Gas to Bord na Móna, Edenderry

Environmental Impact Assessment Report

Volume 1 – Non-Technical Summary

CLIENT

Gas Networks Ireland

DATE

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Volume 1: Non-Technical Summary

1. INTRODUCTION

This non-technical summary of the Environmental Impact Assessment Report (EIAR) has been prepared in respect of the Proposed Development that encompasses the construction, commissioning, and operation of a c. 23.65 kilometre- (km), 300-millimetre (mm) nominal bore (NB) underground steel gas transmission pipeline with a maximum operating pressure of 85 barg (the GNI 143 Ballykilleen Pipeline). The Proposed Development also includes associated ancillary fibre ducting, new offtake installation comprising a hot tap tie in location (the Kilwarden Offtake Installation) located in the townland of Kilwarden, Co. Meath, and new Above Ground Installation (the Ballykilleen AGI) located in the Edenderry Renewable Energy Complex located in Kilcumber, Co. Offaly. These elements collectively constitute the Proposed Development that is the subject of this EIAR.

The Proposed Development site comprises a linear pipeline route (including associated construction works compounds) over an area approximately 243.4 hectares (ha) that traverses counties Meath and Offaly and the following townlands: Aghnagillagh, Ardnamullan, Ballyboggan, Ballynakill, Castlejordan, Clongall, Harristown, Kilwarden, Park, and Ticroghan (Co. Meath); and Ballykilleen, Clonmore, Drumcooly, Esker More, Lenamarran, Monasteroris, Mountwilson, Rathgreedan, Rathmore, Roosk, Shean, and Thornwell (Co. Offaly) (hereinafter referred to as the 'Site' or 'Proposed Development Site'). The location of the Proposed Development is shown in Figure 1-1 and Figure 1-2.

The purpose of the proposed GNI 143 Ballykilleen Pipeline is to connect from the existing 750mm NB BGE77 pipeline (also known as Pipeline to the West (PTTW)) to the Edenderry Renewable Energy Complex. The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants within the Edenderry Renewable Energy Complex from their current singlefuel operation (liquid fuel, primarily hydrotreated vegetable oil (HVO)) to dualfuel operation, with natural gas as the primary fuel and HVO retained as backup. The Edenderry Power Station is required to operate in accordance with its Industrial Emissions (IE) Licence, reference P048204.

This EIAR is prepared in support of 2 no. individual applications being made (1) to Commission for Regulation of Utilities (CRU) under Section 39A[1] of the Gas Act 1976, as amended, and (2) An Coimisiún Pleanála (ACP) as a Strategic Infrastructure Development (SID) application under Section 182C(1) the Planning and Development Act 2000, as amended. The 2 no. applications being made are broadly summarised as follows:

1. Application to the Commission for Regulation of Utilities (CRU):

The consent application relates solely to the underground GNI143 Ballykilleen Pipeline elements only. This consists of the connection to the existing BGE77 pipeline via a hot tap connection at the Kilwarden Offtake Installation and the GNI143 Ballykilleen Pipeline cross-country transmission pipeline terminating at the proposed Ballykilleen AGI.

2. Strategic Infrastructure Development (SID) application to An Coimisiún Pleanála (ACP):

This application encompasses the entire Proposed Development, including the GNI 143 Ballykilleen Pipeline, associated ancillary fibre ducting, Kilwarden Offtake Installation, the Ballykilleen AGI, and all associated works.

[1] Under Section 39A of the Gas Act 1976, as amended, any entity who wishes to construct such a pipeline must obtain a Section 39A Consent from the CRU. Processing a Section 39A Consent application involves assessing the applicant's financial and technical abilities to successfully and safely deliver the pipeline, as well as determining whether the pipeline project is likely to have any significant environmental impacts.

The EIAR is a comprehensive document that assesses the potential environmental impacts of the Proposed Development and provides measures for mitigating these impacts. It is intended to be used by decision-makers, stakeholders, and the public to inform their understanding of the Proposed Development and its potential environmental impacts.

Therefore, it is important that the EIA Report be read in conjunction with all application documentation, which includes all the necessary information on the Proposed Development, including technical specifications, plans, and other relevant documents. This will ensure that the reader has a comprehensive understanding of the Proposed Development and its potential environmental impacts and is able to make informed decisions based on the information provided.

The primary purpose of the Proposed Development is to enable a reduction in greenhouse gas (GHG) emissions associated with the operation of the existing Cushaling Peaker Plant. At present, the plant relies solely on liquid fuel when operating. Providing a natural gas supply will allow the plant to operate in a dualfuel configuration, with natural gas as the primary fuel and liquid fuel retained as a backup.

The dualfuel arrangement provides additional operational flexibility and security of supply, enabling the plant to continue fulfilling its critical role in supplying balancing and peaking capacity to the national electricity system.

The proposed underground gas transmission pipeline and associated infrastructure will be owned and operated by Gas Networks Ireland (GNI) (the Applicant).

Figure 1-1 Proposed Development Site Location National Reference

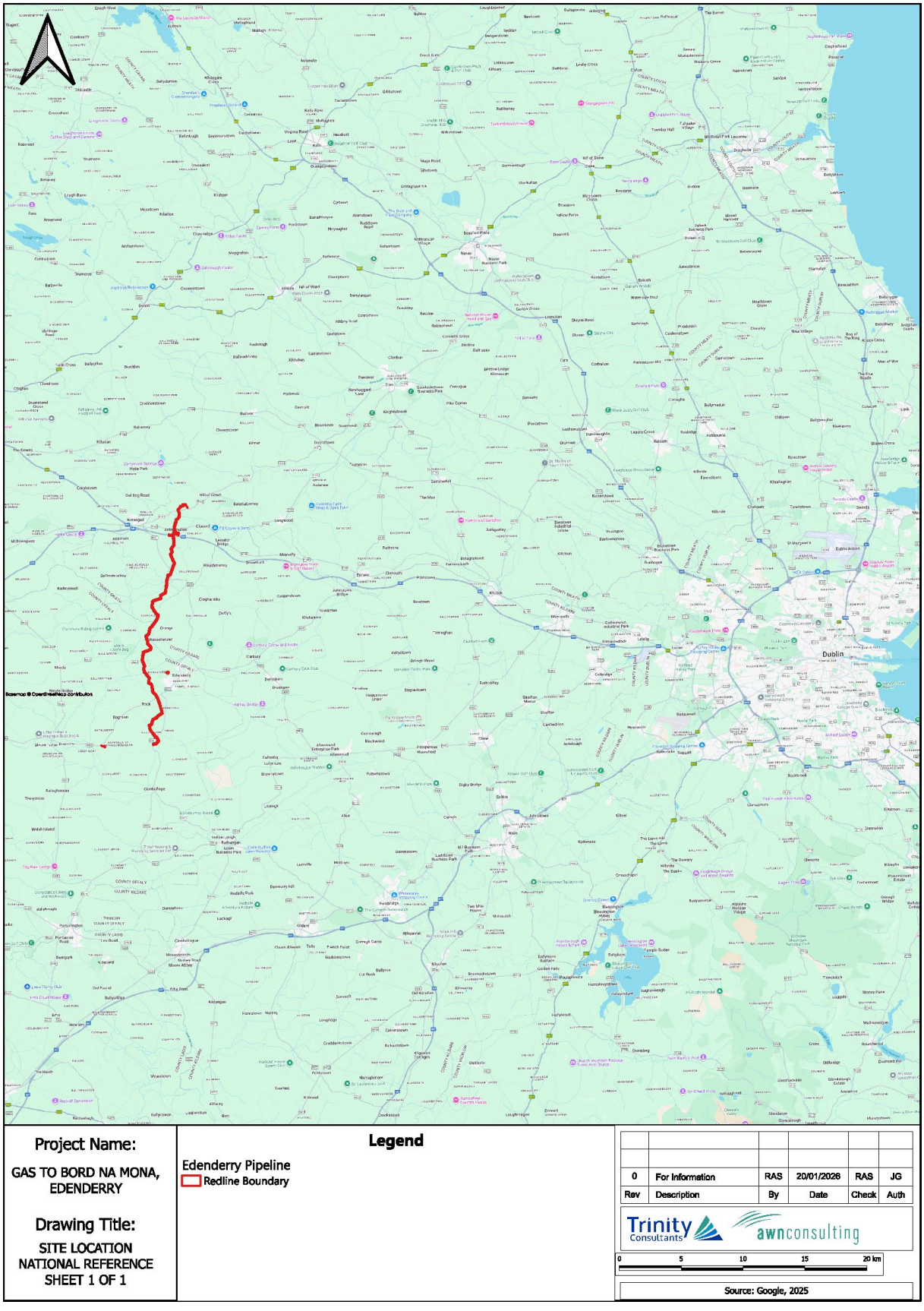
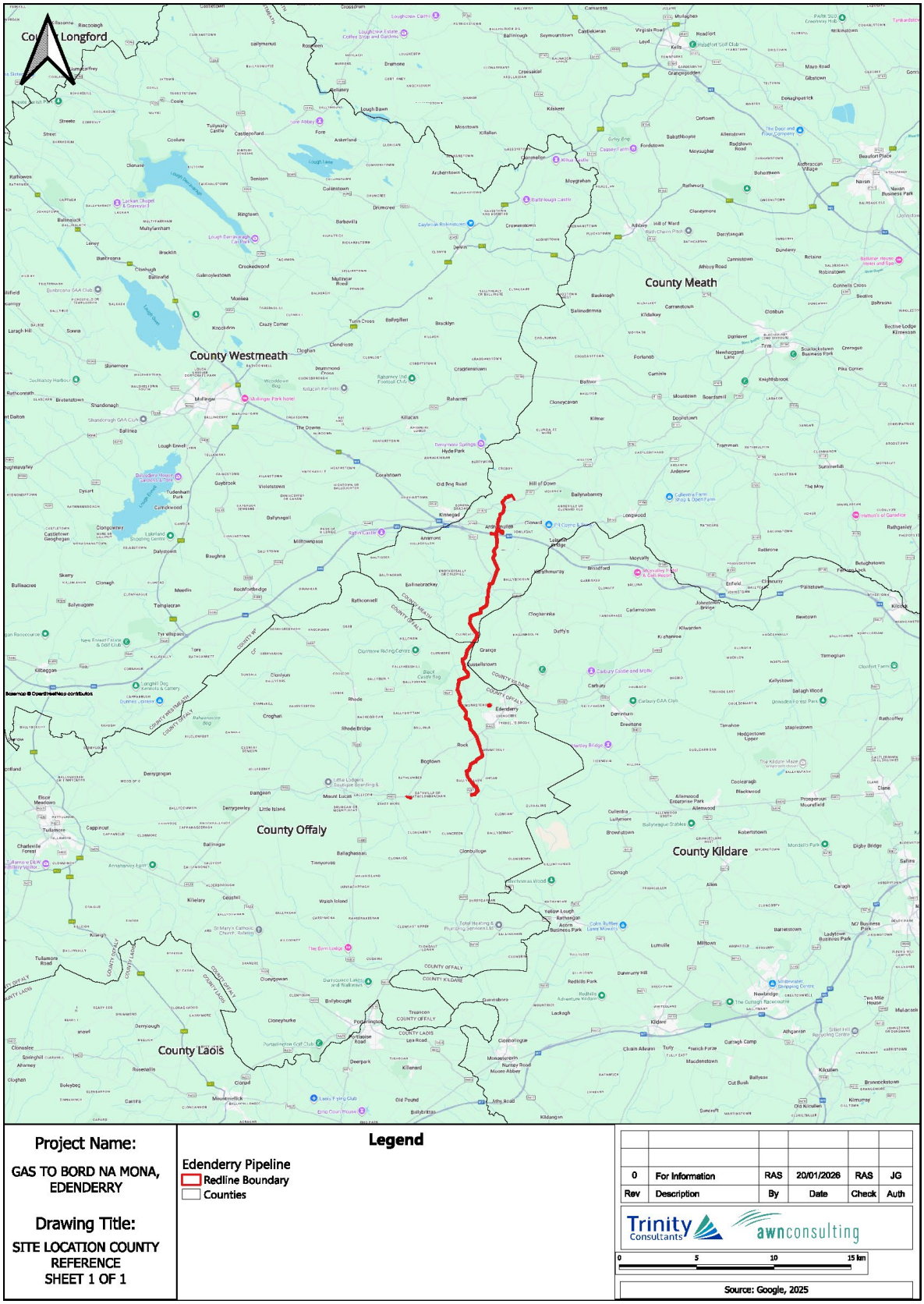


Figure 1-2 Proposed Development Site Location County Reference



1.1 Relevant Legislative Requirement for Environmental Impact Assessment

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

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

1.1.1 EIA Project Thresholds

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

Ireland's type of projects for which an EIA is mandatory are set out in Schedule 5, Part 1 and Part 2 of the Regulations. The EPA Guidance (2022) requires an assessment beyond the general description of the project and a consideration of the component parts of the project and/or any processes arising from it.

In considering the wider context and the component parts of the Proposed Development AWN have identified the thresholds of relevance to the proposal from Part 1 and Part 2 of Schedule 5; outlined in Table 1-1.

Table 1-1 Relevant Schedule 5 Part 1 types or classes of development and requirement for EIA

Development for the Purposes of Class:	Related Development Details	Requirement for EIA
16. Pipelines with a diameter of more than 800mm and a length of more than 40km: for the transport of gas, oil, chemicals, and, for the transport of carbon dioxide (CO2) streams for the purposes of geological storage, including associated booster stations.	The Proposed Development comprises a gas transmission pipeline with a nominal bore of 300 mm and an overall length of approximately 23.65 km . As such, it does not exceed the thresholds of a pipeline diameter greater than 800 mm or a length greater than 40 km.	No - EIA is not mandatory under this class for the Proposed Development.

Table 1-2 Relevant Schedule 5 Part 2 types or classes of development and requirement for EIA

Development for the Purposes of Class:	Related Development Details	Requirement for EIA
10 (i). Oil and gas pipeline installations and pipelines for the transport of CO_2 streams for the purposes of geological storage (projects not included in Part 1 of this Schedule).	The Proposed Development is of a type listed as Part 2, Class 10(i).	The Proposed Development falls within Part 2, Class 10(i) as it comprises the installation of a natural gas transmission pipeline. While the project is of a listed class, it is sub-threshold, because no quantitative threshold applies to Class 10(i). This means that EIA is not automatically mandatory, but instead the project requires EIA Screening. In accordance with Section 40A(b) of the Gas Act, the competent authority (CRU) must undertake an EIA Screening to determine whether the project is likely to give rise to significant environmental effects.
15. Any project listed in this Part which does not exceed a quantity, area or other limit specified in this Part in respect of the relevant class of development but which would be likely to have significant effects on the environment, having regard to the criteria set out in Schedule 7.	The Proposed Development is: of a type listed under Part 2, Class 10(i); does not exceed any applicable threshold (as none are defined for this class); therefore must therefore be considered under Class 15, which requires EIA if the development is likely to have significant environmental effects when assessed against the Schedule 7 criteria.	Following examination of: the nature, scale and location of the Proposed Development; and the sensitivity of environmental receptors it is considered by AWN that the Proposed Development requires an EIAR, even though it is sub-threshold, because a full EIA is necessary to appropriately assess the potential for significant direct, indirect and cumulative environmental effects.

1.2 Format Of This Environmental Impact Assessment Report

1.2.1 EIAR Main Structure

This EIAR has been laid out using the grouped format structure, the report examines each environmental factor in a separate chapter (the chapters are listed in Table 1-3). These EIAR chapters have been prepared by suitably qualified expert(s) and have considered the construction and operational phases of the Proposed Development under the following headings:

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

Interactions between environmental factors are addressed separately in Chapter 16 of this EIAR. While the EIAR focus on the Proposed Development, each environmental specialist also considers the potential cumulative impact (as far as practically possible) of the Proposed Development with the any future development and the cumulative impacts with developments in the locality (including planned and permitted developments). The assessment of cumulative impacts arising from the Proposed Development, in combination with other permitted or Proposed Developments, are addressed in Chapter 17

Table 1-3 EIA Report Structure

EIAR Volume	Section / Chapter Title
Volume 1	Non-Technical Summary
Volume 2	Chapter 1: Introduction to the Environmental Impact Assessment Report
	Chapter 2: Description of the Proposed Development
	Chapter 3: Alternatives
	Chapter 4: Population and Human Health
	Chapter 5: Land, Soils, and Geology
	Chapter 6: Hydrology and Hydrogeology
	Chapter 7: Biodiversity
	Chapter 8: Air Quality
	Chapter 9: Climate
	Chapter 10: Noise and Vibration
	Chapter 11: Landscape and Visual
	Chapter 12: Archaeological, Architectural and Cultural Heritage
	Chapter 13: Material Assets – Traffic and Transportation
	Chapter 14: Material Assets – Utilities
	Chapter 15: Material Assets – Waste
	Chapter 16: Interactions – Interrelationship between the Aspects
	Chapter 17: Cumulative Impact
Volume 3	EIAR Chapter Appendix
Volume 4	EIAR Figures

1.2.2 EIA Scoping and Consultation Processes

The scope of the EIAR has been defined at an early stage of the design process to ensure that all relevant environmental issues were addressed in the subsequent studies.

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

The EIAR has been structured so that information is clearly presented and accessible to both technical specialists and nontechnical readers. Each environmental topic is addressed in a dedicated chapter, and a Non-Technical Summary has been prepared to provide a concise overview of the Proposed Development, the assessment process, and the key findings.

Public participation is an important part of the Environmental Impact Assessment process. The EIAR will be made available to the public through the statutory planning application process, including online publication on the websites of the relevant authorities. This allows members of the public and interested organisations the opportunity to review the information and submit comments or observations before a decision is made on the Proposed Development.

In addition to statutory public consultation, early non-statutory consultation was undertaken with key stakeholders. This included engagement with organisations responsible for fisheries, waterways, and nature conservation, to identify potential environmental concerns at an early stage. Feedback received from these bodies helped to inform the project design and assessment approach.

A programme of public and landowner engagement was also carried out during the project development phase. This included public information meetings and one-to-one meetings with landowners along the proposed pipeline route. These consultations provided opportunities for affected parties to learn about the Proposed Development, ask questions, and provide feedback.

1.2.3 Contributors to the EIA Report

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

1.3 Additional Assessments Required

The additional reports and/or assessments required under legislation or EU Directives other than the Environmental Impact Assessment Directive in respect of the Proposed Development are described below.

- The Water Framework Directive Screening Assessment has been prepared for the Proposed Development by AWN Consulting and is included with the application documentation under separate cover.
- The Appropriate Assessment Screening and Natura Impact Statement has been prepared for the Proposed Development by Altemar Environmental Consultants and is included with the application documentation under separate cover.
- The Site-Specific Flood Risk Assessment (FRA) has been prepared by JBA Consulting in accordance with the Planning System and Flood Risk Management Guidelines for Local Government (2009). The site-specific FRA is included with the application documentation under separate cover.

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Introduction

Chapter 2 of the EIAR provides a description of the Proposed Development, including details of the site location, design, scale, and key features. The scope of Chapter 2 of the EIAR aligns with the following relevant legislation and guidance:

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

In accordance with the EPA (2022) Guidelines, Chapter 2 of the EIAR summarises:

- Description of Construction;
- Description of Commissioning;
- Operation of the Project;
- Changes to the Project; and
- Description of Other Related Development(s).

Chapter 2 of the EIAR has been informed by the detailed project design and summarises the relevant aspects of the Proposed Development and its lifecycle as they relate to this EIAR. This description is not exhaustive, and as such the EIAR should be read in conjunction with full application package including the outline Construction Methodology (Appendix 2.1), the outline Construction Environmental Management Plan (Appendix 2.2), and planning drawings prepared by Fingleton White.

The description of the Proposed Development is described in terms of those environmental topics that will form the basis of the impact assessment process and the characteristics of the Proposed Development and potential effects. The technical assessments in this EIAR have been conducted using this description, and the full application package as a guide to the details of the development under consideration.

2.2 Description Of the Existing Development Site

The Proposed Development site and associated temporary working areas covers an area of approximately 243.4 hectares (ha) (the "Proposed Development Site") and encompasses all lands required for the construction and operation of the pipeline, including the Kilwarden Offtake Installation, the Ballykilleen AGI, temporary construction compounds, line-pipe storage areas, and all associated ancillary works.

The Proposed Development Site comprises the c. 23.65 km linear route of the underground GNI 143 Ballykilleen Pipeline and its temporary working areas.

The Proposed Development site is as shown in Figure 2-1. Further details on the specific characteristics of the site are provided in the subsequent sections of this EIAR.

Given the linear nature of the development, the pipeline has been divided into six sections solely for the purposes of describing the Proposed Development within this EIAR. These sections have been defined on a practical basis, using intervals and identifiable landmark features or crossings

along the route. The segmentation does not reflect any environmental or construction rationale, it provides a structure for presenting information of the Proposed Development. Where relevant, this framework also assists in focusing the environmental assessment on specific localised elements of the route. The six sections, defined by key crossing points and chainages along the proposed alignment, are outlined in Table 2-1.

In addition to the linear pipeline route, the Proposed Development includes a range of temporary construction infrastructure within the overall red line boundary. This comprises five Temporary Construction Compounds, a series of temporary laydown areas (Type A and Type B), temporary construction access points, and a temporary construction haul road or 'running track' extending along the pipeline route. For further details see Section 2.4.4 of Chapter 2.

Table 2-1 Structured Sections to describe the Proposed Development

Pipeline Section	Start Point (m)	End Point (m)	Length (m)
Pipeline Section 1: Kilwarden Offtake Installation to the L40181 Road (RDX05)	0	3,931	3,931
Pipeline Section 2: L40181 Road (RDX05) to the L4091 (RDX09)	3,931	7,441	3,510
Pipeline Section 3: L4091 Road (RDX09) to the Yellow River (RVX02)	7,441	11,669	4,228
Pipeline Section 4: Yellow River (RVX02) to the R441 (RDX12)	11,669	15,348	3,679
Pipeline Section 5: R441 (RDX12) to the L5003 (RDX15)	15,348	19,494	4,146
Pipeline Section 6: L5003 (RDX15) to the Ballykilleen AGI	19,494	23,650	4,156
GNI 143 Ballykilleen Pipeline	0	23,650	23,650

Figure 2-1 Site Location Overview

Project Name:

GAS TO BORD NA MONA, EDENDERRY

Drawing Title:

SITE LOCATION OVERVIEW PLAN SHEET 1 OF 1

Legend

Edenderry Pipeline

Redline Boundary

Rev	Description	By	Date	Check	Auth
0	For Information	RAS	17/04/2026	RAS	JG

Trinity Consultants awnconsulting

0 1 2 3 4 5 km

Source: Google, 2025

2.2.1 Existing Land Use and Site Context

The Proposed Development commences in County Meath, approximately 4 km east of Kinnegad and c. 1 km east of the Meath–Westmeath County boundary, in an agricultural field located c. 20 m south of Mount Hevey Bog Special Area of Conservation (SAC; Site Code 002342), and to the north of the R161. From this point, the pipeline routes southwards across rural farmland, crossing the M4 Motorway and remaining west of the River Boyne, which forms part of the Meath–Kildare County boundary in this area. As the route progresses into County Offaly, it passes to the west of Edenderry town (c. 1 km east at its closest point) before crossing the Grand Canal and continuing south to terminate within the Edenderry Renewable Energy Complex, c. 5 km south of Edenderry town.

Further detail on land use, landscape character and the site setting is provided in Section 2.2.1 of Chapter 2 of the EIAR.

2.2.2 Existing Site Utilities

Existing utilities along the Proposed Development site are limited and reflect the rural nature of much of the route. Within agricultural sections of the pipeline corridor, there are generally no public water supply, wastewater or stormwater networks.

Utilities are mainly concentrated at road crossings and include:

- Underground water mains, electricity and telecommunications services associated with public roads;
- Overhead electricity and telecommunications lines crossing or running parallel to sections of the route;
- Agricultural drainage systems and field drains.

At the Edenderry Renewable Energy Complex, established industrial utilities and drainage infrastructure are already in place. Surface water runoff from this site is managed through an existing drainage network.

The Proposed Development has been designed to accommodate these existing utilities, and no permanent disruption to services is anticipated.

Further detail is provided in Section 2.2.2 of Chapter 2 of the EIAR.

2.2.3 Existing Development Site and Risk of Major Accident / Disasters

The existing development site is not located within the consultation distance of any major accident hazard sites, such as Seveso (COMAH) establishments. The nearest notified Seveso site is located approximately 15 km from the pipeline route.

In terms of natural hazards:

- The risk of landslides along the route is generally low;
- Ireland is not subject to significant seismic or volcanic activity;
- Flood risk varies locally near rivers and watercourses and has been assessed separately as part of the Flood Risk Assessment has been undertaken by JBA Consulting.

The Proposed Development does not involve the storage of dangerous substances during normal operation and does not exceed thresholds under the Control of Major Accident Hazards (COMAH) Regulations.

A detailed assessment of accident and disaster risk, including gas related hazards and natural events, is provided in Section 2.2.3 of Chapter 2, with further assessment in relevant specialist EIAR chapters.

2.2.4 Industrial Emissions Licensed Facilities

According to the EPA (2026) there are 5 no. Industrial Emissions (IE) and Waste facilities within a 2 km radius of the overall development site:

- Bord na Móna (BnM) Cushaling Peaker Plant located within Edenderry Power Limited site (EPA Ref: P0482-04). The Proposed Development terminates at this Site.
- Rosderra Irish Meats Group Unlimited Company EPA Ref: (P0180-02
- Rosderra Farms Unlimited Company (EPA Ref: P0681-01)
- Clonbulloge Ash Repository (EPA Ref: W0049-02)
- Breedon Cement Ireland Limited (EPA Ref: P0487-07)

The Proposed Development itself comprises an underground gas pipeline, and offtake from an existing pipeline and a small above-ground installation on the Edenderry Power Limited site. It does not involve onsite combustion or industrial emissions along the pipeline route. Aside from the direct connection to the Edenderry Power Limited site, the Proposed Development does not alter the emissions profile or licensing requirements of other licenced sites listed above or otherwise. As a result, there is no direct operational interaction between the Proposed Development and other licensed facilities in the area.

The presence of these facilities is relevant mainly in terms of the existing land use context.

Further detail is provided in Section 2.2.4 of Chapter 2.

2.2.5 County Development Plans

The *Offaly County Development Plan 2021 - 2027* zoning designations have been reviewed. The Proposed Development site runs through agricultural land with no zoning designation.

As part of the Edenderry Local Area Plan 2023 – 2029 the *Edenderry Municipal District – Local Transport Plan* has been prepared to illustrate potential future transport development in and around the town of Edenderry. A potential route for a future "Inner / Outer relief route" located to the west of Edenderry is illustrated on this plan. A short section of the Proposed Development (Pipeline Section 5, see Section Pipeline Section 5: R441 Road (RDX12) to the L5003 Road (RDX15)below) coincides with this this relief route corridor. The shared corridor is less than 1 km in length located just north and south of the Grand Canal, between Chainage c. 17550 – 18500. For further information see Section 2.2.5.1 of Chapter 2.

The *Meath County Development Plan 2021 - 2027* zoning designations have been reviewed. The Proposed underground transmission gas pipeline runs through an area designated as 'Rural Area – RA'. The aim of this designation is 'to protect and promote in a balanced way, the development of agriculture, forestry and rural-related enterprise, biodiversity, the rural landscape, and the built and cultural heritage. Of note, 'Utility Structures' are a permitted use under this designation.

2.3 Characteristics of the Proposed Development

The GNI 143 Ballykilleen Pipeline comprises the establishment of a new underground gas transmission pipeline to supply natural gas to the Bord na Móna (BnM) Cushaling Peaker Plant. Once constructed, the underground transmission pipeline will be owned and operated by Gas Networks Ireland (GNI).

The pipeline will commence at a hottap tie-in with the existing 750 mm NB BGE77 Pipeline to the West (PTTW), where a live 'hot tap' connection will be established. From this point, the pipeline will extend southwards (underground) before terminating at the proposed Ballykilleen AGI located within the Edenderry Renewable Energy Complex.

A detailed description of the pipeline alignment, including specific locations and distances referenced by chainage, is provided in Sections 2.3.1.1 to 2.3.1.6 below.

2.3.1.1 Pipeline Section 1: Kilwarden Offtake Installation to L40181 Road (RDX05)

Pipeline Section 1 is located between the Kilwarden Offtake Installation (0 m) and L40181 road crossing (RDX05); and is c. 3.931 km in length. The route section and ancillary works is summarised in Table 2-2. Pipeline Section 1 is located within the townlands of Kilwarden, Aghnagilla, Ardnamullen and Ticrohan, County Meath.

Table 2-2 Pipeline Section 1: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 000 Tie-in point to existing BGE77	The proposed GNI 143 Ballykilleen Pipeline will connect to the designated tie-in point of the BGE77 within the townland of Kilwarden, County Meath. A Temporary Working Area is to be located at the Kilwarden Offtake Installation to facilitate construction.	N/A
Chainage 000 to 842	The pipeline will be routed west, then south-west across agricultural lands crossing existing hedgerows/treelines.	c. 842 m
Chainage 842 to 858 R161 Road Crossing (RDX01)	The pipeline will cross south across the R161 regional road.	c. 16 m
Chainage 858 to 1094	The pipeline will be routed south across agricultural lands crossing three hedgerows/treelines.	c. 236 m
Chainage 1094 to 1366 Kilwarden River Crossing (RVX01)	The pipeline will cross south across the Kilwarden River. The pipeline will be installed using trenchless crossing methods. The Kilwarden River marks the townland boundary between Kilwarden and Aghnagilla.	c. 272 m
Chainage 1366 to 1899	The pipeline will be routed south, southwest, then south following existing parallel to existing field boundaries.	c. 533 m
Chainage 1899 to 1902 Unnamed watercourse crossing (WCX01)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 3 m
Chainage 1902 to 2456	The pipeline will be routed south across agricultural lands crossing existing hedgerows/treelines.	c. 554 m
Chainage 2456 to 2521 R148 Road Crossing (RDX02) and L80217 Road Crossing (RDX03)	The pipeline crosses south perpendicular to the R148 and L80217 Roads. This crossing stretch passes the townland boundary between Aghnagilla and Ardnamullen. This is expected to be a single combined trenchless crossing of both roads. In addition to the pipeline, at this location the route includes an access point to the Temporary Construction Compound 02 via the L80217 (Ardnamullen Road).	c. 65 m
Chainage 2521 to 2919	The pipeline will be routed south across agricultural lands crossing existing hedgerows/treelines.	c. 398 m

Chainage 2919 to 3269 M4 Motorway Crossing (RDX04) and Aghnahillagh Stream crossing (WCX02)	The pipeline will be routed south under the entire M4 Motorway, this crossing is expected to include the Aghnahillagh Stream as a combined crossing. The pipeline is expected to be installed using open cut methods. In addition to the pipeline, at this location a temporary haulage road along the pipeline route will be established to the west of the M4 motorway crossing location utilising an existing overpass bridge.	c. 350 m
Chainage 3269 to 3919	The pipeline will be routed south across agricultural lands crossing existing hedgerows/treelines. This crossing stretch passes to townland boundary between Ardnamullen and Ticrohan.	c. 650 m
Chainage 3919 to 3931 L40181 Road Crossing (RDX05)	The pipeline will be routed south across the Ticrohan Road (L40181). The pipeline is expected to be installed using open cut methods.	c. 12 m

2.3.1.2 Pipeline Section 2: L40181 Road (RDX05) to the L4091 Road (RDX09)

Pipeline Section 2 of the pipeline is located between the L40181 road crossing (RDX05) and the L4091 road crossing (RDX09); and is c. 3.51 km in length. The route section and ancillary works is summarised in Table 2-3. Section 2 is located within the townlands of Ticroghan, Park, Ballyboggan, and Ballynakill, County Meath.

Table 2-3 Pipeline Section 2: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 3931 to 4892	The pipeline is routed south through agricultural lands crossing existing hedgerows and treelines. This pipeline stretch passes the townland boundary between Ticroghan and Park.	c. 961 m
Chainage 4892 to 4895 Unnamed watercourse crossing (WCX03)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 3 m
Chainage 4895 to 5143	The pipeline is routed south through agricultural lands crossing existing hedgerows and treelines.	c. 248 m
Chainage 5143 to 5158 L8022 Road Crossing (RDX06)	The pipeline is routed south across the Park Road (L8022). The pipeline is expected to be installed using open cut methods.. The pipeline crosses underneath an existing overhead telecom cable.	c. 15 m
Chainage 5158 to 6473	The pipeline is routed south parallel to Park Road (L8022) through agricultural lands crossing existing hedgerows and treelines.	c. 1,315 m
Chainage 6473 to 6497 R401 Road Crossing (RDX07)	The pipeline is routed south across the R401 road. The pipeline crosses underneath an underground telecom cable. The pipeline is expected to be installed using open cut methods.	c. 24 m
Chainage 6497 to 6663	The pipeline is routed southwest through agricultural lands. The pipeline crosses underneath an overhead electricity cable.	c. 166 m
Chainage 6663 to 6670 Unnamed Stream Crossing (WCX04)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 7 m

Chainage 6670 to 7132	The pipeline is routed south, crosses underneath and then runs parallel to an existing overhead electricity cable, through agricultural lands crossing existing hedgerows and treelines. This crossing stretch passes the townland boundary between Park and Ballyboggan.	c. 462 m
Chainage 7132 to 7148 L80241 Ballyboggan Road Crossing (RDX08)	The pipeline is routed south across the L80241 (Ballyboggan Road). The pipeline is expected to be installed using open cut methods.	c. 16 m
Chainage 7148 to 7300	The pipeline is routed south across an agricultural field.	c. 152m
Chainage 7300 to 7306 Unnamed Stream Crossing (WCX05)	Unnamed watercourse crossing. This crossing passes the townland boundary between Ballyboggan and Ballynakill. The pipeline is expected to be installed using open cut methods.	c. 6m
Chainage 7306 to 7421	The pipeline is routed south across an agricultural field crossing existing hedgerows and treelines.	c. 115m
Chainage 7421 to 7441 L4091 Road Crossing (RDX09)	The pipeline is routed south across the L4091 (Ballynakill Road). The pipeline crosses underneath an overhead telecom cable. The pipeline is expected to be installed using open cut methods.	c. 20m

2.3.1.3 Pipeline Section 3: L4091 Road (RDX09) to the Yellow River (RVX02)

Pipeline Section 3 of the pipeline is located between the L4091 road crossing (RDX09) and the Yellow River crossing (RVX02); and is 4.228 km in length. The route section and ancillary works is summarised in Table 2-4. Section 3 is located within the townlands of Ballynakill, Harristown, Castlejordan, and Clongall, County Meath.

Table 2-4 Pipeline Section 3: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 7441 to 7486	The pipeline is routed south across an agricultural field.	c. 45 m
Chainage 7486 to 7506 Unnamed Stream Crossing (WCX06)	Unnamed watercourse crossing.. This crossing passes the townland boundary between Ballynakill and Harristown. The pipeline is expected to be installed using open cut methods.	c. 20 m
Chainage 7506 to 8028	The pipeline is routed south across agricultural fields crossing existing hedgerows and treelines. The pipeline crosses underneath an overhead electricity cable.	c. 522 m
Chainage 8028 to 8033 Unnamed Stream Crossing (WCX07)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 8033 to 8813	The pipeline is routed southwest and south across agricultural fields, crossing existing hedgerows and treelines. The pipeline crosses underneath an overhead electricity cable.	c. 780 m
Chainage 8813 to 8818 Unnamed Stream Crossing (WCX08)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. The Proposed Development site boundary is at a distance of c. 350 m to the southeast of the River Boyne (County Meath-County Kildare border).	c. 5 m
Chainage 8818 to 9275	The pipeline is routed southwest across agricultural fields, crossing existing hedgerows and treelines.	c. 457 m
Chainage 9275 to 9281	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 6 m

Unnamed Stream Crossing (WCX09)		
Chainage 9281 to 9600	The pipeline is routed southwest across agricultural fields, crossing existing hedgerows and treelines.	c. 319 m
Chainage 9600 to 9607 Unnamed Stream Crossing (WCX10)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 7 m
Chainage 9607 to 10033	The pipeline is routed south across an agricultural field.	c. 457 m
Chainage 10033 to 10039 Unnamed Stream Crossing (WCX11)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. This crossing passes the townland boundary between Harristown and Castlejordan.	c. 6 m
Chainage 10039 to 10122	The pipeline is routed south across an agricultural field.	c. 83 m
Chainage 10122 to 10128 Unnamed Stream Crossing (WCX12)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. This crossing passes the townland boundary between Castlejordan and Clongall. 10,075	c. 6 m
Chainage 10128 to 11160	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines. This crossing passes within c. 150 m of the River Boyne (County Meath-County Kildare border).	c. 1032 m
Chainage 11160 to 11669 Yellow River Crossing (RVX02)	The pipeline is routed south across the Yellow River. The pipeline will be installed using trenchless crossing methods. The Yellow River marks the townland boundary between Clongall and Clonmore, and the county boundary between County Meath and County Offaly. The pipeline crosses beneath overhead electrical cables.	c. 509 m

2.3.1.4 Pipeline Section 4: Yellow River (RVX02) to the R441 Road (RDX12)

Pipeloine Section 4 of the pipeline is located between the Yellow River crossing (RVX02) and R441 road crossing (RDX12); and is 3.679 km in length. The route section and ancillary works is summarised in Table 2-5. Section 4 is located within the townlands of Clonmore, Roosk, Lenamarran, and Mountwilson, County Offaly.

Table 2-5 Pipeline Section 4: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 11669 to 12913	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines, within the townland of Clonmore. The pipeline crosses beneath existing overhead electricity cables.	c. 1244 m
Chainage 12913 to 12919 Unnamed Stream Crossing (WCX13)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 6 m
Chainage 12919 to 13120	The pipeline is routed south across an agricultural field.	c. 201 m
Chainage 13120 to 13128 Unnamed Stream Crossing (WCX14)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. This crossing passes the townland boundary from Clonmore to Roosk.	c. 8 m
Chainage 13128 to 13374	The pipeline is routed south across agricultural fields.	c. 246 m
Chainage 13374 to 13379 Unnamed Stream Crossing (WCX15)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m

Chainage 13379 to 14435	The pipeline is routed south and southwest across agricultural fields, crossing existing hedgerows and treelines.	c. 1056 m
Chainage 14435 to 14448 L1004 (Roosk) Road Crossing (RDX10)	The pipeline is routed south across the L1004 (Roosk) Road. The pipeline is expected to be installed using open cut methods. The pipeline crosses underneath overhead telecom cables, overhead electricity cables, and watermains. TThis crossing passes the townland boundary between Roosk and Lenamarran.	c. 13 m
Chainage 14448 to 14675	The pipeline is routed southwest across an agricultural field. The pipeline crosses underneath Overhead Electricity Cables. This pipeline stretch passes within 712m of the Black Castle Bog NHA at its nearest point.	c. 227 m
Chainage 14675 to 14683 Private Late Crossing (RDX11)	The pipeline is routed south across a private laneway. The pipeline is expected to be installed using open cut methods.	c. 8 m
Chainage 14683 to 14866	The pipeline is routed southwest across an agricultural field, crossing existing hedgerows and treelines.	c. 180 m
Chainage 14866 to 14876 Unnamed Stream Crossing (WCX16)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. This crossing passes the townland boundary between Lenamarran and Mountwilson.	c. 10 m
Chainage 14876 to 15329	The pipeline is routed southwest across agricultural fields, crossing existing hedgerows and treelines.	c. 453 m
Chainage 15329 to 15348 R441 Road Crossing (RDX12)	The pipeline is routed south across the R441 road, and crosses underground water mains. The pipeline is expected to be installed using open cut methods.	c. 19 m

2.3.1.5 Pipeline Section 5: R441 Road (RDX12) to the L5003 Road (RDX15)

Pipeline Section 5 of the pipeline is located between the R441 road crossing (RDX12) and L5003 road crossing (RDX15); and is 4.146 km in length. The route section and ancillary works is summarised in Table 2-6. Section 5 is located within the townlands of Mountwilson, Thornwell, Monasteroris, Rathmore, and Drumcooly, County Offally.

Table 2-6 Pipeline Section 5: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 15348 to 15540	The pipeline is routed southwest across an agricultural field. The pipeline crosses under overhead electricity cables.	c. 192 m
Chainage 15540 to 15546 Unnamed Stream Crossing (WCX17)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 6 m
Chainage 15546 to 16053	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines. The pipeline crosses under overhead electricity cables. This crossing stretch passes the townland boundary between Mountwilson and Thornwell.	c. 507 m
Chainage 16053 to 16056 Unnamed Stream Crossing (WCX18)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 3 m
Chainage 16056 to 16363	The pipeline is routed south across an agricultural field.	c. 307 m
Chainage 16363 to 16370 Unnamed Stream Crossing (WCX19)	Unnamed watercourse crossing. The pipeline will be installed using open cut methods. This crossing passes the townland boundary between Thornwell and Monasteroris.	c. 7 m
Chainage 16370 to 16702	The pipeline is routed southeast across an agricultural field.	c. 332 m
Chainage 16702 to 16711	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 9 m

Unnamed Stream Crossing (WCX20)		
Chainage 16711 to 16790	The pipeline is routed south across an agricultural field.	c. 79 m
Chainage 16790 to 16810 L5007 (Monasteroris Road) Crossing (RDX13)	The pipeline is routed south across the L5007 (Monasteroris) Road. The pipeline is expected to be installed using open cut methods. The pipeline crosses underneath an overhead telecom cable and crosses an underground watermain.	c. 20 m
Chainage 16810 to 16880	The pipeline is routed south across an agricultural field.	c. 70 m
Chainage 16880 to 16885 Unnamed Stream Crossing (WCX21)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 16885 to 17201	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines. This stretch is c. 2.6 km west of Edenderry town centre at its nearest point.	c. 316 m
Chainage 17201 to 17207 Unnamed Stream Crossing (WCX22)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 6 m
Chainage 17207 to 17994	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines. This crossing stretch is c. 2.5 km west of Edenderry town centre at its nearest point.	c. 787 m
Chainage 17994 to 18186 Grand Canal Crossing (WCX23)	The pipeline is routed south across the Grand Canal. The pipeline will be installed using trenchless methods. This crossing passes the townland boundary between Monasteroris and Rathmore, and passes through the Grand Canal pNHA.	c. 192 m
Chainage 18186 to 18730	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines.	c. 544 m
Chainage 18730 to 18756 R402 Road Crossing (RDX14)	The pipeline is routed south across the R402 Road. The pipeline is expected to be installed using open cut methods. The pipeline crosses underneath an overhead telecom cable. This crossing passes the townland boundary between Rathmore and Drumcooly.	c. 26 m
Chainage 18756 to 19485	The pipeline is routed south across agricultural fields, crossing existing hedgerows.	c. 729 m
Chainage 19485 to 19494 L5003 (Drumcooly) Road Crossing (RDX15)	The pipeline is routed south across the L5003 Road. The pipeline is expected to be installed using open cut methods. The pipeline crosses underneath overhead electricity cables.	c. 9 m

2.3.1.6 Pipeline Section 6: L5003 Road (RDX15) to the Ballykilleen AGI

Pipeline Section 6 of the pipeline is located between the L5003 road crossing (RDX15) and the Ballykilleen AGI; and is c. 4.156 km in length. The route section and ancillary works is summarised in Table 2-7. Section 6 is located within the townlands of Drumcooly, Rathgreedan, Ballykilleen, and Shean, County Offaly.

Table 2-7 Pipeline Section 6: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 19494 to 20520	The pipeline is routed south then southwest across agricultural fields, crossing existing hedgerows and treelines. This crossing stretch passes the townland boundary between Drumcooly and Rathgreedan.	c. 1026 m

Chainage 20520 to 20524 Unnamed Stream Crossing (WCX24)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. This crossing stretch passes the townland boundary between Rathgreedan and Ballykilleen.	c. 4 m
Chainage 20524 to 20676	The pipeline is routed south across an agricultural field.	c. 152 m
Chainage 20676 to 20682 Unnamed Stream Crossing (WCX25)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 6 m
Chainage 20682 to 21032	The pipeline is routed southwest across an agricultural field.	c. 350 m
Chainage 21032 to 21037 Unnamed Stream Crossing (WCX26)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 21037 to 22085	The pipeline is routed southwest and south across agricultural fields, crossing existing treelines and hedgerows. The pipeline crosses underneath an overhead telecom cable.	c. 1048 m
Chainage 22085 to 22095 Private Lane Crossing (RDX16)	The pipeline is routed south across a private laneway. The pipeline is expected to be installed using open cut methods.	c. 10 m
Chainage 22095 to 22457	The pipeline is routed south across an agricultural field. The pipeline crosses underneath an overhead electricity cable.	c. 362 m
Chainage 22457 to 24462 Unnamed Stream Crossing (WCX27)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 22462 to 22615	The pipeline is routed south across an agricultural field.	c. 153 m
Chainage 22615 to 22620 Unnamed Stream Crossing (WCX28)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 22620 to 22695	The pipeline is routed southeast across an agricultural field, crossing existing treelines and hedgerows.	c. 75 m
Chainage 22695 to 22815 Unnamed Stream (WCX29) and R401 Road Crossing (RDX17)	The pipeline is routed across an unnamed watercourse and the R41 Road. This is expected to be a single combined trenchless crossing of the watercourse and road. The pipeline crosses underneath overhead electricity and telecom cables. This crossing passes the townland boundary between Ballykileen and Shean.	c. 120 m
Chainage 22815 to 23149	The pipeline is routed southeast across an agricultural field. The pipeline crosses underneath overhead electricity cables.	c. 334 m
Chainage 23154 to 23154 Unnamed Watercourse Crossing (WCX30)	Unnamed watercourse crossing. The pipeline will be installed using open cut methods.	c. 5 m
Chainage 23154 to 23650	The pipeline is routed southwest into the Edenderry Renewable Energy Complex site. This crossing stretch passes the townland boundary between Shean and Ballykillen.	c. 496 m
Chainage 23650 (Ballykilleen AGI)	The pipeline will terminate at the proposed Ballykilleen AGI installation.	N/A

2.4 Description of Construction

The proposed works will primarily involve the installation of long sections of underground pipeline, generally laid within open-cut trenches at a nominal minimum depth of 1.2 metres. Excavation, backfilling, and reinstatement requirements will vary depending on whether works are undertaken within greenfield areas or within public roadways.

The underground pipeline construction methods anticipated for the Proposed Development include:

- Open Cut – Greenfield Areas

- Open Cut - Service Crossings
- Open Cut - Watercourse Crossings
- Open Cut - Road Crossings
- Trenchless - River/Watercourse/Road Crossings

In addition to the main pipeline works, the construction phase will also include the installation of the Kilwarden Offtake and the Ballykilleen Above Ground Installation (AGI).

2.4.1 Kilwarden Offtake Installation

The Kilwarden Offtake Installation involves construction of a hot-tap connection to the existing 750 NB BGE77 transmission pipeline within an agricultural field south of the R161.

Hot Tapping allows a connection to an existing pipeline to be completed while the line is fully operational, ensuring no shutdown is required and that no gas is lost from the pipe. The valve arrangement will allow for safe welding of the new transmission gas pipeline to the existing gas pipeline by controlling gas flow during installation.

For further details see Section 2.4.1 of Chapter 2.

2.4.2 Pipeline Construction

Construction methodologies to be implemented and materials to be used will ensure that the pipeline is installed in accordance with the guidelines and standards of GNI. See further detail presented in Appendix 2.1 of Chapter 2 of this EIAR, including sequencing of works and diagrams.

The proposed works primarily involve the installation of long sections of conventional pipeline, laid in open-cut trenches, with the pipeline installed at a minimum depth of cover of 1.2 metres, traversing multiple agricultural fields (greenfield lands). The majority (c. 22 km) of the GNI 143 Ballykilleen Pipeline will be constructed using this methodology outlined in Section 2.4.2.1 of Chapter 2: Open Cut – Greenfield Area.

Trenchless crossing techniques for pipeline construction will be required at the Kilwarden River (RVX01), the Yellow River (RVX02), the M4 Motorway (RDX04), and the Grand Canal (WCX23). It is also anticipated that 4 no. other regional roads will use trenchless construction techniques, however this is to be confirmed during the construction phase by the appointed contactor who may decide to use open-cut methods.

Special crossings are undertaken at roads, rivers/watercourses and utilities, however most of the pipeline will be lain in greenfield areas.

For the remaining roads and watercourses, the proposed approach shall be to use open-cut crossing methods. However, it is important to note that this is only the current proposed construction methodology, and the contractor may opt for trenchless construction techniques if deemed more suitable. Trenchless installation may prove to be less intrusive and, in some cases, more efficient from a constructability perspective. The final selection for the crossing construction methodology of these specific crossings will be at the discretion of the contractor, based on site-specific conditions and assessments.

For further details please see Section 2.4.2 of Chapter 2.

2.4.3 Ballykilleen Above Ground Installation

The Ballykilleen AGI will be constructed within the Edenderry Renewable Energy Complex, an established industrial setting that already accommodates energy related infrastructure.

Construction activities involve the development of a secure compound, installation of below ground and above ground gas infrastructure, and provision of all supporting civil, mechanical and electrical systems required for the safe operation of the installation.

For further details see Section 2.4.3 of Chapter 2.

2.4.4 Temporary Construction Works

During construction, temporary access roads to the construction working width for the transmission gas pipeline route will be created at each of the designated road crossing, with the exception of the M4 crossing (RDX04). Temporary access gates will be installed on both sides of the road crossing, with the selected entry point depending on the location of active works. Inside each access point, a temporary laydown area will be established to provide car parking, material storage, and welfare facilities.

A temporary haul road or 'running track' will be established along the entire pipeline route within greenfield lands to allow safe movement of machinery, pipe, and personnel along the pipeline route. The construction working spread along the pipeline will be interrupted at certain locations requiring construction traffic diversions on private and public road network.

For further details see Section 2.4.4.1 of Chapter 2.

At watercourse crossings temporary culvert will be is installed to allow for an uninterrupted running track for the duration of the construction works, and removed once reinstatement of the working area is completed.

For further details see Section 2.4.4.2 of Chapter 2.

A temporary bridge structure will be installed over the Kilwarden River (RVX01) to facilitate construction access. A temporary bridge may also be utilised at other watercourse crossings. This temporary bridge will be subject to OPW section 50 agreement.

For further details see Section 2.4.4.3 of Chapter 2.

Temporary Construction Compounds and Laydown Areas will be established at strategic locations along the proposed pipeline route. These facilities will be temporary in nature and will provide areas for the storage of materials, welfare facilities, administrative functions, and accommodation of construction personnel, plant and equipment necessary for the delivery of the Proposed Development.

For further details see Section 2.4.4.5 of Chapter 2.

2.4.5 Construction and Environmental Management

The Outline Construction Environmental Management Plan (oCEMP) included as Appendix 2.2 of this EIAR has been prepared by AWN Consulting and includes all the mitigation measures set out within this EIAR. The construction contractor will update this oCEMP to include any additional mitigation required to ensure compliance with any subsequent consent conditions relevant to the Proposed Development. It will also set out in detail the overarching vision of how the construction Contractor of the Proposed Development will manage the site in a safe and organised manner.

The oCEMP documents all mitigation measures in this EIAR to ensure implementation of procedures to control pollution and nuisances arising from site clearance and construction activities. Pollution and nuisances will be prevented where possible and managed in accordance with best environmental protection practices.

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

2.4.6 Description of Commissioning

Once the construction of the Proposed Development is completed, Gas Networks Ireland will mobilise to complete the commissioning. Commissioning will be carried out over a 1-2 month period and is included within the construction timelines in Section 2.4.5 of Chapter 2 of the EIAR.

Commissioning works primarily involve suitably qualified individuals connecting the proposed gas pipeline at the hot tap connection to the existing 750 NB transmission gas pipeline BGE77.

The pipework will be cleaned and tested in accordance with the *IS328:2021, GNI/AO/SP/007*. The pipelines will be swabbed with pigs to clean out any debris and a gauge pig will be used to prove the pipelines internal diameter. The pipelines are then hydrostatic tested (pressurised with clean water) to prove the strength and integrity of the pipeline after construction.

Following hydrostatic testing (6,667,655 litres) this water will be discharged to nearby surface water or to ground, alternatively, it may be removed via tankering. There shall not be discharge of untreated, silty, or contaminated water from the works to any watercourse.

Following successful completion of the hydrostatic test, the pipelines will be dried using foam pigs and desiccant air. Finally, a nitrogen gas 'slug' between 2 pipeline inspection gauges (PIGs) is then admitted to one end of the pipeline. The natural gas is then admitted behind the nitrogen slug and the pipeline is commissioned and pressurised in accordance with IS328 and GNI Procedures. It then becomes operational. There are minimal gas emissions to the environment.

The working area will be reinstated as agreed with land owners e.g. such that normal farming activities can be recommenced by the landowners.

A permanent wayleave of 14 m will be sought to allow access for GNI to excavate and inspect the pipeline in the future.

2.5 Description of Operations

Following construction, the GNI 143 Ballykilleen Pipeline will not require on-site operational staff. GNI maintenance personnel will undertake fortnightly to monthly routine checks, travelling along the pipeline route via existing access points and using one van. The operation of the pipeline is based on a closed system, therefore during normal operating conditions there will be no release of natural gas to the atmosphere. Approximately every 7 - 10 years, the pipeline will be 'pigged' using an intelligent pig launched from the AGI in order to monitor the mechanical status of the pipeline itself.

The Kilwarden Offtake Installation will operate as a passive, low intensity "dead site" with no permanent utility connection or energy supply. Its operational function is to provide the live hot tap connection to the existing 750 mm NB PTTW pipeline, allow isolation of the GNI 143 Pipeline, and accommodate temporary pigtrap installation for inspection.

The Ballykilleen AGI will operate as the southern termination point of the transmission pipeline, regulating, metering, pre-heating and monitoring the gas prior to supply to the Cushaling Peaker Plant. Operational activities will be limited to routine inspection and maintenance visits by GNI personnel.

For further details see section 2.6 of Chapter2.

2.6 Changes to the Project/Decommissioning

The lifespan of the Proposed Development is not defined but it is anticipated that it will be maintained, and periodic upgrading undertaken over a long lifetime to meet future demand and upgrade in technology.

If the GNI 143 Ballykilleen Pipeline is no longer required over the long term, then full decommissioning in accordance with prevailing best practice will be undertaken. Transmission pipelines at the end of their operational life are degassed and isolated at the inlet and outlet. The installation shall be filled with 500 mbar of nitrogen within 1 month of the customer's decommissioning date. The GNI 143 Ballykilleen Pipeline is filled with grout in line with standard GNI pipeline decommissioning procedures. The gas transmission property, plant, and equipment shall be decommissioned in line with the transmission decommissioning process AM/BP/107.

The costs associated with the decommissioning, removal and disposal of the asset will be met by GNI.

2.7 Description of Other Development(s)

2.7.1 Description of Related Development(s)

In the context of an EIA, a "related development" refers to any other proposed, ongoing, or planned project, activity, or undertaking that is directly or indirectly connected to the Proposed Development under assessment. These related developments can have various interactions with the Proposed Development being evaluated, potentially resulting in cumulative environmental effects that need to be considered.

The purpose of the proposed GNI 143 Ballykilleen Pipeline to connect from the existing 750mm NB BGE77 pipeline (also known as Pipeline to the West (PTTW)) to the Edenderry Renewable Energy Complex. The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants within the Edenderry Renewable Energy Complex from their current single-fuel operation (liquid fuel) to dual-fuel operation, with natural gas as the primary fuel and HVO retained as backup.

For further details see Section 2.8.1 of Chapter 2.

2.7.2 Other Existing and/or Approved Projects within the Surrounding Area

As part of the assessment of the impact of the Proposed Development, account has been taken of relevant developments that are currently permitted, or under construction and substantial projects for which planning has been submitted within the surrounding areas. Chapter 17 considers the potential for Cumulative Impact with other Existing and/or Approved Projects.

The identification of relevant, currently permitted, and future developments follows a two-fold approach. Firstly, a comprehensive search is undertaken to identify all developments within the vicinity of the Proposed Development site. Subsequently, a review of the magnitude, size, scale, location and current status of these developments is undertaken to assess their potential to contribute to significant cumulative effects. This review was undertaken in accordance with the methodology set out in Section 17.4 of Chapter 17, with the findings of the search and screening exercise provided in Appendix 2.3 of the EIAR.

Based on this assessment, three other developments have been identified as being of particular relevance due to their scale and proximity to the Proposed Development:

- An application by EirGrid plc to upgrade the existing Rinawade – Dunfirth Tee – Kinnegad 110 kV overhead line (Office of the Chief Electrical Inspector Reg. Ref.: 2560500). This project intersects the Proposed Development boundary immediately south of the Yellow River crossing only (approximately chainage 11,350–11,700).
- The Water Supply Project – Eastern and Midlands Region (An Coimisiún Pleanála Reg. Ref.: 323980). A road crossing identified as RDX087 within this project interacts with the Proposed Development at crossing locations RDX17 and WCX29.
- The Ballydermot Wind Farm, which is located in the wider vicinity of the Proposed Development. This project is not currently within the planning system; however, information on the potential extent of the development has been obtained from publicly available sources (ballydermotwindfarm.ie) and is considered at a high level for contextual completeness.

3. ALTERNATIVES

3.1 Introduction

This section of the Non-Technical Summary explains the alternative options that were considered during the design and development of the Proposed Development and the reasons why the preferred option was selected.

The consideration and presentation of the reasonable alternatives studied by the project design team is an important requirement of the EIA process. The reasonable alternatives examined throughout the design process are set out under the following categories :

- Do nothing alternative;
- Alternative Routes;
- Alternative Design;
- Alternative Construction Methods and Mitigations;
- Alternative processes; and
- Methodology.

Alternatives were identified and assessed using a structured route selection process that reflects good practice for linear infrastructure projects such as pipelines.

An initial review of available environmental and technical information was undertaken, including data on designated ecological sites, watercourses, flood risk, soils and geology, archaeology, existing land use and infrastructure. This information was used to identify areas of environmental sensitivity and physical constraints.

Based on this review, a number of broad route corridor options were developed and evaluated at a high level. These corridor options were then compared in terms of their potential environmental effects, technical feasibility and constructability. The assessment was proportionate in nature and aimed to identify the option that best avoided or reduced potential environmental impacts.

3.2 Do-Nothing Alternative

The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants located within the Edenderry Renewable Energy Complex from distillate to dual fuel (natural gas and distillate).

Under the do nothing alternative the new gas connection would not proceed. The energy facility at Edenderry would not be supplied as intended and could not operate as planned on natural gas. While construction phase effects would be avoided, the Proposed Development's decarbonisation objective and associated energy security benefits would not be realised.

3.3 Alternative Routes – Pipeline Corridor Options

For this linear infrastructure development, the assessment of alternative routes is undertaken at a corridor level, prior to the development of a fixed pipeline layout. The route corridor assessment focused on identifying a corridor capable of accommodating a pipeline route to connect the existing Gas Networks Ireland (GNI) infrastructure with the proposed Ballykilleen Above Ground Installation (AGI), located within the Edenderry Renewable Energy Complex.

The process considered a direct line between the preferred tie-in location and the proposed AGI. Constraints and obstacles were identified through a desktop review of available datasets, aerial imagery, and a vantage point survey. Based on this analysis, three potential route corridors—each approximately 1 km wide—were established for further evaluation. These route corridors were

assessed at desktop level to determine potential environmental considerations and constraints to assist in determining the most suitable route corridor for the Proposed Development.

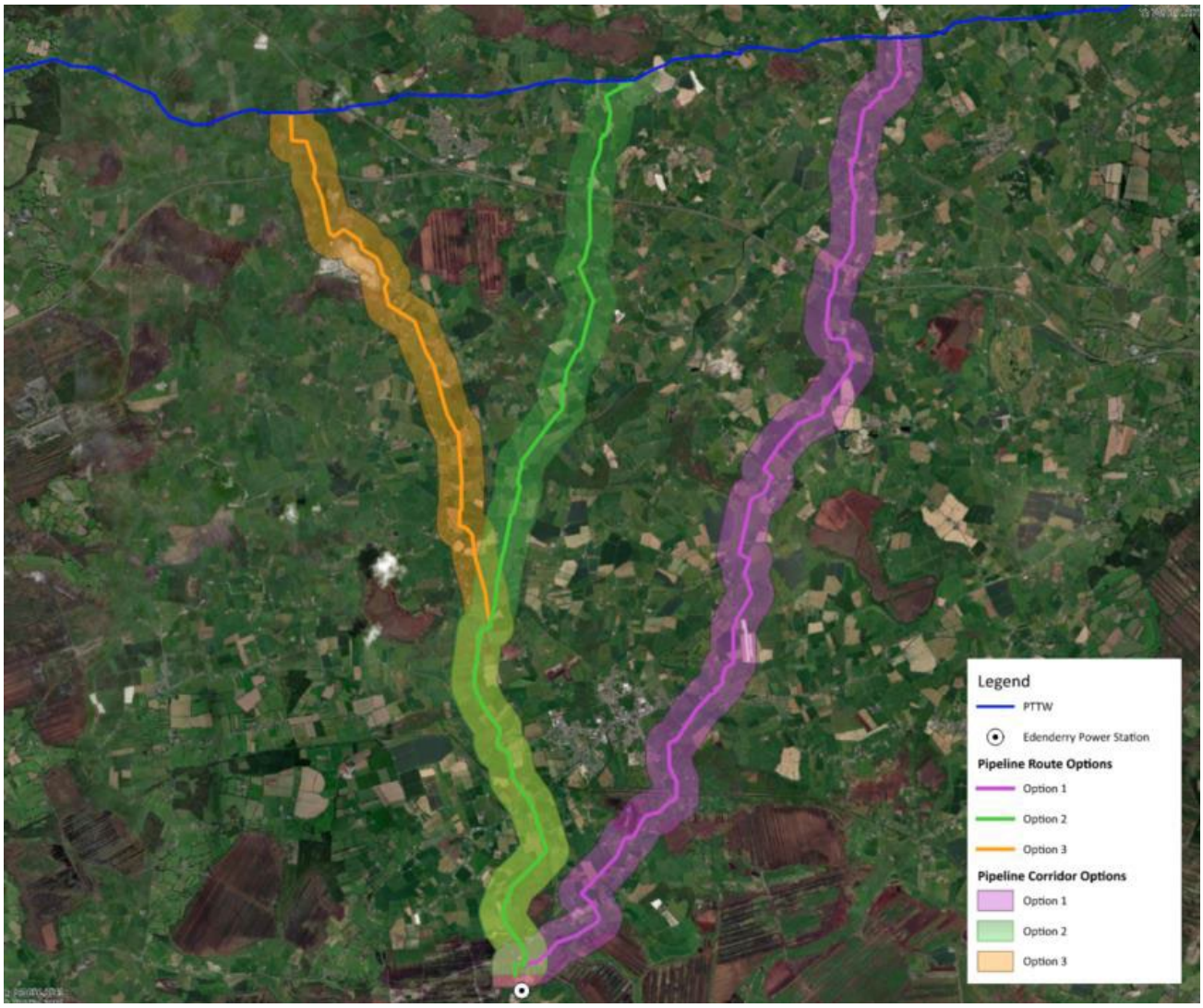
All corridors crossed mainly agricultural land and were developed so as to avoid direct impacts on designated nature conservation sites where practicable.

While the corridors were broadly similar in terms of overall environmental setting, differences were identified in:

- the length of the route;
- the number of road, river and canal crossings required;
- proximity to residential properties and other sensitive receptors;
- interaction with environmentally sensitive areas such as rivers, canals and peatlands; and
- construction complexity and feasibility.

These factors were considered together to determine which corridor would provide the most environmentally appropriate and technically feasible solution.

Insert 3-1 Route Corridor Options



3.3.1 Preferred Route Selection

Following comparison of the alternative route corridors, one corridor was identified as the preferred option to be taken forward for detailed design. This decision took account of environmental, technical and constructability considerations.

The preferred route corridor was selected because it:

- avoids direct crossings of the River Boyne Special Area of Conservation and Special Protection Area;
- is shorter than the other corridor options, thereby reducing the overall extent and duration of construction activities;
- requires fewer crossings of roads and watercourses, reducing disruption and environmental risk;
- avoids highly constrained areas such as combinations of canals and rail infrastructure, forestry blocks and active quarry operations; and
- provides sufficient flexibility to refine the final pipeline route to respond to local environmental and landowner constraints.

Following the identification of Route Corridor Option 2 as the preferred corridor, this option was progressed beyond the corridor level assessment stage to detailed route development and design. During this phase, a fixed and constructible pipeline alignment was identified within the selected corridor.

This refinement process was informed by further desk based assessment, site walkovers, ecological surveys, ground investigation data, detailed engineering design, and engagement with landowners. The objective of the planning design process was to refine the route to develop a technically feasible development that minimised environmental impact while remaining within the preferred route corridor.

As part of the detailed planning design process, localised adjustments were made to the alignment to respond to site specific constraints, refine crossing locations, and reduce environmental and constructability risks. As a result, the number and location of road, river, watercourse crossings, archaeological sites, and townlands traversed by the Proposed Development differ in detail from those identified during the corridor level assessment set out in the Alternatives assessment. These changes reflect the progression from a route corridor evaluation to a fixed pipeline route, rather than any change in the preferred route corridor itself.

The refinement of the alignment has also resulted in a final pipeline length of approximately 23.65 km, which is slightly greater than the indicative length assessed for Route Option 2 at corridor level. This increase reflects minor local realignments introduced to accommodate environmental sensitivities, archaeological constraints, landowner considerations, and engineering requirements.

The outcome of this planning design process is the Proposed Development for which consent is now sought. While refined at a local scale, the Proposed Development remains substantially consistent with Route Option 2 as identified in this alternatives assessment.

3.4 Alternative Design

The proposed underground transmission gas pipeline design is based on requirements stipulated by the GNI. Therefore, from an alternative 'design' point of view, the flexibility to select an alternative underground transmission gas pipeline design is not available to the Applicant.

Pipeline design parameters (diameter, wall thickness, grade, design factor and proximity distances) are governed by national standards and operator specifications for integration into the transmission network. Within these constraints, route-level refinements remain possible at detailed

design to increase separations from receptors, adjust special crossings, and minimise temporary works footprint. Process alternatives are limited given the requirement to integrate with existing transmission system operations, safety and integrity management standards.

3.5 Alternative Construction Methods and Mitigation Strategies

Two principal construction approaches were considered in developing the route alternatives and special crossings strategy: open-cut trenching and trenchless techniques (e.g., auger bore or horizontal directional drilling). Open-cut is generally suitable where environmental sensitivity is low and where watercourse spans are minor or dry. For environmentally sensitive crossings, the Grand Canal and the Kilwarden River and Yellow River, trenchless techniques are the chosen mitigation method to avoid direct in-channel works, protect channel integrity and banks, and reduce the potential for sediment release and hydrological connectivity during construction.

The method selection is supported by standard construction-phase controls, including pollution prevention and spill response, silt management, timing of works to avoid sensitive ecological periods where practicable, reinstatement of drainage to pre-works condition, and archaeological monitoring where required. The adoption of trenchless methods at sensitive crossings is a key embedded mitigation, compatible with the preferred Option 2 corridor.

For each aspect of the environment, each EIA Report specialist has considered the existing environment, likely impacts of the Proposed Development and proposed feasible mitigation measures to address the most significant potential impacts using measures appropriate to the environmental setting of the Proposed Development.

In deciding on the most suitable mitigation measure the specialist has considered relevant guidance and legislation. In each case, a comparison of environmental effects was made, and the specialist has reviewed the possible mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction and offsetting (not required in this development). Mitigation measures have also been considered based on the effect on quality, duration of impact, probability and significance of effects.

The selected mitigation measures are set out in each of the EIA Report Chapters.

3.6 Alternative Processes

This section typically examines the project processes in relation to likely emissions to air and water, likely generation of waste and likely effect on traffic to determine the process that is least likely to impact on these parameters.

The underground transmission gas pipeline will become an integral part of the national transmission network which is currently operated by GNI. As such the underground transmission gas pipeline must meet GNI's specifications to ensure it meets the requirements of the national infrastructure and can provide a reliable gas supply to the Edenderry Renewable Energy Complex. Therefore, from an alternative 'process design' point of view, the flexibility to select alternative processes for integrating into the current national gas network is not available.

As appropriate, alternative processes are considered on an ongoing basis by GNI as a part of each of their operations based on many factors including technical feasibility, environmental impact, efficiency, security, reliability and cost.

4. HUMAN HEALTH AND POPULATION

4.1 Introduction

Chapter 4 (Human Health and Population) has been prepared by AWN to assess the likely significant impacts on Population and Human Health in respect of the Proposed Development.

Human health should be considered in the context of environmental pathways which may affect health such as air quality, noise, water and soil quality. All can contribute to negative effects on human health by facilitating the transport of contaminants or pollutants. An evaluation of the effects of these pathways on health, by considering the accepted standards of safety in dose, exposure or risk of air quality and noise levels for example, is considered appropriate, as these standards have been arrived at via scientific and medical research. Where these topics are dealt with in further detail elsewhere in this EIA Report, the relevant chapters have been cross referenced in Chapter 4 of the EIAR to provide the Planning Authority with a context for their determination.

4.2 Baseline Environment

4.2.1.1 Population Health Sensitivity

In a desk-based assessment of Population Health Sensitivity, the use of Electoral Divisions (ED) was used to analyse the population statistics withing the study area. The area selected for the assessment of the impact on human health has been defined as the EDs that are either entirely contained withing or partially within 1 km of the Proposed Development site. The EDs used for the Population Health Sensitivity include Ardnamullan (167005), Ballyboggan (167008), Castlejordan (167015), Hill of Down (167036) and Kinnegad (237068) in Co. Meath; and Clonmore (187022), Ballymacwilliam (187007), Monasteroris (187063), Edenderry Rural (187035), Edenderry Urban (187036), Clonbulloge (187020), and Esker (187038/187002) in County Offaly. The study area also includes Carrick (087020) in County Kildare / Contae Chill Dara, although the Proposed Development itself does not cross into County Kildare / Contae Chill Dara.

The thirteen EDs within the study area have seen an overall growth in population between 2016 and 2022, with the growth rates of the EDs of Kinnegad, Clonmore, Monasteroris, Edenderry Urban, and Edenderry Rural higher than the national average for the Republic of Ireland. The Pobal HP Deprivation Index shows all five EDs in County Meath were classified as 'Marginally Below Average', compared with the county's overall 'Marginally Above Average' score. In County Offaly, five of the seven EDs were classified as 'Marginally Below Average', which aligns with the overall County Offaly score. Carrick ED in County Kildare was classified as 'Marginally Above Average,' aligning with the overall County Kildare score. Overall, this suggests a low to moderate level of population sensitivity in terms of deprivation.

The information available for the study area shows that a large proportion of the population (45.53%–59.80%), with a low proportion reporting 'Bad' or 'Very Bad' health. However, five of the thirteen EDs have a higher percentage of persons with a disability than the national average, indicating somewhat greater restrictions on daily activity in these areas. Nonetheless, since most EDs in the Study Area record a lower percentage of persons with a disability than the national average, this suggests relatively limited overall restrictions on daily activity across the study area.

Overall, the Study Area is assessed as having **Low to Moderate** Population Sensitivity.

4.2.1.2 Location and Character of the Local Environment

The proposed 1km radius from the site location used for population statistics has also been used to inform the baseline description of the area.

Under the Meath County Development Plan 2021–2027, the Proposed Development traverses an area designated as 'Rural Area – RA'. The objective of this designation is *"to protect and promote, in a balanced way, the development of agriculture, forestry and rural-related enterprise, biodiversity, the rural landscape, and the built and cultural heritage."* Under the Offaly County Development Plan 2021–2027, the Proposed Route Corridor passes through agricultural land that has no specific zoning designation.

Due to the substantial length of the Proposed Development, which extends approximately 23.65 km, multiple sensitive receptors have been identified along the pipeline route and associated supporting infrastructure. The distance of these receptors from the Proposed Development ranges from approximately 15 m to 490 m.

The Proposed Development site is situated within a predominantly rural area characterised by an agricultural landscape with dispersed residential dwellings. With exception of Edenderry, the surrounding landscape consists mainly of single-family homes and farms that reflect the area's strong agricultural character. These residences are scattered throughout the countryside, contributing to a low-density rural living environment.

Edenderry Town lies to the east of the proposed pipeline corridor and is situated in close proximity to the proposed Linepipe Storage Compound 2. As the largest urban centre within the study area, Edenderry contains the highest concentration of dense residential neighbourhoods within 1km radius, along with a mix of community services and employment uses.

Despite the largely agricultural nature of the surrounding environment, the study area presents a variety of recreational facilities and a few public green infrastructures.

In terms of landscape amenity, the lands surrounding the site constitute predominantly rural and agricultural greenfields. The primary land use in this area is farming, with scattered residential properties and farmsteads. There are no listed or scenic views, no landscape or amenity designations pertaining to the site.

There are seven structures from the National Inventory of Architectural Heritage (NIAH) within the study area, which are also included in the Record of Protected Structures (RPS). Additionally, Chapter 12 (Archaeological, Architectural and Cultural Heritage) identifies six Areas of Archaeological Potential within the Study Area, and a total of 32 recorded archaeological sites and monuments. The Proposed Development does not fall within an Architectural Conservation Area (ACA).

According to Chapter 6 (Hydrology and Hydrogeology) the proposed pipeline route is traversed by 30no. watercourses / streams and 2no. rivers. There are no protected Recreational Waters or Bathing Waterbodies within the study area. There are no Groundwater Source Protection Areas or Group Schemes within the Study Area.

The Proposed Development site is not at significant risk of any major accidents, hazards of natural disasters.

4.3 Potential Impacts of the Proposed Development

4.3.1 Construction Phase

The main potential impacts on population and human health from the Proposed Development are related to employment, potential for spills/leaks, air emissions, noise, visual, and traffic impacts:

- Construction will have an indirect positive effect on support industries such as builder suppliers, construction material manufacture, maintenance contracts, equipment supply, landscaping and other local services and creating employment opportunities with a ***positive, local to regional, imperceptible***, ***short-term*** impact.
- During the construction stage, landscape character will be affected by increased heavy vehicle movements, construction machinery, temporary lighting, and material storage. Overall, without mitigation measures, the impacts during construction due to changes on the landscape and visual intrusion is considered to be ***negative, short-term***, ranging from ***moderate to slight.***
- A reduction in soil quality via historical or unmitigated pollutants entering the soil has the potential to lead to negative impacts on human health during construction. In the absence of mitigation measures the potential impacts to human health during the construction phase are ***negative, imperceptible*** and ***short-term.***
- Any contaminated / hazardous soil encountered onsite will be removed from site and sent to a licenced treatment / disposal facility that accepts the corresponding soil classification / category, while clean soils maybe be reused onsite for backfill, reinstatement / landscaping. Therefore, on this basis in the absence of mitigation measures the potential impacts during the construction phase on human health and populations due to changes to the potential for contamination of soil and groundwater are ***negative***, ***slight*** and ***short term.***
- The key elements of construction of the Proposed Development with potential impacts on populations and human health from air quality impacts are dust soiling effects, dust (PM_{10} and $PM_{2.5}$) emissions, engine emissions from construction traffic and changes in traffic flows on nearby road links. In the absence of mitigation, dust impacts on Human Health are predicted to be ***short-term, direct, localised, negative*** and ***slight.***
- Noise impacts have been assessed for the key construction activities along the Proposed Development and are detailed in Chapter 10 (Noise and Vibration). Noise levels during construction phase are expected to differ depending on the proposed works location. Overall impacts on Human Health are predicted to range from ***neutral*** to ***negative, imperceptible*** to ***very significant*** with a ***temporary*** to ***short-term*** duration.
- As detailed in Chapter 13 (Traffic and Transportation), during construction temporary local disruption to pedestrian, cyclists, and vehicular traffic particularly during the trenching and reinstatement at the various crossings of public roads. It is considered that the predicted increases in traffic during the construction phase will have a ***neutral, negligible*** and ***temporary*** impact, while works on crossings will have a ***negative, moderate*** and ***brief*** to ***temporary*** impact on the existing road network.
- The Potential Impacts from Major Accident Hazards and/or Natural Disasters on Population and Human Health during construction has been assessed in Section 4.5.1.7 of Chapter 4. The assessment concludes that the potential effect is ***imperceptible***, and unlikely, with respect to Major Accident Hazards or Natural Disasters on Population and Human Health during the Construction Phase of the Proposed Development.

4.3.2 Operational Phase

The main potential impacts on population and human health from the Proposed Development are related to employment, potential for spills/leaks, air emissions, noise, visual, and traffic impacts:

Once constructed, the proposed underground transmission gas pipeline will not require any staff to operate. GNI maintenance staff, one van, will carry out checks every two weeks to a month

along with routine inspection and maintenance, including pigging, of the asset every seven to ten years.

- During the operational phase, the Proposed Development will not create new employment opportunities and is expected to have a ***neutral, imperceptible, long-term*** impact on businesses and residences in the area during the operational phase.
- Visual impacts and amenity impacts perceived by individual persons are highly subjective and difficult to characterise. Given its mostly underground nature the Proposed Development will have a negligible magnitude of landscape effect with a ***neutral, imperceptible*** and ***long-term*** impact during operations. Post construction and reinstatement, the visual effects of the Proposed Development will be limited to the Ballykilleen AGI and the Kilwarden Offtake Installation and impacts due to visual intrusion will range between ***neutral*** to ***negative, imperceptible*** to ***slight,*** and ***permanent.***
- With reference to Chapter 5 (Land, Soils and Geology) and Chapter 6 (Hydrology and Hydrogeology), during the operational phase of the Proposed Development there is no potential for impact on human health and populations due to changes in land, soil, geology, hydrology and hydrogeology. In the absence of mitigation, the potential impacts are ***neutral***, ***imperceptible*** and ***long-term***.
- As outlined in Chapter 8 (Air Quality), the Ballykilleen AGI will contain small boilers (<1MWth) and a gas-fired backup generator. Because of their size and low thermal output, the emissions of these boilers are highly unlikely to cause a significant air quality effect with impacts anticipated to be ***long-term, direct, localised, negative*** and ***not significant.***
- As detailed in Chapter 10 (Noise and Vibration), since the proposed transmission gas pipeline route will be located underground, there will be no operational noise impacts associated with the Proposed Development. The resultant noise effect is ***neutral***, ***imperceptible*** and ***long-term.***
- An assessment of the additional traffic movements associated with the Proposed Development during the construction and operational phases is presented in Chapter 13 (Traffic and Transportation). The operational phase will not require permanent employees, with only intermittent visits resulting in occasional additional trips on the external road network. The additional traffic during the operational phase is therefore considered to have a ***neutral, imperceptible*** and ***long-term*** impact on the road network and on human health.
- The Potential Impacts from Major Accident Hazards and/or Natural Disasters on Population and Human Health during operations has been assessed in Section 4.5.2.7 of Chapter 4. The assessment concludes that the potential effect is ***imperceptible***, and unlikely, with respect to Major Accident Hazards or Natural Disasters on Population and Human Health during the Operational Phase of the Proposed Development.

4.4 Mitigation and Residual Effects (Post-Mitigation)

4.4.1 Construction Phase

The mitigation measures to address the potential impacts on Population and Human Health from the construction phase of the Proposed Development and post-mitigation residual effects include:

- With reference to Chapter 11 (Landscape and Visual Impact), the remedial measures proposed revolve round the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish. Overall, the residual construction stage significance of landscape effects is deemed to be no greater than ***slight, negative*** and ***short-term*** in duration. The residual construction

stage significance of visual effect is considered to be ***moderate-slight, negative*** and ***short-term***.

- All mitigation measures outlined within the Chapter 5 (Land, Soils, Geology) and Chapter 6 (Hydrogeology and Hydrology) will be implemented in accordance with Construction Environmental Management Plan (CEMP), as well as any additional measures required pursuant to planning conditions which may be imposed. Impacts on the land, soils, geology and hydrological environment will be ***neutral, imperceptible***, and ***short-term.***
- As outlined in Chapter 8 (Air Quality), best practice dust mitigation measures will be implemented throughout the duration of the construction phase. The dust mitigation measures proposed in Chapter 8 will reduce dust emissions and thus dust-related human health effects and residual impact will be ***short-term, direct, localised, negative*** and ***not significant***.
- As outlined in Chapter 10 (Noise and Vibration), the application of noise and vibration limits and limits on the hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum. Due to the short-term duration of the work, the noise and vibration limits in place, this phase of work will not give rise to any significant health effects. With mitigation, impacts to human health due to noise and vibration as a result of the Proposed Development effects are ***negative, slight to moderate and temporary.***
- The implementation of a Construction Traffic Management Plan (CTMP), to be prepared and agreed with the local authority prior to the commencement of works, will ensure all potential impacts are adequately mitigated. The residual effect of construction works will be ***temporary, not significant*** and ***negative***.

4.4.2 Operational Phase

The mitigation measures to address the potential impacts on Population and Human Health from the operational phase of the Proposed Development and post-mitigation residual effects include:

- With reference to Chapter 11 (Landscape and Visual), the main mitigation-by-avoidance measure employed in this instance is the siting of the development in a robust landscape where the zoning aligns and where it is surrounded by other commercial and industrial developments of a similar scale. The Proposed Development will also avail of landscaping and planting measures associated with the permitted development to its immediate north including earthen berms and substantial areas of native planting. During the operational phase all views will remain within acceptable levels of impact, with no further mitigation required. As a result, the anticipated impacts on human health from changes to the local landscape and visual intrusion are expected to be no greater than ***moderate, neutral to negative,*** and ***long-term*** for landscape changes, and ***negative, imperceptible to moderate*** and ***long-term*** for visual intrusion.
- There are no source pathway linkages to potable water supplies or water amenities. As such the **implementation** of the design measures will continue to ensure that the residual impacts during the operational phase in respect of the environmental factor of Soils, Geology, Hydrogeology and Hydrology is ***imperceptible-neutral***.
- Air dispersion modelling has determined that concentrations of all pollutants are in compliance with the relevant ambient air quality standards. and, therefore, will not result in a significant impact on human health. The impacts to human health are predicted to be ***direct, long-term, negative*** and ***not significant*** impact on human health.
- Noise from external plant will be minimised by purchasing low noise generating equipment and incorporating appropriately specified in line attenuators for stacks and exhausts where necessary. A 12m noise barrier is also included in the project design. With due consideration as part of the detailed design process, this approach will result in the site operating well within the constraints of the best practice guidance noise limits that have been adopted as part of this detailed assessment. No further mitigation is deemed required as detailed in

Chapter 10 (Noise and Vibration). Residual human health impact will remain as will continue to be *neutral*, and *long-term*.

- As outlined in Chapter 13 (Traffic and Transportation), a Travel Plan will be implemented and developed on an ongoing basis with the triple objectives of promoting sustainability, enhancing public transport and reducing dependency on the use of the private car. A Transport Co-ordinator will be appointed by the developer as the main point of contact and coordinator of Travel Plan activities for monitoring and achieving sustainable travel targets. it is anticipated that the effects of the Proposed Development both on the local road network and on human beings will continue to be *neutral*, *imperceptible* and *long-term*.

4.5 Cumulative Impact of the Proposed Development

4.5.1 Construction Phase

The implementation of mitigation measures within each chapter and detailed in Section 4.6.1 of Chapter 4, as well as the compliance of granted developments with their respective planning permissions, will ensure there will be minimal to no cumulative potential for the assessed environmental factors (Land, Soils and Geology, Hydrology and Hydrogeology, Air Quality, Noise and Vibration, Landscape and Visual Impact, and Traffic and Transportation) during the construction phase of the Proposed Development and no significant cumulative impacts to human health.

4.5.2 Operational Phase

The implementation of mitigation measures within each chapter and detailed in Section 4.6.2 of Chapter 4, as well as the compliance of granted developments with their respective planning permissions, will ensure there will be minimal to no cumulative potential for the assessed environmental factors (Land, Soils and Geology, Hydrology and Hydrogeology, Air Quality, Noise and Vibration, Landscape and Visual Impact, and Traffic and Transportation) during the operational phase of the Proposed Development and no significant cumulative impacts to human health.

5. LAND, SOILS AND GEOLOGY

5.1 Introduction

The assessment of Land, Soils & Geology is contained within Chapter 5 of the EIAR. Chapter 5 of the EIAR evaluates the likely significant effects, if any, which the Proposed Development will have on Land, Soils and Geology. Chapter 5 contains necessary information as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

The chapter initially provides a description of the receiving environment of the site and the potential impacts of the Proposed Development. When assessing the potential impacts, this assessment considers the significance of the environmental attributes, and the predicted scale, and duration of the likely effects.

The chapter also outlines the proposed mitigation and design measures that will reduce or eliminate the identified potential impacts and defines the residual effects of the Proposed Development (the effect after the implementation of mitigation measures).

5.2 Baseline Environment

The Proposed Development site and associated temporary working areas covers an area of approximately 243.4 hectares (ha) (the "Proposed Development Site" hereafter) and encompasses all lands required for the construction and operation of the pipeline, including the Kilwarden Offtake Installation, the Ballykilleen Above Ground Installation (AGI), temporary construction compounds, line pipe storage areas, and all associated ancillary works.

The Proposed Development Site comprises the c. 23.65 km linear route of the underground GNI 143 Ballykilleen Pipeline and its temporary working areas.

The wider area is characterised as predominantly rural and primarily associated with greenfield land with a predominant agricultural function.

The landscape within the Proposed Development Site is predominantly rural, comprising irregular agricultural fields used for grazing and cropping and bounded by traditional hedgerows characteristic of counties Meath and Offaly. The lands are largely undeveloped, with no residential dwellings or permanent buildings located within the Proposed Development Site. Existing infrastructure intersected along the pipeline route includes regional and local roads, agricultural access tracks, drainage ditches, the M4 Motorway, and the Grand Canal. Residential dwellings occur in the wider area but primarily as dispersed one off houses along local roads, with no urban centres directly adjoining the site.

At the southern end of the route, the receiving environment transitions from agricultural to industrial lands associated with the Edenderry Renewable Energy Complex, an established energy generation facility. The proposed Ballykilleen AGI is located within this industrial area. The route has been divided into 6 sections within the EIAR with reference to chainage. The 6 sections are presented in the Table 1 below.

Table 5-1: Structured Sections to describe the Proposed Development

Pipeline Section	Start Point (m)	End Point (m)	Length (m)

Pipeline Section 1: Kilwarden Offtake Installation to the L40181 Road (RDX05)	0	3,931	3,931
Pipeline Section 2: L40181 Road (RDX05) to the L4091 (RDX09)	3,931	7,441	3,510
Pipeline Section 3: L4091 Road (RDX09) to the Yellow River (RVX02)	7,441	11,669	4,228
Pipeline Section 4: Yellow River (RVX02) to the R441 (RDX12)	11,669	15,348	3,679
Pipeline Section 5: R441 (RDX12) to the L5003 (RDX15)	15,348	19,494	4,146
Pipeline Section 6: L5003 (RDX15) to the Ballykilleen AGI	19,494	23,650	4,156
GNI 143 Ballykilleen Pipeline	0	23,650	23,650

The baseline environment is presented in Table 2 below and has been described in line with each section mentioned in the Table 1 above. In addition Temporary Compound 03 and 04 are described as standalone sections as these are located away from main pipeline route.

Table 5-2. Baseline Land, Soil and Geological Features within GNI143 Pipeline Sections

Pipeline Section	Receiving Environment
Pipeline Section 1: Kilwarden Offtake Installation to the L40181 Road (RDX05)	**Teagasc Soils:** BminDW- Deep well drained mineral (mainly basic), BminPD- Mineral poorly drained (mainly basic), BminPDPT- Peaty poorly drained mineral (mainly basic), BminSP- Shallow poorly drained mineral (mainly basic), BminSRPT- Shallow, rocky, peaty/non-peatymineral complexes (mainly basic), BminSW- Shallow well drained mineral (mainly basic), Cut- Cutover/cutaway peat. **Quaternary Sediments (Subsoils):** 'Alluvium' associated with stream/rivers which traverse the pipeline route, 'Cut over raised peat', 'Lacustrine Sediments', 'Gravels derived from Limestones' and 'Till derived from Limestone'. **Bedrock Geology:** The majority of this section is underlain by the 'Waulsortian Limestones Formation'. The northernmost portion of this section is overlying the 'Edenderry Oolite Member Formation', while the southernmost portion of this section is overlying the 'Lucan Formation'. **Aquifer / Groundwater Vulnerability:** The predominant aquifer vulnerability classification for this section is 'Moderate', while some areas of the central and northern portion of this section have been classified as 'High' and 'Extreme' vulnerability, respectively rating. **Landslide Susceptibility:** The Landslide Susceptibility for this section ranges from 'Low to 'Inferred low' throughout this section.
Pipeline Section 2: L40181 Road (RDX05) to the L4091 (RDX09)	**Teagasc Soils:** AlluvMIN- Alluvial (mineral), BminDW- Deep well drained mineral (mainly basic), BminPDPT- Peaty poorly drained mineral (mainly basic), BminSP- Shallow poorly drained mineral (mainly basic), BminSRPT- Shallow, rocky, peaty/non-peatymineral complexes (mainly basic), BminSW- Shallow well drained mineral (mainly basic), Cut- Cutover/cutaway peat, Lac- Lacustrine type soils. **Quaternary Sediments (Subsoils)-** *Primary*: 'Till derived from Limestone', *Secondary*: 'Lacustrine Sediments', 'Gravels derived from Limestones', 'Alluvium'. **Bedrock Geology**- The Majority of this section is underlain by the 'Lucan Formation'. The southernmost portion of this section is overlying 'Volcanics (in carboniferous)'.

Pipeline Section	Receiving Environment
	Aquifer / Groundwater Vulnerability- The predominant aquifer vulnerability classification for this section is 'Moderate', while some localised areas of the northern and southern portion of this section have been classified as 'High' vulnerability rating. **Landslide Susceptibility**- The Landslide Susceptibility for this section ranges from 'Low'' to 'Inferred low' throughout this section.
Pipeline Section 3: L4091 Road (RDX09) to the Yellow River (RVX02)	**Teagasc Soils:** AlluvMIN- Alluvial (mineral), BminDW- Deep well drained mineral (mainly basic), BminPDPT- Peaty poorly drained mineral (mainly basic), BminSP- Shallow poorly drained mineral (mainly basic), BminSRPT- Shallow, rocky, peaty/non-peatymineral complexes (mainly basic), BminSW- Shallow well drained mineral (mainly basic), Cut- Cutover/cutaway peat, Lac- Lacustrine type soils. **Quaternary Sediments (Subsoils)-** *Primary*: 'Till derived from Limestone' & 'Gravels derived from Limestones'. *Secondary*: 'Lacustrine Sediments', 'Alluvium'. **Bedrock Geology**- The Majority of this section is underlain by the 'Edenderry Oolite Member Formation'. The northernmost portion of this section is overlying the 'Lucan Formation' (and a very minor zone overlying Volcanics in carboniferous). **Aquifer / Groundwater Vulnerability**- The predominant aquifer vulnerability classification for this section is 'Moderate', while some localised (less extensive) zones of the northern, central and southern portion of this section have been classified as 'High' vulnerability rating. **Landslide Susceptibility**- The Landslide Susceptibility for this section ranges from 'Low' to 'Inferred Low' throughout this section.
Pipeline Section 4: Yellow River (RVX02) to the R441 (RDX12)	**Teagasc Soils:** AlluvMIN- Alluvial (mineral), BminDW- Deep well drained mineral (mainly basic), BminPDPT- Peaty poorly drained mineral (mainly basic), BminSP- Shallow poorly drained mineral (mainly basic), BminSRPT- Shallow, rocky, peaty/non-peatymineral complexes (mainly basic), BminSW- Shallow well drained mineral (mainly basic), Cut- Cutover/cutaway peat, Lac- Lacustrine type soils. **Quaternary Sediments (Subsoils)-** *Primary*: 'Till derived from Limestone'. *Secondary*: 'Lacustrine Sediments', 'Alluvium', 'Gravels derived from limestones' (northern part of this section) & 'Cut over raised peat' (southern part of this section). **Bedrock Geology**- This section is entirely underlain by the 'Edenderry Oolite Member formation'. **Aquifer / Groundwater Vulnerability**- The predominant aquifer vulnerability classification for this section is 'Moderate', while some localised (less extensive) zones of the northern portion of this section has been classified as 'High' vulnerability rating. **Landslide Susceptibility**- The Landslide Susceptibility for this section is primarily/predominantly classified as 'Low' to 'Inferred low' throughout this section, with the exception of a minor localised zone located at c. 11,400m along the pipeline which has been classified as 'Moderately Low'.
Pipeline Section 5: R441 (RDX12) to the L5003 (RDX15)	**Teagasc Soils:** Made ground, BminDW- Deep well drained mineral (mainly basic), BminPDPT- Peaty poorly drained mineral (mainly basic), BminSP- Shallow poorly drained mineral (mainly basic), BminSRPT- Shallow, rocky, peaty/non-peatymineral complexes (mainly basic), BminSW- Shallow well drained mineral (mainly basic), Cut- Cutover/cutaway peat, Lac- Lacustrine type soils. **Quaternary Sediments (Subsoils)-** This section is overlying 2No. subsoil types. The Northern portion of this section is predominantly underlain by 'Cut over raised peat', while the southern portion is largely underlain by 'Till derived from Limestone'. **Bedrock Geology**- This section is entirely underlain by the 'Edenderry Oolite Member formation'.

Pipeline Section	Receiving Environment
	Aquifer / Groundwater Vulnerability- The aquifer vulnerability rating for this entire section is 'Moderate'. **Landslide Susceptibility**- The Landslide Susceptibility for this section is primarily/predominantly classified as 'Low', with some less extensive localised areas indicated as 'Inferred Low' located in the northern portion of this section.
Pipeline Section 6: L5003 (RDX15) to the Ballykilleen AGI	**Teagasc Soils:** AlluvMIN- Alluvial (mineral), BminDW- Deep well drained mineral (mainly basic), BminPDPT- Peaty poorly drained mineral (mainly basic), Cut- Cutover/cutaway peat, Lac- Lacustrine type soils. Refer to Volume 4 (Teagasc Soils Sheet 6 of 6) for the Teagasc Soils mapping for this section. **Quaternary Sediments (Subsoils)-** This section is overlying 2No. subsoil types alternating between deposits of 'Cut over raised peat' and 'Till derived from Limestone'. **Bedrock Geology**- The Majority of this section is underlain by the 'Lucan Formation', while the central and northernmost portions of this section are overlying the 'Edenderry Oolite Member Formation'. **Aquifer / Groundwater Vulnerability**- The northern and southern parts of this section have been widely classified with 'Moderate' Vulnerability. The central portion of this section displays varied vulnerability, ranging / alternating between 'Low', 'Moderate', 'High' and 'Extreme' vulnerability rating. **Landslide Susceptibility**- The Landslide Susceptibility classification for this entire section is determined to be 'Low'.
Temporary Construction Compounds 03	**Teagasc Soils:** The eastern and central portion of this area is underlain by Cut- Cutover/cutaway peat. The western portion of the area is predominantly underlain by BminPD- Mineral poorly drained (mainly basic) and partially underlain by BminDW- Deep well drained mineral (mainly basic) in the southwest corner. **Quaternary Sediments (Subsoils)-** This area of the site is overlying 2No. subsoil types. The central and eastern portions of the site are overlying 'Cut over raised peat', while the western portion of this area is underlain by 'Till derived from Limestone'. **Bedrock Geology**- This area is entirely underlain by the 'Edenderry Oolite Member Formation' **Aquifer / Groundwater Vulnerability**- This area is classified as having 'Moderate' vulnerability rating. **Landslide Susceptibility**- The Landslide Susceptibility classification for this entire section is determined to be 'Low'.
Temporary Construction Compounds 04	**Teagasc Soils:** This entire area is entirely underlain by BminSW- Shallow well drained mineral (mainly basic). **Quaternary Sediments (Subsoils)-** This section is entirely underlain by Eskers comprised of gravels of basic reaction. **Bedrock Geology**- This area is entirely underlain by the 'Edenderry Oolite Member Formation'. **Aquifer / Groundwater Vulnerability**- This area is classified as having 'High' vulnerability rating. **Landslide Susceptibility**- The Landslide Susceptibility classification for this entire section is determined to be 'Low'.

5.3 Potential Impacts of the Proposed Development

5.3.1 Construction Phase

In absence of mitigation measures, the construction phase would present potential impacts to the following:

- Ground Disturbance, Excavations, and Reinstatement

- Pollution Risk
- Human Health and Populations
- Resulting from Land and Land Use

Due to the following activities:
- Ground disturbance and excavation works
- Trenchless Crossings
- Risks of contamination from general construction works, spills and leaks.

In the absence of mitigation, the potential impacts during the construction phase due to ground disturbance and excavation on land, soils and geology are ***negative***, ***moderate*** and ***short term***.

In the absence of mitigation, the potential impacts during the construction phase due to isolated areas of contamination on land, soils and geology are ***negative***, ***moderate*** and ***short term***.

In the absence of mitigation measures the potential impacts due to pollution risk during the construction phase on land, soils and geology are ***negative***, ***moderate*** and ***short term***.

In the absence of mitigation measures the potential impacts to human health during the construction phase on land, soils and geology are ***negative***, ***not significant*** and ***short term***. In the absence of mitigation, the potential impact from the Proposed Development will result in ***negative, imperceptible, short-term*** and reversible land-use impacts during construction, with only a small permanent land take at the Kilwarden Offtake Installation, and no long-term reduction in agricultural land use along the pipeline route.

5.3.2 Operational Phase

In absence of mitigation measures, the operational phase would present potential impacts associated to the following activities:

- Land, Soils and Geology
- Human Health and Populations

The Proposed Development will comprise a buried gas transmission pipeline, the Kilwarden Offtake Installation, and the Ballykilleen AGI. Once construction is complete and reinstatement undertaken, the majority of the pipeline route will be returned to its original agricultural or greenfield condition, with no ongoing disturbance to soils or geological materials. The permanent presence of buried infrastructure does not give rise to contamination within the soil and superficial deposits.

The Kilwarden Offtake Installation and Ballykilleen AGI includes areas of hardstanding and sealed surfaces that will prevent interaction between operational activities and underlying soils. No routine storage of hazardous substances is undertaken at these sites.

In the absence of mitigation measures, the potential impacts during the operational phase on land, soils and geology is ***neutral***, ***imperceptible***, and ***long term.***

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

5.4 Mitigation and Residual Effects (Post-Mitigation)

5.4.1 Construction Phase

In order to reduce impacts on the lands, soils and geological environment, a number of mitigation measures will be adopted as part of the construction works on site.

- Implementation of an outline Construction Environmental Management Plan (oCEMP);
- Control, management and disposal of soil excavation and ground disturbances;
- Sourcing of fill and aggregates;
- Surface water management during construction;
- Control of Pollution from Fuels, Oils and Construction Chemicals.

The Residual impact on the land, soils and geological environment during the construction phase following the implementation of the mitigation measures above is ***neutral, imperceptible*** and ***short-term,*** the magnitude of impact is considered ***negligible***.

5.4.2 Operational Phase

During operation measures there is no requirement for bulk storage of petroleum products. Due to the nature of the Proposed Development in operation there is no risk of potential leaks and spillages of fuel and oil.

There will be no requirements for mitigations against increased run-off and sediment loading post construction phase of the Proposed Development as the underground gas transmission pipeline will not alter the existing hardstanding areas (all trenches established across roads to facilitate the proposed pipeline will be fully reinstated). There will be additional hardstanding at the above ground compound / pigging compound station location adjacent to the hot tap connection, which will result in increased surface water generation which will drain to the adjacent land and soakaway to ground. There will be no surface water management required for the Proposed Development once operational.

The residual impact on the land, soils and geological environment during the operation phase is ***neutral, imperceptible*** and ***long-term,*** the magnitude of impact is considered ***negligible***.

5.5 Cumulative Impact of the Proposed Development

The cumulative impact of the Proposed Development with any/all relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2, Section 2.8 and Section 2.9, and Appendix 2.3.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the Proposed Development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of Chapter 5.

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

5.5.1 Construction Phase

The cumulative impact of the Proposed Development with any/all relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2, Section 2.2.1.1 and Appendix 2.3.

The Edenderry Renewable Energy Complex is an established industrial site where land and soils have already been subject to historic disturbance arising from existing development, including areas of hardstanding, foundations, underground services and drainage infrastructure. As a result, soils within the complex are generally engineered and modified, particularly in the vicinity of existing plant, access roads and services.

The potential for cumulative impacts on land, soils, and geological environments in respect of the Proposed Development and the related developments during a simultaneous construction phase would be as a result of engineering works including:

- Control of soil excavation and export from site;
- Sources of fill and aggregates for the Proposed Development;
- Accidental spillages and leakage from construction traffic and construction materials may occur, which could result in localised contamination of soils and groundwater underlying the site; and
- The removal of topsoil and subsoil cover during construction, which will further increase the vulnerability of the underlying bedrock.

Any such cumulative effects would be confined to the operational footprint of the Edenderry Renewable Energy Complex and would not extend into the wider agricultural lands crossed by the Proposed Development pipeline.

The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants within the Edenderry Renewable Energy Complex. This constitutes the related development.

The related development is confined to previously disturbed industrial ground located entirely within the Edenderry Renewable Energy Complex; no new greenfield or agricultural soils are affected by the related development; and best practice soil management, pollution prevention and spill control measures will be implemented as part of standard construction controls.

The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***short-term***.

5.5.2 Operational Phase

In relation to the potential cumulative impacts on land, soils, and geology during the operational phase, there is no risk of accidental spills, leaks, and discharges into the underlying soil..

There are no direct outward emissions associated with the Proposed Development once constructed. The gas transmission pipeline will be fully buried underground and, as such, will not give rise to operational impacts on land, soils or geology.

There is a low risk potential for accidental spillages of fuels or oils during infrequent inspection and maintenance activities. However, these operational elements are fully contained within designed infrastructure and managed systems. Stormwater from the Ballykilleen AGI is conveyed via the existing surface water drainage network within the Renewable Energy Complex, while surface water at the Kilwarden Offtake Installation is managed via on site soakaway infrastructure. These systems are designed and operated to prevent uncontrolled discharges to land or soils. Fuel and oils associated with plant and maintenance activities are stored, handled and managed in accordance with standard operational controls and pollution prevention procedures.

The gas pipeline itself comprises a buried underground gas transmission pipeline which does not require routine ground disturbance during operation.

The related development does not introduce new operational processes that would result in ongoing soil disturbance or contamination pathways beyond those already licensed and managed at the Renewable Energy Complex.

The operational phase cumulative effect of the Proposed Development in combination with the related developments, with respect to land, soils and geology, is assessed as ***neutral, imperceptible and long term.***

6. HYDROLOGY AND HYDROLOGY

6.1 Introduction

The assessment of Hydrology and Hydrogeology is contained within Chapter 6 of the EIAR. Chapter 6 assesses and evaluates the likely significant effects of the Proposed Development on the hydrological and hydrogeological aspects of the site and surrounding area. Chapter 6 contains necessary information as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

The chapter initially provides a description of the receiving environment of the site and the potential impacts of the Proposed Development. When assessing the potential impacts, this assessment considers the significance of the environmental attributes, and the predicted scale, and duration of the likely effects.

The chapter also outlines the proposed mitigation and design measures that will reduce or eliminate the identified potential impacts and defines the residual effects of the Proposed Development (the effect after the implementation of mitigation measures).

6.2 Baseline Environment

The Proposed Development site and associated temporary working areas covers an area of approximately 243.4 hectares (ha) (the "Proposed Development Site" hereafter) and encompasses all lands required for the construction and operation of the pipeline, including the Kilwarden Offtake Installation, the Ballykilleen AGI, temporary construction compounds, line pipe storage areas, and all associated ancillary works.

The Proposed Development Site comprises the c. 23.65 km linear route of the underground GNI 143 Ballykilleen Pipeline and its temporary working areas.

The wider area is characterised as predominantly rural and primarily associated with greenfield land with a predominant agricultural function.

The landscape within the Proposed Development Site is predominantly rural, comprising irregular agricultural fields used for grazing and cropping and bounded by traditional hedgerows characteristic of Counties Meath and Offaly. The lands are largely undeveloped, with no residential dwellings or permanent buildings located within the Proposed Development Site. Existing infrastructure intersected along the pipeline route includes regional and local roads, agricultural access tracks, drainage ditches, the M4 Motorway, and the Grand Canal. Residential dwellings occur in the wider area but primarily as dispersed one off houses along local roads, with no urban centres directly adjoining the site.

At the southern end of the route, the receiving environment transitions from agricultural to industrial lands associated with the Edenderry Renewable Energy Complex, an established energy generation facility. The proposed Ballykilleen AGI is located within this industrial area. The route has been divided into 6 sections within the EIAR with reference to chainage. The 6 sections are presented in the Table 1 below.

Table 6-1. Structured Sections to describe the Proposed Development

Pipeline Section	Start Point (m)	End Point (m)	Length (m)
Pipeline Section 1: Kilwarden Offtake Installation to the L40181 Road (RDX05)	0	3,931	3,931

Pipeline Section 2: L40181 Road (RDX05) to the L4091 (RDX09)	3,931	7,441	3,510
Pipeline Section 3: L4091 Road (RDX09) to the Yellow River (RVX02)	7,441	11,669	4,228
Pipeline Section 4: Yellow River (RVX02) to the R441 (RDX12)	11,669	15,348	3,679
Pipeline Section 5: R441 (RDX12) to the L5003 (RDX15)	15,348	19,494	4,146
Pipeline Section 6: L5003 (RDX15) to the Ballykilleen AGI	19,494	23,650	4,156
GNI 143 Ballykilleen Pipeline	0	23,650	23,650

The Proposed Development pipeline route spans across three sub catchments. The northern (section 1-2), central (Section 3-5) and southern portions (Section 6) of the site lie within the Boyne_SC_030 subcatchment, Boyne_SC_010 subcatchment and Figile_SC_010 subcatchment, respectively.

The current EPA watercourse mapping shows that the entire pipeline route is traversed by 11No. watercourses / streams and 2 no. rivers. The flow directions, outfall and distance are presented in Table below.

Table 6-2. EPA Rivers Traversing the Proposed Pipeline

Section	EPA Waterbody Name	Water Crossing Reference	Order Class	Flow Direction	Outfall	Distance to Outfall
1	Kinnegad 07 / Kilwarden	RVX01	River	Easterly	River Boyne	c. 5.3 km
	AGHNAGILLAGH	WCX02	Stream	South Easterly	River Boyne	c. 3.5 km
2	KNOCKERSALLY or COLEHILL	WCX04	Stream	Easterly	River Boyne	c. 1.8 km
	PARK 07	WCX05	Stream	Easterly	River Boyne	c. 1.4 km
3	BALLYNAKIL 07	WCX06	Stream	South	River Boyne	c. 1.0 km
	CASTLEJORDAN 07	WCX11	Stream	Easterly	River Boyne	c. 0.6 km
	RAHIN	WCX12	Stream	Easterly	CASTLEJORDAN 07 Stream	c. 180m
	Yellow [Castlejordan]	RVX02	River	Easterly	River Boyne	c. 130m
4	ROOSK 07	WCX16	Stream	Easterly	River Boyne	c. 1.5 km
5	MOUNTWILSON	N/A*	Stream	Easterly	KINNAFAD Stream	c. 550m
	KINNAFAD	WCX19	Stream	Easterly	River Boyne	c. 2.5 km
6	BALLYLEAKEN	WCX24	Stream	South Easterly	Figile River	c. 3.1 km
	BALLYKILLEEN	WCX29 & WCX30	Stream	South	Figile River	c. 200m

The WFD surface water quality status for 2019-2014 and Risk Score for the waterbodies presented in Table 2 above is presented in Table 3 below.

Table 6-3. WFD Surface Water Quality Status 2019-2024

Section	EPA Water Body Name	WFD Water Body Name	European Code	WFD Status (2019-2024)	WFD Risk Score (3rd Cycle)

1	Kinnegad 07 / Kilwarden	Boyne_040	IE_EA_07B040600	Poor	At Risk
	AGHNAGILLAGH	Boyne_040	IE_EA_07B040600	Poor	At Risk
2	KNOCKERSALLY or COLEHILL	Boyne_030	IE_EA_07B040400	Good	Not At Risk
	PARK 07	Boyne_030	IE_EA_07B040400	Good	Not At Risk
3	BALLYNAKIL 07	Boyne_030	IE_EA_07B040400	Good	Not At Risk
	CASTLEJORDAN 07	Boyne_030	IE_EA_07B040400	Good	Not At Risk
	RAHIN	Boyne_030	IE_EA_07B040400	Good	Not At Risk
	Yellow [Castlejordan]	YELLOW (CASTLEJORDAN)_030	IE_EA_07Y020300	Good	Not At Risk
4	ROOSK 07	Boyne_030	IE_EA_07B040400	Good	Not At Risk
5	MOUNTWILSON	Boyne_020	IE_EA_07B040300	Moderate	At Risk
	KINNAFAD	Boyne_020	IE_EA_07B040300	Moderate	At Risk
6	BALLYLEAKEN	FIGILE_030	IE_SE_14F010200	Moderate	At Risk
	BALLYKILLEEN	FIGILE_030	IE_SE_14F010200	Moderate	At Risk

There are 20 unmapped watercourses and 1 canal which also transverses the route. They are referenced by the water crossings and chainage as presented in Table 4 below.

Table 6-4. Unmapped Watercourses and Canal Traversing the Proposed Pipeline

Water Crossing Reference	Chainage/ ITM Coordinates	Inferred Flow Direction	River Q Values, Status*	Final Receptor
WCX01	1900	north-easterly	Q2-3, Poor	River Boyne
WCX03	4893	southeast	Q2-3, Poor	River Boyne
WCX06	7496	south	N/A *	River Boyne
WCX07	8030	South Easterly	Q2, Bad	River Boyne
WCX08	8815	South	Q2-3, Poor	River Boyne
WCX09	9278	South	Q2, Bad	River Boyne
WCX10	9603	South Easterly	Q2-3, Poor	River Boyne
WCX13	12916	East	Q3, Poor	River Boyne
WCX14	13124	East	Q3, Poor	River Boyne
WCX15	13376	Northeast	Q2-3, Poor	River Boyne
WCX17	15543	Southwest then Northeast	Q3, Poor	River Boyne
WCX18	16054	Southwest then Northeast	N/A*	River Boyne
WCX20	16706	Northeast	Q3, Poor	River Boyne
WCX21	16882	Southwest	Q3, Poor	River Boyne
WCX22	17204	West	N/A*	River Boyne
WCX23 (Grand Canal)	18090	East		Liffey Lower Estuary Transitional Waterbody & Dublin Bay Coastal Waterbody
WCX25	20679	Southeast	Q3, Poor	River Figile

WCX26	21034	Southeast	Q3, Poor	River Figile
WCX27	22459	East	Q3, Poor	River Figile
WCX28	22617	East	Q2-3, Poor	River Figile

There are no Recreational Waters or Bathing Waterbodies located in the immediate vicinity of the site or downstream in any of the watercourses or rivers through which the pipeline route traverses / crosses.

The surface waterbodies that traverse the site which are listed above in Table 4 are not located within a designated Surface Water Drinking RPA.

The site is located within Flood Zone A, B and C, signifying varying risk from fluvial (surface water) flooding. Pluvial flood (flooding from rainfall) potential may arise from localised depressions in the ground at the site but is not considered a significant risk. The CFRAM predictive flood extent study indicates that majority of the Proposed Development is within Flood Zone C with the only section within Flood Zone A / B is the section that will traverse the Boyne tributary. All other Flood Zone A & B areas that intercepts the pipeline remain within the stream banks, that is they do not flood out on to the adjacent land. All development located in Flood Zone B will be installed underground, and all associated construction works are located in Flood Zone C.

The Areas of Conservation or European sites in closest proximity of the site are as follows:

- The Mount Hevey Bog SAC (Site Code: 002342), located c. 20m north (linear distance) of the Kilwarden Offtake Installation Pipeline Section 1.
- The River Boyne & River Blackwater SAC (Site Code: 002299) and SPA (Site Code: 004232), located c. 6.2km east (linear distance) at the point of closest proximity to the site.
- The River Nore & River Barrow SAC (Site Code: 002162), located c. 16.1km south (linear distance) at the point of closest proximity to the site.
- The Grand Canal pNHA (Site Code: 002104), traverses / intersects the site at Pipeline Section 5.
- The Long Derries, Edenderry SAC (Site Code: 000925), located upstream c. 3.8 km east of Pipeline Section 6 of the site at the point of closest proximity.

There is a direct hydrological connection between the River Boyne & River Blackwater SAC and SPA and proposed pipeline route via the River Boyne which receives water from multiple streams which transverses the route and different locations as described in Chapter 6.

There is a direct hydrological connection between the River Nore & River Barrow SAC and the proposed pipeline route via River Figile which receives water from multiple streams which transverses the route and different locations as described in Chapter 6.

The hydrogeological environment which includes aquifer classification, groundwater body and groundwater vulnerability within each section is presented in Table 5 below.

Table 6-5. Hydrogeological Environment

Section	Groundwater Body	Aquifer Classification	Groundwater Vulnerability
1	Athboy	LI – Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones	Moderate to Extreme
		Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive	

Section	Groundwater Body	Aquifer Classification	Groundwater Vulnerability
2	Athboy	LI – Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones	Moderate to High
		Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive	
3	Athboy	LI – Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones	Moderate to High
	Kilrathmurry Gravels	Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive	
4	Trim	Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive	Moderate to High
5	Trim	Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive	Moderate to High
6	Rhodes	LI – Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones	Moderate to Extreme
	Cushina	Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive	

The WFD groundwater quality status for the period of 2019-2024 for each groundwater body presented above and WFD risk score is presented in Table 6 below.

Table 6-6. WFD Groundwater Quality Status 2019-2024

Section	Groundwater Body	WFD Status (2019-2024)	WFD Risk Score (3rd Cycle)
1	Athboy	Good	Not At Risk
2	Athboy	Good	Not At Risk
3	Athboy	Good	Not At Risk
	Kilrathmurry Gravels	Good	Not At Risk
4	Trim	Good	At Risk
5	Trim	Good	At Risk
6	Rhodes	Good	Not At Risk
	Cushina	Good	Not At Risk

The nearest Group Water Scheme (Preliminary Source Protection Area Zone of Contribution) to the site is Ballykilleen (Zone of Contribution Unique ID IE_GSI_ZOC_37), which is located c. 600m to the east of the subject development site at the point of closest proximity. The subject development site is outside the zone of contribution for this supply.

The Public Water Supply / Public Supply Source Protection Area / Zone (SPZ) / drinking water protection area in closest proximity to the Proposed Development site is the EDENDERRY PWS (Source Protection Area Unique ID: IE_GSI_SPA_269), which is located c. 2.7 km east of the pipeline route beneath the townland of Edenderry (linear distance at the point of closest proximity). The subject development site is outside the zone of contribution for this supply.

Neither of these areas share a hydrological or hydrogeological connection to the site and are located hydrologically upgradient / upstream of the development site.

6.3 Potential Impacts of the Proposed Development

6.3.1 Construction Phase

In absence of mitigation measures, the construction phase would present potential impacts associated with the following activities:

- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates)) – arising from excavation and ground disturbance;
- Excavations/ top and sub soil stripping- Increase sediment run off (erosion during rainfall periods), Pollutant mobilisation (heavy metal runoff), Loss of vegetation;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons and other construction chemicals (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms. Construction phase sewerage will be contained in a tank and taken by tanker off site for disposal at a licensed waste management facility.

In the absence of mitigation measures the potential impacts during the construction phase on surface water quality and groundwater quality are ***negative***, ***slight and short term***.

In the absence of mitigation measures, there is the potential for ***negative, significant, brief effects*** (effects lasting less than a day) on surface water quality associated with open-cut watercourse crossings during the construction phase.

In the absence of mitigation measures, there is the potential for ***negative, significant, brief effects*** (effects lasting less than a day) on surface water quality during the installation and removal of temporary structures, and ***negative, slight to moderate, short-term effects*** on surface water quality during the period in which temporary structures remain in place during construction.

In the absence of mitigation measures, the potential impacts during the construction phase on surface water quality and groundwater quality associated with trenchless crossings are considered to be ***negative, slight, short-term***.

In the absence of mitigation measures, the potential impacts on surface water and groundwater flow/quantity from general construction activities are **negative, short-term** and ***slight to moderate***.

In the absence of mitigation measures, open-cut watercourse crossings have the potential to result in ***negative, significant, short-term effects*** on surface water flow.

In the absence of mitigation measures, there is potential for ***negative, significant, brief effects*** on flow conditions during the installation and removal of temporary structures, and ***negative, slight to moderate, short-term effects*** on local flow conveyance during construction.

In the absence of mitigation measures, the potential impacts on surface water flow and quantity associated with trenchless crossings are considered ***negative, slight,*** and ***short-term.***

In the absence of mitigation measures, construction-phase activities have the potential to result in ***negative, slight to moderate, short-term impacts*** on surface water flow and local flood conditions during periods of high rainfall or elevated river levels.

In the absence of mitigation measures the potential impacts during the construction phase on River Boyne and River Blackwater SAC/SPA are ***negative***, ***moderate to significant*** and ***short term***.

In the absence of mitigation measures the potential impacts during the construction phase on River Nore and River Barrow SAC are ***negative***, ***slight*** and ***short term***.

In the absence of mitigation measures the potential impacts during the construction phase on Grand Canal pNHA and Long Derries, Edenderry SAC are ***negligible, imperceptible*** and ***short term***.

In the absence of mitigation measures the potential impacts during the construction phase on human health and populations due to changes to the potential for contamination of soil and groundwater are ***negative***, ***slight*** and ***short term.***

In the absence of mitigation measures the potential impacts during the construction phase on Water Framework Directive Status due to changes to the potential for contamination of soil and groundwater are ***neutral, imperceptible*** and ***short term.***

6.3.2 Operational Phase

There will be no direct discharges to the ground or abstractions from the bedrock aquifer during the operation of the development. The potential impacts of the development post development in relation to hydrology and hydrogeology have been assessed under the following headings:

- Localised and Minor Accidental Emissions (spill or leakages) to ground from designated car parking areas.
- Increase in hardstanding area will result in a localised reduction in recharge to the aquifer. This provides protection to the underlying aquifer but also reduces local recharge in this area of the aquifer. As the area of aquifer is large this reduction in local recharge will have no significant change in the natural hydrogeological regime.

In the absence of mitigation, the potential impacts on surface water and groundwater quality during the operational phase are assessed as ***neutral, imperceptible,*** **and** ***long-term.***

In the absence of mitigation, the potential impacts on surface water and groundwater quality during the operational phase are assessed as ***neutral, imperceptible,*** **and** ***long-term.***

In the absence of mitigation, the potential impacts on surface water and groundwater flow and quantity during the operational phase are assessed as ***neutral, imperceptible,*** **and** ***long-term.***

The operational-phase effects on flood risk, surface water flow and groundwater flow and quantity are assessed as ***neutral, imperceptible,*** **and** ***long-term***.

In the absence of mitigation measures the potential impacts during the operational phase on the designated areas are ***neutral, imperceptible,*** and ***long-term***.

In the absence of mitigation measures the potential impacts during the operational phase on human health and population due to changes in the hydrological and hydrogeological environment are ***neutral, imperceptible,*** and ***long-term***.

In the absence of mitigation measures the potential impacts during the operational phase on water framework directive are ***neutral, imperceptible,*** and ***long-term***.

6.4 Mitigation and Residual Effects (Post-Mitigation)

6.4.1 Construction Phase

In order to reduce impacts on the hydrological and hydrogeological environment, a number of mitigation measures will be adopted as part of the construction works on site.

- Implementation of Sediment Control Plan (SCP) included in the Outline Construction Environmental Management Plan (CEMP).
- Control of Pollution from Fuels, Oils and Construction Chemicals.
- Control of Concrete
- Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, attenuation pond) and use of riparian zone along the stream.
- Surface water and wastewater management infrastructure- protection from flooding, protection of watercourses and fisheries habitat and accidental wastewater discharges.
- Mitigations measures related to open cut water crossings have been designed in accordance with IFI guidelines and include buffer zones, silt reduction measures and silt fences.
- Mitigation measures related to trenchless drilling 10m buffer zone for launch and reception pit. A buffer zone 50m at river crossings and 20m at watercourse crossings has been included for any storage and construction activity.

The predicted residual impact on the hydrological and hydrogeological environment with mitigation during the construction phase is ***neutral, imperceptible*** and ***long-term,*** the magnitude of impact is considered ***negligible***.

6.4.2 Operational Phase

Increase in hardstanding area will result in a localised reduction in recharge to the aquifer. The use of permeable / porous surfacing (gravel) in the parking areas and access roads will allow some percentage of recharge to the underlying bedrock aquifer.

In order to mitigate against localised and minor accidental emissions (spill or leakages) to ground from designated car parking areas. Sumps and bypass petrol interceptors will be provided for parking. These will remove any sediment/ silt and oil prior to discharge from site.

The drainage at the Kilwarden Offtake site connects to a soakaway pit, as indicated in the planning drawings. This soakaway is also linked to the existing roadside drain outside the compound. This setup ensures that in the highly unlikely event of the soakaway overflowing, excess water would be safely diverted into the roadside drain.

Stormwater drainage from the Ballykilleen AGI will connect to an attenuation pond located within the Edenderry Renewable Energy Complex. This pond subsequently discharges through hydrocarbon interceptors at a controlled rate into the Figile River.

The predicted residual impact on the hydrological and hydrogeological environment with mitigation during the operational phase is ***neutral, imperceptible*** and ***long-term***, the magnitude of impact is considered ***negligible.***

6.5 Cumulative Impact of the Proposed Development

6.5.1 Construction Phase

The Edenderry Renewable Energy Complex is an established industrial site where the hydrological environment has been extensively modified by existing development, including permanent hardstanding, foundations, underground services and engineered drainage infrastructure. As a

result, surface water runoff is already managed within a controlled drainage system and directed towards a single receiving waterbody, the River Figile.

The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants within the Edenderry Renewable Energy Complex. This constitutes the related development.

During the construction phase, the Proposed Development may overlap temporally with construction activities associated with the related development within the Renewable Energy Complex. In relation to the potential cumulative impact on hydrology and hydrogeology during the construction phase, the construction works which would have potential cumulative impacts are as follows:

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

Construction of the Proposed Development will be subject to a Construction Environmental Management Plan (CEMP), incorporating standard best practice measures for sediment control, spill prevention and containment, and construction water management. These measures, together with the established drainage controls already operating within the Renewable Energy Complex, will ensure that construction phase runoff and accidental discharges are effectively managed prior to discharge to the River Figile.

The mitigation measures set out in Section 6.6 and monitoring/reinstatement measures in Section 6.7, provides best practice procedures for sediment control, treatment of construction water.

The works contractors will also be obliged to ensure that measures are in place to protect soil and water quality in compliance with legislative standards for receiving groundwater quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 as amended), and water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Surface Waters) Regulations (S.I. No. 272 of 2009 as amended).

The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***long-term***.

6.5.2 Operational Phase

During the operational phase, the Proposed Development primarily comprises buried infrastructure and does not alter existing surface water drainage patterns along the pipeline route. Within the Edenderry Renewable Energy Complex, operational hydrological interaction is limited to the Ballykilleen AGI.

Additional hardstanding at the Ballykilleen AGI will generate surface water runoff during rainfall events. Stormwater arising from this hardstanding will be captured and managed through the existing site drainage infrastructure. The pond is designed to regulate flow and provide settlement prior to discharge, with treated surface water released at a controlled rate to the River Figile.

Operational activities at the AGI may present a low-probability risk of minor accidental spills during infrequent inspection or maintenance activities. However, these risks are managed through established operational procedures and by the controlled surface water drainage and attenuation system, which provides separation between potential sources and the receiving environment.

The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***long-term***.

7. BIODIVERSITY

7.1 Introduction

The Biodiversity chapter of the Environmental Impact Assessment Report (EIAR) was carried out by Altemar Ltd. It assesses the biodiversity value of the Proposed Development area and the potential effects of the development on the ecology of the surrounding area and within the potential zone of influence (ZOI). It also assesses the significance of the likely impacts of the scheme on the biodiversity elements and designs mitigation measures to alleviate identified impacts.

A separate Natura Impact Statement (NIS), in accordance with the requirements of Article 6(3) of the EU Habitats Directive, has been produced to identify potential effects of the development on Natura 2000 sites, Annex species or Annex habitats.

7.2 Baseline Environment

The proposed development areas predominantly comprised of open, improved, grazed agricultural grassland along with occasional arable fields and wet grassland across an area of approximately 23.65 km in length comprising 243.4 ha from the townland of Kilwarden, Co. Meath, and Edenderry Renewable Energy Complex in Kilcumber, Co. Offaly. The proposed works area crossed a number of waterbodies that provide both local biodiversity benefits and hydrological linkages with sensitive habitats and species. Surveys were carried out recording and mapping sensitive ecological receptors within and adjacent to the subject site, including bat, breeding bird, mammal, Fossitt/flora and aquatic biodiversity assessments. A number of badger setts, active bat roosts, trees of bat roosting potential, nesting areas, rare/threatened plant species and Habitat Directive Annex-listed aquatic species were recorded within and adjacent to the subject site.

7.3 Potential Impacts of the Proposed Development

7.3.1 Construction Phase

- In the absence of mitigation, the impact of the proposed development on sites of international importance is considered low, adverse, significant, and short-term.
- In the absence of mitigation, the impact of the proposed development on sites of national importance is considered low, adverse, significant, and short-term.
- In the absence of mitigation, the impact of the proposed development on habitats is considered low/negligible, adverse, not significant, and short-term.
- The loss of Low value hedgerow will have a low, adverse, not significant and short-term effect on biodiversity. The loss of Moderate value hedgerow will have a low, adverse, not significant and short-term effect on biodiversity. The loss of High value hedgerow will have a low, adverse, not significant and short-term effect on biodiversity locally.
- Without mitigation, it is highly likely that active badger setts (breeding and non-breeding) and badger movements and behaviour will be disturbed. There is a risk to the safety of individuals via excavations along the proposed corridor. The potential impact on badgers locally in the absence of mitigation measures is moderate, adverse, significant and short-term.
- The potential impact on otters locally, in the absence of mitigation measures, is low, adverse, significant and short-term.
- The potential impact in the absence of mitigation measures on trees of bat roosting potential and potential bat roosts is negative, significant, long-term in duration. The potential impact of lighting in the absence of mitigation measures on bats is negative, not significant, temporary in duration.
- Considering the species actively or displaying evidence of breeding, and cumulative scale of hedgerow removal in relation to similar available habitat in the wider area, and the planned

reinstatement of removed hedgerows following construction, the potential effects on local bird populations in the absence of mitigation are low adverse, negative, not-significant, medium-term.
- In the absence of mitigation, given the context and scale of the proposed in-stream works, potential impacts on aquatic biodiversity locally are considered to be medium adverse, negative, significant and short-term. Mitigation is required to protect aquatic habitats along the proposed route from silt and pollution.

7.3.2 Operational Phase

- In the absence of mitigation, the impact of the proposed development on sites of international importance is considered neutral, imperceptible and long-term.
- In the absence of mitigation, the impact of the proposed development on sites of national importance is considered neutral, none and long-term.
- In the absence of mitigation, the operational impact of the proposed development on habitats is considered negligible-neutral, not significant, and short-term.
- In the absence of mitigation, the operational impact of the proposed development on hedgerows is considered low-negative, not significant, and long-term.
- In the absence of mitigation, the operational impact of the proposed development on badgers is considered negligible-neutral, not significant, and long-term.
- In the absence of mitigation, the operational impact of the proposed development on otters is considered negligible-neutral, imperceptible, and long-term.
- In the absence of mitigation, the operational impact of the proposed development on bat foraging and navigation is considered negligible adverse, negative, not significant, medium-term in duration.
- In the absence of mitigation, the operational impact of the proposed development on bat roosts and trees of bat roosting potential is considered low adverse, negative, significant, long-term in duration.
- In the absence of mitigation, the operational impact of the proposed development on breeding birds is considered negligible-neutral, imperceptible, and long-term.
- In the absence of mitigation measures, the operational impact on aquatic biodiversity is considered negligible-neutral, imperceptible and long-term.

7.4 Mitigation and Residual Effects (Post-Mitigation)

7.4.1 Construction Phase

- With the employment of the appropriate mitigation measures regarding sites of international importance, any residual effects of the Proposed Development on these sites at a local level are anticipated to be low-adverse, negative, not significant and temporary.
- With the employment of the appropriate mitigation measures regarding sites of national importance, any residual effects of the Proposed Development on these sites at a local level are anticipated to be low-adverse, negative, not significant and short-term.
- With the employment of the appropriate mitigation measures regarding hedgerows, any residual effects of the Proposed Development on hedgerows at a local level are anticipated to be low-adverse, negative, not significant and medium-term.
- With the employment of the appropriate mitigation measures regarding habitats (and their associated flora), any residual effects of the Proposed Development on habitats at a local level are anticipated to be low-adverse, negative, not significant and short-term.
- With the employment of the appropriate mitigation measures regarding badgers, any residual effects of the Proposed Development on badgers and their resting places at a local level are anticipated to be negligible-adverse, neutral, not significant and short-term.
- With the employment of the appropriate mitigation measures regarding otters, any residual effects of the Proposed Development on otters and their habitat at a local level are anticipated to be negligible-adverse, neutral, not significant and short-term.

- With the employment of the appropriate mitigation measures regarding breeding birds, any residual effects of the Proposed Development on breeding birds and nesting habitat at a local level are anticipated to be low-adverse, negative, not significant and short-term.
- With the employment of the appropriate mitigation measures regarding bats and bat roost habitat, any residual effects of the Proposed Development on bats at a local level are anticipated to be low-adverse, neutral, not significant and short-term.
- With the employment of the appropriate mitigation measures regarding aquatic biodiversity, in-stream works, surface water run-off and works in proximity to waterbodies, any residual effects of the Proposed Development on aquatic biodiversity are anticipated to be low-adverse, neutral, not significant and short-term.

7.4.2 Operational Phase

- With the employment of the appropriate mitigation measures regarding sites of international importance, any residual effects of the Proposed Development on these sites at a local level are anticipated to be negligible-adverse, neutral, imperceptible and long-term.
- With the employment of the appropriate mitigation measures regarding sites of national importance, any residual effects of the Proposed Development on these sites at a local level are anticipated to be neutral-none and long-term.
- With the employment of the appropriate mitigation measures regarding hedgerows, any residual effects of the operational phase of the Proposed Development on hedgerows are anticipated to be negligible-adverse, neutral, not significant and long-term.
- With the employment of the appropriate mitigation measures regarding habitats (and their associated flora), any residual effects of the operational phase of the Proposed Development on habitats at a local level are anticipated to be negligible-adverse, neutral, not significant and long-term.
- With the employment of the appropriate mitigation measures regarding badgers, any residual effects of the operational phase of the Proposed Development on badgers and their resting places at a local level are anticipated to be negligible-adverse, neutral, not-significant and long-term.
- With the employment of the appropriate mitigation measures regarding otters, any residual effects of the operational phase of the Proposed Development on otters and their habitat at a local level are anticipated to be negligible-adverse, neutral, not-significant and long-term.
- With the employment of the appropriate mitigation measures regarding breeding birds, any residual effects of the operational phase of the Proposed Development on breeding birds and nesting habitat at a local level are anticipated to be negligible-adverse, neutral, imperceptible and long-term.
- With the employment of the appropriate mitigation measures regarding bats and bat roost habitat, any residual effects of the operational phase of the Proposed Development on bats at a local level are anticipated to be negligible-adverse, neutral, imperceptible and long-term.
- With the employment of the appropriate mitigation measures regarding aquatic biodiversity, in-stream works, surface water run-off and works in proximity to waterbodies, any residual effects of the operational phase of the Proposed Development on aquatic biodiversity are anticipated to be negligible-adverse, neutral, imperceptible and long-term.

7.5 Cumulative Impact of the Proposed Development

7.5.1 Construction Phase

- Potential cumulative impacts with the future conversion of the existing 116 MW Cushaling Peaker Plant during construction are considered to be negligible-adverse, neutral, imperceptible, temporary. Significant cumulative impacts are unlikely.
- Potential cumulative impacts with the permitted Eirgrid PLC application to Offaly County Council (OCC) to upgrade the existing Rinawade – Dunfirth Tee – Kinnegad 110kV overhead line (OCC

Reg. Ref.: 2560500) during construction are considered to be negligible-adverse, neutral, imperceptible, temporary. Significant cumulative impacts are unlikely.

- Potential cumulative impacts with the submitted Water Supply Project Eastern and Midlands Region (An Coimisiún Pleanála (ACP) Reg. Ref.: 323980) during construction are considered to be negligible-adverse, neutral, imperceptible, temporary. Significant cumulative impacts are unlikely.
- In the event of direct overlap in peak construction activity with the potential future Ballydermot Windfarm Project, potential cumulative impacts are considered to be low-adverse, not significant, temporary. Significant cumulative impacts are unlikely.

7.5.2 Operational Phase

- Potential cumulative impacts with the future conversion of the existing 116 MW Cushaling Peaker Plant during operation are considered to be negligible-adverse, neutral, imperceptible, long-term. Significant cumulative impacts are unlikely.
- Potential cumulative impacts with the permitted Eirgrid PLC application to Offaly County Council (OCC) to upgrade the existing Rinawade – Dunfirth Tee – Kinnegad 110kV overhead line (OCC Reg. Ref.: 2560500) during operation are considered to be negligible-adverse, neutral, imperceptible, long-term. Significant cumulative impacts are unlikely.
- Potential cumulative impacts with the submitted Water Supply Project Eastern and Midlands Region (An Coimisiún Pleanála (ACP) Reg. Ref.: 323980) during operation are considered to be negligible-adverse, neutral, imperceptible, long-term. Significant cumulative impacts are unlikely.
- Potential cumulative impacts with the potential future Ballydermot Windfarm Project during operation are considered to be negligible-adverse, neutral, not significant, long-term. Significant cumulative impacts are unlikely.

8. AIR QUALITY

8.1 Introduction

The assessment of Air Quality is contained within Chapter 8. The air quality assessment has focused on:

- Potential construction dust emissions and impacts to nearby sensitive receptors such as residential properties, schools, hospitals, etc.
- Potential vehicle emissions from traffic accessing the site for construction works and during operation; and
- Operational boiler emissions associated with the Proposed Development.

8.2 Baseline Environment

Baseline data and data available from similar environments indicates that levels of nitrogen dioxide (NO_2), particulate matter less than 10 microns (PM_{10}) and particulate matter less than 2.5 microns ($PM_{2.5}$) and are generally well within the current National and European Union (EU) ambient air quality standards.

8.3 Potential Impacts of the Proposed Development

8.3.1 Construction Phase

An assessment of the potential dust impacts as a result of the construction phase of the Proposed Development was carried out based on the UK Institute for Air Quality Management 2024 guidance document *'Guidance on the Assessment of Dust from Demolition and Construction'*. This established that there is a high risk of dust related impacts associated with the Proposed Development. In the absence of mitigation there is the potential for ***short-term, direct, localised, negative*** and ***slight*** impacts to air quality, which is potentially significant in the absence of mitigation.

In addition, construction phase traffic emissions have the potential to impact air quality, particularly due to the increase in the number of HGVs accessing the site. Construction phase traffic did not meet the scoping criteria for a detailed modelling assessment outlined in Transport Infrastructure Ireland's 2022 guidance document *'Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106'.* As a result, a detailed air assessment of construction phase traffic emissions has been scoped out and the construction phase traffic emissions will have a ***short-term, direct, localised, negative*** and ***not significant*** impact on air quality.

8.3.2 Operational Phase

Operational phase traffic has the potential to impact air quality due to vehicle exhaust emissions as a result of the increased number of vehicles associated with the Proposed Development. Operational phase traffic did not meet the scoping criteria for a detailed modelling assessment outlined in Transport Infrastructure Ireland's 2022 guidance document *'Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106'.* As a result, a detailed air assessment of operational phase traffic emissions has been scoped out and the operational phase traffic emissions will have a ***short-term, direct, localised, negative*** and ***not significant*** impact on air quality.

The Ballykilleen AGI will contain small boilers (<1MWth). Because of their size and low thermal output, the emissions of these boilers are highly unlikely to cause a significant air quality effect and so have been scoped out of this assessment.

A qualitative assessment was carried out separately to review the likely changes in emissions as a result of the change in fuel source to the Cushaling Peaker Plant and determine if there are likely to be any air quality effects that require mitigation. This can be found in Appendix 2.4 of Chapter 2 of the EIAR.

8.4 Mitigation and Residual Effects (Post-Mitigation)

8.4.1 Construction Phase

Detailed dust mitigation measures are outlined within the air quality chapter to ensure that no significant impacts as a result of construction dust emissions occur at nearby sensitive receptors. Once these best practice mitigation measures, derived from the Institute for Air Quality Management 2024 guidance '*Guidance on the Assessment of Dust from Demolition and Construction'* as well as other relevant dust management guidance, are implemented the impacts to air quality during the construction of the Proposed Development are ***short-term, direct, localised, negative*** and ***not significant***.

8.4.2 Operational Phase

No site-specific mitigation measures are proposed for the operational phase. The impact to air quality has been assessed as ***long-term, direct, localised, negative*** and ***not significant***.

8.5 Cumulative Impact of the Proposed Development

8.5.1 Construction Phase

There is the potential for cumulative impacts to air quality should the construction phase of the Proposed Development coincide with that of other developments within 500 m of the site. A review of proposed/permitted developments in the vicinity of the site was undertaken.

The recommended dust mitigation measures will be applied during the construction phase which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the Proposed Development is deemed ***short-term, direct, localised, negative*** and ***not significant.***

8.5.2 Operational Phase

Operational phase direct impacts on air quality associated with the Proposed Development and cumulative traffic emissions are predicted to be ***long-term, direct, localised, negative*** and ***not significant***.

9. CLIMATE

9.1 Introduction

The assessment of Climate is contained within Chapter 9. The impact assessment included the following:

- The potential greenhouse gas emissions during the construction and operational phases of the Proposed Development.
- The vulnerability of the project to climate change, including considerations for increased rainfall and other projected climate impacts.

9.2 Baseline Environment

The existing climate baseline can be determined by reference to data from the EPA on Ireland's total greenhouse gas (GHG) emissions and alignment with Ireland's 2030 sectoral emissions ceilings and carbon budgets. The EPA state that Ireland had total GHG emissions of 57.6 Mt CO_2e in 2024, these are the most recent figures available. This is 1.03 Mt CO_2e higher than Ireland's annual target for emissions in 2024. EPA projections indicate that Ireland has used 82.5% of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025. This leaves 17.5% of the budget available for 2025, requiring a substantial 10.3% annual emissions reduction for 2025 to stay within budget.

9.3 Potential Impacts of the Proposed Development

The potential impacts on climate have been assessed in two distinct ways – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA). The GHGA quantifies the GHG emissions from a project over its lifetime and compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude. The CCRA considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

9.3.1 Greenhouse Gas Assessment

Calculation of the GHG emissions associated with the construction and operation of the Proposed Development was carried out using the online Transport Infrastructure Ireland Carbon Tool. The GHG emissions associated with the Proposed Development are predicted to be a small fraction of Ireland's 2030 non-ETS of 27.7 $MtCO_2e$, and a small fraction of the relevant sectoral 2030 emissions ceilings.

The TII PE-ENV-01104 guidance states that the following two factors should be considered when determining significance:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

The level of mitigation proposed for the Proposed Development has been taken into account when determining the significance of the Proposed Development's GHG emissions. The Proposed Development has proposed some best practice mitigation measures and is committing to reducing climate impacts where feasible. The Proposed Development is fully in line with national climate policy, in terms of both CAP25 and the National Biomethane Strategy, as investment in existing and expansion gas pipelines is required for GNI to meets its policy obligations and to enable decarbonisation of its network.

Therefore, according to the TII significance criteria, the significance of the GHG emissions during the construction and operational phase is minor adverse. The Proposed Development has mitigated some GHG impacts where possible. In accordance with the EPA guidelines the above significance equates to a significance of effect of GHG emissions during the construction and operational phases which is ***direct, long-term, negative*** and ***slight***, which is overall ***not significant***.

9.3.2 Climate Change Risk Assessment

A CCRA was conducted to consider the vulnerability of the Proposed Development to climate change, as per the TII 2022 PE-ENV-01104 guidance. This involves an analysis of the sensitivity and exposure of the Proposed Development to future climate hazards which together provide a measure of vulnerability. The hazards assessed included flooding (pluvial, fluvial); extreme heat; extreme cold; drought; extreme wind; lightning, hail and fog; wildfire and landslides. The Proposed Development is predicted to have at most low vulnerabilities to the various climate hazards and therefore climate change risk is considered ***direct, long-term, negative*** and ***imperceptible***, which is considered overall ***not significant*** with regard to the construction and operational phase.

Overall, no significant impacts to climate are predicted during the construction or operational phases of the Proposed Development.

9.4 Cumulative Impact of the Proposed Development

With respect to the requirement for a cumulative assessment PE-ENV-01104 states that *"the identified receptor for the GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable. By presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. This assessment approach is considered to be inherently cumulative"*.

As a result, the cumulative impact of the Proposed Development in relation to GHG emissions is considered ***direct, long-term, negative*** and ***slight***, which is overall ***not significant*** in EIA terms.

9.5 Mitigation and Residual Effects (Post-Mitigation)

A number of best practice mitigation measures are proposed for the construction and operational phases of the Proposed Development to ensure that impacts to climate are minimised.

The impact to climate as a result of a Proposed Development must be assessed as a whole for all phases. The Proposed Development will result in some impacts to climate through the release of GHGs. TII PE-ENV-01104 guidance references the Institute of Sustainability and Environmental Professionals (ISEP) (formerly IEMA) guidance which states that the crux of assessing significance is *"not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050"*. The Proposed Development has proposed some best practice mitigation measures and is committing to reducing climate impacts where feasible. The Proposed Development is fully in line with national climate policy, in terms of both CAP25 and the National Biomethane Strategy, as investment in existing and expansion gas pipelines is required for GNI to meets its policy obligations and to enable decarbonisation of its network.

The effect of the Proposed Development in relation to GHG emissions is considered ***direct, long-term, negative*** and ***slight***, which is overall ***not significant***.

In relation to climate change vulnerability, it has been assessed that there are no significant risks to the Proposed Development as a result of climate change. The residual effect of climate change on the Proposed Development is considered ***direct, long-term, negative*** and ***imperceptible***, which is overall ***not significant*** in EIA terms.

10. NOISE AND VIBRATION

10.1 Introduction

The assessment of Noise and Vibration is contained within Chapter 10. Chapter 10 assesses the likely significant noise and vibration impacts associated with the construction and operation of the proposed GNI143 Ballykilleen Pipeline, Ballykilleen Above Ground Installation (AGI) and Kilwarden Offtake Installation, and all associated ancillary works hereafter collectively referred to as the Proposed Development.

10.2 Baseline Environment

There are individual residential properties adjoining the roads and green field areas along which the underground gas pipeline will run. Attended daytime noise surveys were carried out at locations positioned on the surrounding road network that intersected with the proposed pipeline. The existing noise environment in the vicinity of the nearest noise sensitive locations are dictated by transportation sources from local and distant roads. Existing noise levels have been found to be typical of a rural area.

10.3 Potential Impacts of the Proposed Development

10.3.1 Construction Phase

Indicative construction noise calculations have been carried out for the following aspects of the construction phase:

- Kilwarden Offtake Installation;
- Pipeline Construction;
- Trenchless Crossings;
- Ballykilleen AGI Construction;
- Temporary Bridge Installations; and
- Temporary Compounds.

The findings of the assessment indicate that the associated effect is stated to be ***negative***, ***significant*** to ***very significant*** and ***temporary*** where construction works are taking place within 50 m of residential noise sensitive receivers. At all other distances, the associated effect is stated to be ***negative***, ***not significant*** to ***moderate*** and ***temporary***.

In the case of pipeline route works, solid screening is recommended at noise-generating equipment to avoid a significant impact when works are taking place within 50m distance from residential noise sensitive receivers to avoid a significant noise impact.

The potential for elevated levels of vibration at sensitive locations during construction activities is typically confined to road surface breaking activities. The findings of the vibration assessment indicate that the associated effect is stated to be ***negative***, ***not significant*** to ***slight*** and ***temporary***.

10.3.2 Operational Phase

Once operational, the GNI143 Ballykilleen Pipeline and associated Kilwarden Offtake Installation and Ballykilleen AGI will not require permanent on-site staffing. Routine operational checks will be carried out by GNI personnel approximately every two weeks to one month, with a single van accessing the sites via the established entrances. More extensive maintenance, including pipeline

pigging operations (internal cleaning), is anticipated only every seven to ten years and will be undertaken using the same access routes.

The Ballykilleen AGI will contain small boilers and a gas-fired backup generator. Due to the distance between the AGI site and the nearest NSLs, any noise generated from these items are unlikely to give rise to significant impacts.

The resultant noise effect is *neutral*, *imperceptible* and *long term*.

10.4 Mitigation and Residual Effects (Post-Mitigation)

10.4.1 Construction Phase

Detailed noise and vibration mitigation measures are outlined within Section 10.6 of Chapter 10. Reference has been made to BS 5228-1 and BS 5228-2 which offer detailed guidance on the control of noise and vibration from construction activities.

In terms of noise associated with Kilwarden Offtake Installation construction works, the overall residual effects are *negative, not significant* and *temporary*.

In terms of noise associated with Ballykilleen AGI construction works, the overall residual effects are *negative, not significant* and *temporary*.

In the case of construction works along the pipeline route taking place within 50 m of residential noise sensitive receivers, solid barriers are recommended at noise-generating equipment to avoid a significant noise impact at the nearest residential property.

The associated construction noise effect is stated to be *negative*, *moderate* to *very significant* and *temporary* where construction works are taking place between 10 m to 25 m of noise sensitive location. Where pipeline construction activities occur within 25 m of NSLs, the receptors comprise either individual dwellings or small clusters of two or three houses.

For the majority of noise sensitive locations along the pipeline route, at distances greater than 25 m, the associated effect is stated to be *negative*, *not significant* to *slight* and *temporary*.

Vibration monitoring is recommended at residential dwellings where proposed works have the potential to be at or exceed the vibration limit values.

The associated construction vibration effect is stated to be *negative*, *not significant* to *slight* and *temporary*.

10.4.2 Operational Phase

As the operational noise effect associated with the proposed development is *neutral, imperceptible* and *long term* at noise-sensitive locations, mitigation measures are not required.

10.5 Cumulative Impact of the Proposed Development

10.5.1 Construction Phase

The mitigation measures outlined in Chapter 10, Section 10.6 will be implemented during the construction phase to minimise the significance of cumulative noise and vibration impacts at sensitive receptors in the vicinity of the Proposed Development. Similar mitigation measures are required for other permitted developments under their respective impact assessments and planning conditions.

Due to the significance in distance between all external developments and the proposed development and provided the mitigation measures are implemented throughout the construction phase of the proposed development, significant cumulative noise and vibration impacts are not predicted at the nearest noise-sensitive locations.

10.5.2 Operational Phase

The operational phase cumulative effect of the proposed development in combination with the related developments with regards to noise and vibration is considered to be *neutral*, *imperceptible* and *long term*.

11. LANDSCAPE AND VISUAL

11.1 Introduction

This Landscape and Visual Assessment (LVIA) has been prepared to accompany a planning application for a Proposed Development, consisting of c. 23.65km 300mm NB GNI143 Ballykilleen Pipeline, Kilwarden Offtake Installation and the Ballykilleen AGI located in the southern extents of County Meath and the northern extent of County Offaly.

Landscape Impact Assessment (LIA) relates to assessing effects of a 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 (VIA) relates to assessing effects of a 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 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).

11.2 Baseline Environment

The landform does not change dramatically throughout the various defined sections and chainages of the Proposed Development site, with the majority of the land presenting as a typical inland flat to low-rolling rural setting. Topography varies from 60-70m AOD in the locality of the site with low, broad hill rising to around 100m AOD in the surrounding landscape. The most notable waterbody in the study area would be the Grand Canal, which runs perpendicular to the to the Proposed Development site in the southern extent of the study area as the canal passes west of Edenderry. There are several other watercourses in the area including the Kilwarden River and the Yellow River. The area consists of multiple varied land uses including agricultural farmland bordered by mature hedgerow vegetation. The fields are split into geometrically shaped medium to large sized agricultural fields. There are also several large areas of boglands scattered throughout the study area and its immediate surrounds, especially to the south of the study area both within the wider landscape to the east and west. These peatbog areas tend to be encircled by areas of scrubby vegetation along their wider periphery. Other notable land uses include the Edenderry Power Plant located adjacent to the proposed AGI, whilst Cloncreen Wind Farm is another notable anthropogenic land use within the wider landscape to the southern extent of the study area.

The most notable centre of population in relation to the Proposed Development is the settlement of Edenderry located approximately 950m from the Proposed Development site at its nearest point. Other notable centres of population within the study area are Kinnegad located within the wider landscape west of the north extent of the study area. Kinnegad is located to the west of the Proposed Development approximately 2.2km from the Proposed Development site while the settlement of Clonard is located to the east of the northern extent of the study area, approximately 1.7km from the Proposed Development. The majority of the dwellings within the study area follow the pattern of the local roads with small linear clusters of dwelling located along located and regional roads within the study area.

The principal transport route is the M4, which intersects the proposed pipeline at chainage 3000m (Section 1) and is oriented in a general east-west direction through the study area. Apart from the

M4, the study area is connected through a network of regional and local roads. The most notable regional roads in the area are the R441, R148, R402 and R401 regional road. The main tourism and outdoor recreational amenity in the local area is the Grand Canal that passes through the south of the study area. The Grand Canal is a waymarked walking trail that offers routes along its banks and several aesthetically pleasant views from the multiple bridges that traverse the canal.

11.3 Potential Impacts of the Proposed Development

11.3.1 Assessment of Receptor Sensitivity

11.3.1.1 Landscape

Landscape value and sensitivity are considered in relation to a number of factors highlighted in the Guidelines for Landscape and Visual Impact Assessment 2013, which are set out and discussed in Chapter 11 of the EIAR relative to the proposal site and wider study area. The study area represents a relatively typical and robust rural landscape that is not considered highly rare or distinctive. The landscape character is principally influenced by the surrounding pastoral lands, typically bound by layers of intervening mixed hedgerow vegetation that truncate any notable sense of openness.

Some small areas of scrubby vegetation and peat bogs are also situated throughout the study area, whilst small linear clusters of residential dwellings also occur along the surrounding local and regional road network. The M4 motorway corridor also has a notable influence on the surrounding landscape as it crosses the proposed pipeline in the northern extent of the study area.

There are no designated scenic views/routes within the study area, and the landscape value is typically associated with a productive, working rural landscape that is not considered highly rare or distinctive in any sense. In terms of recreational amenity within the study area, this is typically associated with a section of the Grand Canal, which intersects the Proposed Development as it passes through Edenderry in the southern extent of the study area.

With regard to landscape designations within County Meath, the Proposed Development is situated within the 'Southwest Lowlands' – LCA, which is attributed with a 'high' landscape value, a 'medium' landscape sensitivity and is described as a landscape of 'regional' importance. Nonetheless, at a more local level, the site and much of the study area is not considered highly susceptible to development or change, which is reinforced by the broad array of anthropogenic development types within the extent of the study area and wider surrounding landscape. It should also be noted that the majority of the proposed pipeline alignment within the study area in County Offaly is classified as of 'low' sensitivity, with the only area of high sensitivity within the study area being the immediate context of the Grand Canal corridor.

Overall, it is considered that this is a robust, rural landscape context that is not highly susceptible to change and is influenced by a varied mix of highly anthropogenic land uses and built features. Therefore, on balance of these factors and in accordance with the criteria outlined in the landscape sensitivity table is deemed to be **Medium-low**, with some localized areas of higher and lower sensitivity.

11.3.1.2 Visual

The study area generally presents as a robust rural landscape, influenced by various forms of anthropogenic land uses such as urban settlements and major routes including the motorway and regional roads. Indeed, parts of the study area that are heavily influenced by such forms of development or land use tend to have a landscape sensitivity of Medium-low and in some cases, low where these land uses are the prominent land uses within the immediate surrounding landscape, such as contained sections of the M4 motorway corridor.

Some of the more susceptible parts of the surrounding landscape relate to the corridors of streams and watercourses. Of most note, is the Grand Canal corridor, which is also a notable amenity feature as it hosts a national waymarked walking trail and provides a localised sense of visual amenity that is principally contain within the corridor of the Grand Canal corridor itself. Indeed, the receptor sensitivity at the Grand Canal Corridor is deemed Medium.

Views of the working agricultural landscape are generally pleasant in terms of its rolling pastoral aesthetic and 'green', settled working character. The network of hedgerows and vegetation throughout it contributes to some sense of naturalness and, combined with its undulating topography, generates a sense of containment in many locations. However, whilst a pleasant pastoral aesthetic is noted throughout some parts of the study area, as noted above, this is a typical robust rural landscape that is not considered high rare or distinctive. Overall, the sensitivity of visual receptors within the more typical working landscape context tends to range between Medium and Medium-low, with those of a Medium sensitivity representing more open expansive views across the wider landscape.

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 in closer proximity to the site are considered more susceptible to changes in views over those where views are experienced at a distance.

11.3.2 Construction Phase Effects

11.3.2.1 Landscape

During the construction phase, there will be notably higher intensity of activity at the site and along the surrounding local roads than during the operational phase, consisting of heavy vehicle movement to and from the site as well as construction machinery within the site, albeit HGV's are commonplace along the busier regional roads and the M4 motorway corridor. The impacts on the physical terrain of the Proposed Development relate to the stripping of topsoil to a typical depth of 300mm along the site's working area, which extends the entire extent of the route. This working area will marginally increase in the surrounds of water and road crossings. This construction methodology requires the removal of a stretch of hedgerow at each boundary crossing. This will result in short term loss of some areas of existing hedgerow. With regard to the storage of materials, the proposed linepipe will be stored within the 5 no. of the Temporary Construction Compounds as set out in Chapter 2.

The most notable physical impacts on the landscape relate to the excavation of the proposed trenches, areas of soil stripping and some excavations for the buildings at the Kilwarden Offtake Installation and the Ballykilleen AGI. Construction phase impacts on the landscape are considered to be 'short-term' and will occur over a 24 month period. A summary of construction activities within the site are included below:

- HGV's transporting materials to and from the site;
- Movement of heavy earth-moving machinery on-site;
- Temporary storage of excavated materials and construction materials on-site;
- Security fencing and site lighting.
- Trees and hedgerows to be retained will be protected in accordance with British Standard BS5837: 2012 Trees in Relation to Design, Demolition and Constriction

For these reason outlined above, the magnitude of landscape effects during the construction stage is deemed to be Low within the immediate surrounds of the site, however, this quickly reduces to Low-negligible and Negligible in the wider surrounds of the study area where visibility of construction activity is likely to be very limited as a result of the surrounding dense intervening hedgerow networks.

In combination with the Medium-low landscape sensitivity designation outlined above, the significance of construction stage effect (***short-term***) is deemed to be ***slight*** within the immediate surrounds of the site, however this quickly reduces to ***slight-imperceptible*** and ***imperceptible*** within the wider study area where construction activities will be barely discernible. The quality of the construction stage effects will be ***negative***.Overall, construction stage landscape effects are assessed as ***not significant*****.**

11.3.2.2 Visual

During construction, the main visual impacts will arise from frequent heavy vehicle movements and worker vehicles travelling to and from the site and using the site entrance. In addition, there will be construction machinery on site, which may rise above intervening vegetation and buildings. There will also be stockpiles of stripped topsoil and construction materials awaiting use, much of which will be located within the 5 no. designated Temporary Construction Compounds along the proposed route. However, aside from the site's immediate vicinity, a large part of this temporary activity within the site will remain screened and partially screened from view by the mixed clipped and mature tree-lined hedgerows located in the surrounds of the site and its immediate landscape context. Furthermore, construction-related activity is 'short-term' in nature and will cease once the Propsed Development becomes fully operational. Thus, construction stage visual effects are likely to result in a visual impact of no greater Medium-low in the immediate surroundings of the site.

Coupled with the Medium-low visual receptor sensitivities in the surrounds of the site, the significance of construction stage (***short-term***) visual effects in the immediate vicinity of the site will be no greater than ***moderate-slight*** and will reduce considerably beyond 500m from the site, where the Proposed Development will be heavily screened. As a result, construction stage visual effects are assessed as ***not significant*****.**

11.3.3 Operational Phase Effects

11.3.3.1 Landscape

Once the construction phase is complete, any disturbed road surface / agricultural grassland will be reinstated along the pipeline route. Thus, there will be little evidence of the Proposed Development, aside from the permanent above ground pigging compound at the Kilwarden Offtake Installation and Ballykilleen AGI, which will both be fenced off with 2.4m high-security fences. Nonetheless, it is proposed to plant native hedgerow in the surrounds of this fence at the Kilwarden Offtake Installation to further screen the Proposed Development, which further limits its potential to have any notable impact on the surrounding landscape character. Aside from areas located immediately above the pipeline route, all areas of hedgerow vegetation removed will be fully reinstated with an appropriate native planting mix of local provenance.

Operational stage impacts mainly relate to the maintenance works for the pipeline route, which will be infrequent and will be brief in nature. Maintenance operations will be much less intensive than the activity at the construction stage. For these reasons, the underground cable is deemed to have a ***negligible*** magnitude of landscape effect.

In combination with the Medium-low landscape sensitivity, the significance of operational stage (***long-term - permanent***) landscape impact is deemed ***imperceptible*** and of a ***neutral*** Quality. Thus, operational phase landscape effects are assessed as **not significant.**

11.3.3.2 Visual

In similar circumstances to the landscape effects, due to the limited visibility of the Proposed Development from surrounding receptors, there is limited potential for the Proposed Development to generate any notable visual impacts. Indeed, once the landscape in the surrounds of the proposed pipeline corridor has fully reinstated, there will be little, if any evidence that the pipeline corridor exists. The only real potential for residual visual impacts relates to the Ballykilleen AGI and the Kilwarden Offtake Installation, which will both be enclosed by a 2.4m high fence and surrounding hedgerow planting. In this regard, several representative views were selected in the surrounds of both the Kilwarden Offtake Installation at the northern end of the pipeline corridor and the proposed Ballykilleen AGI located at the southern tip of the proposed pipeline corridor.

A summary of operational phase visual impacts at the representative views is provided in the table below.

VP No.	VP Sensitivity	Residual Significance / Quality / Duration of Effect
VP1	Medium-Low	Imperceptible / Neutral / Permanent
VP2	Medium-Low	Imperceptible / Neutral / Long-term
VP3	Medium-Low	Imperceptible / Neutral / Long-term
VP4	Medium-Low	Moderate / Negative / Permanent

11.4 Mitigation and Residual Effects (Post-Mitigation)

11.4.1 Mitigation Measures

11.4.1.1 Construction Phase

The proposed mitigation measures focus on good site management and housekeeping during construction, including control of lighting, material storage and deliveries, compound placement, parking, and maintaining a tidy, dust-free site with public areas kept clear of debris; site hoarding and fencing will be appropriately designed and maintained, and as construction impacts are temporary, no further mitigation is required. Existing trees and hedgerows will be protected in accordance with BS5837 (2012), supported by a baseline Arborist Report, with tree removal minimised and overseen by the Project Arboriculturist. Where vegetation removal is unavoidable, like-for-like replanting using native, locally sourced species will be carried out in line with a landscape plan, retaining green corridors and promoting biodiversity where feasible.

11.4.1.2 Operational Phase

The primary 'mitigation measure' employed in respect of landscape and visual impacts for the Proposed Development was avoidance of impacts. The key mitigation relevant to landscape and visual, as well as many of the other environmental factors, was to place the pipeline underground. This mitigation is embedded in the final design.

Once the construction stage works are complete, the grounds surrounding the proposed pipeline will be reinstated and will be reseeded with an appropriate grass seed mix of local provenance. Once fully reinstated, the areas of existing farmland can be used for typical agricultural practices.

Areas of existing hedgerow removed as part of the construction stage works (aside from those directly over the pipeline) will be reinstated with a native whip planting mix of local provenance.

It is also proposed to plant sections of native hedgerow around the permanent Kilwarden Offtake Installation to reduce the built tone and texture of the proposed 2.4m high security fencing. As noted above, compensatory planting to offset the removal of any mature trees or vegetation during the construction stages of the Proposed Development will also be included in the surrounds of the Kilwarden Offtake Location to further screen the Proposed Development and assimilate it into the surrounding pastoral landscape context. These planting works will be undertaken in the next available planting season after the completion of the main civil engineering works.

11.4.2 Residual Impacts

11.4.2.1 Construction Phase

It is not considered that the residual construction stage effects will notably differ from the construction stage impacts above. Overall, the residual construction stage significance of landscape effects are deemed to be no greater than ***slight, negative*** and ***short-term*** in duration. The residual construction stage significance of visual effect is considered to be ***moderate-slight, negative*** and ***short-term***.

11.4.2.2 Operational Phase

Whilst the residual operational stage effects will be much the same as the impacts stated above, there will be a marginal reduction in the residual visual impact at receptors in the surrounds of both the proposed mitigation screen planting has fully established. Once fully established, the proposed planting will largely screen both the Kilwarden Offtake Installation and the Ballykilleen AGI, creating a much softer and site specific boundary treatment. Thus, the residual significance of operational stage landscape impact is deemed not greater that ***slight-imperceptible, neutral-negative*** and ***permanent***, whilst the residual significance of operational stage visual impact will reduce to ***slight-imperceptible, neutral*** and ***permanent***.

11.5 Cumulative Impact of the Proposed Development

Cumulative landscape and visual impact assessment concerns additional changes to the landscape or visual amenity caused by the Proposed Development in conjunction with other developments (associated or separate from it), or actions that occurred in the past or present or are likely to occur in the foreseeable future. In this instance, cumulative effects have been subdivided into effects generated from related developments and effects generated in combination with other existing / permitted developments. Related developments in this instance is the conversion of the existing 116 MW Cushaling Peaker Plant located within the Edenderry Power Station whilst other existing / permitted developments considered include the following:

- upgrade works to the existing Rinawade – Dunfirth Tee – Kinnegad 110kV overhead line (Offaly County Council (OCC) Reg. Ref;
- the planned Ballydermot Windfarm, and;
- the proposed Water Supply Project Eastern and Midlands Region (An Coimisiún Pleanála (ACP) Reg. Ref.: 323980).

11.5.1 Construction Phase

11.5.1.1 Related Developments

Cumulative construction stage effects are mainly associated with the Ballykilleen AGI and the southern sections of the proposed underground pipeline, as these are closest to the related

development within the Edenderry Power Station complex. Given the highly developed, industrial character of the complex, most construction activities will occur within its existing confines, aside from increased HGV movements. Although construction activity intensity and duration may increase, the modest scale and localised nature of the works mean that cumulative effects on landscape character and visual receptors will be limited and are therefore considered ***not significant***.

11.5.1.2 Other Existing/Permitted Developments

In a similar manner to the related developments outlined above, the potential for notable cumulative construction stage effects arising from the Proposed Development is limited by its localised nature and relatively modest scale. Whilst the presence of other existing and permitted developments, if constructed concurrently, would result in an increased intensity of construction stage activity within the study area, the contribution of the Proposed Development to such cumulative effects is anticipated to be comparatively minor. This is attributable to the limited scale and extent of the Proposed Development and, in particular, the predominantly underground nature of the pipeline route, which would give rise to construction stage effects that are largely localised and temporary in nature. Thus, it is deemed that the construction stage cumulative effects with other existing/permitted developments will be limited and are deemed ***not significant*.**

11.5.2 Operational Phase

11.5.2.1 Related Developments

At the operational stage, the Proposed Development will contribute minimally to changes in landscape character, largely because the Ballykilleen AGI is contained within the established Edenderry Power Station complex, a dominant and modified land use. The pipeline will have negligible operational effects following reinstatement, with only a post-and-wire fence remaining above ground, and the AGI will have very limited visual exposure, largely within an existing industrial context. As a result, any cumulative operational landscape and visual effects in combination with related developments will be modest, highly localised, and assessed as ***not significant***.

11.5.2.2 Other Existing/Permitted Developments

At the operational stage, only the Kilwarden Offtake Installation and the Ballykilleen AGI will be visible above ground, while the pipeline will be fully reinstated with a post-and-wire fence as its only surface feature. In combination with other existing and permitted developments, the Proposed Development will make only a very modest contribution to cumulative effects, primarily through a limited increase in built development intensity within an already heavily modified landscape. As this does not materially alter landscape character, cumulative operational phase effects are assessed as ***not significant***, and no significant cumulative impacts are anticipated overall.

12. ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

12.1 Introduction

Chapter 12 of the EIAR assesses the predicted impacts of the Proposed Development on archaeological, architectural and cultural heritage.

12.2 Baseline Environment

The baseline survey indicates that whilst the Proposed Development will not impact on any recorded archaeological or architectural heritage sites, it traverses a rich landscape which has substantial evidence in the form of archaeological sites, findings from excavations, and discovered artefacts of continuous human habitation from at least the Neolithic Period to the present day.

12.3 Potential Impacts of the Proposed Development

12.3.1 Construction Phase

- No recorded archaeological, architectural or cultural heritage sites will be directly impacted on by construction works within the Proposed Development corridor.
- However, the baseline survey has indicated that the land through which the Proposed Development corridor traverses has been continuously inhabited from at least the Neolithic, with archaeological sites and / or artefacts recovered from within 500m of the Proposed Development corridor from all time periods.
- Five Areas of Archaeological Potential were identified during the study based on proximity to known archaeological sites and findings, or relating to previously unrecorded potential features noted. Geophysical survey (License no. 25R0348) of these Areas identified a number of anomalies that might indicate the sub-surface survival of archaeological features, notably in Ardnamullan townland (AAP1).
- The Proposed Development corridor traverses one county boundary, two barony boundaries, and nineteen townland boundaries, and runs adjacent to a further townland. These are considered to be of high archaeological potential.
- The Proposed Development corridor traverses two rivers and 30 no. watercourses, but the two river crossings and two of the watercourse crossings will be trenchless. Thirteen of the remaining watercourses form one of the above townland boundaries. Watercourses, notably rivers and streams, particularly those at boundaries, are considered to be of high archaeological potential.
- Potential impacts on archaeological and cultural heritage associated with the Proposed Development involves ground disturbance associated with the construction of the Proposed Development. Should archaeological remains survive below surface, then ground disturbance in these areas would remove sub-surface features.
- Potential impacts on architectural heritage consist of the portions of the Proposed Development corridor that will traverse demesne features associated with Park House and Harristown House.

Should archaeological or architectural heritage features survive, then without mitigation, the impact will be *negative*, *moderate* and *permanent*.

12.3.2 Operational Phase

There are no potential impacts on archaeological, architectural and cultural heritage expected as a result of the operational phase of the Proposed Development.

12.4 Mitigation and Residual Effects (Post-Mitigation)

12.4.1 Construction Phase

A suitably qualified archaeological consultant will be appointed to oversee the project from design through to planning and construction phase.

The geophysical survey (see Appendix 12.5 of Chapter 12) of the Proposed Development, under license to the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht, will be completed across the entire route planning corridor.

Given the cultural significance of sacred trees in Ireland, the hawthorn tree identified in Ticroghan townland will be avoided and fenced off for the duration of the construction phase to protect it, and its root bed, from harm.

Pre-development archaeological testing, under license to the National Monuments Service of the Department of Housing, Local Government and Heritage, will be undertaken in advance of construction, as follows:

- Trenches will largely target anomalies identified by the geophysical survey, as well as county / barony / townland boundaries. A number of trenches will also be excavated in areas where no features were highlighted (as per best practice guidelines; c. 10% of the Proposed Development corridor should be tested in total).
- Trenches will be dug by a tracked excavator equipped with a 1.8 m wide toothless ditching bucket. Each trench will be excavated to the surface of archaeological features, deposits or structures, or to the surface of the undisturbed natural soil or bedrock (typically less than 75cm). Topsoil will be removed from the test trenches in horizontal levels of not more than 0.20 m in thickness until sterile subsoil is reached.
- A suitably qualified underwater archaeology specialist will assess the following watercourses along the Proposed Development corridor (WCX02, WCX04, WCX05 and WCX19) and undertake a wade or dive survey as appropriate under license to the National Monuments Service of the Department of Housing, Local Government and Heritage.
- Should archaeological or architectural heritage features, deposits or structures be uncovered during survey will be cleaned by hand, investigated and recorded.
- Archaeological excavation of features, deposits or structured identified, will be undertaken in advance of construction, in consultation with and under license to the National Monuments Service of the Department of Housing, Local Government and Heritage.

Applying these mitigation measures will ensure that the effect on the archaeology and architectural heritage will be *permanent*, *neutral* and *imperceptible*.

Please note that the recommendations given here are subject to the approval of the National Monuments Service, Department of Housing, Local Government and Heritage.

12.4.2 Operational Phase

As there are no potential impacts on archaeological, architectural and cultural heritage expected as a result of the operational phase of the Proposed Development, no mitigation is required.

12.5 Cumulative Impact of the Proposed Development

12.5.1 Construction Phase

12.5.1.1 Related Development

The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants within the Edenderry Renewable Energy Complex. This constitutes the related development.

There have been twelve licensed archaeological investigations within the study area, from 2002 to 2017 relating to small scale development works. Archaeological features were identified in eight of these. Should any sub-surface features exist that will be potentially impacted on by the Proposed Development, they will be archaeologically recorded in advance of construction works in these areas, in consultation with and under license to the National Monuments Service of the Department of Housing, Local Government and Heritage.

While the Proposed Development traverses areas of elevated archaeological potential, including watercourses, townland boundaries and five identified Areas of Archaeological Potential, the potential for cumulative impacts with related developments is limited. Mitigation measures are recommended in Section 12.6 of Chapter 12 to address any potential impact on archaeological, cultural, or architectural heritage. With these measures in place, there will be no residual impacts on archaeology and cultural heritage associated with the construction phase of the Proposed Development.

Where related developments require ground disturbance to land that has not been developed in recent times, the planning process will require mitigation measures are undertaken comprising geophysics and / or archaeological testing and / or archaeological monitoring under license from the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht.

The Proposed Development will not alter the predicted construction-phase effects of the related developments; therefore, the conclusions of their EIARs remain unchanged. Consequently, the cumulative construction-phase effect of the Proposed Development in combination with the related developments on archaeology and cultural heritage is considered ***neutral, not significant,*** and ***permanent.***

12.5.1.2 Other Existing / Permitted Development(s)

Archaeological, architectural and cultural heritage impacts arise solely from direct ground disturbance within the footprint of a development and do not involve emissions, pathways or zones of influence extending beyond the site boundary. As such, there is no mechanism by which the Proposed Development could interact cumulatively with other existing or permitted developments in respect of archaeological or cultural heritage.

All existing and permitted developments within the wider area have been, or will be, subject to individual archaeological assessment, licensing and mitigation measures under the statutory control of the National Monuments Service. Any archaeological remains encountered during construction would be addressed through preservation by record in accordance with licensing requirements and would not give rise to residual adverse effects.

Given the site-specific nature of archaeological impacts, the absence of any shared impact pathways, and the statutory controls governing all development-related ground disturbance, the consideration of cumulative impacts between the Proposed Development and other unrelated existing or permitted developments is not applicable. Accordingly, there is no potential for cumulative impacts with other existing and permitted development on archaeological, architectural or cultural heritage during the construction phase.

12.5.2 Operational phase

12.5.2.1 Related Development

There is no potential impact on archaeological, architectural and cultural heritage expected as a result of the operational phase of the Proposed Development.

12.5.2.2 Other Existing / Permitted Development(s)

There is no potential impact on archaeological, architectural and cultural heritage expected as a result of the operational phase of the Proposed Development. Therefore, there is no cumulative impact.

13. MATERIAL ASSETS – TRAFFIC AND TRANSPORTATION

13.1 Introduction

The Proposed Development comprises laying approximately 23.65km of gas pipeline and associated work located predominantly within agricultural lands and incorporating a number of road crossings. There are also associated structures at either end of the pipeline. Chapter 13 undertakes a Traffic and Transportation assessment of any likely or significant impact arising from the Proposed Development.

13.2 Baseline Environment

The Proposed Development site is located in private agricultural lands and public roadway approximately 4 km east of Kinnegad and c. 1 km east of the Meath–Westmeath County boundary routing south to the west of Edenderry and terminates within the Edenderry Renewable Energy Complex, c. 5 km south of Edenderry town. The Proposed Development will traverse public roads fifteen times and private accesses three times along its route.

13.3 Potential Impacts of the Proposed Development

13.3.1 Construction Phase

At the construction stage, the site will generate a maximum of 60 light vehicles (LV) per day together with up to 30 Heavy Vehicle (HV) movements daily during the construction period.

All traffic will access the gas pipeline laying site via the surrounding road network through which the pipeline will be routed and through accesses into agricultural lands. The works will result in an increase of vehicular trips on the local road network, but these will not have a significant impact on the road capacities.

The increase in traffic during the construction phase of the GNI143 Ballykilleen Pipeline and associated terminal works on the existing roads has the potential for ***neutral, negligible*** and ***temporary*** effects on the existing network.

The works associated with the pipeline will require trenching and reinstatement at the crossings of sections of public roads where trenchless construction is not opted for. There will be a need to carry out the works under traffic management via lane closure, shuttle working or by road closure with associated diversions, however these will be applicable for only a short amount of the overall construction duration. Working hours will be agreed with the local authorities in the case of public roads and with affected landowners where carried out within private lands/estates prior to commencement of works.

Traffic management for the various crossings of public roads during the construction phase has the potential for ***negative, moderate*** and ***brief*** effects (effects lasting less than a day) to ***temporary*** effects (effects lasting less than a year) on the existing road network.

13.3.2 Operational Phase

As there are only intermittent visits by employees required for the operational phase there will be a small number of additional trips on the external roads network.

The additional traffic during the operational phase on the existing road has the potential for a ***neutral, imperceptible*** and ***long term*** impact.

13.4 Mitigation and Residual Effects (Post-Mitigation)

13.4.1 Construction Phase

The measures incorporated will include:

- Carrying out road crossing works under traffic management/road closures and diversions;
- Regular cleaning of the road;
- Surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads;
- Monitoring and control of construction traffic during construction works;
- Material deliveries and collections from site will be planned, scheduled and staggered to avoid unnecessary build-up of construction work related traffic;
- All works carried out within public roadways will be carried out under Traffic Signs Manual Chapter 8 requirements.

The residual effect, taking into account all the mitigation and monitoring measures for the construction works for the Proposed Development will be ***negative, moderate*** and ***brief effects*** to ***temporary effects*** on the existing road network***.***

13.4.2 Operational Phase

The Proposed Development will have a negligible impact the road network, in particular the road links in the proximity of the development. Overall, the residual impact of the development will be ***long term*** in duration of ***imperceptible, neutral*** effect on the traffic and transportation environment.

13.5 Cumulative Impact of the Proposed Development

13.5.1 Construction Phase

The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants within the Edenderry Renewable Energy Complex. This constitutes the related development.

The potential cumulative impact on traffic and transportation during the construction phases are those key works which could result in cumulative impact if not adequately mitigated arise from additional trips due to the works associated with the related development.

There is potential for the works to the related project, the conversion of the existing distillate fired power station to gas at the Edenderry Renewable Energy Complex to result in cumulative effects on certain roads. However, the potential for significant cumulative effects is between the Proposed Development, and the conversion proposal is sufficiently reduced to imperceptible by the construction-phase mitigation measures proposed within this EIAR, including the requirement for the related development to adhere to a Construction Environmental Management Plan.

Based on the assessment of the network links there will be moderate effect on the receiving traffic and transportation environments. The need for diversions would be restricted where works necessitate occupation of the carriageway. The cumulative impact for the affected R401 making up the local network will be of ***negative, moderate,*** and ***temporary*** effects.

The cumulative construction impact with respect of roads as a material asset is ***neutral, negligible and temporary effects.***

13.5.2 Operational Phase

As there will be a small amount of intermittent operational traffic generated by the Proposed Development , the conclusions of the residual impact for the related project would also be applicable in a cumulative context.

As the operational phase would generate less traffic than the construction phase it would be expected that the impact on the local transportation environment would be lower. Therefore, the cumulative impact of the operational phase is *long term, neutral* and *imperceptible*.

14. MATERIAL ASSETS - WASTE

14.1 Introduction

The assessment of Material Assets – Waste is contained within Chapter 14. The waste management assessment has focussed on:

- Construction waste management
- Operational waste Management

14.2 Baseline Environment

The receiving environment is largely defined by Offaly County Council (OCC) and Meath County Council (MCC) as the local authorities responsible for setting and administering waste management activities in the area through regional and development zone specific policies and regulations.

There will be waste materials generated from site excavations, construction of the pipeline and associated services and from the operational phase of the Proposed Development.

14.3 Potential Impacts of the Proposed Development

14.3.1 Construction Phase

During the construction phase the mismanagement of waste, including the inadequate storage of waste, inadequate handling of hazardous waste, the use of inappropriate or insufficient segregation techniques, and the use of non-permitted waste contractors, would likely lead to negative impacts such as waste unnecessarily being diverted to landfill, litter pollution which may lead to vermin, runoff pollution from waste, fly tipping and illegal dumping of waste.

In the absence of mitigation, inappropriate on-site waste management is likely to result in *indirect, long-term, significant* and *negative* effect on the local and regional environment.

In the absence of mitigation, use of non-permitted waste contractors or waste facilities is likely to result in *indirect, long-term, significant* and *negative* effect on the local and regional environment.

In the absence of mitigation, inappropriate disposal soils is likely to result in *indirect, short-term, significant* and *negative* effects on the local and regional environment.

14.3.2 Operational Phase

The potential impacts on the environment during the operational phase of the Proposed Development would be caused by improper, or lack of waste management. In the absence of mitigation, the effect on the local and regional environment is likely to be *indirect, long-term, significant* and *negative*.

14.4 Mitigation and Residual Effects (Post-Mitigation)

14.4.1 Construction Phase

During the construction phase, typical construction waste materials will be generated which will be source segregated on-site into appropriate skips/containers, within designated waste storage areas and removed from site by suitably permitted waste contractors as required, to authorised

waste facilities, by appropriately licensed waste contractors. While the accurate keeping of waste records will be undertaken.

All waste leaving the site will be recorded and copies of relevant documentation maintained.

This will all be overseen by the main contractor, who will appoint a construction phase Resource Manager to ensure effective management of waste during the excavation and construction works. All construction staff will be provided with training regarding the waste management procedures on site.

A carefully planned approach to waste management and adherence to the site-specific Resource and Waste Management Plan (Appendix 14.1) and Chapter 14 during the construction phase, this will ensure that the effect on the environment will be ***short-term, neutral*** and ***imperceptible***.

14.4.2 Operational Phase

During the operational phase, it is anticipated that small amounts of waste will be generated at the Proposed Development by staff or subcontractors during their inspections and maintenance works. The waste materials will be removed by the staff or subcontractors. The staff or subcontractors removing waste from the site will ensure source segregation is a priority. Waste will be removed off-site by the staff or subcontractors for re-use, recycling, recovery and/or disposal.

Operational waste that will be generated includes cardboard, plastic, paper, glass, dry mixed recyclables, mixed non-recyclables, batteries, WEEE waste, organic waste, metals/wiring, timber, operational oils and paints.

All recyclable materials will be segregated at source where possible to ensure maximum diversion of materials from landfill. This strategy will be supplemented, as required, by the operator as required with any new information on waste segregation, storage, reuse and recycling initiatives that are subsequently introduced.

Provided the mitigation measures in Chapter 14 are implemented, and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be ***long-term, neutral*** and ***imperceptible***.

14.5 Cumulative Impact of the Proposed Development

14.5.1 Construction Phase

The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants within the Edenderry Renewable Energy Complex. This constitutes the related development.

In a worst-case scenario, the related development and other existing and/or permitted projects developments in the area could be developed concurrently or overlap in the construction phase. Due to the high number of waste contractors in both the OCC and MCC regions, as detailed in the National Waste Collection Permit Office and the EPA, there will be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the cumulative effect will be ***short-term, imperceptible*** and ***neutral***.

14.5.2 Operational Phase

There are existing residential and commercial developments close by. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate any potential cumulative impacts associated with waste generation and waste management. As such the cumulative effect will be a ***long-term, imperceptible*** and ***neutral***.

15. MATERIAL ASSETS – UTILTIES

15.1 Introduction

Chapter 15 (Material Assets – Utilities) assesses ownership and access, built services and infrastructure, which have not already been addressed elsewhere in this EIA Report. The associated built services and infrastructure in the vicinity of the Proposed Development are summarised in the following sections; further detail is provided within the planning application documentation.

15.2 Baseline Environment

The Proposed Development comprises the construction, commissioning, and operation of the GNI 143 Ballykilleen Pipeline and all ancillary and associated temporary works. The proposed GNI 143 Ballykilleen Pipeline is designed to connect the existing BGE77 pipeline (also known as Pipeline to the West (PTTW)) to the Edenderry Renewable Energy Complex.

The pipeline commences at the Kilwarden Offtake Installation, located in Kilwarden, Co. Meath, and routes south cross-country through Counties Meath and Offaly, terminating at the new Ballykilleen AGI within the existing Edenderry Power Station site, Co. Offaly.

The known locations of utilities are detailed in Section 15.3 of Chapter 15 of the EIAR. Locations of known electrical infrastructure, potable water infrastructure and telecommunications infrastructure are outlined in this section.

15.3 Potential Impacts of the Proposed Development

15.3.1 Construction Phase

During construction, temporary activities such as excavation, machinery operation and the formation of temporary access routes may give rise to short-term and localised disturbance. Construction will not involve permanent connections to public utility networks.

Temporary power required for construction activities will be provided by on-site generators, meaning there will be no draw on the electricity network. Water required for construction activities and welfare facilities will be supplied by tanker, and foul wastewater from welfare facilities will be removed by a licensed contractor.

During the commissioning of there will be a requirement to fill the entire pipeline with clean potable water, requiring approximately 6,667,655 litres and pressurised to identify any leak. The required water will be sourced from an existing supply either from nearby municipal supply point (mains water supply, local authority fire hydrants) or alternatively, abstraction from another water supply in private ownership from groundwater / surface water that is permitted and registered with the EPA under the Water Environment (Abstractions and Associated Impoundments) Act 2022 (No. 48 of 2022).

All crossings of existing utilities will be carried out with the agreement of the relevant service providers, using established methods that protect the infrastructure and avoid service disruption.

Overall, the potential impacts on utilities during construction are assessed as ***negative, not significant,*** and ***short term***.

15.3.2 Operational Phase

Once construction is complete and the site is reinstated, the underground gas pipeline will not require utilities such as electricity, water, wastewater or telecommunications and will not generate surface water runoff. The land above the pipeline will be returned to its original condition and remain permeable.

The Kilwarden Offtake Installation will operate as a passive facility and will not require connections to electricity, water, wastewater or telecommunications. Surface water at this location will be managed on site via a soakaway system.

The Ballykilleen AGI, located within the Edenderry Renewable Energy Complex, will require an electricity and telecommunications connection to support the monitoring and control systems. These connections will use existing local infrastructure and will not place noticeable demand on networks or affect service capacity for other users. A gas-fired backup generator will operate only during power outages.

Surface water from the AGI will discharge to the existing drainage network within the Edenderry Renewable Energy Complex that ultimately discharges to the Figile River. The increase in runoff will be minimal. No foul wastewater will be generated during operation.

Limited natural gas will be used at the AGI to support ancillary equipment such as gas pre-heating and a backup generator. This demand will be small and intermittent and will not affect the wider gas transmission network.

Overall, the operation of the Proposed Development will not place significant demands on utilities or disrupt existing services. Impacts during operation are assessed as ***neutral, imperceptible*** and ***long-term.***

15.4 Mitigation and Residual Effects (Post-Mitigation)

15.4.1 Construction Phase

Ongoing consultation with third party service providers (e.g. Uisce Éireann, EirGrid, ESB Networks, Eir), within the locality and compliance with any requirements or guidelines they may have will ensure a smooth construction schedule without disruption to the local and business community. The works contractor will be obliged to put best practice measures in place to ensure that there are no interruptions to these utilities, unless this has been agreed in advance.

All applicable standards, guidelines and codes of practice will be adhered to regarding both installation of the gas transmission pipeline and working in the vicinity of existing services, in particular the Gas Networks Ireland (GNI) Guidelines for Designers and Builders – Industrial and Commercial (Non-Domestic) Sites (2018) and the Health & Safety Authority (HSA) Code of Practice for Avoiding Danger from Underground Services (2016).

The works contractor will be required to implement best practice measures to protect existing utility infrastructure, including telecommunications, watermains, sewers and electrical services, during construction activities. All works in the vicinity of existing services will be undertaken in consultation with the relevant utility providers and in accordance with their requirements. Any planned service interruptions, should they be necessary, will be agreed in advance with the relevant service providers.

The predicted impact will be ***neutral, imperceptible,*** and ***short term*** for the construction phase.

15.4.2 Operational Phase

No specific mitigation measures are required during the operational phase. The Proposed Development will not result in significant demands on utility infrastructure or disruption to existing services, and operational interactions with electricity, telecommunications, drainage and gas infrastructure are limited.

There are no potentially significant impacts during the operational phase in respect of material assets utilities and therefore residual effects the material assets during the operational phase will be *neutral, imperceptible* and *long-term*.

15.5 Cumulative Impact of the Proposed Development

15.5.1 Construction Phase

When considered in combination, the cumulative construction-phase impact of the Proposed Development and the related development on material assets (utilities) is assessed as ***negative, slight,* and** *temporary,* reflecting short-term disruption risk to ESB Networks 20 kV overhead power line the during construction rather than any permanent loss of utility infrastructure or capacity.

With appropriate inter-project coordination, including liaison between project teams, agreement on construction phasing, and coordination of access arrangements, cumulative effects on material assets (utilities) are not anticipated. While there is potential for cumulative impacts during simultaneous construction phases, the likely cumulative impact on material assets (utilities) is assessed as ***neutral, imperceptible****, and* ***short-term.***

15.5.2 Operational Phase

The operational-phase cumulative impact of the Proposed Development in combination with related development and other existing or permitted developments on material assets (utilities) is assessed as ***neutral, imperceptible,*** and ***long-term.***