management

The CEMP forms a standalone document in this planning application pack. The CEMP will be updated by the appointed contractor prior to the commencement of the Construction Phase, so as to include any additional measures required pursuant to conditions attached to any decision to grant approval. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the CEMP the manner in which it is intended to effectively implement all the applicable mitigation measures identified in this EIAR.

The CEMP summarises the overall environmental management strategy that shall be adopted and implemented during the Construction Phase of the Proposed Development and must be read in conjunction with the construction details outlined in Chapter 4 (Proposed Development Description).

Details of mitigation measures proposed to address potential impacts arising from construction activities are described in Chapter 5 (Population) to Chapter 20 (Cumulative Impacts and Environmental Interactions), as appropriate, and are summarised in Chapter 21 (Summary of Mitigation and Monitoring Measures).

19.4.2.1.2 Construction Resource and Waste Management

Construction Resource and Waste Management is addressed in Appendix C of the CEMP (included as a standalone document in the planning application pack), to ensure that materials and waste arising during the Construction Phase of the Proposed Development will be managed in a way that ensures compliance with the provisions of Number 10 of 1996 – Waste Management Act, 1996, as amended. The Construction Resource and Waste Management Plan will be further developed by the appointed contractor.

19.4.2.1.3 Construction Traffic Management

The Construction Traffic Management Plan (CTMP) has been prepared to establish the manner in which the interface between the public and construction-related traffic will be managed and how vehicular movement will be controlled (refer to Appendix B of the CEMP, which is included as a standalone document in the planning application pack). It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the CTMP the manner in which it is intended to effectively implement all the applicable mitigation measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála, should they grant approval. Further details on the assessment of construction traffic, and traffic related mitigation measures are provided in Chapter 14 (Traffic and Transport).

19.4.2.1.4 Non-Native Species Management

Non-Native Invasive Species Management is addressed in Appendix E of the CEMP (included as a standalone document in the planning application pack) to provide the strategy that will be adopted during the construction of the Proposed Development in order to manage and prevent the spread of non-native invasive plant species. The Non-Native Invasive Species Management Plan will be developed by the appointed contractor using a suitably qualified ecologist as necessary.

Non-native invasive plant species have been identified and documented within the Proposed Development boundary, as well as in close proximity to the Proposed Development boundary. The survey results have been provided in Appendix E of the CEMP, in addition to potential management options for the treatment of non-native species.

19.4.2.1.5 Surface Water Management

Surface Water Management is addressed in Appendix D of the CEMP (included as a standalone document in the planning application pack), summarising the procedures and technical practices for implementing effective sediment, erosion and pollution control that will be adopted during the Construction Phase of the Proposed Development. The Surface Water Management Plan will be further developed by the appointed contractor.

19.4.2.1.6 Environmental Incident Response

Environmental Incident Response is addressed in Appendix A of the CEMP (included as a standalone document in the planning application pack), demonstrating how, in the unlikely event of an incident, response efforts will take place promptly, efficiently, and suitably for the particular circumstances. An Environmental Incident Response Plan will be developed by the appointed contractor. The management of the risk of major accidents and / or disasters occurring will continue throughout the planning, detailed design and Construction Phase of the Proposed Development. The CEMP and its appendices detail procedures that could be undertaken in the event of a significant release of sediment into a watercourse, or a significant spillage of chemical, fuel or other hazardous substances (e.g. concrete), a non-compliance incident with any permit or licence, or other such risks that could lead to a major pollution incident, including flooding. This assessment has considered the reasonable worst-case consequences, and as such, risks are unlikely to be greater than those that have been assessed within this EIAR. However, activities on-site will be monitored and controlled to ensure that risk does not increase over time.

19.4.2.2 Operational Phase

Given that there were no potential risks identified during the Operational Phase which fall within the Amber or Red Zones ('Medium' or 'High' risk scenarios), no mitigation or monitoring measures are proposed specific to reducing the risk of major accidents and / or disasters during the Operational Phase. The operation of the electricity infrastructure will be subject to EirGrid and ESB management and protocol.

19.4.3 Assessment of Mitigation Measures

As discussed in Section19.3.2, Risk IDs A, G and H, all identified during the Construction Phase, fall within the Amber Zone ('Medium' risk event), requiring further consideration and assessment of the proposed mitigation measures. This assessment is presented in Table 19.6.

Table 19.6: Risk of Major Accidents and/ or Disasters (Medium Risk)- Assessment of Mitigation Measures

Risk ID	Event	Pre-Mitigation Risk Score	Mitigation Measures	Post-Mitigation Likelihood	Post-Mitigation Consequence	Post-Mitigation Risk Score
Construction Phase						
A	Utilities – Risk of gas explosion due to the strike of a gas mains during excavation works.	Medium	Please refer to CEMP and its appendices (included as standalone documents in this planning application pack) for details on pre-construction preparations that will be carried out to ensure that all utilities are identified and recorded prior to construction works.	2 Very Unlikely	2 Limited	Low
G	Contamination Event – Pollution event leading to environmental damage to watercourses or groundwater, particularly associated with the potential release of silt to the aquatic environment.	Medium	Please refer to Chapter 11 (Soils, Geology and Hydrogeology) and Chapter 12 (Hydrology) in Volume 2 of this EIAR, and the CEMP (notably Appendix D to the CEMP) (included as standalone documents in this planning application pack) for full details on design and mitigation measures to be put in place, to prevent contamination events.	2 Very Unlikely	2 Limited	Low
H	Biosecurity – Risk of spread of invasive species during construction works.	Medium	Please refer to Chapter 10 (Biodiversity) in Volume 2 of this EIAR, and the CEMP (notably Appendix E to the CEMP) (included as standalone documents in this planning application pack) for details on mitigation measures to be put in place, to prevent the spread of non-native invasive species.	2 Very Unlikely	3 Serious	Low
Operational Phase						
N/A						

Following the implementation of mitigation measures, Risk IDs A, G and H fall within the Green Zone ('Low' risk), as presented in Table 19.7, and are therefore not considered to present a risk of significant impacts.

Table 19.7: Evaluation of Levels of Significance – Post Mitigation

Likelihood	5 – V. Likely					
	4 – Likely					
	3 – Unlikely					
	2 – V. Unlikely		[A] [G]	[H]		
	1 – Ext. Unlikely					
		1 – Minor	2 – Limited	3 – Serious	4 – V. Serious	5 – Catastrophic
	Consequence of Impact					

19.5 Residual Impacts

There are no identified incidents and / or major accidents and / or disasters risk events that present a sufficient combination of risk and consequence that would lead to significant residual environmental impacts. No significant residual impacts have been identified either in the Construction or Operational Phases of the Proposed Development.

19.6 References

DHLGH (2021). A Framework for Major Emergency Management

DEHLG (2010). A Framework for Major Emergency Management. Guidance Document 1. A Guide to Risk Assessment in Major Emergency Management

Department of Defence (2020). Strategic Emergency Management National Structures and Framework

Department of Transport and DEHLG (2005). Maximum Aircraft Movement Data and the Calculation of Risk and PSZs: Dublin Airport

EPA (2014). Guidance on Assessing and Costing Environmental Liabilities

EPA (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

European Commission (2017). Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report

FCC (2023). Major Emergency Plan of Fingal County Council

Government of Ireland (2023). A National Risk Assessment for Ireland 2023

HSA (2024a). Upper Tier Establishments (01.02.24). [Online] Available at https://www.hsa.ie/eng/your_industry/chemicals/legislation_enforcement/comah/list_of_establishments/upper_tier_sites_01_02_2024.pdf. Accessed 14 February 2024.

HSA (2024b). Lower Tier Establishments (12.02.24). [Online] Available at https://www.hsa.ie/eng/your_industry/chemicals/legislation_enforcement/comah/list_of_establishments/lower_tier_sites_12_02_2024.pdf. Accessed 14 February 2024.

IEMA (2020). Major Accidents and Disasters in EIA: A Primer

MCC (2019). Major Emergency Plan

Directives and Legislation

Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EU

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

Number 10 of 1996 – Waste Management Act, 1996, as amended

Number 10 of 2005 - Safety, Health and Welfare at Work Act 2005

S.I. No. 299/2007 - Safety, Health and Welfare at Work (General Application) Regulations 2007

S.I. No. 138/2012 - Building Regulations (Part A Amendment) Regulations 2012

S.I. No. 291 of 2013 - Safety, Health and Welfare at Work (Construction) Regulations 2013

S.I. No. 209/2015 – Chemical Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015

S.I. No. 229 of 2021 - Building Control (Amendment) Regulations 2021

S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021

S.I. No. 255/2023 - Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2023

Jacobs

East Meath to North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 20 Cumulative Impacts and Environmental Interactions

EirGrid

March 2024

Contents

20. Cumulative Impacts and Environmental Interactions

20.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) considers and assesses the potential for cumulative impacts arising from the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) in combination with approved developments or other developments which, at the time of assessment, were yet to be approved, but for which a decision on such development is reasonably foreseeable over the likely consenting and construction period anticipated for the Proposed Development.

In addition, this Chapter addresses the potential for interactions between impacts on different environmental factors of the Proposed Development itself on the receiving environment.

This Chapter should be read in conjunction with Chapter 5 to Chapter 18 in Volume 2 of this EIAR, and their appendices, which present the assessment of the likely potential environmental impacts arising from the Proposed Development itself and proposed mitigation measures to ameliorate those likely potential impacts. It should also be read in conjunction with Appendix A20.1 in Volume 3 of the EIAR, which contains the detailed cumulative assessment of other developments.

20.1.1 Cumulative Impacts

Annex IV of Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the EIA Directive) requires that an EIAR provides a "*description of the likely significant effects of the project on the environment resulting from…the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.*" In addition, Schedule 6 of S.I. No. 600/2001 – Planning and Development Regulations, 2001 (as amended) states that the EIAR should include "*a description of the likely significant effects (including……cumulative……) of the proposed development*".

The Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission 1999) provide the following definition of cumulative impacts:

> "*Impacts that result from the incremental changes caused by other past, present or reasonably foreseeable actions together with the project.*"

The Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as EPA Guidelines) (EPA 2022) define cumulative effects as:

> "*The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.*"

It should be noted that the EPA Guidelines use the terms impacts and effects interchangeably. A relatively minor effect on a particular receptor caused by the Proposed Development could result in a significant effect if it is added to by impacts from another nearby development. This Chapter identifies and provides an assessment of likely significant cumulative effects caused by the Proposed Development in combination with other planned developments. Section 20.2 sets out the process for deciding which other planned developments were included in the assessment.

20.1.2 Environmental Interactions

Environmental interactions are the reactions between impacts, whether between impacts of just one development (i.e., the Proposed Development), or between the impacts of multiple developments. For each environmental topic there will be certain interactions or interdependencies with other environmental topics, whereby impacts may interact to create a greater effect or a different type of effect. An assessment of these interactions has been undertaken as required by Article 3 of the EIA Directive, which states the following:

> "*The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*
>
> *(a) 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;*
>
> *(d) Material assets, cultural heritage and the landscape;*
>
> *(e) The interaction between the factors referred to in points (a) to (d).*"

This is also reflected in Section 171A(b) of Number 30 of 2000 - Planning and Development Act 2000 (as amended by Section 53 of Number 30 of 2010 – Planning and Development (Amendment) Act 2010, which states:

> "*…'environmental impact assessment' means an assessment carried out by a planning authority or the Board, as the case may be, in accordance with this Part and regulations made thereunder, that shall identify, describe and assess in an appropriate manner, in light of each individual case and in accordance with Articles 4 to 11 of the Environmental Impact Assessment Directive, the direct and indirect effects of a proposed development on the following:*
>
> *(a) human beings, flora and fauna;*
>
> *(c) soil, water, air, climate and the landscape;*
>
> *(d) material assets and cultural heritage; and*
>
> *(e) the interaction between the factors mentioned in paragraphs (a), (b) and (c).*"

Some of the topic assessments within this EIAR already address environmental interactions. For example, Chapter 5 (Population) in Volume 2 of this EIAR provides an assessment of effects on community amenity, which relates to the interaction of impacts on air quality; visual amenity; traffic and transport; and noise and vibration. Furthermore, Chapter 6 (Human Health) in Volume 2 of this EIAR describes and assesses how a combination of impacts on health determinants (air quality, noise and vibration, community amenity, traffic and transport) can interact and influence health outcomes.

Section 20.6 of this Chapter sets out the main environmental interactions identified from the Proposed Development, sign-posting chapters which already address environmental interactions and providing a description and assessment of environmental interactions which are not addressed elsewhere in this EIAR.

20.1.3 Relevant Guidelines

This assessment has been completed with regard to the following guidance documents:

- EPA Guidelines (EPA 2022);
- Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017);

- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission 1999); and
- Advice Note 17: Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects (The Planning Inspectorate 2019).

20.2 Methodology for Cumulative Impact Assessment

20.2.1 Introduction

It is necessary to consider the scale, nature and likely impacts of other developments which could combine with the Proposed Development to cause cumulative impacts. It was therefore necessary to identify which other developments should be included for analysis as part of the cumulative impact assessment. A staged approach to identify such other developments was applied, as illustrated in Image 20.1, with each stage described in subsequent Chapter sections.

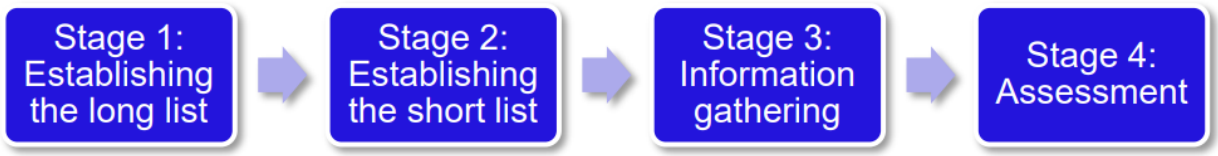

Image 20.1: Staged Approach to Identifying Which Other Developments Should be Included for Analysis as Part of the Cumulative Impact Assessment

20.2.2 Identification of Other Developments

20.2.2.1 Stage 1: Establishing the Long List of Other Developments

The first stage of the cumulative assessment was to identify other developments deemed potentially relevant to be included in the long list. While the EIA Directive only requires the consideration of other existing and / or approved developments, the assessment has gone further in that it has considered a number of other developments with the potential to receive approval and be progressed, which may give rise to cumulative impacts, in combination with the Proposed Development.

Stage 1 involved a desk-based assessment, which is outlined in the following sections.

20.2.2.1.1 Zone of Influence

The long listing process involved establishing the topic Zones of Influence (ZoI). This was achieved by establishing whether each of the other developments identified would fall within the study areas for the topics considered for the Proposed Development in isolation, as assessed in the topic chapters of this EIAR. The ZoI provides a guide as to the likelihood that another development may contribute to potentially significant cumulative impacts with the Proposed Development. The largest ZoI identified in the assessment chapters of the EIAR was 1 kilometre (km). Therefore, a 1km buffer from the Planning Application Boundary was applied and considered appropriate to capture the potential cumulative impacts that could arise for all assessment topics.

20.2.2.1.2 Sources of Identification of Other Developments

Potentially relevant other developments include those from various sectors, such as residential and commercial projects, utilities, and transport projects. The identification of developments for the long list considered the following sources:

- The An Bord Pleanála (ABP) website (ABP 2024) – for details of Strategic Infrastructure Developments, Strategic Housing Developments and Large-Scale Residential developments;
- Local authority websites and the development plans for Meath and Fingal – for details of allocations for housing, areas for regeneration and other zoning objectives (Fingal County Council 2024; Meath County Council 2024);
- National Planning Application Database (Government of Ireland 2024) – for downloadable list of planning applications sent from Local Authorities;
- EirGrid-owned developments, as provided by EirGrid, and captured within the National Planning Application Database and the ABP website;
- Projects being planned by the National Transport Authority (NTA) on the NTA website (NTA 2024), as part of other major transport projects and programmes in accordance with the Greater Dublin Area Transport Strategy 2022 – 2042 (hereafter referred to as the GDA Transport Strategy) (NTA 2023);
- Project Ireland 2040, which combines the National Development Plan 2021-2030 (Government of Ireland 2021) and the National Planning Framework (Government of Ireland 2019);
- Transport Infrastructure Ireland (TII) website (TII 2024) – to identify major transport projects and programmes;
- The EIA Portal maintained by the Department of Housing, Planning and Local Government (DHPLG 2024) – for applications for development consent accompanied by an EIAR;
- Uisce Éireann's website, which includes a page on its projects (Uisce Éireann 2024); and
- Other infrastructure and utility providers and developers, including daa, as captured within the National Planning Application Database and the ABP website.

All planning application data provided by each local authority is fed into the National Planning Application Database. This dataset was used to identify planning applications within the ZoI of the Proposed Development. The dataset included all planning applications lodged to the relevant local authorities within 1km of the Planning Application Boundary. The dataset contained planning applications which had been granted, granted and appealed, refused, refused and appealed, withdrawn or invalidated. The application list was screened for potential cumulative impacts to contain any application that was conditional, or appealed and conditional. The exercise to identify relevant planning applications was undertaken in January 2024, with a cut-off date for assessment of other developments of 5 January 2024.

In addition to this process, and to capture other potentially relevant foreseeable developments, major projects as part of transport and other infrastructure programmes, were added to the preliminary long list, using the sources outlined above. This included other EirGrid proposed developments that had not been submitted for planning but which might reasonably (if approved) give rise to cumulative impacts.

The planning application datasets were searched to identify and exclude very minor applications from the long list on the basis that, given their minor nature, these were not likely to have a cumulative impact noticeable over the impacts of the Proposed Development in isolation. Examples of planning applications which were excluded from the preliminary long list were applications for one off houses and residential housing extensions. Granted and pending applications older than five years were also excluded from the preliminary long list on the basis that they would likely already have been built (and so would form part of the existing baseline) or are now unlikely to be progressed. Applications which have been refused or invalidated were discounted from the preliminary long list on the basis that they are unlikely to progress, unless through successful appeal.

The types of developments that were identified for consideration on the long list have been classed as follows:

- Local Planning Applications – those developments for which planning permission is applied for through local planning authorities themselves and were identified from the local authority planning application lists;
- Strategic Housing Developments or Large-Scale Residential Developments – housing developments of a certain type and scale (e.g., 100 or more houses or student accommodation units) for which applications are lodged directly with ABP);
- Strategic Infrastructure Developments - major developments by local authorities and others for which applications are lodged directly with ABP;
- Uisce Éireann Projects – projects under the programmes of work listed on Uisce Éireann's website; and
- Other Major Projects – major projects which were at a pre-application stage at the time of identification, but which are anticipated to be developed over the estimated programme for the Proposed Development. These include major projects from various sectors including energy, utilities and transport, as identified from the sources listed in this Section.

20.2.2.1.3 Assignment of Tiers

A 'tier' (1 or 2) was assigned to each of the other developments to indicate the level of certainty associated with its implementation, as detailed in Image 20.2. While the tiers provide an indication of the level of information available on which to base an assessment, the status of planning applications change through time.

Appendix A20.1 in Volume 3 of this EIAR provides an indication of the tier of each other development at the time of assessment.

Tier 1	Under construction	Decreasing level of detail likely to be available ↓
	Permitted application(s) but not yet implemented	
	Submitted application(s) but not yet determined	
Tier 2	Identified in the relevant Development Plan and Strategies (and emerging Development Plans, with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited	
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.	

Image 20.2: Tier 1 and Tier 2 Classification for Other Developments (adapted from The Planning Inspectorate 2019)

20.2.2.2 Stage 2: Establishing the Shortlist of Other Developments

The aim of Stage 2 was to narrow down the Stage 1 long list to include only those other developments where there was the potential for significant cumulative impacts to arise in combination with the Proposed Development. To do this, the following were considered:

- Whether the development has been completed, or the planning applications have been refused (where not identified at Stage 1), invalidated or expired (if so, they were not shortlisted). If a development was identified as completed, it has been considered as part of the baseline as appropriate;
- Whether there is a likelihood of temporal overlap (including overlap for construction periods) between the Proposed Development and the other development; and

- Whether the scale and nature of the other development is likely to significantly contribute to the effects of the Proposed Development, taking account of the aspects of the environment for which the ZoI is relevant.

In considering the scale and nature of the other developments, regard was had for the screening thresholds set out in Schedule 5 of S.I. No. 600/2001 - Planning and Development Regulations, 2001 (as amended). For example, the threshold for screening a housing development for Environmental Impact Assessment (EIA) is where there are more than 500 dwelling units. The use of EIA screening thresholds was only a guide however, and some developments which are below thresholds, yet relatively close in proximity to the Proposed Development and still of a scale to be noticeable in the local context were shortlisted. Ultimately, the judgement as to whether a development should be shortlisted depended on whether the scale, location and / or nature could be sufficient to generate impacts which would be noticeable against typical baseline trends in the same ZoI as the Proposed Development.

The shortlisting was informed by input from the environmental topic specialists involved in the preparation of this EIAR, which allowed for consideration as to whether a particular type of development could result in impacts to receptors of interest for the Proposed Development assessment.

The rationale for whether a development should be scoped out or not is recorded, where relevant, in Appendix A20.1 in Volume 3 of the EIAR, which provides a record of key decisions made when shortlisting developments for Stages 3 and 4 of the cumulative impact assessment. This includes a note of the reasons where a specialist has scoped out a development that falls within the ZoI for their topic. The shortlisted developments are indicated on Figure 20.1 in Volume 4 of the EIAR.

20.2.2.3 Stage 3: Information Gathering for the Shortlist of Other Developments

The cumulative impact assessment has relied primarily on the gathering of environmental information from a range of sources published as part of planning application submissions or planning documentation for the shortlisted developments. In addition, where environmental assessments have not yet been undertaken or published, then any published Strategic Environmental Assessments (SEA) have been relied on for additional supporting information, where available. Specific information has been obtained from the following sources:

- Planning application documentation and supporting environmental assessments obtained via the National Planning Application Database and the EIA Portal;
- Local authority websites and the development plans for Meath and Fingal; and
- Developer websites (where available), for example for Uisce Éireann and other utilities companies.

The information sought focused on:

- Proposed design and location of the development;
- Proposed programme of construction, operation and decommissioning (if relevant); and
- Environmental assessments, if available, that set out baseline data and effects arising from the development.

In some cases, there is limited information on the above available with which to inform the cumulative impact assessment (i.e., for many of the developments in a pre-application stage or where environmental impact assessment is not required).

20.2.2.4 Stage 4: Assessment of Other Developments

The potential cumulative impacts of the Proposed Development with each of the other developments were assessed to a level of detail commensurate with the information that was available at the time of assessment. Where information regarding other developments was limited, these gaps were acknowledged within the assessment and the associated uncertainty in these cases is documented.

There are no prescriptive techniques used in the evaluation of the significance of cumulative impacts. Professional judgement and consideration of standards, guidelines and environmental carrying capacities have been applied to determine whether in-combination impacts have the potential to give rise to additional levels of significance. The EPA Guidelines (EPA 2022) significance criteria were applied.

The significance criteria used to assess likely cumulative impacts considered the capacity of environmental resources and receptors to accommodate changes that are likely to occur. These include:

- The duration of the impact (i.e. would it be temporary or permanent);
- The extent of impact (e.g. its geographical area);
- The type of impact (e.g. whether additive (i.e. the loss of two pieces of woodland of one hectare (ha), resulting in 2ha cumulative woodland loss)) or synergistic (i.e. two discharges combine to have an effect on a species not affected by discharges in isolation);
- The frequency of the impact;
- The 'value' and resilience of the receptor affected; and
- The likely success of mitigation.

The potential cumulative impacts of other developments with the Proposed Development are assessed against the significance criteria outlined in Table 1.3 in Chapter 1 (Introduction and the Environmental Impact Assessment Process) in Volume 2 of this EIAR. These effects are based on their combination with the potential impacts identified in the individual topic assessments. Mitigation measures are identified if required, and where relevant, residual impacts are assessed.

20.3 Potential Cumulative Impacts

The long list of developments considered are presented in Table 1 in Appendix A20.1 in Volume 3 of this EIAR. Table 2 in Appendix A20.1 in Volume 3 of this EIAR presents the assessment of potential cumulative impacts for each of the 'other developments' carried forward for Stage 4 assessment and provides a breakdown of the assessment per environmental topic.

It should be noted that the environmental topic of 'climate' was screened out of the cumulative impact assessment, as the assessment of cumulative greenhouse gas (GHG) emissions cannot be carried out in a process analogous to other environmental topics because there is no causal link between the location of GHG emissions and the impacts arising from the cumulative aggregation of GHGs in the atmosphere. This limitation has also been recognised in the recent update to the Institute of Environmental Management and Assessment (IEMA) Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA 2022).

Of the initial long list of 57 'other developments' considered to have the potential to overlap (either spatially or temporally) with the Proposed Development at Stage 1 / Stage 2, 29 were assessed for potential cumulative impacts with the Proposed Development at Stage 3 / Stage 4. A summary of each of the 28 other developments carried forward for Stage 3 / Stage 4 assessment, and their temporal and spatial relationship to the Proposed Development, is included in Table 20.1 (please refer to Appendix A20.1 in Volume 3 of the EIAR for further detail).

Table 20.1: Summary of Other Developments Assessed at Stage 4

Planning Application Reference / Planning Body	Other Development Applicant / Name	Potential for Spatial or Temporal Overlap with the Proposed Development
PCI0001 / ABP	EirGrid - CP0466 North South Interconnector	• Planning permitted; • Overlaps with the Planning Application Boundary for the Proposed Development at Woodland Substation; • Construction is due to commence in Q1 2025 and be completed by 2027. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
316372 / ABP	EirGrid - CP0966 Kildare Meath Grid Upgrade	• Submitting for planning permission in Q1 2024; • Overlaps with the Planning Application Boundary for the Proposed Development at Woodland Substation and along the 'Woodland Corridor' between Woodland Substation and the R156 Regional Road (refer to Figure 20.2 in Volume 4 of this EIAR); • Construction Phase of CP0966 is estimated to commence in Q2 2026 and be completed by Q3 2028. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
312131 / ABP	Uisce Éireann - Greater Dublin Drainage Project	• Lodged for planning. No determination as of yet; • Proposed orbital sewer will overlap with the Planning Application Boundary for the proposed cable route on approach to Belcamp Substation; • Construction is estimated to commence in Q4 2025 and be completed by Q4 2028, with commissioning to take place through to Q4 2029. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
314724 / ABP	TII – MetroLink	• Lodged for planning. No determination as of yet; • Overlaps with the Planning Application Boundary for the proposed cable route at the R132 Regional Road; • Proposed to deliver MetroLink by 2035 (subject to planning approval), with a 9.25 year construction programme indicated. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
314232 / ABP	TII – Dart+ West	• Lodged for planning. No determination as of yet; • Directly adjacent to the Planning Application Boundary for the proposed cable route at M3 Parkway; • Originally proposed to commence construction in the second half of 2023 (subject to planning approval) but planning is yet to be granted. A 47 month construction programme indicated and there is therefore potential for Construction Phases to overlap; and • Operational Phases will coincide.
317121 / ABP	NTA – BusConnects - Swords to City Centre Core Bus Corridor Scheme	• Lodged for planning. No determination as of yet; • Overlaps with the Planning Application Boundary for the proposed cable route at the R132 Regional Road; • Proposed to deliver the BusConnects schemes over the period 2023 to 2028 (subject to planning approval), with a 36 month construction programme indicated. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
312060 and F21A/0401 / ABP and Fingal County Council	Gannon Properties - Residential development at Belcamp Hall, Malahide Road, Dublin 17	• Planning permitted; • Approximately 1km from Planning Application Boundary at Belcamp Substation;

Planning Application Reference / Planning Body	Other Development Applicant / Name	Potential for Spatial or Temporal Overlap with the Proposed Development
		• Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
314169 and F22A/0136 / ABP and Fingal County Council	Gerard Gannon Properties – Residential development at Belcamp Hall, Malahide Road, Dublin 17	• Planning permitted; • Approximately 695m to the east of Planning Application Boundary at Belcamp Substation; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
308130 / ABP	Enginenode Limited -220kV substation with 2 underground transmission cables between Pace and Bracetown	• Planning permitted; • Approximately 3m from Planning Application Boundary proposed cable route at the M3 Motorway crossing; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
309833 and FW21A/0003 / ABP and Fingal County Council	Montague Ventures Limited - Residential development at Hollystown, Mulhuddart, Dublin 15	• Planning permitted; • Approximately 237m to the south of the Planning Application Boundary for the proposed cable route before the M2 Motorway crossing; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
312271 / ABP	Glenveagh Homes Limited - Residential development at Hollystown-Kilmartin, Dublin 15	• Planning permitted; • Approximately 184m to the south-west of the Planning Application Boundary for the proposed cable route before the M2 Motorway crossing; • Construction timeline for the other development is unknown but construction is estimated to take approximately 36 months. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
312848 and F21A/0488 / ABP and Fingal County Council	Gerard Gannon Properties – Residential development at Belcamp Hall, Malahide Road, Dublin 17	• Planning permitted; • Approximately 961m to the east of Planning Application Boundary at Belcamp Substation; • Construction timeline for the other development is unknown but construction is estimated to take approximately 24 months. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
314894 / ABP	Kilshane Energy Ltd. – Proposed 220kV Gas Insulated Switchgear substation on lands at Kilshane Road, and an underground 220kV cable to the existing Cruiserath 220kV substation.	• Planning permitted; • Approximately 557m to the south of the Planning Application Boundary for the proposed cable route before the M2 Motorway crossing; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.

Planning Application Reference / Planning Body	Other Development Applicant / Name	Potential for Spatial or Temporal Overlap with the Proposed Development
F21A/0147 and F23A/0006 / Fingal County Council	Genvest ULC. – Industrial development at a site to the west of Stockhole Lane / Clonshaugh Road, County Dublin.	• Planning permitted; • Approximately 121m to the west of the Planning Application Boundary for the proposed cable route on the approach into Belcamp Substation; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
F20A/0550 / Fingal County Council	daa plc - Extension to the North Apron in the Airfield at Dublin Airport, County Dublin	• Planning permitted; • Approximately 448m to the south of the Planning Application Boundary for the proposed cable route lying to the north of Dublin Airport; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
F21A/0681 and 3041/22 / Fingal County Council and Dublin City Council	Mayne Stability Limited - Synchronous Compensator Development south of Belcamp Substation, Belcamp Dublin 17	• Planning permitted; • Approximately 4m to the south of the Planning Application Boundary at Belcamp Substation; • Construction timeline for the other development is unknown but the Construction Phase is estimated to take approximately 12 months. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
FW22A/0167 / Fingal County Council	IPUT plc – Industrial development at The Ward, County Dublin	• Planning permitted; • Approximately 4m to the south - east of the Planning Application Boundary for the proposed cable route before the M2 Motorway crossing; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
FW19A/0177 / Fingal County Council	ESB Engineering & Major Projects - Underground cable route from the existing Macetown ESB station to a permitted medium voltage substation in the townlands of Cruiserath and Tyrrelstown	• Planning permitted; • Approximately 1km to the south of the Planning Application Boundary for the proposed cable route before the M2 Motorway crossing; • Construction timeline for the other development is unknown. Construction works, testing and reinstatement will take approximately 19 weeks. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
F18A/0306 / Fingal County Council	Clarke Family Partnership – Residential development at Fosterstown North, County Dublin	• Planning permitted; • Approximately 1km to north of the Planning Application Boundary for the proposed cable route before the M1 Motorway crossing; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.

Planning Application Reference / Planning Body	Other Development Applicant / Name	Potential for Spatial or Temporal Overlap with the Proposed Development
FW22A/0156 / Fingal County Council	Earlstand Corporation Unlimited Company – Industrial development at Northwest Logistics Park, Ballycoolin, Dublin 15	• Planning permitted; • Approximately 1km to south of the Planning Application Boundary for the proposed cable route before the M2 Motorway crossing; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
FW21A/0042 / Fingal County Council	Glenveagh Homes Ltd - Residential development at Hollystown, Dublin 15	• Planning permitted; • Approximately 756m south of the Planning Application Boundary for the proposed cable route before the M2 Motorway crossing; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
F22A/0682 / Fingal County Council	Fingleton White – Alterations to the aviation fuel pipeline at the Athletic Union League / FAI sports grounds, M1 and Dublin Airport, within the townlands of Toberbunny and Stockhole, Co. Dublin.	• Planning permitted; • Overlaps with the Planning Application Boundary for the proposed cable route to the west of Belcamp Substation; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
F23A/0040 / Fingal County Council	EirGrid - CP1213 Belcamp 220kV Extension	• Planning permitted; • Overlaps with the Planning Application Boundary at Belcamp Substation; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
F22A/0687/ Fingal County Council	Clondev Properties Limited - Residential development at Nevinstown, Swords, County Dublin	• Planning permitted; • Approximately 1km to the north of the Planning Application Boundary for the proposed cable route before the M1 Motorway crossing; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
4367/19 / Dublin City Council	The Electricity Supply Board - 200m long medium / low voltage underground cable from the former Diamond Innovations site to the existing ESB Darndale Substation	• Planning permitted; • Approximately 1km to the south-west of the Planning Application Boundary at Belcamp Substation; • Construction timeline for the other development is unknown and there is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
2360290 / Meath County Council	Marina Quarter Ltd. -	• Planning permitted; • Approximately 315m from the Planning Application Boundary for the proposed cable route before the M3 Motorway crossing;

Planning Application Reference / Planning Body	Other Development Applicant / Name	Potential for Spatial or Temporal Overlap with the Proposed Development
	Large-Scale Residential Development at Dunboyne North, County Meath	• Construction timeline for the other development is unknown but estimated to take three years to complete. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
22837 and 23136 / Meath County Council	GDA Energy 4 Ltd - Battery energy storage facility and synchronous condenser at Woodland, County Meath	• Planning permitted; • Approximately 160m to the north-west of the Planning Application Boundary at Woodland Substation; • Construction timeline for the other development is unknown but estimated to take 10 years to complete. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
RA170873 and 23787 / Meath County Council	South Meath Solar Farm Limited - Solar farm at a site in the townlands of Vesingstown, Polleban and Harlockstown, Dunboyne, County Meath	• Planning permitted; • Approximately 660m to the north-east of the Planning Application Boundary for the proposed cable route before the M3 Motorway crossing; • Construction timeline for the other development is unknown but estimated to take 10 years to complete. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.
221550 / Meath County Council	EirGrid PLC CP1194 Woodland Station 400kV Station Redevelopment.	• Planning permitted; • Overlaps with the Planning Application Boundary at Woodland Substation; • Construction is due to commence in Q2 2025 and be completed by Q4 2028. There is therefore the potential for Construction Phases to overlap; and • Operational Phases will coincide.

Each environmental topic was considered for potential cumulative impacts with the Proposed Development, in the absence of any mitigation for the Proposed Development. There is limited potential for cumulative impacts during the Operational Phase, on the basis that fewer impacts are anticipated during this phase for the Proposed Development.

Potential cumulative impacts that could arise in the absence of any mitigation for the Proposed Development are summarised in Table 20.2 (please refer to Appendix A20.1 in Volume 3 of the EIAR for further detail).

Table 20.2: Summary of Potential Cumulative Impacts

Environmental Topic	Other Development(s)	Description of Potential Cumulative Impact (Pre-Mitigation)	Phase
Population	312131 – Greater Dublin Drainage, 314724 – Metrolink, 314232 – Dart+ West, 317121 – BusConnects Swords, 308130 - Enginenode Limited development, 309833 / FW21A/0003 - Montague Ventures Limited development, 312271 – Glenveagh Homes Limited development, F21A/0147 / F23A/0006 - Genvest ULC. development, F21A/0681 / 3041/22 – Mayne Stability Limited development, FW22A/0167 – IPUT plc development, F22A/0682 – Fingleton White development, F23A/0040 – CP1213 EirGrid development, 2360290 - Marina Quarter Ltd. Large-Scale Residential Development and 22837 / 23136 – GDA Energy Ltd development.	• Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy.	Construction Phase
Human Health	CP0966 Kildare Meath Upgrade EirGrid development.	Negative, Imperceptible and Temporary cumulative impact on public health (transport modes, access and connections) if Construction Phases were to overlap.	Construction Phase
	312131 – Greater Dublin Drainage.	Negative, Imperceptible and Temporary cumulative impact on the air quality and noise health determinants for residents of small areas 267005001/02 and 267001009/03 in Dublin, in the event of overlapping Construction Phases.	Construction Phase
	314724 – Metrolink.	Negative, Not Significant and Temporary cumulative impact on the air quality, noise and traffic health determinants for residents of small areas 267005001/02 and 26709902 in Dublin, in the event of overlapping Construction Phases.	Construction Phase
	317121 – BusConnects Swords.	Negative, Not Significant and Temporary cumulative impact on traffic and transport for residents of small areas 267001009/03, 267005001/02, 267132011 and 267099015/01 in Dublin, in the event of overlapping Construction Phases.	Construction Phase
	308130 – Enginenode.	Negative, Imperceptible and Temporary cumulative impact on traffic and transport determinant for residents of small areas 167029015 and 167029001 in Meath, in the event of overlapping Construction Phases.	Construction Phase
	309833 / FW21A/0003 - Montague Ventures Limited development, 312271 - Glenveagh Homes Limited development, F21A/0147 / F23A/0006 - Genvest ULC. development.	Negative, Imperceptible, and Temporary cumulative impact on the air quality and noise determinants for a small number of residential dwellings located in the Hollywood / Hollystown area (Montague development only), the Yellowstown area (Glenveagh Homes development only) and a small number of residential dwellings located in Stockhole Lane area of Clonshaugh area (small area 267005001/02) (Genvest development only), in the event of overlapping Construction Phases.	Construction Phase
	FW22A/0167 – IPUT plc development, and 2360290 – Marina Quarter Ltd. Development.	Negative, Imperceptible and Temporary cumulative impact on the air quality, noise and traffic and transport health determinants for residents of small area 267158009/02 (IPUT development only) and residents of small areas 167029001 and 167029015 (Marina Quarter development only), in the event of overlapping Construction Phases.	Construction Phase
Air Quality	PCI0001 – CP0466 North South Interconnector EirGrid development, 316372 – CP0966 Kildare Meath Upgrade EirGrid development, 312131 – Greater Dublin	Negative, Not Significant and Short-Term dust impact if Construction Phases were to overlap.	Construction Phase

Environmental Topic	Other Development(s)	Description of Potential Cumulative Impact (Pre-Mitigation)	Phase
	Drainage, 314724 – Metrolink, 314232 – Dart+ West, 317121 – BusConnects Swords, 308130 - Enginenode Limited development, F21A/0681 / 3041/22 – Mayne Stability Limited development, FW22A/0167 – IPUT plc development, F22A/0682 – Fingleton White development, F23A/0040 – CP1213 EirGrid development, 22837 / 23136 – GDA Energy Ltd development, and 221550 - CP1194 EirGrid Station Redevelopment.		
Noise and Vibration	316372 – CP0966 Kildare Meath Upgrade EirGrid development, 312131 – Greater Dublin Drainage, 314724 – Metrolink, 314232 – Dart+ West, 317121 – BusConnects Swords, 308130 - Enginenode Limited development, F21A/0681 / 3041/22 – Mayne Stability Limited development, FW22A/0167 – IPUT plc development, F22A/0682 – Fingleton White development, and F23A/0040 – CP1213 EirGrid development.	Negative, Not Significant and Short-Term noise impact on nearby receptors in the event that Construction Phases were to overlap due to the spatial overlap between the other development and the Proposed Development.	Construction Phase
Biodiversity	Water Quality (see Hydrology below).		
	PCI0001 – CP0466 North South Interconnector, 308130 - Enginenode Limited development, 312271 – Glenveagh Homes Limited development, 312848 / F21A/0488 – Gerard Gannon Properties development, 314894 – Kilshane Energy Ltd. development, F21A/0147 / F23A/0006 – Genvest ULC development, F21A/0681 / 3041/22 - Mayne Stability Limited development, F22A/0682 – Fingleton White development, 2360290 - Marina Quarter Ltd development, 22837 / 23136 – GDA Energy 4 Ltd development, RA170873 / 23787 – South Meath Solar Farm Limited development, and 221550 - CP1194 EirGrid Station Redevelopment.	Negative, Not Significant and Short-Term general impact on biodiversity, if Construction Phases were to overlap.	Construction Phase
	316372 – CP0966 Kildare Meath Upgrade EirGrid development.	Negative, Significant, and Medium-Term impact on breeding birds at Woodland Substation due to spatial overlap and removal of habitat for Construction Phases.	Construction Phase
	F23A/0040 - CP1213 EirGrid development.	Negative, Significant, and Long-Term impact on calcareous grassland / natural grassland and bats at Belcamp Substation due to spatial overlap and removal of habitat for Construction Phases.	Construction Phase
	F23A/0040 - CP1213 EirGrid development.	Negative, Significant, and Medium-Term impact on breeding birds at Belcamp Substation due to spatial overlap and removal of habitat for Construction Phases.	Construction Phase
	317121 – BusConnects Swords.	Negative, Significant and Long-Term impact on trees and hedgerows due to removal required during Construction Phases.	Construction Phase
	309833 / FW21A/0003 - Montague Ventures Limited.	Negative, Significant and Long-Term impact on bats due to disturbance / lighting and the loss of trees / hedgerows, if Construction Phases were to overlap.	Construction Phase
	FW22A/0167 – IPUT plc development, FW22A/0156 – Earlstand Corporation development, FW21A/0042 – Glenveagh Homes Ltd development.	Negative, Slight and Short-Term impact on wintering birds due to disturbance effects, if Construction Phases were to overlap.	Construction Phase
	FW19A/0177 - ESB Engineering & Major Projects development Macetown / Corduff underground cable).	Negative, Very Significant and Short-Term impact on North Dublin Bay Special Area of Conservation (SAC), South Dublin Bay and River Tolka Estuary Special Protection	Construction Phase

Environmental Topic	Other Development(s)	Description of Potential Cumulative Impact (Pre-Mitigation)	Phase
		Area (SPA) and North Bull Island SPA, for which there is a hydrological connection from both developments, if Construction Phases were to overlap.	
Hydrogeology	PCI0001 – CP0466 North South Interconnector EirGrid development, 316372 – CP0966 Kildare Meath Upgrade EirGrid development, 312131 – Greater Dublin Drainage, 314724 – Metrolink, 317121 – BusConnects Swords, F21A/0681 / 3041/22 – Mayne Stability Limited development, FW22A/0167 – IPUT plc development, F22A/0682 – Fingleton White development, and F23A/0040 – CP1213 EirGrid development.	Negative, Slight and Short-Term cumulative impacts on groundwater quality, if Construction Phases were to overlap.	Construction Phase
	316372 – CP0966 Kildare Meath Upgrade EirGrid development.	Negative, Negligible and Short-Term impact to the underlying aquifers, if Construction Phases were to overlap. Negative, Moderate and Short-Term impact on the hydrology of one groundwater dependent terrestrial ecosystem (GWDTEw2), if Construction Phases were to overlap.	Construction Phase
Hydrology	PCI0001 – CP0466 North South Interconnector EirGrid development, 316372 – CP0966 Kildare Meath Upgrade EirGrid development, F23A/0040 – CP1213 EirGrid development.	Negative, Significant and Short-Term impact on the Dunboyne_010 Stream water body from the potential for an increase in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching, as both developments will cross this watercourse if Construction Phases were to overlap.	Construction Phase
	312131 – Greater Dublin Drainage.	Negative, Significant and Short-Term impact on the Mayne_10 water body from the potential for an increase in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching, as both developments will cross this watercourse if Construction Phases were to overlap.	Construction Phase
	314724 – Metrolink, 317121 – BusConnects Swords.	Adjacent to the Ballymun, Collins Town and Forest Little (for 314724) and Ballymun and Dublin Airport (for 317121), a Negative, Significant and Short-Term impact on Sluice_010 and Mayne_010 water bodies, from the potential for an increase in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching, as both developments would cross these water bodies within 500m of each other, if Construction Phases were to overlap.	Construction Phase
Archaeology, Architectural and Cultural Heritage	312131 – Greater Dublin Drainage.	Negative, Moderate and Permanent impact on CH_32 (Field system) as a result of the interaction between this development and the Proposed Development, as both will remove archaeological remains that form this part of this asset.	Construction Phase
	314724 – Metrolink.	Negative, Slight and Permanent impact on AY_43 (A Recorded Monument) as a result of the interaction between this development and the Proposed Development, as both will be located within the Zone of Notification	Construction Phase
	309833 / FW21A/0003 - Montague Ventures Limited development, 312271 – Glenveagh Homes Limited development, and FW21A/0042 - Glenveagh Homes Ltd development.	Negative, Moderate and Permanent impact on DL_05 (Designed Landscape) as a result of the interaction between each of these other developments and the Proposed Development, as both will remove features that form this part of this asset.	Construction Phase

Environmental Topic	Other Development(s)	Description of Potential Cumulative Impact (Pre-Mitigation)	Phase
	F22A/0682 – Fingleton White development.	Negative, Slight and Permanent impact on DL_15 as a result of the interaction between this development and the Proposed Development, as both developments will remove features that form this part of this asset.	Construction Phase
	F23A/0040 - CP1213 EirGrid development.	Negative, Slight and Permanent direct impact on CH_32 (Field system) if the Construction Phases were to overlap.	Construction Phase
	309833 / FW21A/0003 - Montague Ventures Limited development, 312271 – Glenveagh Homes Limited development, and FW21A/0042 - Glenveagh Homes Ltd development.	Negative, Moderate and Permanent cumulative impact on DL_05 (Designed Landscape) due to the presence of the other development and permanent access tracks and Joint Bays within the demesne.	Operational Phase
Traffic	PCI0001 – CP0466 North South Interconnector EirGrid development, 316372 – CP0966 Kildare Meath Upgrade EirGrid development, 314724 – Metrolink, 317121 – BusConnects Swords, 314232 – Dart+ West, 312060 / F21A/0401 - Gannon Properties development, 314169 / F22A/0136 – Gerard Gannon Properties development, 312848 / F21A/0488 - Gerard Gannon Properties development, 308130 - Enginenode Limited development, 309833 / FW21A/0003 - Montague Ventures Limited development, 312271 – Glenveagh Homes Limited development, 314894 - Kilshane Energy Ltd. development, F21A/0147 / F23A/0006 – Genvest ULC development, F20A/0550 – daa plc, F21A/0681 / 3041/22 – Mayne Stability Limited development, FW22A/0167 – IPUT plc development, FW19A/0177 – ESB Engineering & Major Projects development (Macetown / Corduff underground cable), F18A/0306 – Clarke Family Partnership development, FW22A/0156 – Earlstand Corporation Unlimited development, FW21A/0042 – Glenveagh Homes Ltd development, F22A/0682 – Fingleton White development, F23A/0040 – CP1213 EirGrid development, F22A/0687 – Clondev Properties Limited development, 4367/19 – ESB development, 2360290 - Marina Quarter Ltd. development, 22837 / 23136 – GDA Energy 4 Ltd development, RA170873 / 23787 - South Meath Solar Farm Limited development, and 221550 - CP1194 EirGrid Station Redevelopment.	Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap due to cumulative construction traffic on the following roads for the following other developments: • R125, R147, R154, R156, R157 and The Red Road (CP0466, CP0966 and CP1194); • R139 and Clonshaugh Road (Greater Dublin Drainage and Mayne Stability development); • R132 (BusConnects Swords, daa plc and Clarke Family developments); • R157 (Dart+ West and Marina Quarter development); • R139 (Gannon Properties developments x3 and CP1213 and ESB developments); • R147 and R157 (Enginenode Development); • Cherryhound Tyrrelstown Link Road, Ratoath Road, Kilbride Road and R121 Ward Road (Montague Ventures, Glenveagh Homes x2 and Kilshane Energy developments); • R139 Road, Clonshaugh Road and Stockhole Lane (Genvest development); • Cherryhound Tyrrelstown Link Road (IPUT, ESB Engineering and Earlstand developments); • R139 Road, Stockhole Lane, Clonshaugh Road and the R132 Road (Fingleton White and Clondev developments); • R147, R154 and R125 Roads (GDA Energy development); and • R147, R156 and R157 Roads (South Meath Solar Farm development).	Construction Phase
Agronomy and Equine	316372 – CP0966 Kildare Meath Upgrade EirGrid development.	There is the potential for cumulative impacts on the following land parcels, within the overlapping Woodland Corridor between the two developments: • Land parcel Ref No 1 – Negative, Not Significant and Long-Term; • Land parcel Ref No 2 – Negative, Not Significant and Long-Term; • Land parcel Ref No 3 – Negative, Slight and Long-Term; and	Construction and Operational Phase

Environmental Topic	Other Development(s)	Description of Potential Cumulative Impact (Pre-Mitigation)	Phase
		• Land parcel Ref No 4 – Negative, Slight and Long-Term.	
	312131 – Greater Dublin Drainage.	Negative, Profound and Permanent impact on land parcel Ref No 39, and a Negative, Significant and Permanent impact on land parcel Ref No., 40 due to land take from both developments.	Construction and Operational Phase
	314232 – Dart+ West.	Neutral, Not Significant and Short-Term impact on land parcel Ref No. 10 and 11 during the Construction Phases of both developments in the area to the south of Junction 5 of the M3 Motorway.	Construction Phase
	308130 - Enginenode Limited development.	Negative, Not Significant and Short-Term cumulative impact on land parcel Ref No. 11 during the Construction Phases of both developments due to land take.	Construction Phase
	F23A/0040 – CP1213 EirGrid development.	Negative, Significant and Permanent impact on land parcel Ref No. 40 due to land take during the Construction and Operational Phases for both developments.	Construction and Operational Phase
Waste	All 29 other developments (as listed in Table 20.1).	Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during any overlapping Construction Phase years.	Construction Phase
	All 29 other developments (as listed in Table 20.1).	Neutral, Imperceptible and Long-Term cumulative impact as potential wastes from both the Operational Phases will be insignificant.	Operational Phase
Material Assets	PCI0001 – CP0466 North South Interconnector EirGrid development, 316372 – CP0966 Kildare Meath Upgrade EirGrid development, 312131 – Greater Dublin Drainage, 317121 – BusConnects Swords, FW22A/0167 – IPUT plc development, F22A/0682 – Fingleton White development, F23A/0040 – CP1213 EirGrid development, and 221550 - CP1194 EirGrid Station Redevelopment.	Neutral, Imperceptible and Temporary cumulative impact as there is limited potential for an overlap in interfaces with existing utilities requiring diversions during the Construction Phases of the Proposed Development and each of the other developments.	Construction Phase
	314724 – Metrolink.	Negative, Moderate and Temporary cumulative impact due to the potential for an overlap in interfaces with existing utilities requiring diversions if Construction Phases were to overlap.	Construction Phase
	PCI0001 – CP0466 North South Interconnector EirGrid development, 316372 – CP0966 Kildare Meath Upgrade EirGrid development, F21A/0681 / 3041/22 – Mayne Stability Limited development, FW19A/0177 - ESB Engineering & Major Projects development (Macetown / Corduff underground cable), F23A/0040 – CP1213 EirGrid development, 4367/19 – ESB development at Darndale, and 221550 - CP1194 EirGrid Station Redevelopment.	Positive, Significant and Long-Term cumulative impact on the regional electricity network when each other development and the Proposed Development are operational.	Operational Phase
Landscape and Visual	PCI0001 – CP0466 North South Interconnector EirGrid development.	Neutral, Imperceptible and Short-Term visual impacts, if Construction Phases were to overlap.	Construction Phase
	PCI0001 – CP0466 North South Interconnector EirGrid development 221550 - CP1194 EirGrid Station Redevelopment.	Negative, Slight and Short-Term landscape impact, if Construction Phases were to overlap.	Construction Phase

Environmental Topic	Other Development(s)	Description of Potential Cumulative Impact (Pre-Mitigation)	Phase
	316372 – CP0966 Kildare Meath Upgrade EirGrid development.	Negative, Slight and Short-Term visual impact within the Woodland Corridor, and a Negative, Moderate-Slight and Short-Term impact on the Tara Skryne Hills landscape character area, if Construction Phases were to overlap.	Construction Phase
	F23A/0040 – CP1213 EirGrid development.	Negative, Slight-Imperceptible and Short-Term visual impact, and a Negative, Slight and Short-Term landscape impact, if Construction Phases were to overlap.	Construction Phase
	PCI0001 – CP0466 North South Interconnector EirGrid development 221550 - CP1194 EirGrid Station Redevelopment.	Negative, Imperceptible and Permanent landscape and visual impact during the Operational Phases.	Operational Phase
	316372 – CP0966 Kildare Meath Upgrade EirGrid development.	Negative, Slight and Permanent visual impact within the Woodland Corridor, and a Negative, Imperceptible and Permanent impact on the Tara Skryne Hills landscape character area.	Operational Phase
	F23A/0040 – CP1213 EirGrid development 221550 - CP1194 EirGrid Station Redevelopment.	Negative, Imperceptible and Permanent landscape and visual impact during the Operational Phases.	Operational Phase

20.4 Mitigation and Monitoring Measures

The results of the assessment presented in Table 2 in Appendix A20.1 in Volume 3 of this EIAR indicate that for the majority of environmental topics, no additional mitigation measures other than those provided in this EIAR (as summarised in Chapter 21 (Summary of Mitigation and Monitoring Measures) in Volume 2 of this EIAR), and in the Construction Environmental Management Plan (CEMP) and its associated appendices (included as standalone documents in the planning application pack)), are required to mitigate the identified cumulative impacts.

However, the following additional mitigation measures will be implemented in the event that Construction Phases for the Proposed Development and the CP0966 Kildare Meath Grid Upgrade occur at the same time, due to the spatial overlap between the two developments in the 'Woodland Corridor' (refer to Figure 20.2 in Volume 4 of the EIAR), which extends from Woodland Substation southwards to the R156 Regional Road:

- Air Quality: Liaison meetings with the CP0966 construction management team / appointed contractor will be held to ensure plans in the Woodland Corridor are coordinated, in order to reduce cumulative dust and particulate matter emissions. As part of this liaison process, the appointed contractors will be required to determine the interactions of the offsite transport / deliveries which might be using the same strategic road network routes;
- Hydrology: Given the proximity of the two development crossings of the Dunboyne Stream_010 water body, coordination of the construction programmes for the two developments will be required between the respective appointed contractors to ensure that, where possible, works to cross the water body are undertaken at the same time, and as such, minimising disruption;
- Traffic: Coordination of the construction programmes for the two developments will be required to ensure that there are no conflicting road closures from either development at the same time;
- Traffic: Cumulative construction traffic will also be timed to avoid peaks in construction programmes, where possible; and
- Material Assets: Coordination / consultation between the appointed contractors for the two developments will be required in the event that there are overlapping works within the Woodland Corridor area. Any future utility work identified as being required during the Construction Phase will be undertaken in consultation with the relevant utility companies.

20.5 Residual Cumulative Impacts

With the implementation of the mitigation measures included in this EIAR and the CEMP, in addition to the additional mitigation measures outlined in Section 20.4, there will be no significant residual cumulative impacts for the majority of the potential cumulative impacts identified in Section 20.3 (please refer to Appendix A20.1 in Volume 3 of the EIAR which sets out the full details for the basis of these conclusions).

Table 20.3 outlines the significant residual impacts (Significant rating or higher unless otherwise stated below) that have been identified.

Table 20.3: Summary of Predicted Significant Residual Cumulative Impacts

Environmental Topic	Other Development(s)	Pre-Mitigation Cumulative Impact	Post-Mitigation Cumulative Impact	Comment
Biodiversity	F23A/0040 – CP1213 Belcamp 220kV Extension.	Negative, Significant, and Long-Term impact on calcareous / natural grassland at Belcamp Substation due to spatial overlap and removal of habitat for Construction Phases.	Negative, Significant, and Medium-Term impact on calcareous / natural grassland, at Belcamp Substation.	There will be a significant and medium-term impact associated with the loss of habitat as habitat will take longer periods to grow / re-establish.
Archaeology, Architectural Heritage and Cultural Heritage	309833 / FW21A/0003 - Montague Ventures Limited development, 312271 – Glenveagh Homes Limited development, and FW21A/0042 - Glenveagh Homes Ltd development.	Negative, Moderate and Permanent cumulative impact on DL_05 (Designed Landscape) due to the presence of the other development and permanent access tracks and Joint Bays within the demesne.	Negative, Moderate and Permanent cumulative impact on DL_05 (Designed Landscape) due to the presence of the other development and permanent access tracks and Joint Bays within the demesne.	There will be a Negative, Moderate (noting that an impact that is Moderate or higher is considered 'significant' in the archaeology, architectural heritage and cultural heritage assessment) and Permanent impact on DL_05 (Designed Landscape) due to the Proposed Development's permanent access tracks and Joint Bay covers remaining visible and the presence of the other development further reducing the legibility of this demesne which cannot be mitigated.
Agronomy and Equine	312131 – Greater Dublin Drainage.	Negative, Profound and Permanent on land parcel Ref No. 39 (Construction and Operational Phases) due to land take.	Negative, Profound and Permanent on land parcel Ref No. 39 (Construction and Operational Phases) due to land take.	All temporary land take will be reinstated in line with the mitigation measures outlined in this EIAR. However, the loss of agricultural land as a result of the construction and operation of each other development and the Proposed Development will be a permanent loss which cannot be mitigated.
		Negative, Significant and Permanent on land parcel Ref No. 40 (Construction and Operational Phases) due to land take.	Negative, Significant and Permanent on land parcel Ref No. 40 (Construction and Operational Phases) due to land take.	
	F23A/0040 – CP1213 Belcamp 220kV Extension.	Negative, Significant and Permanent on land parcel Ref No. 40 (Construction and Operational Phases) due to land take.	Negative, Significant and Permanent on land parcel Ref No. 40 (Construction and Operational Phases) due to land take.	
Material Assets	PCI0001 – CP0466 North South Interconnector EirGrid development, 316372 – CP0966 Kildare Meath Upgrade EirGrid development, F21A/0681 / 3041/22 – Mayne Stability Limited development, FW19A/0177 - ESB Engineering & Major Projects development (Macetown / Corduff underground cable), F23A/0040 – CP1213 EirGrid development, 4367/19 – ESB development at Darndale, and	Positive, Significant and Long-Term impact on the regional electricity network once the Proposed Development and each one of the other developments are operational.	Positive, Significant and Long-Term impact on the regional electricity network once the Proposed Development and each one of the other developments are operational.	N/A

Environmental Topic	Other Development(s)	Pre-Mitigation Cumulative Impact	Post-Mitigation Cumulative Impact	Comment
	221550 - CP1194 EirGrid Station Redevelopment.			

20.6 Environmental Interactions

The interaction of impacts arises from the combined action of a number of different environmental topic-specific impacts upon a single receptor / resource. For example, the removal of trees can have landscape, visual and ecological impacts, or an individual residential receptor can be affected by noise and visual impacts. Cumulative impacts can also arise from different types of impact within a single topic on a receptor, such as the cumulative visual impact of vegetation removal and erection of an electricity tower on a single receptor.

The technical assessments in Volume 2 of this EIAR (refer to Chapter 5 to Chapter 19) contain assessments of the likely significant impacts arising from the Proposed Development singularly. During the assessment process, coordination took place between assessment specialists to ensure that interacting impacts arising from the Proposed Development singularly were identified, assessed and, where appropriate, mitigated. These impacts are reported in the individual chapters and are not repeated here. Table 20.4 sets out a matrix to indicate where interactions between different impacts on different environmental factors have been addressed. This is in line with the approach set out in the EPA Guidelines (EPA 2022).

Table 20.4: Environmental Interactions Matrix

Environmental Topic	Population	Human Health	Air Quality	Climate	Noise and Vibration	Biodiversity	Soils, Geology and Hydrogeology	Hydrology	Archaeology, Architectural and	Traffic	Agronomy and Equine	Waste	Material Assets	Landscape and Visual	Risk of Major Accidents and / or Disasters
Population															
Human Health	X														
Air Quality	X	X													
Climate		X													
Noise and Vibration	X	X													
Biodiversity			X	X	X										
Soils, Geology and Hydrogeology		X				X									
Hydrology		X				X	X								
Archaeology, Architectural and Cultural Heritage							X	X							
Traffic	X	X	X		X										
Agronomy and Equine	X	X	X	X	X		X	X							
Waste							X			X					
Material Assets		X								X					
Landscape and Visual	X	X				X			X						
Risk of Major Accidents and / or Disasters	X	X		X		X	X	X		X			X		

Note: This matrix should be read down, starting with each topic identified across the top. X = significant interaction between. Blank cells indicate no or weak interaction.

Key interactive impacts include:

- Biodiversity and Hydrology – interactive impacts could potentially occur to the surface water environment. They could include potential impacts on aquatic species, requiring mitigation measures;
- Biodiversity and Landscape and Visual – interactive impacts could potentially occur as a result of loss of habitats (hedgerows, trees, grassland, etc.);
- Archaeology, Architectural Heritage, and Cultural Heritage and Landscape and Visual – interactive impacts could potentially occur in relation to the landscape character and setting of cultural heritage assets;
- Archaeology, Architectural Heritage, and Cultural Heritage and Soils, Geology and Hydrogeology – interactive impacts arising from dewatering could potentially impact on cultural heritage sites, such as historical wells; and,
- Material Assets, Agronomy, Air Quality, Noise and Vibration, Traffic and Transport, Population and Human Health – interactions in the human environment are typically complex as there is the potential for receptors to be impacted in a number of ways.

The likely significance of these combined and interrelated impacts has been assessed, and mitigated where required, within the individual assessment chapters.

20.7 References

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Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

S.I. No. 600/2001 – Planning and Development Regulations, 2001 (as amended)

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 21 Summary of Mitigation and Monitoring Measures

EirGrid

March 2024

Contents

21. Summary of Mitigation and Monitoring Measures

21.1 Introduction

The purpose of this Chapter is to collate the mitigation and monitoring measures identified in the Environmental Impact Assessment Report (EIAR) that are considered necessary to protect the environment, prior to the commencement of, and throughout the duration of the Construction and / or Operational Phases of the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development).

The design of the Proposed Development has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental impacts, where practicable. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process have been incorporated, where appropriate. As described throughout this EIAR, the design of the Proposed Development has been progressed taking account of environmental constraints and considerations that have been identified in assessments. This has enabled the avoidance of potential environmental impacts, wherever possible.

21.2 Mitigation and Monitoring Schedule

Mitigation and monitoring measures have been identified as environmental commitments and overarching requirements which will avoid, reduce or offset potential impacts. Mitigation and monitoring measures specified within the EIAR technical assessments are also provided in Chapter 5 to Chapter 20 of this EIAR. The timing and implementation of the mitigation and monitoring measures are indicated within this Chapter as occurring during the:

- Detailed Design Stage: The completion of further design refinement of the Proposed Development prior to construction. The detailed design will account for any conditions attached to a grant of planning for the Proposed Development;
- Pre-Construction Phase: Activities such as investigative surveys (e.g. bat surveys) that need to be undertaken in advance of the construction works;
- Construction Phase: The undertaking of physical works to construct elements of the Proposed Development, as outlined in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR; and
- Operational Phase: When the Proposed Development comes into operation (i.e., any mitigation associated with the planned maintenance).

The following tables summarise the Detailed Design Stage, Pre-Construction Phase, Construction Phase and Operational Phase mitigation and monitoring measures that are outlined in the relevant EIAR technical assessments, but should be read in conjunction with the mitigation outlined in the specific Chapter and also within the Construction Environmental Management Plan (CEMP), which is included as a standalone document in this planning application pack (note that the CEMP summarises the Pre-Construction Phase / Construction Phase mitigation and monitoring measures only). Where appropriate, the location to which the mitigation or monitoring measure relates to is identified, and where the mitigation or monitoring measures is development-wide, the location is given as ‘throughout (as required)’. Note that in certain instances, a mitigation or monitoring measure may be relevant to more than one environmental aspect.

21.3 General Mitigation Requirements

Table 21.1: General Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
GEN1	N/A	Throughout (as required)	The mitigation measures appropriate to the construction contract (Pre-Construction and Construction Phase mitigation measures) summarised in this Chapter have been included in the CEMP and its associated appendices (which are included as standalone documents in the planning application pack).	Pre-Construction / Construction

21.4 Population Mitigation and Monitoring Measures

Table 21.2: Population Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
N/A	N/A	N/A	No mitigation or monitoring measures are considered necessary beyond those already identified in other environmental assessments.	N/A

21.5 Human Health Mitigation and Monitoring Measures

Table 21.3: Human Health Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
HH1	6.5.1	Off-Road Sections and throughout (as required)	The following mitigation measures, in relation to agronomy and equine, will be implemented in full to provide support to the farming community likely to be affected by the Proposed Development: • The appointed contractor will be required to maintain close liaison with local community representatives and landowners and farmers to provide them with adequate progress information and advance notice of works. This will ensure that construction activities are planned around the reasonable access needs of the landowner, so that access is maintained when required by the landowner for farming activities, such as for example, forage and crop harvesting, fertiliser spreading, slurry spreading, and herding of livestock etc. Scheduling of works will be agreed with each landowner to facilitate the operation of the farm and minimise disturbance. Where it is necessary to move livestock along public roads or across the working area, this will be facilitated by the appointed contractor; and • Where the working area severs land access or access to farmyards, the appointed contractor will ensure that there is adequate access provided to facilitate the farmer to effectively farm severed land.	Construction
HH2	6.5.1	Throughout (as required)	The CEMP, which is included as a standalone document in the planning application pack will be implemented.	Construction
HH3	6.5.1	Throughout (as required)	The following mitigation measures, in relation to traffic, will be implemented: • An adopted, regulated and approved Construction Traffic Management Plan (CTMP) (refer to Appendix B of the CEMP which is included as a standalone document in this planning application pack) will be implemented; • Signed diversion routes will be provided to mitigate journey disruption and to minimise potential driver delay. These are outlined in Chapter 14 (Traffic and Transport) but will be subject to final agreement with the Roads Authorities. Where practically achievable, diversion routes will not apply outside of the working area hours of operation; and • Construction activity generated vehicles will travel on predefined construction access routes to and from the relevant working areas to reduce the effects on local traffic.	Construction
HH4	6.5.1	Throughout (as required)	The following mitigation measure, in relation to air quality, will be implemented: • 'Highly recommended' measures for 'medium risk' dust soiling impacts, as identified in the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.1) (IAQM 2023), will be implemented.	Construction
HH5	6.5.1	Throughout (as required) and at HDD Compounds (HDD 1 and HDD 2)	The following mitigation measures, in relation to noise, will be implemented: • Noise barriers will be installed around two of the Horizontal Directional Drilling (HDD) Compounds (HDD1 and HDD2) Compounds and acoustic enclosures will be placed around HDD plant; and • British Standard Institute (BSI) British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (BSI 2014a) will be complied with.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
HH6	6.5.1	Throughout (as required)	The following specific mitigation measures have been identified for human health and will be implemented during the Construction Phase: • All proposed traffic diversion routes will remain suitable for walkers, cyclists and horse riders as well as motorised vehicles if these user types are known or anticipated to make use of the closed route; • A Community Liaison Officer will be engaged who will act as a single point of contact for members of the community who may have concerns about construction related activities, collate data regarding issues raised by members of the community to enable them to be addressed, and who will act to resolve concerns in a timely manner; • The Community Liaison Officer will be contacted either via telephone or by a suitable online feedback mechanism; and • There will be specific liaison between the appointed contractor's Community Liaison Officer and the following facilities to develop targeted mitigation measures which will help to minimise adverse effects associated with increased traffic flows on nearby roads: ○ Scoil Bhríde, Kilbride Road, Kilbride; ○ Dunboyne Nursing Home, Harlockstown, Dunboyne; and ○ Anovocare Nursing Home, Stockhole Lane, Cloghran.	Construction

21.6 Air Quality Mitigation and Monitoring Measures

Table 21.4: Air Quality Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
AQ1	7.5.1	Throughout (as required)	Good practice dust mitigation measures to manage the generation of dust at source will be implemented. The proposed mitigation measures, as per the) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.1) (IAQM 2023).	Construction
AQ2	7.5.1	Throughout (as required)	**Communication:** • A stakeholder communication plan will be developed and implemented and will include community engagement before work commences on-site; • The name and contact details of the person(s) accountable for air quality and dust issues on the Temporary Construction Compound (TCC) and Horizontal Directional Drilling (HDD) Compound site boundaries will be displayed. This may be the environment manager / engineer or the site manager; and • The head or regional office contact information for the developer and appointed contractor will be displayed.	Construction
AQ3	7.5.1	Throughout (as required)	**Site Management:** • All dust and air quality complaints will be recorded, cause(s) will be identified, appropriate measures to reduce emissions in a timely manner will be undertaken, and the measures taken will be recorded; • The complaints log will be made available to the local authority when asked; and • Any exceptional incidents that cause dust and / or air emissions, either on-site or off site, will be recorded in a log book, along with the action taken to resolve the situation.	Construction
AQ4	7.5.1	Throughout (as required)	**Monitoring:** • Regular site inspections to monitor compliance with the CEMP or equivalent management plan will be carried out, with inspection results recorded. The inspection log will be made available to the local authority when asked; and • The frequency of site inspections by the person accountable for air quality and dust issues on-site will be increased, when activities with a high potential to produce dust are being carried out, and during prolonged dry or windy conditions. Regular site inspections to monitor compliance with the CEMP will be carried out and inspection results will be recorded.	Construction
AQ5	7.5.1	Throughout (as required)	**Preparing and maintaining the site.** • The site layout will be planned so that machinery and dust causing activities are located away from receptors, as far as is possible; • Solid screens or barriers will be erected around dusty activities that are at least as high as any stockpiles on-site; • Specific operations will be fully enclosed where there is a high potential for dust production and impacts on nearby receptors; • Site runoff of water or mud will be avoided; • Materials that have a potential to produce dust will be removed from site as soon as possible, unless being reused on-site. If they are being reused on-site, they will be covered as described below; and • Stockpiles will be covered or fenced to prevent wind whipping.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
AQ6	7.5.1	Throughout (as required)	**Operating vehicles / machinery and sustainable travel:** • All vehicle operators will be required to switch off engines when vehicles are stationary (i.e. no idling vehicles); and • The use of diesel, or petrol-powered generators will be avoided. Mains electricity or battery powered equipment will be used, where practicable.	Construction
AQ7	7.5.1	Throughout (as required)	**Operations:** • Site personnel will 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); • An adequate water supply will be made available for dust / particulate matter suppression, where required; • Covered skips will be used; • Drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment will be minimised, and fine water sprays will be used on such equipment, wherever appropriate; and • The appointed contractor will ensure that equipment is readily available on-site to clean any dry spillages. Spillages will be cleaned up as soon as reasonably practicable after the event using wet cleaning methods.	Construction
AQ8	7.5.1	Throughout (as required)	**Waste management:** • Bonfires and burning of waste materials will be avoided.	Construction
AQ9	7.5.1	Throughout (as required)	**Measures specific to trackout**: • Water-assisted dust sweeper(s) will be used on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use; • Dry sweeping of large areas will be avoided; • It will be required to ensure that vehicles entering and leaving sites containing friable materials are covered to prevent escape of materials during transport; • On-site haul routes will be inspected for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; • All inspections of haul routes and any subsequent action will be recorded in a site log book; • A surfaced haul route to the TCCs and HDD Compounds will be installed, which will be regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and will be regularly cleaned, if required; • A wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable) will be implemented; • It will be required to ensure that there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and • Access gates will be located at least 10m from receptors, where possible.	Construction

21.7 Climate Mitigation and Monitoring Measures

Table 21.5: Climate Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
CL1	8.5.2.2	Throughout (as required)	The compensation of unavoidable residual GHG emissions will be considered during the detailed design stage of the Proposed Development.	Detailed Design
CL2	8.5.1.2	Throughout (as required)	The following good practice measures will be implemented to reduce greenhouse gas (GHG) emissions during the Construction Phase of the Proposed Development: • Investigating and implementing sustainable reuse of any materials won from excavation; • The reuse, where possible of materials and waste generated from construction works; • Procuring locally sourced materials where reasonably practicable to reduce transportation emissions; • Careful consideration of material quantity requirements to avoid over-ordering and generation of waste materials, while also reducing transportation-related emissions; and • The appointed contractor will develop and implement a plan to reduce energy consumption and GHG emissions throughout construction, including, for example: ○ Monitoring of fuel and mains electricity use on site (site accommodation to have motion activated lighting and use lower power lighting techniques such as light-emitting diodes (LEDs)); ○ Training of plant operatives in fuel efficient driving techniques or use of appropriate technology on construction vehicles (e.g. stop – start); and ○ Consideration of renewable / and or low carbon energy sources to power TCCs and HDD Compounds.	Construction
CL3	8.5.2.2	Throughout (as required)	The party responsible for maintenance of the assets (the Electricity Supply Board (ESB) and its appointed contractor(s)) will ensure that the following mitigation measures are implemented to reduce GHG emissions during the Operational Phase of the Proposed Development: • Locally sourced, low carbon materials will be used, where technically feasible for asset replacements; and • Regular planned preventative maintenance checks will be implemented to optimise operational efficiency.	Operational

21.8 Noise and Vibration Mitigation and Monitoring Measures

Table 21.6: Noise and Vibration Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
NV1	9.5.1.1	Throughout (as required)	Construction activities will comply with BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (BSI 2014a) and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration (BSI 2014b).	Construction
NV2	9.5.1.1	Throughout (as required)	The appointed contractor will comply with local authority controls on noise and vibration during the Construction Phase of the Proposed Development.	Construction
NV3	9.5.1.1	HDD Compounds (and throughout as required)	Noise barriers will be installed around the following HDD Compounds, and acoustic enclosures will be placed around the HDD plant: • HDD2 M2 Motorway (Chainage 23,550). Noise barriers will be placed on the perimeter of both launch and receiver HDD Compounds (HDD Compound 2a and 2b) to screen noise at the nearest sensitive receptors; • HDD1 M3 Motorway (Chainage 12,800). Noise barriers will be placed on the perimeter of both launch and receiver HDD Compounds (HDD 1a and 1b) to screen noise at the nearest sensitive receptors; • The noise barriers will be within the Planning Application Boundary. The requirement for the noise barriers will be confirmed pre-construction through confirmatory assessment following detailed design for the HDD (within the parameters assessed in this EIAR). The location of the noise barrier will be set out and agreed with the local planning authority in advance of the works designed to keep noise levels within the specified limits. If it can be demonstrated to the local authorities that the barriers are not required, in accordance with the limits in this assessment, then they will not be provided, subject to agreement with the local planning authority; • BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (BSI 2014a) states that a noise barrier which blocks the line of sight between the source and the receptor would result in an approximate attenuation of 10dB. Therefore, the noise barriers will be designed to block the line of sight between the noise source and the affected receptors; • Noise barriers will comply with the standard BS EN 14388:2015 – Road traffic noise reducing devices. Specifications (BSI 2015); • Portable acoustic enclosures will be placed around the HDD plant in HDD2 and HDD1 including the drilling rig and the generator. Acoustic enclosures will surround the noise source in order to reduce noise levels at nearby receptors; • Local residents will be kept informed of any HDD works taking place outside normal working hours; • All valid complaints will be dealt with expeditiously and appropriate action will be taken; • The routing, depth, locations, and drilling types of the proposed HDD works will be carefully selected to avoid effects. Confirmatory structural surveys will be completed pre-construction at all structures that will be crossed or that are within 50m of the HDD locations. Monitoring by the appointed contractor of these locations will occur during the HDD works, and the surveys will be repeated post-construction. In the extremely unlikely event of repairs being required, these will be immediately undertaken in agreement with the structure owner; and • During the HDD works, constant monitoring by the specialist drilling team will be carried out. The volume of cuttings produced will also be monitored to ensure that no over cutting takes place and that hole cleaning is maintained. The nature of the cuttings will also be monitored to understand the ground conditions as the drilling progresses. The CEMP (included as a standalone document in the planning application pack) will be updated pre-construction with further	Detailed Design / Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			information of HDD monitoring, when the appointed contractor is appointed, and will be agreed with stakeholders including the local authorities, Transport Infrastructure Ireland, Waterways Ireland, and Irish Rail.	
NV4	9.5.1.1	Throughout (as required)	The appointed contractor will develop and implement a Stakeholder Communications Plan which will facilitate community engagement prior to the commencement of construction.	Pre-construction
NV5	9.5.1.1	Throughout (as required)	Only plant conforming with or better than relevant national or international standards (including BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (BSI 2014a) and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration (BSI 2014b)), directives or recommendations on noise or vibration emissions will be selected and used. Construction plant will be maintained in good condition with regards to minimising noise and vibration emissions.	Construction
NV6	9.5.1.1	Throughout (as required)	Plant will be operated and maintained appropriately, with due regard for manufacturer recommendations. All vehicles, plant and equipment will be switched off when not in use.	Construction
NV7	9.5.1.1	Throughout (as required)	Where practicable, gates (to TCCs, HDD Compounds and construction areas) will not be located opposite noise sensitive receptors.	Construction
NV8	9.5.1.1	Throughout (as required)	Routes and programming for the transport of construction materials, spoil and personnel will be carefully selected to reduce the risk of increased noise and vibration impacts during construction.	Construction
NV9	9.5.1.1	Throughout (as required)	Vehicle and mechanical plant / equipment used for the purpose of the works will be fitted with effective exhaust silencers, to be maintained in good working order and operated in such a manner to minimise noise emissions.	Construction
NV10	9.5.1.1	Throughout (as required)	Construction plant and activities will be positioned appropriately to minimise noise at sensitive locations	Construction
NV11	9.5.1.1	Throughout (as required)	Equipment that breaks concrete by pulverising or similar, rather than by percussion, will be used close to noise sensitive locations.	Construction
NV12	9.5.1.1	Throughout (as required)	Mufflers will be used on pneumatic tools.	Construction
NV13	9.5.1.1	Throughout (as required)	Works will be programmed to minimise the requirement for working outside normal working hours.	Construction
NV14	9.5.1.1	Throughout (as required)	Unnecessary revving of engines and idling will be avoided.	Construction
NV15	9.5.1.1	Throughout (as required)	Plant and vehicles will be started-up sequentially rather than all together.	Construction
NV16	9.5.1.1	Throughout (as required)	Drop height of materials will be minimised.	Construction
NV17	9.5.1.1	Throughout (as required)	Rubber linings will be used in, for example, chutes and dumpers to reduce impact noise.	Construction
NV18	9.5.1.1	Throughout (as required)	Any plant, such as generators, which are required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen.	Construction
NV19	9.5.1.1	Throughout (as required)	Low vibratory or non-vibratory plant will be used when working in close proximity to a vibration sensitive receptor.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
NV20	9.5.1.1	Throughout (as required)	Vibratory equipment will be started-up or turned off as far away from sensitive receptors as possible.	Construction
NV21	9.5.1.1	Throughout (as required)	All site access roads will be kept even to reduce vibration.	Construction
NV22	9.5.1.2	Diversion Routes	The following mitigation measures will be implemented: • Road closures and diversion routes will be minimised; and • Suitable advanced warning of road closures will be provided to residents within 25m of the affected diversion routes.	Construction

21.9 Biodiversity Mitigation and Monitoring Measures

Table 21.7: Biodiversity Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
BD1	10.5.1	Throughout (as required)	An on-site Ecological Clerk of Works (ECoW) will be appointed by the appointed contractor to carry out pre-construction surveys to ensure that the ecological baseline remains current and, where required, will implement the appropriate mitigation measures, as outlined in Chapter 10 (Biodiversity) and this Table. The ECoW will have sufficient experience to carry out the task(s) at hand and will be a member of a professional body, such as the Chartered Institute of Ecology and Environmental Management (CIEEM), or similar.	Pre-Construction / Construction
BD2	10.5.2	Throughout (as required)	In advance of enabling works, the appointed contractor's EcoW will complete pre-construction confirmatory surveys of selected ecological features whose distribution is dynamic over time, and which are known to have the potential to occur within the Zone of Influence (ZoI) of the Planning Application Boundary. At this time, maximum effort will be adopted to survey those small number of areas that could not be surveyed during baseline data collection for this EIAR, due to site access limitations. The pre-construction confirmatory surveys will include: • Bat trees previously identified as having roosting potential and within the ZoI will be subject to pre-construction surveys. Bat surveys will be carried out in accordance with guidance from Bat Mitigation Guidelines for Ireland – 2 (Marnell et al. 2022), Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority (NRA 2006a)) and Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition (Collins 2023). Surveys will be carried out by a licensed bat worker, who will determine the locations where they are required, using best practice techniques; • Otter breeding / resting sites within the ZoI of the Planning Application Boundary (minimum 50m from watercourse crossings, up to 150m at HDD Compound sites, will be subject to pre-construction surveys, where access allows (noting that guidance recommends 20m for non-breeding sites); • Badger setts within the ZoI of the Planning Application Boundary (minimum 50m, up to 150m at HDD Compound locations, will be subject to pre-construction surveys, where access allows). Further information relating to determining sett activity and mitigation measures is provided in Mitigation Item BD15; • Squirrel (grey and red), where dreys are identified within trees to be felled within the Planning Application Boundary will be subject to pre-construction surveys.; • Amphibians and reptiles: a pre-construction survey will be undertaken by the ECoW of previously identified areas that are suitable to host these species including reptile habitat (dry calcareous grassland, dry meadows and grassy verges and recolonising bare ground) and of amphibian habitat (drainage ditches and wet grassland) within the Planning Application Boundary. A suitable safe receptor site will be pre-identified, and if amphibians or reptiles are found within the Planning Application Boundary, the ECoW will translocate animals if necessary to the suitable receptor habitat; • Watercourses within the Planning Application Boundary will be subject to pre-construction surveys, particularly for the presence of sensitive aquatic fish and invertebrate species (e.g. white-clawed crayfish, eel, lamprey species, salmon, trout); • Invasive species within the Planning Application Boundary will be subject to pre-construction surveys; and	Pre-Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• Hedgerows and treelines to be removed will be resurveyed before construction commences (collecting information on canopy, understorey and field layer species, and associated features such as ditches, earth banks, and walls) to inform reinstatement. All surveys will be undertaken by the ECoW and supported by a suitably qualified ecologist where needed with demonstrable experience in the survey and assessment of the feature.	
BD3	10.5.2.1	Throughout (as required)	**Reporting** The results of the pre-construction confirmatory surveys will inform the refinement of mitigation and monitoring measures (if required) in the appointed contractor's method statements (in accordance with the commitments set out in this EIAR and any conditions attached to any grant of planning), and all results will be incorporated into the appointed contractor's constraint mapping. Survey reporting and mapping will be provided to the Developer's Ecologist (ESB), EirGrid's Planning and Environmental Unit (PEU) within the Chief Infrastructure Office, and to any prescribed bodies as additionally required by any planning conditions.	Pre-Construction
BD4	10.5.3.1.1	Throughout (as required)	The appointed contractor's EcoW will be on-site during the Construction Phase for any works deemed to be of sensitive nature due to the number of sensitive ecological receptors and the works taking place within watercourses connected to European sites. Where sensitive habitats or species have the potential to be impacted, the ECoW will be on-site to oversee the implementation all mitigation measures as described below. The EcoW will be at sensitive locations, for example, where there will be in-stream works and where a watercourse is hydrologically connected to European site, at locations where there is the potential for disturbance to Special Conservation Interests (SCI) birds, where hoarding will be erected, and in areas of vegetation reinstatement, including tree planting. Table 10.29 in Chapter 10 (Biodiversity) in Volume 2 of the EIAR outlines the location of proposed silt fencing, that will be installed to prevent any silt-laden runoff from impermeable surfaces, with the aim of preserving protected areas and areas of conservation and their associated habitats and species (further detail is provided in Mitigation Item BD7). To note, some of these locations are not yet determined. The final locations will be determined by the EcoW on-site to ensure that the locations are suitable and are in-line with the requirements of this EIAR, and any conditions attached to any grant of planning. The EcoW will be a member of a professional body, such as CIEEM, or similar, and will be suitably experienced for the task at hand.	Construction
BD5	10.5.3.1.1	Throughout (as required)	The ECoW will give toolbox talk to all site personnel to highlight any environmental sensitivities and the boundaries of sensitive habitats. Toolbox talks will include findings of pre-construction surveys on baseline changes and any adaptive mitigation measures required. The ECoW will propose adaptive mitigation measures in response to, for instance, extreme weather events (amber and red Met Éireann weather warnings which can be checked on the Met Éireann website (Met Éireann 2024), or new mitigation requirements arising from pre-construction surveys. Method statements in relation to trenched crossings will be agreed with Inland Fisheries Ireland (IFI) prior to the start of works. No sensitive works will be permitted without the prior approval of the ECoW. The ECoW will be able to demonstrate previous experience and will be a member of a profession body, such as CIEEM, or similar.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
BD6	10.5.3.1.2	Throughout (as required)	**Pollution Control** The measures set out below will be implemented to ensure that there will be no pollution of surface water during the Construction Phase of the Proposed Development. The measures are included in the CEMP and Appendix D to the CEMP (Surface Water Management Plan (SWMP)) which are included as standalone documents in this planning application pack, and will also be incorporated into the appointed contractor's final CEMP, which is a key contract document that will be implemented in full by the appointed contractor. The CEMP will be updated to include any mitigation measures prescribed by An Bord Pleanála as a condition to any grant of planning permission. The CEMP has been developed in accordance with legislation and the following guidance documents and legislation: • Construction Industry Research and Information Association (CIRIA) C532 Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al. 2001); • CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (Murnane et al. 2006a); • CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al. 2006b); • CIRIA C741 Environmental Good Practice on Site (Charles and Edwards 2015); • Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2005); and • S.I. No. 113/2022 - (European Union (Good Agricultural Practice for Protection of Waters) (Amended Regulations).	Construction

BD7	10.5.3.1.3	Throughout (as required)	**Control of Silt-Laden Runoff**
			Specific measures to control silt, as shown in Figure 10.11 in Volume 4 of this EIAR, will be implemented to prevent surface water flowing into surface water receptors:
			• The appointed contractor will ensure no deleterious discharges are released from construction sites to the nearby water bodies during construction. If a discharge to a watercourse is necessary, the water will pass through a suitable drainage system such as a swale and / or silt buster prior to discharge. Levels of suspended solids in any discharge will be no greater than 25mg/l (milligrams per litre) as per the Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016), and flows will be controlled to levels appropriate to the receiving water. It is possible that such a discharge may require a licence under the Water Pollution Acts 1977 and 1990 (as amended), and the Arterial Drainage Act 1945 and 1995 (as amended). The appointed contractor will liaise with the regulatory authorities at an early stage to determine the need for licences and include the appropriate application time required in any construction programme;
			• Silt fences will be erected along the boundary of water bodies to prevent any silt-laden runoff from impermeable surfaces, temporary or permanent, as well as spoil heaps within the construction swathe:
			  ○ Silt fencing will also be applied to areas that are within 30m of a watercourse and hydrologically linked to a European site, where concrete pouring is to be undertaken and where there is a risk to European designated sites. Where required, this will be double silt fencing;
			  ○ Silt fences will be installed downgradient of the potential source of the silt / sediment;
			  ○ The silt curtain will contain the area where silted waters are being generated and will terminate on high ground;
			  ○ They will be constructed using permeable filter fabric (Hy-Tex Terrastop silt fence or similar) rather than a mesh material and its base will be embedded at least 15cm into the ground and staked at 2m intervals;
				Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			○ Vegetation will be retained as far as practicable. However, where targeted vegetation removal is required, additional measures will be put in place including additional silt fencing in these areas; ○ The vegetated turves will be peeled back and not detached from the ground, the materials inserted and the turves replaced to hold the base in place; ○ The silt fence will be inspected regularly by the ECoW and appointed contractor, and in particular following heavy rainfall; ○ Silt fences will remain in-situ until the vegetation on the disturbed ground is re-established as determined by the ECoW; ○ The fence will not be pulled from the ground, but cut at ground level and the stakes / posts removed; ○ Should water build up behind the fences, the sediment will settle to the bottom. Water can be released, but sediments will remain; ○ Two lines of silt fencing will be installed in sensitive areas, based on the ECoW's professional judgement; ○ A record of its installation, inspection and removal will be maintained by the ECoW; and ○ Reinstatement of any banks affected by silt-laden runoff during construction will be reinstated back to pre-development conditions.	
BD8	10.5.3.1.4	Throughout (as required)	**<u>Stockpiling of Materials</u>** The following mitigation measures will be implemented for the stockpiling of materials. Mobilisation sites will either be cleared in stages during the Construction Phase to prevent bare earth being exposed to ambient conditions for prolonged periods, or the bare earth will be immediately covered in a gravel / plastic covering to reduce the likelihood of sediment laden runoff following rainfall events. Stripped soil will be stockpiled more than 10m away from the surface interceptor drain. Stockpiles will be in a dry zone that is not subject to flooding (i.e., outside the1:100 flood extent (1% Annual Exceedance Probability (AEP)). The following measures will be put in place by the appointed contractor for the stockpiling of materials: • Temporary stockpiles will be located away from drains and watercourses. Stockpiles will not be located within 10m of a watercourse; • For watercourse crossings, stockpiles will not be located anywhere within the crossing working area; • Stockpiles will be managed to prevent siltation of watercourse systems through runoff during rainstorms with the measures to be implemented by the appointed contractor. These will include the following: ○ No use of commercial seed to stabilise exposed soils; ○ Coir matting to be used, where required (e.g. along all bank surfaces), to enable vegetation to establish on the exposed soil; ○ Providing silt fences or straw barriers at the toe of the stockpile to mitigate runoff during rainfall events; ○ Surrounding stockpiles with cut-off ditches to contain runoff; ○ Directing any runoff to the site drainage system or filter drains along the construction working width and to the settlement pond (or other) treatment systems; and ○ Providing bunds or another form of diversion to keep runoff from entering the stockpile area.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
BD9	10.5.3.1.5	Throughout (as required)	**<u>Storage of Materials</u>** The following mitigation measures will be implemented for the storage of materials: • All oil and diesel storage facilities will be at least 30m from any watercourse, including surface water drains, and outside the 1:100 flood extent (1% AEP), unless prior approval is confirmed by the ECOW to reduce this distance; • Spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed (all teams will also carry spill kits and spill kits will be suitably sized to address the amount of pollutant substances being used); • Storage areas for solid materials, including waste soils, will be designed and managed to prevent deterioration of the materials and their escape (via surface runoff or wind blow); • Storage areas will be kept secure to prevent acts of vandalism that could result in leaks or spills; and • All containers of any size will be correctly labelled, indicating their contents and any hazard warning signs.	Construction

BD10	10.5.3.1.6	Throughout (as required)	**<u>Spills</u>**
			The following mitigation measures will be implemented across the Proposed Development to prevent spills:
			• Fuel tanks, drums and mobile bowsers (and any other equipment that contains oil and other fuels) will have a secondary containment, for example double-skinned tanks;
			• All tanks, drums and mobile bowsers will be located in a sealed impervious bund with sufficient capacity to contain at least 25% of the total volume of the containers or 110% of the largest container, whichever is the greatest;
			• Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas;
			• Fuel fill pipes will not extend beyond the bund wall and will have a lockable cap secured with a chain;
			• Where fuel is delivered through a pipe permanently attached to a tank or bowser:
			  ○ The pipe will be fitted with a manually operated pump or a valve at the delivery end which closes automatically when not in use;
			  ○ The pump or valve will be fitted with a lock;
			  ○ The pipe will be fitted with a lockable valve at the end where it leaves the tank or bowser;
			  ○ The pipework will pass over and not through bund walls;
			  ○ Tanks and bunds will be protected from vehicle impact damage;
			  ○ Tanks will be labelled with contents, capacity information and hazard warnings; and
			  ○ All valves, pumps and trigger guns will be turned off and locked when not in use. All caps on fill pipes will be locked when not in use.
			• Suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including:
			  ○ Each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled; and
			  ○ Containers and equipment will be stored on a firm, level surface.
			• For deliveries and dispensing activities, the appointed contractor will ensure that:
			  ○ Site-specific procedures are in place for bulk deliveries; and
				Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			o Delivery points and vehicle routes are clearly marked. Emergency procedures will be displayed, and suitably sized spill kits will be available at all delivery points, and staff will be trained in these procedures and the use of spill kits.	
BD11	10.5.3.1.7	Throughout (as required)	**Fuel and Oil Leaks from Vehicles and Plant** The use of vehicles and plant poses similar risks to those posed by storage of liquids. Fuel and oil may leak from such equipment which may enter drains and / or watercourses, as well as contaminating the ground itself. The following mitigation measures will be implemented to reduce this risk: • Vehicles and plant provided for use on-site will be regularly inspected to ensure they are free from leaks and promptly repaired when not in good working order; • Sufficient spill kits will be carried on all vehicles; • Vehicles and plant will not park near or over drains; • Refuelling of vehicles and plant will be carried out on hardstanding, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas; and • Vehicles and plant will be in good working order to ensure optimum fuel efficiency.	Construction
BD12	10.5.3.1.8	Throughout (as required)	**Concrete** Where concrete is required on-site, the following mitigation measures will be implemented to reduce risks associated with concrete pouring: • Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to ensures it is fit for purpose; • Established concrete washout management areas will be designated to control the discharge of concrete washout; • An emergency response plan will be developed and communicated to site staff prior to the concrete pouring; • The ECoW and on-site personnel will monitor the concrete pour continuously, ensuring that any spills are promptly addressed and mitigated; • The ECoW will conduct a thorough inspection of the site after the concrete pour to identify any environmental impacts and implement clean-up measures if necessary; • When working in or near surface water and the use of introduced materials (e.g. oil) cannot be avoided, alternative materials such as biodegradable oils will be used; • Placing of concrete in or near watercourses will be only carried out under the supervision of the ECoW; • Wet concrete operations adjacent to water bodies will be avoided, where possible, with a minimum separation distance of 20m, with exception to in-stream pours which will be undertaken within a sealed dry working area. The appointed contractor will ensure that all concrete truck washing / cleaning is undertaken off site, as far as practicable, and remote from water bodies or potential pathways to water bodies; • There will be no hosing of concrete, cement, grout or similar material spills into surface water drains. Such spills shall be contained immediately, and run-off prevented from entering the watercourse; • Concrete waste and wash-down water will be contained and managed on-site to prevent pollution of all surface watercourses; and	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• Washout from concrete lorries will not be permitted on-site and will only take place at the batching plant (or other appropriate facility designated by the manufacturer).	
BD13	10.5.3.1.9	Throughout (as required)	**Breeding Birds** Unless suitable mitigation is adopted, hedgerows, trees and scrub will not be removed within the breeding bird season (1 March to 31 August, inclusive) to avoid impacts on nesting birds. Where this seasonal restriction cannot be adhered to, habitats that need to be removed will be inspected by a ECoW suitably experienced in the identification of nests for the presence of breeding birds prior to clearance. When nesting birds are present, the ecologist will demarcate a suitable buffer around an active nest and clearance within this area will be postponed until the chicks have fledged. A suitable exclusion zone will be established by the ECoW. To reduce the potential of birds to nest, bird deterrents (e.g. flicker tape / compact discs) will be tied to habitat confirmed to be without nests and the habitat will be cleared within three days of the inspection. Otherwise, repeat inspections will be required to confirm the continued absence of nesting birds. If vegetation is to be cleared in the breeding season (under supervision of a suitably qualified ecologist), it will be chipped, removed or covered on the same day to prevent birds from nesting. Reinstated habitat including trees, hedgerows and grassland, will provide suitable habitat for breeding birds recorded in the study area, once established. The locations of trees that will be lost and retained are shown on Figure 18.2 to Figure 18.5 in Volume 4 in this EIAR (with discussion included in Appendix A18.2 in Volume 3 in this EIAR). It may be necessary for temporary lighting to be provided at the proposed TCCs and HDD Compounds for security purposes. However, temporary lighting will be controlled and directed in order to mitigate any potential impacts to birds as advised by the appointed EcoW.	Construction
BD14	10.5.3.1.10	Throughout (as required)	**Bats** Any roosts recorded during the pre-construction surveys, as outlined in Mitigation Item BD2, will be felled under a derogation licence. As part of the licence, mitigation measures such as the provision of bat boxes as alternative roosts will be required. The type and number of bat boxes (if required) will be relative to the species and conservation status of the roost to be impacted. In all instances, bat boxes will be sited in suitable, undisturbed locations, away from works during the Construction Phase, either on third party lands (subject to agreement with landowners) or in the instance of no landowner agreement on ESB-owned lands at Woodland and / or Belcamp Substations. The loss of trees with high potential for roosting bats will be mitigated on a 3-to-1 ratio with bat boxes, and moderate potential trees will be mitigated on a 2-to-1 ratio with bat boxes. A range of models determined by the appointed EcoW will be used, suited to the species recorded within the study area, and for different seasons. The boxes will be erected in a suitable location. It may be necessary for temporary lighting to be provided at the proposed TCCs and HDD Compounds for security purposes. However, temporary lighting will be controlled and directed in order to mitigate any potential impacts to bats as advised by the appointed EcoW.	Construction
BD15	10.5.3.1.11	Throughout (as required)	**Otter** The following general mitigation measures for otter will be implemented during the Construction Phase, after otter pre-construction surveys have been carried out (refer to Mitigation Item BD2): • Any excavations will be covered at night to prevent otter from falling in or becoming trapped;	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• Should any otter be observed within the Planning Application Boundary or should any evidence of otter activity be found during the Construction Phase, works will cease immediately and the ECoW will be contacted for advice; and • Although there are not predicted to be any impacts on otters, if confirmatory surveys identify likely disturbance of otters, further mitigation following the Guidelines for the Treatment of Otters (NRA 2008b) will be implemented by the ECoW to ensure no significant effects on otters arise. Should a non-breeding otter holt or rest site be identified, a buffer zone of 30m will be implemented around the feature. Where a resting place is confirmed to be a natal site, this will increase to 150m. Should works occur in the vicinity of otter holts with breeding females or cubs, screening will occur and working hours will be restricted. When holts are present, no wheeled or tracked vehicles will be used within 20m, and no light work will occur within 15m. Exceptions may be adopted under licence. Appropriate fencing will be set around areas associated with otters, before works commence, to mark the areas that cannot be accessed. Disused and inactive holts will be destroyed, after verified as inactive and after blocking and monitoring the entrances for a five-day period.	
BD16	10.5.3.1.12	Throughout (as required)	**Badger** The following general mitigation measures for badger will be implemented during the Construction Phase to avoid / minimise impacts in accordance with the mitigation hierarchy, following the completion of the badger pre-construction surveys (refer to Mitigation Item BD2): • Ground excavations will be covered at night to prevent badger from falling in or becoming trapped; • Any works within 30m of an active sett will be supervised on-site for the full duration of those works by an ECoW (extended to 50m during the breeding season for a main sett where there is breeding activity); • Breeding setts will not be interfered with or disturbed during the badger breeding season (December to June, inclusive); • Only the use of hand tools will be permitted within 20m of an active sett; • No heavy machinery will be used within 30m of a sett; • During the breeding season, none of the construction works including ground excavation, and use of tools and heavy machines, will be undertaken within 50m of active setts, and blasting (if required) will not be undertaken within 150m of active setts. Should this not be possible, the ECoW will provide advice on how best to proceed. Mitigation measures will include sett screening and restricted working hours. The ECoW will be able to advise on any mitigation options such as sett screening and restricted working hours that may be available relative to the predicted scale and duration of impact (which is informed by the proposed works and sett specifics (i.e., sett type, level of sett activity, tunnel direction, type of substrate, vegetative cover, and topography)). It should be noted that for the HDD platforms, none of the badger signs were within these distances. The nearest badger signs (prints) to the proposed HDD works under the M1 Motorway were approximately 1.15km away. The nearest badger signs (prints) to the proposed HDD works under the M2 Motorway were approximately 0.52km away. The nearest badger signs to the proposed HDD works under the M3 Motorway (a disused sett) was approximately 1.95km away; • Night-time working will be restricted as far as possible within 100m of a sett; • The use of noisy plant and machinery near badger setts will cease before sunset; and • Any spoil heaps will be sited at a minimum distance of 30m from setts.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
BD17	10.5.3.1.13	Throughout (as required)	**Red Squirrel** Where pre-construction surveys identify potential dreys at risk from felling, vantage point watches (for individual trees) or transects (for hedgerows / groups of trees) will be conducted to visualise squirrels and identify if the squirrel is grey (invasive) or red (protected). Surveys will be conducted in the early morning, during the summer months. Where visualisations are inconclusive, hair tube surveys may be required, following the best practice guidance (i.e., Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009)). As grey squirrels are a scheduled invasive species, confirmed grey squirrel dreys can be felled without mitigation. In the event that confirmed or suspected red squirrel dreys require felling, felling will only be carried out from October to January, in consultation with the NPWS, from which a licence may be required, subject to survey findings.	Construction
BD18	10.5.3.1.14	Throughout (as required)	**Other Protected Mammals** Removal and clearance of vegetation may affect small mammal species if present in these habitats. The following mitigation measures will be adhered to in order to minimise impacts to small mammal species: • Any excavations will be covered at night to prevent small mammals from falling in and / or becoming trapped; • Working at night will be prohibited where specific tasks such as vegetation removal and clearance are to be carried out; • Any lights will be turned off after working hours; • Noise levels will not exceed permissible levels for construction works (70 decibels (dB(A)), based on Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA 2004); and • With the exception of permanent areas of hardstanding, the site will be re-vegetated at the end of the Construction Phase.	Construction

BD19	10.5.3.1.15	Throughout (as required)	**Reptiles and Amphibians**
			Removal and clearance of vegetation has the potential to affect amphibians or reptiles if present in these habitats. The following mitigation measures will be adhered to, to minimise impacts on amphibians or reptiles:
			• A toolbox talk will be carried out to ensure all site personnel are aware of these protected species and their mitigation requirements;
			• Vegetation will be cleared in the following two stages, during the reptile and amphibian active season, following the completion of the toolbox talk:
			    ○ A hand-search will be undertaken by a licensed ECoW for any animals present within vegetation to be cleared, followed by a first cut of vegetation down to 210mm above ground-level using hand tools; and
			    ○ A second hand-search will be undertaken of vegetation to be cleared by an ECoW for any animals present, followed by the second cut of vegetation to ground-level (or as close as practicable).
			• If any reptiles are found during the pre-construction surveys or during the construction works, they will be captured and translocated by a suitably qualified and experienced ecologist under licence to a previously identified receptor site;
			• Where practicable, in the context of the Construction Phase, water levels will be maintained in any ponds or ditches potentially used by amphibians; and
			• Habitat reinstatement will recreate the former habitats within the Planning Application Boundary (excluding woody vegetation that cannot be planted within the permanent cable easement and other permanent habitat losses).
				Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase

BD20	10.5.3.1.16	Throughout (as required)	**<u>Invasive Species</u>**
			A management plan for those Third Schedule invasive plant species recorded during the survey (refer to Table 10.23 in Chapter 10 (Biodiversity) in Volume 2 of the EIAR) which have the potential to be impacted by the works will be included in the final CEMP for the Proposed Development (this will be adapted from Appendix E of the CEMP included as a standalone document in this planning application pack). The mitigation measures described below follow the recommendations set out in the Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA 2010) and will be implemented during the Construction Phase:
			• All staff will be informed of the proximity and identification of Giant hogweed and rhododendron and any other invasive species identified through toolbox talks;
			• Giant hogweed will be controlled chemically or physically;
			• The most effective chemical control for Giant hogweed is glyphosate. Foliar sprays of glyphosate are suitable for large infestations, and injection into the stem of the plant approximately 30cm above the ground with 5ml of a 5% v/v solution can be used where spot treatment is required. Chemical applications will be adopted before stem-elongation (mid-spring);
			• Giant hogweed physical control will include eradication of the plant, during the springtime, as follows:
			    o Young plants can be readily pulled out the soil using hand tools;
			    o Where plants are larger than 1.5m, the upper part can be cut back and the lower part used to lever the roots out;
			    o Seed heads on old stems will be removed by individually bagging seed heads and cutting to prevent accidental spread of seeds;
			    o Mowers, strimmers or weed-whackers will not be used;
			    o Periodic removal will be required to control continuous germination of seedlings;
			    o Seed might remain viable up to 15 years, thus control will require continued input over time (at least 5 years), and monitoring will occur between spring and autumn;
			    o Seed can be present in soil within 4m of established plants and it will not be transferred to other parts of a site;
			    o The top 5 cm of soil contains the majority of the seed, and will not be stockpiled within 10m of watercourse to prevents plant spread; and
			    o Giant hogweed material and infected soil will be stored on top of a membrane of fabric in a designated area for appropriate disposal; by a suitably qualified and licensed expert.
			• Tracked machinery will be limited in the area and will be cleaned when leaving the site;
			• Rhododendron will be controlled chemically or physically;
			• Chemical control will be adopted during the active growth of the plant in late spring or summer (June to September). A variety of herbicides have proven effective for chemical control, including 2,4_glyphosate, dicamba and triclopyr. Chemical applications can include foliar spray, wiper applicator or spot treatment, stem-injection or cut-stump. Triclopyr will not be used during drought when temperatures are high;
			• A range of physical control measures have been developed for rhododendron in response to the sensitivity of the site. These include:
				Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			◦ Uprooting by hand: roots are relatively shallow and can be toppled using a hand operated turfer or mechanical winch. Younger plants can be hand-pulled; ◦ Chainsaw cutting of root-ball: more effective on larger plants but restricted to soft soil areas. It can be used in combination with winching methods to reduce soil disturbance; and ◦ Experimental methods include mulch matting to prevent regrowth following initial clearance and bud rubbing on cut stumps. • Exclusion zones will be established where necessary to prevent the spread of invasive species; • No machinery will be allowed within exclusion zones other than where necessary to undertake treatment measures; • Any plant material and soil-containing plant material will be disposed of by a suitably qualified and licensed expert in accordance with the Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads; • Care will be taken near watercourses to ensure that material that contains flower heads, seeds or cuttings of any invasive species will be disposed of correctly and not enter watercourses; • Three-cornered leek and Spanish bluebell will be controlled chemically or physically; • Chemical treatment for three-cornered leak and Spanish bluebell will be made in the spring (when above ground vegetation visible) but before flowering. Multiple applications may be required due to persistence of bulbs and soil seed bank; and • Physical control of small populations of three-cornered leek and Spanish bluebell (as recorded within the Planning Application Boundary) will include hand digging, ensuring that all biomass including bulbs collected. Longer term eradication will also require a number of years of mechanical cutting to exhaust seed / bulb bank in wider subsurface environment.	
BD21	10.5.3.2.1	Throughout (as required)	**European Designated Sites** The AA Screening Report determined that likely significant effects (LSEs) in the absence of mitigation on the following 14 European sites could not be excluded: Malahide Estuary SAC , Baldoyle Bay SAC, Malahide Estuary SPA, Baldoyle Bay SPA, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, North-West Irish Sea SPA, Rogerstown Estuary SPA, Ireland's Eye SPA, Lambay Island SPA, Skerries Islands SPA, River Nanny Estuary and Shore SPA, Boyne Estuary SPA, and Dundalk Bay SPA. Mitigation measures to protect these sites from pollution, mortality and disturbance are described in the Natura Impact Statement (NIS) (included as a standalone document in the planning application pack) and in the site-wide measures (see Mitigation Items BD5 to BD19). These measures will be implemented in full.	Construction
BD22	10.5.3.2.3.1	Throughout (as required)	**Wintering Birds – Disturbance** The following mitigation measures will be implemented to ensure that there will be no disturbance to Qualifying Interest (QI) species within functionally linked habitat during the Construction Phase of the Proposed Development: • A 2m to 3 m high non-transparent visual and noise screening barrier will be erected along the perimeter of the site to block the construction works and the movement of machinery / workforce to minimise disturbance to protected birds in functionally linked habitats. This height will be achieved at the typical working level of plant and personnel and will be raised accordingly, if necessary, to ensure that the screening is of adequate height (i.e., no visual disturbance). Locations	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			of the proposed screening are outlined in Table 10.30 in Chapter 10 (Hydrology) in Volume 2 of the EIAR and shown on Figure 10.11 in Volume 4 of this EIAR: ○ This screening barrier will have a mass per unit area exceeding 7 kg/m^2 (kilogrammes per metre squared) in accordance with the recommendations of Part B.4 of BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (BSI 2014a). The fencing will be of adequate height to screen the works area (3m to 4m) or as advised by an experienced ecologist. The appointed ECoW will supervise the erection of the screening (where natural screening cannot be retained) and will provide guidance through a toolbox talk ensuring that these measures are effective. The ECoW will regularly check the screening throughout the works to ensure that it is maintained in good condition and working order; ○ Screening will be installed prior to site clearance, and installation will be monitored by the EcoW. There will be no restrictions on the timing of this installation as the works area will not be directly adjacent to a Special Protection Area (SPA); and ○ This screening will remain in place for the duration of the works and will be moved regularly as work advances. • All plant used during the Construction Phase will be the quietest of its type that is practical for achieving the works, as demonstrated in writing by the appointed contractor to the local authority, with reference to other noisier models; • Noise levels will not exceed permissible levels for construction works (70 decibels (dB(A)), based on Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA 2004); • A Noise and Vibration Management Plan will be developed by the appointed contractor; • All plant will be operated in accordance with the manufacturer's recommendations including the use and maintenance of specific noise reduction measures to reduce the impact further: ○ The use of mufflers on pneumatic tools; ○ Effective exhaust silencers; ○ Sound reducing enclosures; ○ Machines in intermittent use will not be left idling and will be switched off during periods where they are not required; and ○ Post construction, semi-natural habitats will be left to re-vegetate naturally from the seed bank within re-instated soils. Commercial seed mixes will only be used to reinstate vegetation on agricultural lands.	
BD23	10.5.3.2.4	Throughout (as required)	**Otter** In line with the mitigation measures set out in the Guidelines for the Treatment of Otters during the Construction of National Road Schemes (NRA 2008b), namely, when holts are present, no wheeled or tracked vehicles will be used within 20m, and no light work will occur within 15m of any holts present. When a non-breeding otter holt or rest site is identified, a buffer zone of 30m will be implemented around the feature. When a breeding otter holt or resting site is identified, the buffer zone will be extended to 150m. Buffer zones will be fenced prior to works commencing. Moreover, should works occur in the vicinity of otter holts with breeding females or cubs, screening will occur and working hours will be restricted. Disused and inactive holts can be destroyed, after being identified as inactive holts and after their entrances have been blocked and monitored for a five-day period. Exceptions can be adopted under licence. The Guidelines for the Treatment of Otters Prior to	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			Construction of National Road Schemes (NRA 2008b) state that a licence will be required for any works likely to cause disturbance (e.g., piling and blasting) to active breeding holts when present with 150m of a development. During the field surveys one potential otter holt with a slide was identified approximately 145m from the proposed cable route, one otter slide was identified approximately 173m from the proposed cable route and one otter spraint was identified approximately 26m from the proposed cable route (see Figure 10.7 in Volume 4 of this EIAR). Since the holt showed signs of otter use (a slide was recorded next to it), and due to its location near to a river, there is high potential for use. However, the nearest potential holt was 145m way, close to the 150m threshold, and did not have evidence of breeding otters. Therefore, there is no requirement for monitoring and works will be able to proceed under the supervision of an ECoW.	
BD24	10.5.3.2.5	Throughout (as required)	**Badger** During the baseline surveys, it was identified that 10 badger setts / potential badger setts have the potential to be impacted by the Proposed Development, including two within 50m of the Planning Application Boundary and four between 51m and 150m. Exact locations of setts, are not provided due to persecution of this species. Sensitive information relating to the location of badger setts is provided in a confidential appendix (Appendix A10.1 and Figure 10.10), which are provided to An Bord Pleanála and the National Parks and Wildlife Service (NPWS) separately. The following pre-construction surveys and mitigation measures that follow the recommendations set out in the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA 2006b) will be implemented: • Affected badger setts will be marked and the extent of bounds prohibited for vehicles will be clearly marked by fencing and signage. When there is the need to proceed with works close to active setts during the breeding season, mitigation measures, such as sett screening and restricted working hours will be adopted, prior expert consultation; • To determine whether a sett is active or inactive, camera traps will be set up prior to the commencement of construction to monitor the entrance to the holes for a minimum of five days. If, after five days, there is no evidence that badgers are using the sett, it is presumed inactive, and no further actions will be required. However, this will only apply if the camera trap monitoring is carried out directly prior to the start of works, meaning that there was no change to the baseline. The use of the sett may change over time, so if there is a delay of more than 12 months prior to the commencement of the works from the date of the final camera monitoring, then a further badger survey will be undertaken to determine the status of the hole; • Disused and inactive sett entrances will be blocked to prevent reoccupation, and the disused or inactive sett will be destroyed using a mechanical digger after five days of monitoring, under the supervision of a suitably experienced and qualified EcoW; and • No heavy machinery will be used within 30m of active badger setts. Lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance. Light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances. During the breeding season (December to June, inclusive), none of the above works will be undertaken within 50m of active setts, nor blasting or pile driving within 150m of active setts.	Pre-Construction
BD25	10.5.3.2.5	Throughout (as required)	**Badger** Where an active sett is required to be closed, the following mitigation measures presented in the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA 2006b) will be implemented:	Pre-Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• Active entrances will have one-way gates installed (plus proofing around sides of gates) to allow badgers to exit but not to return (inactive entrances will not require gates and may be soft and then hard-blocked as per inactive setts); • The gates will be tied open for three days prior to the sett exclusion and sticks placed in the entrance to monitor sett activity; • Gates will be left installed, with regular inspections, over a minimum period of 21 days (including period with gates tied open) before the sett is deemed inactive. Any activity at all will require the procedures to be repeated or additional measures taken; • Sett destruction will commence immediately following the 21 day exclusion period, provided that all badgers have been excluded and will be conducted under the supervision of a suitably experienced and qualified ECoW; • Sett destruction is usually undertaken with a tracked 12 to 25 tonne 360 excavator, commencing at approximately 25m from the outer sett entrances and working towards the centre of the sett, excavating approximately 0.5m slices in a trench to a depth of 2m; • Exposed tunnels will be checked for recent badger activity, with full attention paid to safety requirements in so doing; • The sett will be destroyed from several directions, in the same manner, until only the central core of the sett remains. Once it is ensured that no badgers remain, the core will then also be destroyed and the entire area back-filled and made safe; and • Sett excavation will, preferably, be concluded within one working day, as badgers may re-enter exposed tunnels and entrances. The NPWS Wildlife Licensing was consulted regarding licensing requirements for works in and around badgers and their setts. Section 23(7)I(iv) of the Wildlife Act outlines that if a licence or permission has been received from another public authority whose actions are directed by a statute or statutory instrument, further permission is not required from the NPWS for works affecting badgers (i.e., a licence will be issued by the relevant local authority if required rather than the NPWS).	
BD26	10.5.3.2.6	Works at watercourses throughout (as required)	**Fish and Aquatic Invertebrates** Mitigation measures regarding pollution control of surface water have been detailed in the site-wide mitigation measures (see Mitigation Item BD6 to BD12). These measures have been developed to protect water bodies, drainage ditches and ponds / lakes and the habitats and species that they support, and will avoid a reduction in water quality during construction. Although white-clawed crayfish were confirmed to be likely absent in 14 of the watercourses, on a precautionary basis, it can be considered that white-clawed crayfish have the potential to be affected by the Proposed Development through watercourse pollution or direct disturbance. The following control measures will be implemented during the Construction Phase in or adjacent to a watercourse: • In-stream works will not be carried out in watercourses frequented by salmon or trout during the Annual Close Season. The duration of the season varies regionally within the period from the beginning of October to the end of February, inclusive (IFI 2016). River and brook lamprey spawn during the period March to April / May. Therefore, translocation (fish rescue) and in-stream works will be undertaken outside of the spawning season. As the spawning season can vary regionally, work will be carried out in watercourses in the period June to September to minimise the impact on fish. This mitigation will also protect white-clawed crayfish. The timing of works will be considered on a site-specific basis by the ECoW and in agreement with IFI;	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• Operation of machinery in-stream will be kept to an absolute minimum. All construction machinery operating in-stream will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery will be cleaned and checked prior to commencement of in-stream works; • The design of temporary settlement ponds, the outfalls from these temporary ponds and the construction method statements for their installation will be agreed with IFI prior to construction; • The area of disturbance of the watercourse bed and bank will be the absolute minimum required for the installation of outfalls / culverts; • Any de-watering flows will be directed to the construction drainage system and to the settlement pond (or other) treatment system; • Sediment mats / silt traps or similar will be located immediately downstream of the works within and adjacent to the watercourses. These will be inspected daily, maintained and cleaned regularly by the ECoW during the course of site works. Diversion of water to and from a temporary diversion channel will only take place during the period March to September (IFI 2016) or as agreed with IFI; • Small check dams will be constructed in the cut-off watercourse to trap any sediment, and a sediment trap will be provided immediately downstream of the diversion to the existing watercourse; and • Where in-stream bed material is to be removed, coarse aggregates, if present, will be stockpiled at least 10m away from the watercourse for replacement following reinstatement of a watercourse channel. Watercourse banks affected during construction in / near a watercourse will be reinstated back to pre-construction conditions.	
BD27	10.5.3.2.6	Works at watercourses throughout (as required)	**<u>Fish and Aquatic Invertebrates</u>** Where open trenching is proposed, site restoration works will be carried out following completion of the crossing, in agreement with IFI (see Table 10.29 in Chapter 10 (Biodiversity) in Volume 2 of the EIAR for a list if these watercourses). These works may include riverbank and gravel replacements. In all cases, the site will be restored post-installation. An adverse weather stop work plan will be developed to ensure that activities with the potential to cause pollution are stopped under certain weather conditions (Met Éireann red, amber, yellow warnings will be monitored daily by the ECoW by accessing the Met Éireann website (Met Éireann 2024)). Works will be stopped where a red weather warning is issued. Where an amber warning is issued, works will be monitored by the ECoW and stopped where deemed appropriate based on the site conditions.	Construction
BD28	10.5.3.2.6	Works at watercourses throughout (as required)	**<u>Fish and Aquatic Invertebrates</u>** Additional mitigation measures that will be undertaken to protect fish species are as follows: • Where in-stream trenching is to be carried out, the area will be dewatered to provide a dry works area; • The impermeable barrier will be tailored to the watercourse in question, as per consultation with IFI to-date, and where technically feasible, fluming will be preferred to over pumping techniques to provide the dry working area (refer to Chapter 4 (Proposed Development Description) for details); • Netting, sandbags and / or dumpy-bags filled with rock will be installed upstream to prevent fish travelling downstream into the working area; • Fish will be removed from the working area through electrofishing and moved upstream of the dammed area; and	Construction

<table>
<tr><th>Mitigation Number</th><th>EIAR Section Reference</th><th>Location</th><th>Description of Mitigation or Monitoring Measure</th><th>Implementation Phase</th></tr>
<tr><td></td><td></td><td></td><td>Once construction is completed, the watercourse will be re-wetted under the direction of the ECoW. Water will be released slowly and silt mats, sediment traps and haybales will be used to avoid a sudden influx of sediment to the system. A silt buster will be used where required.</td><td></td></tr>
<tr><td>BD29</td><td>10.5.3.2.7.1</td><td>Throughout (as required)</td><td><u>Reinstatement – General Requirements for All Hedgerows</u>
The following mitigation measures will be implemented during the Construction Phase:
All planting will be native (only) and of local provenance, taking account of the vegetation that has been removed and typical species of the local landscape;
A post-consent / pre-construction baseline survey of all hedges to be removed will be carried out to characterise its canopy, understorey and field layer species, and associated features (ditches, earth banks, walls etc.) to inform reinstatement;
Unless otherwise agreed with the Developer (ESB) and the local authority, the appointed contractor will reinstate hedgerows and treelines to a species-rich condition (i.e., five native woody species per 30m (excluding brambles), with no use of commercial seed), comprising only native species. All other sites will be returned as close as possible to their pre-existing condition, using the same woody species removed, under the supervision and direction of the appointed contractor's EcoW;
Hedging / hedgerow plants will be planted as a staggered double row, six plants per metre with 330mm between rows. Suitable individual protection from browsing animals will be provided by tube, spiral or similar held in place with a short cane. Group protection of new planting will be provided by suitable fencing, but individual plant protection of spirals will be provided to protect against browsing animals. Mulch mats or similar weed suppression materials (restricted to a biodegradable specification) will be used to promote successful establishment;
The appointed contractor will make orders by the scientific name to ensure native plants are delivered and not a cultivated variety;
Nurseries prefer to grow trees to order, so the appointed contractor will make the order as soon as possible (up to a year in advance) to ensure that the required species and stock specification can be secured;
Consideration will be given to the procurement of planting so that there are suitable lead-in times to ensure that plants are of the right age / height required for when they are planted;
The appointed contractor will manage the establishment phase of planting (one to two years) in accordance with the Teagasc guidance, How to plant a hedge (Teagasc 2020), to include watering in, weed suppression (using biodegradable mulches), and (where required) protection from browsing animals; and
Thereafter, the Developer (ESB) will manage plantings from years three to five in agreement with the landowner.</td><td>Construction</td></tr>
<tr><td>BD30</td><td>10.5.3.2.7.2</td><td>Throughout (as required)</td><td><u>Reinstatement – Specific Requirements for Hedgerows and Trees Within the Cable Easement</u>
At the time of writing, the latest EirGrid Functional Specification for Underground Cables (EirGrid 2021) stated:
"The easement area shall be cleared, and kept clear, of trees and other vegetation with deep root systems as these may damage the cable".
Since publishing this specification, EirGrid has identified precedence from Germany and the Netherlands for safely planting certain shrubs over High Voltage (HV) underground cables. EirGrid has engaged closely with the ESB, and relevant Dutch and German</td><td>Pre-Construction / Construction</td></tr>
</table>

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			Transmission System Operators across Europe, to understand feasibility of planting over HV underground cables in Ireland. A Draft Over Cable Planting Strategy is in advance development in consultation with ESB, for which the Design Risk Assessment (DRA) was ongoing at time of writing (including calculations to assess a possible cable de-rating). The draft strategy combines the requirement for a minimum cable burial depth of 1m (to top of Cement Bound Granular Mixture in the cable trench), use of a high performing Root Barrier Membrane, and a strictly defined shrub species list with known maximum root depths of less than 1m. It is possible that the DRA may conclude that over cable planting cannot be delivered while guaranteeing cable performance and security. There are also risks that the strictly defined shrub species list is not compatible with landowner farm boundary requirements and / or agricultural farm payments. As such, applying a precautionary principle, offsite compensatory planting is assumed for all permanent losses within the permanent easement (losses are outlined in Table 10.26 in Chapter 10 (Biodiversity) in Volume 2 of the EIAR). Subject to consent, the offsite compensatory planting will commence in advance of, or in parallel with, the Construction Phase of the Proposed Development. EirGrid has identified candidate sites in County Meath and County Dublin in consultation with a charity partner, who provides compensatory planting options on third-party lands. Whether these candidate sites or other sites are used for compensatory planting, there will be no planting in semi-natural habitats of significant ecological value, which will be verified by the suitably qualified ecologist employed the compensation supplier. Offsite compensatory planting will deliver 130% of trees permanently lost within the Planning Application Boundary.	

BD31	10.5.3.2.7.3	Throughout (as required)	**<u>Reinstatement – Specific Requirements for Semi-Natural Grasslands</u>**
			The appointed contractor's ECoW will develop site-specific reinstatement plans for all semi-natural habitats (including dry calcareous grassland, and dry meadows and grassy verges). These plans will be provided to the Developer's Ecologist (ESB), and the Planning and Environmental Unit in EirGrid's Chief Infrastructure Office. In accordance with the All-Ireland Pollinator Plan 2021-2025 (National Biodiversity Council (NBDC 2021)), commercial seed mixes will not be sown with the objective of restoring biodiversity. Seeds of certain plant species, such as wildflowers and certain species included in multi-species mixtures, are not subject to the seed certification schemes as implemented by the European Union Member States and The Organisation for Economic Co-operation and Development OECD-designated authorities in respect of third countries, so there is no guarantee of the species mix or its provenance. Furthermore, even where harmful weed species are not present, seeds of non-local origin (even if the species are native) introduce new genetic strains which may displace or compromise the local, naturally-occurring flora (Dublin Naturalists Field Club 2021).
			As such, in the site-specific habitat reinstatement plans for semi-natural habitats, the appointed contractor's ECoW will adopt the following approach, subject to consultation with the NPWS:
			• Where it is deemed appropriate to allow habitats to re-vegetate naturally (e.g. roadside verges, where similar habitat is contiguous either side of the construction area), there will be no active seeding of re-instated topsoil;
			• In all other areas, the preferred approach to reinstatement will be the use of locally collected seed from similar habitats;
			• Use of commercial seed in semi-natural habitats will only be permitted where local seed is not available, or where local seed establishment has failed, <u>and if both</u>:
			  o Certified native by the Department of Agriculture, Food, and the Marine; and
			  o With the written agreement of the NPWS.
				Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
BD32	10.5.3.2.7.4	Throughout (as required)	**Reinstatement – General Requirements for Roadside Verges and Agricultural Areas** The requirements that will be followed for use of seed in grassland reinstatement are: • Commercial seed mixes will only be used on agricultural lands. All other areas will be left to naturally revegetate from the seed bank within reinstated soils; • All seed mixes will be certified native by the Department of Agriculture, Food, and the Marine; and • In agricultural areas, the rate of seeding, time and method of sowing, including the application of fertiliser, will be agreed with an experienced agronomist and will follow the guidance on reseeding – Pocket Manual for Reseeding (Teagasc 2020).	Construction
BD33	10.5.3.2.7.5	Throughout (as required)	**Reporting** All reinstated or indirectly impacted semi-natural vegetation will be inspected at the completion of the Construction Phase, at which time the appointed contractor's ECoW will provide written reports on habitat condition to the Developer's Ecologist (ESB), and EirGrid's Planning and Environmental Unit. At that time, the Developer's Ecologist (ESB) will determine what additional steps are required to assist vegetation growth and establishment. Additional steps will include any of the following; replacement tree planting, additional hedge mulch, protection from browsing animals, or sowing of locally harvested seed for semi-natural grassland, using a green hay approach.	Construction

21.10 Soils, Geology and Hydrogeology Mitigation and Monitoring Measures

Table 21.8: Soils, Geology and Hydrogeology Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
LSGH1	11.5.1	Throughout (as required)	The results of further confirmatory ground investigations to be carried out in 2024 will be evaluated and reviewed as part of the detailed design, within the parameters of the planning application.	Detailed Design
LSGH2	11.5.1	Throughout (as required)	The CEMP (included as a standalone document in this planning application pack) which includes good industry working practice and pollution prevention measures, with a particular focus on controlling run off and suspended solids, preventing accidental spillages, excavated material stockpile management, and ensuring safe storage of materials and product in sealed areas will be implemented.	Construction
LSGH3	11.5.1	Joint Bays	Topsoil stripping will be undertaken in some areas of the proposed cable route as part of constructing with the Joint Bays. A Soil Management Plan will be developed for the Proposed Development, which will include measures for segregation of soil types and to maintain soil quality during movement, stockpiling and subsequent placement.	Construction
LSGH4	11.5.1	Throughout (as required)	Risks to workers from ground gas when working within confined spaces will be mitigated through the development and adoption of an appropriate safe system of work, including the use of personal protective equipment (PPE) and Respiratory Protective Equipment (RPE) as a last resort.	Construction
LSGH5	11.5.1	Throughout (as required)	Prior to the Construction Phase commencing, appropriate health and safety and waste management procedures for working with potentially contaminated soils (including asbestos) and water will be established, including the development and adoption of safe systems of work, including the use of PPE as a last resort. With specific regard to asbestos in soils (as identified at one location) a competent asbestos specialist will develop a plan to manage risks taking into account guidance presented in Asbestos-containing Materials (ACMs) in Workplaces – Practical Guidelines on ACM Management and Abatement (Health and Safety Authority (HSA 2013), and Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction & Demolition materials: Industry Guidance (shortened name CAR-SOIL™) (CL:AIRE 2012). The plan will include the use of appropriate PPE and RPE and the carrying out of air monitoring during works at relevant locations. In addition, all staff working with soils potentially containing asbestos will be trained to identify asbestos containing material.	Pre-Construction
LSGH6	11.5.1	Throughout (as required)	To mitigate potential risks from radon migration into excavations and other enclosed spaces during the Construction Phase, an occupational monitoring programme will be implemented by the relevant contractor(s) to identify whether radon migration and build up is occurring in areas where the risk is considered to be present. The monitoring will be undertaken in accordance with the EPA Protocol for the Measurement of Radon in Homes & Workplaces (EPA 2019). If the workplace reference level of 300Bq/m^3 (becquerels per cubic metre of air) is exceeded, mitigation measures will be required during the Construction Phase, such as development of safe systems of work to ensure protection of personnel, potentially including measures such as use of PPE, RPE and working time restrictions.	Construction
LSGH7	11.5.1	Throughout (as required)	A watching brief will be implemented to identify the potential presence of previously unidentified contamination. Personnel appointed by the appointed contractor will be appropriately trained in ground contamination identification (including Asbestos Awareness Training) if involved in earthworks activities. Any such instances of previously unidentified contamination will be recorded, the associated risks assessed, and a remedial strategy developed by the appointed contractor to manage the identified risks as appropriate.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
LSGH8	11.5.1	Throughout (as required)	Specifically relating to individual receptors, such as groundwater dependent terrestrial ecosystems (GWDTEs) and groundwater abstractions, the following mitigation measures will be implemented, prior to the commencement of, and throughout the duration of the Construction Phase to limit these impacts: • The CEMP will include good industry working practice and pollution prevention measures, with a particular focus on controlling runoff and suspended solids, preventing accidental spillages, excavated material stockpile management, and ensuring safe storage of materials and product in sealed areas; • Uisce Éireann will be further consulted during the detailed design stage regarding the Dunboyne abstractions. This will include relevant aspects of the CEMP in addition to agreeing a method statement within the final CEMP for the works in the relevant location (potentially including monitoring and reporting requirements); • Where trenching is carried out outside of existing roads, the methodology to backfill trenches will ensure that the backfill is not creating preferential subsurface flow pathway. Soil compaction will be undertaken, and where needed on off road sections, additional clay bunds will be installed within the trench in areas that are adjacent to or in proximity to potential GWDTEs; o Clay bunds are proposed to be installed along the proposed cable trench, with an increased frequency between approximate Chainages 2,200 to 2,650, 2,750 to 2,850, 26,200 to 26,250, and around Chainage 12,500 in proximity of the potential GWDTEs to prevent the formation of a drainage pathway. • Should any unknown private supplies be identified in the vicinity of the proposed cable route, the supply will be monitored and, if required, an alternative supply will be provided.	Detailed Design / Pre-Construction / Construction
LSGH9	11.5.2	Throughout (as required)	Risks to maintenance workers from ground gas when working within confined spaces will be mitigated by the development and adoption of safe system of work, including the use of PPE and RPE as a last resort.	Operational
LSGH10	11.5.2	Throughout (as required)	In the event that ground works are required during the Operational Phase (it is currently assumed that no further ground works will be undertaken), appropriate health and safety and waste management procedures for working with potentially contaminated soils (including asbestos) and water will be established by the relevant appointed contractor, prior to such works commencing, such as the development and adoption of safe systems of work including the use of PPE as a last resort.	Operational

21.11 Hydrology Mitigation and Monitoring Measures

Table 21.9: Hydrology Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase

HY1	12.5.1.1	Throughout (as required)	**General Mitigation**
			The following mitigation measures will be implemented prior to commencement, and throughout the duration of the Construction Phase:
			• The CEMP, which is included as a standalone document in the planning application pack), and its associated appendices (Appendix C - Construction Resource Waste Management Plan (CRWMP) and Appendix D SWMP will be implemented in full. General measures to control and manage activities, surface water, drainage and waste at the surface to prevent issues are outlined within Sections 1 to 5 of the SWMP and Sections 1 to 4 of the CEMP. The measures include general mitigation to control accidental spillage or increased runoff as a result of hardstanding or precipitation infiltration into stockpiles, exposed soils and silt;
			• A full-time on-site Environmental Clerk of Works (EnCoW) will be appointed prior to the commencement of works. The role of the EnCoW will be to monitor and report on compliance with planning consents, environmental permits, legislation and mitigation. The EnCoW will be experienced in the types of construction works that are being carried out;
			• Works will be carried out in accordance with the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland (IFI 2016);
			• Works method statements will be agreed with IFI for all water body crossings, prior to works commencing at each crossing. The works method statement will include details on monitoring requirements for instream concrete pouring works and handheld turbidity monitoring for instream works. The method statements will ensure that:
			  ○ Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to ensures it is fit for purpose;
			  ○ Established concrete washout management areas will be designated to control the discharge of concrete washout;
			  ○ An emergency response plan will be developed and communicated to site staff prior to the concrete pouring;
			  ○ The EnCoW and on-site personnel will monitor the concrete pour continuously, ensuring that any spills are promptly addressed and mitigated; and
			  ○ The EnCoW will conduct a thorough inspection of the site after the concrete pour to identify any environmental impacts and implement clean-up measures if necessary.
			• An adverse weather stop work plan will be developed to ensure that activities with the potential to cause pollution are stopped under certain weather conditions. Met Éireann (red, amber, yellow) warnings will be monitored daily by the EnCoW by accessing the Met Éireann website (Met Éireann 2024). Works will be stopped where red weather warning are issued. Where an amber weather warning is issued, works will be monitored by the EnCoW and stopped where deemed appropriate based on the site conditions.
				Pre-Construction / Construction

HY2	12.5.1.2	Throughout (as required)	**Surface Water Quality Protection Measures**	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase

			The following surface water quality mitigation measures will be implemented prior to commencement, and throughout the duration of the Construction Phase. Works will only be completed outside of any known seasonal restrictions including instream working restrictions which are generally confined to the summer/early autumn season (i.e., June / July / August / September):
			• Activities will be planned in advance and machinery will be managed to ensure that the number of trips is limited to the minimum required at each location;
			• A buffer zone of 20m will be maintained between storage and working areas and Water Framework Directive (WFD) designated water bodies (as listed in Table 12.7 in Chapter 12 (Hydrology) in Volume 2 of this EIAR), taking account of the minimum working area required to facilitate the works;
			• Oil or fuel stored in or adjacent to the works area will be kept in a bunded area (providing 110% capacity of the largest storage unit), at a minimum distance of 20m from any WFD designated water body, or any non-designated water body that appears on a 1:50,000 OS map. This will include all unnamed watercourses as listed in Table 12.7 in Chapter 12 (Hydrology) in Volume 2 of this EIAR;
			• Tracking beside streams and tracks will be avoided where practicable to avoid damage to the bankside. Where tracking of plant and machinery is necessary, steps will be taken to reduce the impact to channel banks through the provision of track mats to reduce the impacts on the substrate;
			• Geotextile or timber matting will be used on soft ground unless the EnCoW advises, before or after monitoring, that use of a wide-tracked machine alone, will produce relatively lower siltation risk, than the installation and removal of bog mats;
			• The time period over which areas of clearance are left open will be reduced insofar as is reasonably practicable;
			• Re-instatement method statements will be subject to approval by the EnCoW. Species local to the surrounding area will be used in the reinstatement for any vegetation lost during construction, as described in Chapter 10 (Biodiversity) in Volume 2 of this EIAR;
			• Concrete will be brought to site by covered truck;
			• Wet concrete operations adjacent to water bodies will be avoided, where possible, with a minimum separation distance of 20m, with exception to in-stream pours which will be undertaken within a sealed dry working area. The appointed contractor will ensure that all concrete truck washing / cleaning is undertaken off site, where possible, and remote from water bodies or potential pathways to water bodies;
			• In order to reduce the risk of contamination arising as a result of spills or leakages, measures including, but not limited to, the following will be employed:
			  ○ All collected waste will be managed in accordance with Number 10 of 1996 - Waste Management Act, 1996 (as amended), and all associated Regulations;
			  ○ Fuels, chemicals, liquid and solid waste will be stored on impermeable surfaces;
			  ○ All tanks and drums containing potentially polluting materials will be bunded;
			  ○ Refuelling of plant, equipment and vehicles will be carried out on impermeable surfaces; and
			  ○ All tanks will be marked with the substances they are carrying. Tanks will not be emptied and refilled with another substance (i.e. emptied of fuel and refilled with water) prior to appropriate cleaning and removal of contaminating substances.	

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• Spill kits will be provided at all compound locations and carried by all crews during underground cable installation works. Spill kits will be of adequate size for the volume of substances being carried; • The Emergency Incident Response Plan and environmental control and mitigation measures described in the CEMP will be agreed prior to construction with IFI; and • Water pumped from the dry works areas and dewatering will be treated using settlement tanks to remove sediment prior to discharge onto grass and allowed to filter back to water body.	
HY3	12.5.1.3	Throughout (as required)	**Silt Control Measures** The following mitigation measures will be implemented during the Construction Phase: • Silt control measures will be used to control silt generated from activities on-site and prevent it gaining access to surface drainage which could convey silt to larger streams and water bodies; • Silt traps will be located in small drains where flow is small and silt fences will be located where runoff from large areas needs to be controlled; • Silt fences will be installed in the working areas and not at the water body; • Where distances between the works and water body allow, a minimum setback distance of 20m from the water body will be maintained; • Proposed construction access routes will be delineated, such that an appropriate set back distance from water bodies is maintained; • Where an appropriate set back distance cannot be maintained, and works are to be undertaken adjacent to water bodies, the setback distance will be delineated and monitored by the EnCoW on-site; • Where the site is constrained, the best available set back distance will be determined by the EnCoW, taking account of the minimum working area required to facilitate the works; • Clearing and stripping of topsoil or existing roads and footpaths that expose underlying granular layers at each phase of works will be delayed as long as possible, and will be carried out shortly before construction begins; and • Cut-off ditches, berms or diversion channels will be utilised around working area boundaries, where possible, to limit surface water entering the excavated areas and silty water running off the site into surface water drains or watercourses.	Construction
HY4	12.5.1.3.1	Throughout (as required)	**Silt Control Measures - Silt Traps** The following requirements will apply during the Construction Phase: • Silt traps will be placed in drains downstream of working areas where the volume of water flow is expected to be low and will be identified on-site by the EnCoW; • Silt traps will be made of terram, not mesh; • The silt trap will be staked into the banks of the drain / water body, such that no water can flow around the sides; • The material will be bedded into the drain bed / water body to prevent water flowing beneath it; • The height of the trap will be lower than the bank heights. The upper edge will be fixed to a timber cross piece. This will allow water to overtop the silt trap and not burst through or around it; • Inspections will be carried out daily during the proposed Construction Phase works by the EnCoW, and after heavy rains and / or strong winds; weekly on completion of the works for at least one month, and monthly thereafter until bare areas have developed new growth; • Any build-up of solids will be carefully removed without removing any vegetation growing on the bottom;	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• The silt trap will not be pulled from the ground but cutaway at ground level and posts removed; and • A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package.	
HY5	12.5.1.3.2	Throughout (as required)	**Silt Control Measures - Silt Fences** The following measures will be implemented in relation to silt fences during the Construction Phase: • Silt fences will be installed prior to the commencement of works and will be inspected daily by the site team and EnCoW to inform adaptive management, as required. The locations of the same will be determined by the EnCoW; • Site restoration post-works will be carried out, in agreement with IFI. These works will include riverbank stabilisation, gravel replacements, bank profiling and planting where required. In all cases, the site will be restored post-installation; • Silt fences will be installed downslope of the area where silt is being generated; • The silt fence will contain the area where silt is generated and will terminate on high ground (i.e., an elevated area not adjacent to any watercourse); • The base of the silt fence will be bedded at least 15cm to 30 cm into the ground at 2m intervals. The manufacturer's installation instructions will be followed during installation to ensure that the silt fence is appropriately installed; • Once installed, the silt fence will be inspected regularly by the EnCoW, daily during the proposed Construction Phase works, and regularly on completion of the works until bare areas have developed new growth, but particularly after heavy rains and / or strong winds. Any defects will be rectified immediately; • Two lines of silt curtain / fence will be installed for the receptors outlined in Table 12.7 in Chapter 12 (Hydrology) in Volume 2 of the EIAR, unless otherwise agreed by the EnCoW; • Any build-up of sediment along the fence boundary will be removed daily; • Silt fences will be maintained until vegetation on the disturbed ground has re-established; • The silt fencing will be left in place until the works are completed (which includes removal of any temporary ground treatment) and will remain in place until bare areas have developed new growth; • Silt fences will not be removed during heavy rainfall; • The silt fence will not be pulled from the ground but cutaway at ground level and posts removed; and • A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package.	Construction
HY6	12.5.1.4	TCCs and HDD Compounds	**Construction Compounds / Laydown Areas** The following measures will be implemented during the Construction Phase: • All proposed TCCs and HDD Compounds will be secured with hoarding / fencing around the compound perimeters, as appropriate; • Where temporary construction areas are required and existing hardstanding is not available, engineered stone fill will be laid, compacted, and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed, and the land will be reinstated to its original condition; • Temporary facilities will be provided at the TCCs / HDD Compounds, including Construction Phase car parking and welfare facilities and temporary material storage areas, as necessary;	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• Where a construction access route is required, engineering stone fill will be laid and compacted and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed, and the land will be reinstated to its original condition; • All construction workers will be required to use the designated access / egress routes only. Storage of fuel and refuelling will be undertaken within bunded areas; • Any discharges from temporary welfare facilities will be connected to either the existing sewage network (where available) or to a sealed holding tank to be emptied and disposed of off site by a licensed contractor to an approved licensed facility; • Storage of fuel and refuelling will be undertaken within bunded hardstanding areas. Water will be brought to site via tankers, as required; and • Where a potential flood event is forecast, plant and materials vulnerable to flooding in any 'at risk' compounds areas will be relocated to parts of the compound that are considered to be not at risk of flooding.	
HY7	12.5.1.5	Watercourse crossings	**Open Trench Water Crossings** The following measures will be implemented during the Pre-Construction / Construction Phase: • As with all construction works proposed, no works on water bodies will be allowed to commence until the relevant Risk Assessment Method Statements (RAMS) and pertinent Health and Safety documents are received from the specialist appointed contractor and are reviewed and agreed by the Client's representative; • The appointed contractor documents will include method statements, open trenching risk assessments and environmental management plans specific to the area where the trenching is to take place. These plans will be submitted by the appointed contractor to the Employer's Representative on-site for review and comment, prior to commencing open trench operations; • In addition to this, for the in-channel crossings, the appointed contractor will be required to prepare detailed construction method statements. Such method statements will be provided to IFI for approval; • All open trenched water body crossings will take place during the June to September period in order to avoid the period of salmon and trout spawning, unless otherwise agreed with IFI. Consultation to-date with IFI indicates that for the crossings of the Tolka_020 (WB06), as a minimum, instream timing restrictions will apply as per the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (IFI 2016); and • The ground preparation works (such as soil stripping and hardstand formation) adjacent to the water body crossing will be carried out in the same manner as that for other works activities. All clean coarse surface material (gravel, cobbles and boulders) on the riverbed or stream to a depth of 30cm will be removed. Where a depth of 30cm is not present, the full depth of the layer will be removed to where the substrate is mainly clay or sand. Any natural bed substrate removed from water bodies will be stored separately to other stockpiled material and covered with suitable waterproofing (geotextile base and cover) to prevent the washing out of fines such that they can be reinstated upon completion of the works.	Pre-Construction / Construction
HY8	12.5.1.5	Watercourse crossings	**Open Trench Water Crossings (continued)** The following measures will be implemented during the Pre-Construction / Construction Phase: • Where sites can be flumed, the diameter of the flume pipe will be chosen to accommodate flows at the time, with spare capacity to cover that predicted over the period that the works are expected to last. A clay material will be used around	Detailed Design / Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase

			the flume pipe to create a seal and prevent leakage and loss of flow volumes. Image 4.21 in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR includes an example graphic of a typical flume pipe crossing;
			• Where fluming cannot be achieved, and damming and pumping methods are to be used for open trenching, sandbags will be used with an impermeable barrier. Material excavated from the trench (and an upstream pump sump, if required) will be placed on terram on level ground as far back from the water body edge, as is practicable, and surrounded on its downslope side by a silt fence and / or impermeable berm to prevent material re-entering the water body. This material, if deemed suitable, can be used to partially backfill the trench. However, a significant amount of material will be in excess and will be removed from site by a suitably licensed handler to a suitably licensed facility. All pumps will be monitored on a daily basis, and if failure occurs, pumps will be repaired or replaced as soon as possible;
			• Dewatering of the excavation will be treated on-site, and where necessary, pumps will be used to remove excess water from excavations. De-watering volumes will be treated using settlement tanks before the settled water is returned to the water body. A second tank in series with the first will be used if the first is not sufficient to remove enough solids. Pumped over water will be directed to a splash plate to prevent erosion of the riverbed / bank at the downstream outlet;
			• The natural bed material removed which was set aside will be used to reinstate the stream bed after the ducts have been installed and the flume pipe has been removed, as well as all the damming materials. The stream bed will be reinstated at the same level and grade as it was prior to the works to ensure that there are no changes in channel bed gradient;
			• All bank surfaces will be reinstated using biodegradable stabilising materials (e.g. coir matting), which will be allowed to degrade and revegetate naturally from wind-blown seed. A silt fence will be placed along the riverbank where the works were undertaken to prevent solids washed off during heavy rainfall from entering the stream while the surface re-vegetates. This measure will be particularly important at sites which slope to the edge of the water body. Visual monitoring, supported by visual turbidity monitoring of receiving waters, will be conducted by appointed contractor's EnCoW for the duration of the works. Post-reinstatement, weekly monitoring will also be undertaken until vegetation is established;
			• Where temporary culverts are required, they will be designed with input from a fluvial geomorphologist during the detailed design phase. At a minimum they will:
			  ○ Not lead to changes in channel gradient upstream, through and downstream of the structure;
			  ○ Have buried inverts and be embedded with material removed from the channel during construction. This will aid in maintaining fluvial process and ecological connectivity; and
			  ○ For the detailed design of the crossing structure, climate change will be considered to ensure the culvert is adequately sized.	

HY9	12.5.2	Dunboyne_010 water body crossing	An options appraisal will be undertaken at the detailed design stage to outline the most appropriate crossing methodology for the proposed permanent access track crossing of the Dunboyne_010 water body.	Detailed Design
HY10	12.5.2.1	Dunboyne_010 water body crossing	**Permanent Culvert Crossing** If the preferred option for the crossing of the Dunboyne_010 water body is a culvert, the detailed design stage will consider the following: • The culvert will be positioned on the straightest part of the water body and aligned with the water body bed in this location;	Detailed Design

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• The culvert will be positioned on the straightest part of the water body and aligned with the water body bed in this location; • Culvert lengths will be the minimum required to facilitate the crossing; • Bottomless or clear span culverts will be favoured during the detailed design stage with respect to closed pipe culverts; • All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse (and will be agreed with IFI during the detailed design stage); • Where possible, pre-cast elements for culverts and concrete works will be used; • Culverts will be installed such that, where practicable, they align with the existing channel gradient and maintain existing channel width. This will help to ensure adequate water depth and velocity for fish passage; • The natural riverbed level and slope will be maintained, by burying the culvert invert below the natural bed level. The culvert invert will be embedded to a minimum depth of 300mm (millimetres), or as agreed with IFI during the detailed design stage; • All guidance / mitigation measures proposed by the Office of Public Works (OPW) or the IFI will be incorporated into the detailed design of the proposed culvert; • A sediment retention system (e.g. baffles) will be installed within culverts, where required, based on channel gradient and likely flow conditions; • A low flow channel will be considered during the detailed design stage to account for periods of low flow during summer months. The low flow channel will be designed in conjunction with the hydraulics of the culvert with input from an experienced fluvial geomorphologist; and • Energy dissipation at culvert outlets (where deemed necessary, based on hydraulic analysis during the detailed design stage) will be designed with reference to appropriate guidance and technical standards guidance.	
HY11	12.5.2.2	Dunboyne_010 water body crossing	**Permanent Bridge Structure** If the preferred option for the crossing of the Dunboyne_010 water body is a bridge structure, the detailed design stage will consider the following: • Abutments will be set back from the river channel and banks to allow the continuation of the riparian corridor underneath the structure. This will help to minimise or prevent the need for bed and bank reinforcement, reduce the risk of creating a barrier to fish passage and will allow mammal passage under the bridge structure; • The distance between the bridge abutments will be designed to be as wide as possible to maintain the bank habitat, maximising the riparian corridor and allowing the water body some space to move; • The natural channel width will be maintained; • The foundations (of abutments) will be buried deep enough to minimise or prevent the need for bed or bank reinforcement or bridge weirs or aprons. This will maintain the natural bed material and bed levels, protecting habitat and allowing fish passage; • The foundations will be buried deep enough to allow for scour during high flows. A suitably qualified engineer or geomorphologist will be consulted to advise on an appropriate depth; • The structure will be designed to facilitate the passage of woody debris; • The requirements for bed and bank reinforcement will be considered, only if the risk of erosion cannot reasonably be eliminated through the above measures;	Detailed Design

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• The length of bed and bank protection will be restricted and green bank protection measures will be implemented, where applicable; • Bridge piers / abutments will be designed to minimise impacts on morphological processes such that abutments are set back on the floodplain. In-channel structures will not be favoured as part of the detailed design; • The crossing location will be identified with input from an experience geomorphologist to identify preferential crossing locations within the Planning Application Boundary in relation to channel alignment; and • Post-construction management and maintenance will be carried out and will include sediment and debris clearance, riparian vegetation management, and structure repair or maintenance.	
HY12	12.5.3.1	Dunboyne_010 water body crossing	Regardless of the crossing type selected and designed for the proposed permanent crossing of the Dunboyne_010 water body, post-construction management and maintenance will be carried out and will include sediment and debris clearance, riparian vegetation management, and structure repair or maintenance as and when required by regular inspection.	Operational

21.12 Archaeology, Architectural Heritage and Cultural Heritage Mitigation and Monitoring Measures

Table 21.10: Archaeology, Architectural Heritage, and Cultural Heritage Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
AACH1	13.5	Throughout (as required)	Mitigation for archaeology, architectural heritage and cultural heritage will be undertaken within the framework provided by with the Code of Practice between the Department of the Environment, Heritage and Local Government and EirGrid (Department of the Environment, Heritage and Local Government and EirGrid 2009).	Construction Phase
AACH2	13.5	Throughout (as required)	Where preservation in situ is feasible, a methodology for this will be agreed with National Monuments Service (NMS).	Construction Phase
AACH3	13.5	Throughout (as required)	All mitigation will be carried out under the supervision of a suitably qualified archaeologist under Licence (where required) granted by the Minister for Housing, Local Government and Heritage, and in accordance with the provisions of the National Monuments Acts 1930–2004 (as amended). Written reports on the results of all mitigation undertaken will be prepared in accordance with the requirements of the Licence(s) granted by the NMS	Construction Phase
AACH4	13.5	Throughout (as required)	The appointed contractor will allow sufficient time in their programme to allow the mitigation to be completed in the areas in which such mitigation is required.	Pre-Construction

AACH5	13.5.1	In the location of the various archaeological, architectural heritage and cultural heritage assets receptors identified	Mitigation measures for known archaeological, architectural heritage and cultural heritage assets, that will be undertaken post-consent but in advance of the Construction Phase, will comprise the following:
			• Topographical survey of the upstanding remains of LI_08;
			• A photographic and written record of the elements of GDLs DL_04, DL_05, DL_15 and DL_16 impacted by the Proposed Development;
			• Townland boundary surveys comprising a detailed written and photographic survey, and test trenching of TB_01, TB_04, TB_38, TB_39, TB_44, TB_51, TB_52, TB_54, TB_57, TB_67, TB_76, TB_78, TB_82, TB_85, TB_86, TB_87, TB_96 and TB_97;
			• Palaeoenvironmental assessment and analysis of LI_24, LI_36 and LI_58;
			• Archaeological excavation of AY_47, CH_32, CH_59, CH_62, CH_67, CH_75, CH_78, LI_05, LI_08, LI_09, LI_11, LI_24, LI_36, LI_40 and LI_58, informed by archaeological geophysical survey and archaeological test excavation, where preservation in-situ is not feasible;
			• Underwater assessment comprising wade and metal detecting survey of:
			  ○ Dunboyne Stream (WCP01);
			  ○ Pinkeen River (WCP05); and
			  ○ Two unnamed streams (UNWC 34 and WCP16).
			• An archaeological metal detecting survey will be undertaken of the banks of UNWC 1, UNWC 2, UNWC 3, WCP04, WCP07, WCP08, UNWC 28, UNWC 29, WCP12, WCP13, UNWC 31 (1), UNWC 33 (2), UNWC 33A and UNWC 35).
				Pre-Construction

AACH6	13.5.1	Throughout (as required)	Archaeological geophysical survey and archaeological test excavation will be undertaken post consent but pre-construction in all off-road sections required for construction, including land required for the proposed access tracks, Passing Bays and Joint Bays, and HDD Compounds and TCCs. Where preservation in situ is not feasible, the results of the archaeological geophysical survey and archaeological test excavation will inform the design of archaeological excavation required to mitigate the impact on any unknown archaeological remains identified.	Pre-Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
AACH7	13.5.2	In the location of the various archaeological, architectural heritage and cultural heritage assets receptors identified	During construction, the following mitigation will be undertaken: • Archaeological monitoring of on-road construction works within the Zones of Notification of Recorded Monuments (AY_18, AY_23, AY_24, AY_25, AY_29, AY_41 and AY_43) and for assets CH_34, CH_53, CH_68, CH_80, CH_81, CH_82, CH_83, LI_37, LI_57 and LI_60 will be undertaken; and • AY_24, CH_15 and CH_63 will be clearly demarcated with temporary fencing within the Planning Application Boundary to avoid accidental damage.	Construction
AACH8	13.5.2	Throughout (as required)	If archaeological remains are identified during the archaeological monitoring, and preservation in-situ is not feasible, archaeological excavation will be undertaken under an excavation licence granted by the Minister for Housing, Local Government and Heritage and in accordance with the provisions of the National Monuments Acts 1930–2004 (as amended).	Construction

21.13 Traffic and Transport Mitigation and Monitoring Measures

Table 21.11: Traffic and Transport Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
TT1	14.5.1.1	Throughout (as required)	The temporary impacts that construction will have on traffic and movement through the study area will be mitigated through the adoption of a regulated and approved CTMP. The CTMP is included as Appendix B of the CEMP (which is a standalone document in the planning application pack). It should be noted that in this regard both the CTMP and CEMP are included herewith for the purposes of this application and assessment. However, they will comprise 'live' documents insofar as they are subject to ongoing future refinement by the appointed contractor in collaboration and agreement with the Roads Authorities. However, all such refinement will occur in the context of the CTMP (and CEMP) included in this planning application pack for approval, and therefore, the subject of the assessment of the consenting authority. The CTMP will document measures to promote the efficient transportation of components and materials to site, whilst reducing congestion and disruption which might impact negatively on local communities or general traffic and in particular emergency services.	Pre-Construction / Construction
TT2	14.5.1.1	Throughout (as required)	The appointed contractor will agree temporary traffic measures, and will then adopt and monitor an appropriate way of working, in consultation with Meath County Council, Fingal County Council, daa, Transport Infrastructure Ireland (TII) and / or their agents, and An Garda Síochána, as appropriate.	Pre-Construction / Construction
TT3	14.5.1.1	Throughout (as required)	Construction activity generated vehicles will travel on predefined construction access routes to and from the relevant working areas to reduce the effects on local traffic.	Construction
TT4	14.5.1.1	Throughout (as required)	Signed diversion routes will be provided to mitigate journey disruption and to minimise potential driver delay. These are outlined in Chapter 14 (Traffic and Transport) in Volume 2 of the EIAR but will be subject to final agreement with the Roads Authorities. Where practically achievable, diversion routes will not apply outside of the working area hours of operation.	Construction
TT5	14.5.1.1	Throughout (as required)	Signage will be installed to warn road and recreational route users to the presence of the works access and the associated likely presence of large or slow-moving construction traffic.	Construction
TT6	14.5.1.1	TCCs	To minimise inconvenience to the local community in terms of obstructive parking, adequate car parking for permanent site personnel, visitors and deliveries will be provided within the TCCs. Adequate vehicle parking is available on-site at either substation, and car parking will not be permitted on any of the public road network that bounds the respective TCC or work site, so that sight lines will be maintained and to minimise the potential for obstruction and delay for other road users.	Construction
TT7	14.5.1.1	Throughout (as required)	Only vehicles essentially required to facilitate construction will be permitted to attend proposed cable route worksites. Car sharing will be promoted to construction personnel by the appointed contractor during the induction process.	Construction
TT8	14.5.1.1	Throughout (as required)	The appointed contractor will nominate a person to be responsible for the co-ordination of all elements of traffic and transport during the construction process (liaison officer). This person will liaise with the local community so that the community has a direct point of contact within the contractor organisation who they can contact for information purposes or to discuss matters pertaining to the traffic management.	Construction
TT9	14.5.1.2	M3 Parkway railway line HDD works	**Railway Monitoring** The following monitoring measures will be implemented for the HDD works at the M3 Parkway: • The appointed contractor that will undertake the HDD at the M3 Parkway railway will use track monitoring equipment; and	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			• A detailed methodology will be determined by the appointed contractor in consultation with Irish Rail. However, it is anticipated that rail track monitoring will involve the use of survey equipment and target sights before, during and immediately following HDD operations to monitor any movements accurately.	
TT10	14.5.1.3	Throughout (as required)	**Construction Access Arrangements** The following mitigation measures will be implemented during the Construction Phase: • Transportation, including deliveries to and from the Construction Phase working areas, will be on the existing public road network with access to off-road locations gained through both existing and constructed accesses and haul roads; • The proposed programme of working area locations will be confirmed by the appointed contractor as an integral part of their adopted CTMP; • All construction vehicle drivers will be instructed to access their destination worksite via an approved construction access route; and • A wheel wash facility and road sweeper will be provided to minimise any mud and debris on the surrounding public road network and to prevent the introduction and spread of non-native or invasive plant material onto the site.	Construction
TT11	14.5.2	Throughout (as required)	The following mitigation measures will be implemented during the Operational Phase: • To minimise inconvenience to the local community in terms of obstructive parking, adequate vehicle parking space is available on-site at Woodland and Belcamp Substations; • For cable inspection, car parking will not be permitted on any part of the public road network for inspection of link boxes at each Joint Bay location, for example; and • Any localised, temporary traffic management will be devised by the contractor that carries out the inspection in consultation with the road authorities with consideration that sight lines will be maintained and to minimise the potential for obstruction and delay for other road users.	Operational

21.14 Agronomy and Equine Mitigation and Monitoring Measures

Table 21.12: Agronomy and Equine Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
AE1	15.5.1	Off-Road Sections (as required)	The appointed contractor will be required to maintain close liaison with local community representatives and landowners and farmers to provide them with adequate progress information and advance notice of works. This will ensure that construction activities are planned around the reasonable access needs of the landowner, so that access is maintained when required by the landowner for farming activities, such as for example, forage and crop harvesting, fertiliser spreading, slurry spreading, and herding of livestock etc. Scheduling of works will be agreed with each landowner to facilitate the operation of the farm and minimise disturbance. Where it is necessary to move livestock along public roads or across the working area, this will be facilitated by the appointed contractor.	Construction
AE2	15.5.1	Off-Road Sections (as required)	Landowners with lands adjoining sites, if rock breaking is required to take place, will be notified in advance of these activities.	Construction
AE3 (see TT1 to TT11 (as applicable))	15.5.1	Off-Road Sections (as required)	Traffic mitigation measures outlined in Chapter 14 (Traffic and Transport) in Volume 2 of this EIAR and in Table 21.11 of this Chapter, and any associated traffic management plans will be implemented to ensure that farmers and agri-business owners have adequate access to farmyards and land so that the transport of farm inputs and produce is not significantly affected.	Construction
AE4 (see AQ1 to AQ9)	15.5.1	Off-Road Sections (as required)	Mitigation measures for the control of dust, as set out in Chapter 7 (Air Quality) in Volume 2 of this EIAR and in Table 21.4 of this Chapter will be implemented by the appointed contractor.	Construction
AE5 (see NV1 to NV22)	15.5.1	Off-Road Sections (as required)	Mitigation measures for the control and monitoring of noise and vibration as set out in Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR and in Table 21.6 of this Chapter will be implemented by the appointed contractor.	Construction
AE6 (see HY1 to HY8)	15.5.1	Off-Road Sections (as required)	Mitigation measures for the control and monitoring of water quality, as set out in Chapter 12 (Hydrology) in Volume 2 of this EIAR and in Table 21.9 of this Chapter will be implemented by the appointed contractor.	Construction
AE7	15.5.1	Off-Road Sections (as required)	The appointed contractor will comply with any regulations pertaining to the control of farm diseases as specified by the Department of Agriculture, Food and the Marine and will employ reasonable precautions against spreading any such farm disease. The appointed contractor will operate a biosecurity plan where machinery and personnel that are moving between farms will have adequate available disinfection facilities and equipment to ensure that disinfection can take place as required. The ESB and / or its appointed contractor will also take due notice and consideration of reasonable concerns expressed by landowners or occupiers prior to entry.	Construction
AE8	15.5.1	Off-Road Sections (as required)	Where field boundaries are to be affected, replanting and fencing will be used to ensure that the boundaries are maintained between landowners and within existing field systems. Therefore, no permanent restructuring will occur. Hedgerows will be replanted with species-rich varieties and with suitable fit for purpose fencing in-line with Teagasc and the Department of Agriculture, Food and the Marine guidelines. However, technical considerations may limit planting above the proposed underground cable circuit. Where replanting is not feasible, suitable fit for purpose stockproof fencing will be provided with	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
			standard agricultural gates provided where required. Access between landowners will not be provided except where required on the joint bay access tracks (e.g. between Chainage 700 and 3,400 for the permanent access track to Joint Bay 1 to 4). Double gates will be provided at field boundaries between landowners on these permanent access tracks. The gates will be locked and maintained by ESB with no access provided to the landowner. Double fencing will be provided between separate landowners to maintain biosecurity between adjoining farms.	
AE9	15.5.1	Off-Road Sections (as required)	Where the working area severs land access or access to farmyards, the appointed contractor will ensure that there is adequate access provided to facilitate the farmer to effectively farm severed land.	Construction
AE10	15.5.1	Throughout (as required)	The appointed contractor will adhere to the mitigation specified in this Chapter of the EIAR, and the CEMP which is included as a standalone document in this planning application pack	Construction
AE11	15.5.1	Off-Road Sections (as required)	The appointed contractor will: • Maintain pre-entry records; • Erect fit for purpose livestock proof fencing to prevent straying livestock; • Maintain and repair existing field drainage systems to restore the drainage of land to the condition that prevailed before the proposed works; • Store soil separate from the works traffic ensuring minimum amount of damage and disturbance to excavated soil material; • Reinstate the land so that it is level and surface is free of stones and weeds; and • Treat soil compaction by breaking up the soil to the required depth to address such compaction.	Construction
AE12	15.5.1	Off-Road Sections (as required)	The drainage reinstatement will not impede the drainage of surrounding agricultural lands, and where land drains have been intersected or blocked during construction, these will be reconnected or diverted to a suitable outflow.	Construction
AE13	15.5.1	Off-Road Sections (as required)	Field boundaries (hedgerows and fencing) removed during the Construction Phase will be replaced with fit for purpose stock proof fencing and hedgerows. However, hedgerows will not be replaced directly along the easement where they are permanently removed.	Construction
AE14	15.5.2	Off-Road Sections (as required)	The loss of agricultural land due to the construction of the Proposed Development will be a permanent loss which cannot be mitigated, except through compensation. Restriction of Common Agricultural Policy (CAP) payments, farmyard building, commercial forestry and commercial tree planting will be addressed by compensation, where applicable.	Operational
AE15	15.5.2	Off-Road Sections (as required)	Routine maintenance and inspection of cable infrastructure will be notified in advance to minimise disturbance to livestock and farm enterprises, where possible. If faults occur, excavation of soil may be required, resulting in disturbance and crop loss. The risk of such faults is low, and therefore, the frequency of this type of disturbance is very low.	Operational

21.15 Waste Mitigation and Monitoring Measures

Table 21.13: Waste Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
W1	16.5.1.1	Throughout (as required)	A CRWMP has been prepared (included as Appendix C to the CEMP included as a standalone document in this planning application). The appointed contractor will implement and update this document (as necessary) in accordance with best practice as described in Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (EPA 2021). The appointed contractor(s) will be responsible for reviewing and updating the CRWMP prior to the commencement of construction and will undertake periodic reviews, updating as necessary throughout the Construction Phase in agreement with the planning authorities. The CRWMP outlines how waste arising during the C&D Phases of the Proposed Development will be managed in a way that ensures compliance with the provisions of the Waste Management Act 1996 (as amended).	Construction
W2	16.5.1.1	Throughout (as required)	All operations will be managed and programmed in such a manner as to prevent / minimise waste production. All waste material will be managed in accordance with the waste hierarchy outlined in Image 6.2 in Chapter 16 (Waste) in Volume 2 of this EIAR, with an emphasis on reuse, recycling and recovery of material over disposal where feasible.	Construction
W3	16.5.1.1	Throughout (as required)	In order to minimise the creation of waste, opportunities for reuse of excavated material within the Proposed Development (e.g. as fill) will be sought. Where possible, excavated materials will be re-used for backfill subject to the results of testing, whereby representative samples will be retrieved from each material type (allow one per 100m^3 (cubic metres)) submitted for laboratory analysis and the results of analysis assessed to assess whether it is inert. If material is not inert, it will be disposed of at a suitable facility in line with waste management legislation and guidance.	Construction
W4	16.5.1.1	Throughout (as required)	Where there is no reuse potential within the Proposed Development of such material, either due to the material being unsuitable or due to the quantity being in excess of requirements, the potential for reuse as a by-product in accordance with Article 27 will be investigated by the appointed contractor(s). Where this option is technically / economically feasible, the appointed contractor(s) will be responsible for the EPA Article 27 notification and the associated requirements. Any material which is to be managed as a by-product will be appropriately stored on-site and will be kept separate from any waste storage to avoid cross contamination.	Construction
W5	16.5.1.1	Throughout (as required)	Where waste is created it will be managed on-site in accordance with good practice and applicable waste legislation as follows: • Waste excavated material will be appropriately stockpiled; • Waste will be segregated at source to prevent cross contamination; • Where relevant (e.g. excavated fill material), wastes will be sampled and tested to allow classification prior to disposal; • Waste receptacles will be appropriate to the waste streams using them, and covered or netted where practicable to prevent wind-blown debris emanating from them; • Any hazardous wastes will be stored in segregated waste containers which are appropriately labelled; • All waste will be collected by a suitable contractor in possession of a valid and appropriate Waste Collection Permit, and will only be transported to suitably licensed or permitted waste facilities (i.e. facilities in possession of a valid EPA Licence, Waste Facility Permit or Certificate of Registration); • Regular site inspections and cleaning will be done in order to minimise the potential for litter in the surrounding area; • Waste records will be maintained throughout the Construction Phase of the Proposed Development; and • Waste auditing against the CRWMP will be carried out.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
W6	16.5.1.1	Throughout (as required)	The quantity and type of waste and materials leaving site during the Construction Phase will be recorded by the appointed contractor. The name, address and authorisation details of all facilities and locations which waste and materials will be delivered to will be recorded along with the quantity for each facility. Records will show which material is recovered, which is recycled and which is disposed of.	Construction
W7	16.5.1.1	Throughout (as required)	Any off site interim storage or waste management facilities for excavated material will have the appropriate EPA Licence, Waste Facility Permit or Certificate of Registration, as appropriate, in place.	Construction
W8	16.5.1.1	Throughout (as required)	Excavated materials from within roadways (e.g. capping, subbase and bituminous materials) will be reused or recycled in line with TII specifications where reasonably practicable: • Capping, subbase, bituminous and concrete materials could be reused or recycled in fill and capping materials providing they comply with the Specification for Road Works Series 600 – Earthworks (CC-SPW-00600) (TII 2013a); • Subbase, bituminous and concrete materials could be reused or recycled in subbase or base materials providing they comply with the Specification for Road Works Series 800 – Unbound and Cement Bound Mixtures (CC-SPW-00800) (TII 2013b); and • Subbase and bituminous materials could be recycled in base or binder materials providing they comply with Road Pavements – Bituminous Materials (CC-SPW-00900) (TII 2015).	Construction
W9	16.5.1.1	Throughout (as required)	With respect to the potential to encounter coal tar within road planings, this will be managed in alignment with TII's The Use of Road Tar in Ireland and Research Treatment Protocols (TII 2023). The contractor will test all road planings for the presence of coal tar to ensure accurate classification of all arisings prior to disposal, thus minimising the quantity being disposed of as hazardous waste. Furthermore, the contractor will seek recycling options for any coal tar to divert it from landfill.	Construction
W10	16.5.1.2	Throughout (as required)	**Imported Materials** The following mitigation measures in relation to imported materials will be implemented during the Construction Phase of the Proposed Development: • Excavated materials will be re-used for backfill subject to the results of testing (as outlined in Section 16.5.1.1 of Chapter 16 (Waste) in Volume 2 of the EIAR); • Consideration will be given by the appointed contractor to the sustainability of material being sourced for the construction of the Proposed Development. As far as is reasonably practicable, materials required for the construction of the Proposed Development will be sourced locally to reduce the amount of travelling required to get the material to the site. Key issues to be considered when sourcing materials for the Construction Phase will include the source, the material specification, production and transport costs, and the availability of the material. For quarried material sourced within the State, only quarries which are included in local authority quarry registers will be used by the appointed contractor to source any quarried material; and • Construction materials will be managed on-site by the appointed contractor in such a way to prevent overordering and waste. Materials will be stored in appropriate storage areas or receptacles to reduce the potential for damage requiring replacement. 'Just-In-Time' ordering principles will be implemented by the appointed contractor, where practicable, to reduce the potential for over-ordering.	Construction

21.16 Material Assets Mitigation and Monitoring Measures

Table 21.14: Material Assets Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
MA1	17.5.1	Throughout (as required)	Where there are interfaces with existing utility infrastructure, protection in place or diversion as necessary is proposed to prevent long-term interruption to the provision of the affected services, which will be based on applicable minimum safety clearances and design standards.	Construction
MA2	17.5.1	Throughout (as required)	Prior to excavation works commencing, localised confirmatory surveys will be undertaken by the appointed contractor to verify the results of the pre-construction assessments undertaken and reported in this EIAR and to ensure any unknown utilities are identified. Where works are required in and around known utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances, where possible, isolation of the section of infrastructure during works in the immediate vicinity.	Pre-Construction
MA3	17.5.1	Throughout (as required)	All utility companies for which diversions are potentially required will continue to be consulted when designing any diversions to ensure that the proposed diversions conform to the utility provider's requirements and to ensure that service interruptions are kept to a minimum.	Pre-Construction / Construction
MA4	17.5.1	Throughout (as required)	Where diversion, or modifications, are required to utility infrastructure, service interruptions and disturbance to the surrounding residential, commercial and / or community property may be unavoidable. Where this is the case, it will be planned in advance by the appointed contractor. Required service interruptions will generally only occur for a set period of time per day (a set number of hours not exceeding eight hours where reasonably practicable) and generally will not be continuous for a full day at a time. Prior notification of disruptions will be given to all impacted properties. This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruptions. Any required works will be carefully planned by the appointed contractor to ensure that the duration of the interruptions is minimised, in as far as possible. Consultation with relevant neighbouring parties will be undertaken prior to any proposed disruptions.	Construction
MA5	17.5.2	Throughout (as required)	Should maintenance measures necessitate it, service disruptions impacting the surrounding residential, social and commercial properties will be kept to a minimum only occurring where unavoidable. Prior notification of disruptions will be given to all impacted properties. This will include information on when disruptions are scheduled to occur and the duration of the disruption. Consultation with relevant neighbouring parties will be undertaken prior to any proposed disruption.	Operational

21.17 Landscape and Visual Mitigation and Monitoring Measures

Table 21.15: Landscape and Visual Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
LV1	18.5.1	Throughout (as required)	The following mitigation measures will be implemented during the detailed design stage: • A Project Arboriculturalist will be appointed by the ESB to provide relevant additional input to be addressed at appropriate points; • The Generic Arboricultural Method Statement (AMS) (included in Appendix C of Appendix A18.2 in Volume 3 of this EIAR) will be reviewed and updated into a site-specific AMS to provide appointed contractors with details on how specific operations need to be performed to protect trees, including the use of exclusion zones and ground protection; and • A Tree Protection Plan will be produced providing schematic details of how protective fencing will be installed and any other pre-planned targeted tree protection measures.	Detailed Design
LV2	18.5.1	Woodland Corridor	At detailed design stage, a locally reduced separation between adjacent cable circuits (CP0966 development, under An Bord Pleanála planning reference number 316372, and the Proposed Development) will be considered at the following key locations to reduce the potential impact on adjacent trees: • Chainage 950 to Chainage 1,100; • Chainage 1,450 to Chainage 1,650; • Chainage 2,350 to Chainage 2,500; and • Chainage 3,050 to Chainage 3,150. This will allow a greater setback between the Proposed Development cable circuit and the adjacent field boundary. Areas of land between the Proposed Development cable circuit and field boundary will also be fenced off and will not be trafficked by heavy plant or machinery.	Detailed Design
LV3	18.5.1	Throughout (as required)	The site-specific AMS and Tree Protection Plan produced during the detailed design stage will be implemented as soon as works begin on-site.	Construction
LV4	18.5.1	Throughout (as required)	As far is reasonably practicable, all cable installation works, particularly in the existing road surfaces will adhere to Volume 4 of the Guidance for The Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees is a widely adopted document within the utilities sector (National Joint Utilities Group (NJUG) 2007).	Construction
LV5	18.5.1	Throughout (as required)	The Project Arboriculturalist will be retained to advise and resolve any unforeseen tree related issue which might occur during the Construction Phase and to provide general tree related advice.	Construction
LV6	18.5.1	Throughout (as required)	On-site monitoring will be undertaken at agreed intervals before and during the Construction Phase (this will be achieved through a combined effort between the ESB and the appointed contractor) to ensure protection measures and the site-specific AMS produced during the detailed design stage are being implemented correctly.	Pre-Construction / Construction
LV7	18.5.1	Throughout (as required)	Once construction is complete, the road surface / agricultural grassland will be reinstated along the proposed underground cable route for all temporary works areas.	Construction
LV8	18.5.1	Throughout (as required)	Hedgerows removed for temporary works within the Planning Application Boundary will be replanted with a new species-rich hedgerow which is estimated to reach similar maturity in 30 years and is likely to be more ecologically diverse than what was removed.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
LV9	18.5.1	Throughout (as required)	Where applicable, vegetation removed during the Construction Phase at temporary Passing Bays will be reinstated along the original alignment and will also be replanted with species-rich hedgerows, albeit immediately above the proposed underground cable route will remain absent of woody species to aid periodic maintenance.	Construction
LV10	18.5.1	Throughout (as required)	The avoidance measures outlined in the Generic Arboricultural Method Statement (refer to Appendix C of Appendix A18.2 in Volume 3 of this EIAR) will be adopted in full and will help limit the impacts on the landscape and for visual receptors.	Construction

21.18 Risk of Major Accidents and / or Disasters Mitigation and Monitoring Measures

Table 21.16: Risk of Major Accidents and / or Disasters Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
N/A	N/A	N/A	No additional mitigation or monitoring measures are considered necessary beyond those already identified in other environmental assessments and the CEMP and its associated appendices (which are included as standalone documents in the planning application pack).	N/A

21.19 Cumulative Impacts and Environmental Interactions Mitigation and Monitoring Measures

Table 21.17: Cumulative Impacts and Environmental Interactions Mitigation and Monitoring Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
CIEI1	20.4	Overlaps with the CP0966 Development in the vicinity of Woodland Substation / Woodland Corridor	The following mitigation measures will be implemented in the event that Construction Phases for the Proposed Development and the CP0966 Kildare Meath Grid Upgrade (Planning Ref No. 316372) occur at the same time, due to the spatial overlap between the two developments in the 'Woodland Corridor' (refer to Figure 20.2 in Volume 4 of the EIAR), which extends from Woodland Substation southwards to the R156 Regional Road: • Air Quality: Liaison meetings with the CP0966 construction management team / appointed contractor will be held to ensure plans in the Woodland Corridor are coordinated, in order to reduce cumulative dust and particulate matter emissions. As part of this liaison process, the appointed contractors will be required to determine the interactions of the offsite transport / deliveries which might be using the same strategic road network routes; • Hydrology: Given the proximity of the two development crossings of the Dunboyne Stream_010 water body, coordination of the construction programmes for the two developments will be required between the respective appointed contractors to ensure that, where possible, works to cross the water body are undertaken at the same time, and as such, minimising disruption; • Traffic: Coordination of the construction programmes for the two developments will be required to ensure that there are no conflicting road closures from either development at the same time; • Traffic: Cumulative construction traffic will also be timed to avoid peaks in construction programmes, where possible; and • Material Assets: Coordination / consultation between the appointed contractors for the two developments will be required in the event that there are overlapping works within the Woodland Corridor area. Any future utility work identified as being required during the Construction Phase will be undertaken in consultation with the relevant utility companies.	Pre-Construction / Construction

21.20 References

BSI (2014a). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise

BSI (2014b). BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration

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Murnane et al. (2006a). CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide

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NRA (2006a). Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes

NRA (2006b). Guidelines for the Treatment of Badgers during the Construction of National Road Schemes

NRA (2008b). Guidelines for the Treatment of Otters

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes

NRA (2010). Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads

Teagasc (2020). How to plant a hedge. Available online at https://www.teagasc.ie/news--events/daily/environment/how-to-plant-a-hedge.php

TII (2013a). Specification for Road Works Series 600 – Earthworks (CC-SPW-00600)

TII (2013b). Works Series 800 – Unbound and Cement Bound Mixtures (CC-SPW-00800)

TII (2015). Road Pavements – Bituminous Materials (CC-SPW-00900)

TII (2023). The Use of Road Tar in Ireland and Research Treatment Protocols

<u>Directives and Legislation</u>

Arterial Drainage Act 1945 and 1995 (as amended)

National Monuments Acts 1930–2004 (as amended)

Number 10 of 1996 - Waste Management Act, 1996 (as amended)

Number 39 of 1976 – Wildlife Act, 1976 (as amended)

S.I. No. 113/2022 - (European Union (Good Agricultural Practice for Protection of Waters) (Amended Regulations).

Water Pollution Acts 1977 and 1990 (as amended)

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 22 – Summary of Significant Residual Impacts

EirGrid

March 2024

Contents

22. Summary of Significant Residual Impacts

This Chapter summarises the likely potential significant residual impacts, which may result from the Construction and Operational Phases of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). Please refer to Chapter 5 to Chapter 20 in Volume 2 of this Environmental Impact Assessment Report (EIAR) for full assessments and residual impacts.

Residual impacts are the final or intended impacts which occur after the proposed mitigation measures have been implemented. They refer to the degree or change that will occur after the proposed mitigation measures have taken effect. Significant residual impacts are those remaining impacts assessed as Significant or higher, unless otherwise stated in Table 22.1. All other residual impacts are detailed within Chapter 5 to Chapter 20 in Volume 2 of this EIAR.

Table 22.1 presents the residual impact significance, following the implementation of mitigation measures that are set out in Chapter 5 to Chapter 20 in Volume 2 of this EIAR, and summarised in Chapter 21 (Summary of Mitigation and Monitoring Measures).

The terminology used in this Chapter to describe the residual impact significance reflects the assessment terminology and guidelines used within Chapter 5 to Chapter 20 in Volume 2 of this EIAR. While the terminology in the Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) is predominantly used, some chapters use discipline specific guidelines, and this terminology is presented within this Chapter to maintain consistency with the assessments undertaken in Chapter 5 to Chapter 20.

Table 22.1: Summary of Significant Residual Impacts from the Construction and Operational Phases of the Proposed Development

EIAR Chapter	Residual Impact Description	Impact Significance (Pre-Mitigation)	Residual Impact Significance (Post-Mitigation)
Chapter 5 (Population)	**Construction and Operational Phases**		
	No significant residual impacts are predicted as a result of the Construction Phase or Operational Phase of the Proposed Development.		
Chapter 6 (Human Health)	**Construction and Operational Phases**		
	No significant residual impacts are predicted as a result of the Construction Phase or Operational Phase of the Proposed Development.		
Chapter 7 (Air Quality)	**Construction and Operational Phases**		
	No significant residual impacts are predicted as a result of the Construction Phase or Operational Phase of the Proposed Development.		
Chapter 8 (Climate)	**Construction and Operational Phases**		
	No significant residual impacts are predicted as a result of the Construction Phase or Operational Phase of the Proposed Development.		
Chapter 9 (Noise and Vibration)	**Construction Phase**		
	Noise impacts as a result of traffic on proposed diversion routes 1.2, 1.14,1.16 and 1.24.	Adverse, Significant and Temporary.	Adverse, Significant and Temporary.
	Noise impacts as a result of traffic on proposed diversion routes 1.6, 1.18, 1.20, 1.21 and 1.23.	Adverse, Moderate to Significant and Temporary	Adverse, Moderate to Significant and Temporary
	Operational Phase		
	No significant residual impacts are predicted as a result of the Operational Phase of the Proposed Development.		
Chapter 10 (Biodiversity)	**Construction Phase**		
	Habitat loss (temporary and permanent) and habitat degradation – surface water quality on Drainage ditches (FW4) Fossitt habitat type.	Local Level.	Local Level.
	Habitat loss (temporary and permanent) and on Dry calcareous grassland (GS1) Fossitt habitat type.	Local Level.	Local Level.
	Habitat loss (temporary and permanent) and fragmentation on Dry meadows and grassy verges (GS2) Fossitt habitat type.	Local Level.	Local Level.
	Habitat loss (temporary and permanent) fragmentation and degradation on Wet grassland (GS4) Fossitt habitat type.	Local Level.	Local Level.
	Habitat loss (temporary and permanent) and fragmentation on (Mixed) broadleaved woodland (WD1) Fossitt habitat type.	Local Level.	Local Level.
	Habitat loss (temporary and permanent) and fragmentation on Hedgerows (WL1) species rich Fossitt habitat type.	County Level.	Local to County Level.
	Habitat loss (temporary and permanent) and fragmentation on Hedgerows (WL1) species poor Fossitt habitat type.	County Level.	Local Level.

EIAR Chapter	Residual Impact Description	Impact Significance (Pre-Mitigation)	Residual Impact Significance (Post-Mitigation)
	Habitat loss (temporary and permanent) and fragmentation on Treeline (WL2) Fossitt habitat type.	County Level.	Local to County Level.
	Habitat loss (temporary and permanent) and fragmentation on Scrub (WS1) Fossitt habitat type.	Local Level.	Local Level.
	Habitat loss (temporary and permanent) and fragmentation on Immature woodland (WS2) Fossitt habitat type.	Local Level.	Local Level.
	Operational Phase		
	No significant residual impacts are predicted as a result of the Operational Phase of the Proposed Development.		
Chapter 11 (Soils, Geology and Hydrogeology)	**Construction and Operational Phases**		
	No significant residual impacts are predicted as a result of the Construction Phase or Operational Phase of the Proposed Development.		
Chapter 12 (Hydrology)	**Construction and Operational Phases**		
	No significant residual impacts are predicted as a result of the Construction Phase or Operational Phase of the Proposed Development.		
Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage	**Construction Phase**		
	Removal of AY_47 (a Recorded Monument) required during the Construction Phase.	Negative, Moderate and Permanent.	Negative, Moderate and Permanent.
	Operational Phase		
	No significant residual impacts are predicted as a result of the Operational Phase of the Proposed Development.		
Chapter 14 (Traffic and Transport)	**Construction Phase**		
	Delay to vehicles users caused by road closures requiring the use of proposed diversion routes 1.02, 1.07, 1.09 and 1.12.	Significant and Temporary.	Significant and Temporary.
	Operational Phase		
	No significant residual impacts are predicted as a result of the Operational Phase of the Proposed Development.		
Chapter 15 (Agronomy and Equine)	**Construction and Operational Phases**		
	No significant residual impacts are predicted as a result of the Construction Phase or Operational Phase of the Proposed Development.		
Chapter 16 (Waste)	**Construction and Operational Phases**		
	No significant residual impacts are predicted as a result of the Construction Phase or Operational Phase of the Proposed Development.		
Chapter 17 (Material Assets)	**Construction Phase**		
	No significant residual impacts are predicted as a result of the Construction Phase of the Proposed Development.		
	Operational Phase		
	Increased electricity infrastructure in the region.	Positive, Significant and Long-Term.	Positive, Significant and Long-Term.

EIAR Chapter	Residual Impact Description	Impact Significance (Pre-Mitigation)	Residual Impact Significance (Post-Mitigation)
Chapter 18 (Landscape and Visual)	**Construction and Operational Phases**		
	No significant residual impacts are predicted as a result of the Construction Phase or Operational Phase of the Proposed Development.		
Chapter 19 (Risk of Major Accidents and / or Disasters)	**Construction and Operational Phases**		
	No significant residual impacts are predicted as a result of the Construction Phase or Operational Phase of the Proposed Development.		
Chapter 20 (Cumulative Impacts and Environmental Interactions)	**Construction Phase**		
	Cumulative biodiversity impact as a result of the removal of calcareous / natural grassland habitat at Belcamp Substation as a result of the Proposed Development and the CP1213 Belcamp 220kV Extension (Planning Ref No. F23A/0040).	Negative, Significant, and Long-Term	Negative, Significant, and Medium-Term
	Operational Phase		
	Cumulative archaeological, architectural and cultural heritage impact on DL_05 (Designed Landscape) due to the presence of the Montague Ventures Limited development (Planning Ref No. 309833 / FW21A/0003), the Glenveagh Homes Limited development (Planning Ref No. 312271), and the Glenveagh Homes Ltd development (Planning Ref No. FW21A/0042), and the permanent access tracks and Joint Bays for the Proposed Development, within the demesne.	Negative, Moderate and Permanent.	Negative, Moderate and Permanent.
	Cumulative land take agronomy impact on land parcel Ref No. 39 as a result of the Proposed Development and the Greater Dublin Drainage Project (Planning Ref No. 312131).	Negative, Profound and Permanent	Negative, Profound and Permanent
	Cumulative land take agronomy impact on land parcel Ref No. 40 as a result of the Proposed Development and the Greater Dublin Drainage Project (Planning Ref No. 312131) and the CP1213 Belcamp 220kV Extension (Planning Ref No. F23A/0040).	Negative, Significant and Permanent	Negative, Significant and Permanent
	Cumulative material assets impact on the regional electricity network once the Proposed Development and each of the following developments are operational: CP0466 North South Interconnector EirGrid development (Planning Ref No. PCI0001), CP0966 Kildare Meath Upgrade EirGrid development (Planning Ref No. 316372), Mayne Stability Limited development (Planning Ref No. F21A/0681 / 3041/22), ESB Engineering & Major Projects development (Macetown / Corduff underground cable) (Planning Ref No. FW19A/0177), CP1213 Belcamp 220kV Extension (Planning Ref No. F23A/0040), ESB	Positive, Significant and Long-Term	Positive, Significant and Long-Term

EIAR Chapter	Residual Impact Description	Impact Significance (Pre-Mitigation)	Residual Impact Significance (Post-Mitigation)
	development at Darndale (Planning Ref No. 4367/19), and CP1194 EirGrid Station Redevelopment (Planning Ref No. 221550) are operational.		

22.1 References

EPA (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports