

Environmental Impact Assessment Report (EIAR)

Slievegrine Renewable
Energy Development, Co.
Waterford

Chapter 8 – Land, Soils and Geology



8. LAND, SOILS AND GEOLOGY

8.1 Introduction

This chapter identifies, describes and assesses the likely significant effects of the Proposed Project on land, soils and geology and any associated receptors. The assessment is informed by **Chapter 4: Description of the Proposed Project** and has been undertaken in accordance with the legislation and guidance outlined in **Chapter 1: 'Introduction to the Proposed Project'**, and in **Sections 8.1.3 and 8.1.4** of this EIAR.

As detailed in **Section 1.1.1 in Chapter 1**, for the purposes of this EIAR, the following references are used: 'Proposed Project', 'Proposed Wind Farm', 'Proposed Grid Connection', 'Proposed Turbines', 'Proposed 110kV Underground Cabling Route', 'Proposed 110kV Substation', 'Proposed 220kV Loop-in Substation' and 'Site'. A detailed description of the Proposed Project is provided in **Chapter 4: 'Description of the Proposed Project'** of this EIAR.

8.1.1 Objectives

The objectives of this chapter are:

- To present the methodology that was applied to assess potential and likely significant effects of the Proposed Project.
- To present the baseline land, soils, and geology environments of the Proposed Project.
- To identify potential or confirmed land, soils, and geology related receptors that can be affected by the Proposed Project.
- To identify, describe, and assess the likely significant (positive or negative) effects of the Proposed Project on potential or confirmed receptors, during construction, operational and decommissioning phases.
- To identify, assess, and propose suitable mitigate actions that will be implemented to address (avoid, counteract, reduce) any significant negative effects.
- To assess likely significant residual effects.
- To assess cumulative effects of the Proposed Project after mitigation measures are implemented, in association with other relevant projects as outlined in **Appendix 2-3 and Chapter 2: 'Background to the Proposed Project', Section 2.9.3.**

8.1.2 Statement of Authority

This report has been prepared by Dr Bébhinn Anders, supported by Anna Bannon, both of MKO.

Dr. Anders has a BSc in Earth and Ocean Sciences and a PhD from the University of Galway titled "Investigating sediment source, supply and evolution in the Northwest Carboniferous Basin: A multi-proxy provenance approach". Bébhinn has 5 years of practical field experience with projects that involve environmental monitoring, hydrogeological data analysis, and flood risk assessments. She has conducted geological mapping, supervised borehole drilling, and coordinated and led water monitoring campaigns. Her experience includes preparing both Land, Soils, and Geology, and Hydrology and Hydrogeology chapters for EIARs.

Anna Bannon has a BSc in Geology from the University College Dublin. She is experienced conducting environmental monitoring, processing environmental data using commonly applied analytical tools and GIS, and supporting the preparation of EIAR chapters.

This report has been reviewed by Monika Kabza of MKO. Monika is a registered geologist (PGeo, EurGeol) with over 16 years of professional experience in groundwater resource assessment,

environmental consultancy, and infrastructural development projects. She holds an MSc (Hons) in Groundwater Engineering from the AGH University of Science and Technology in Krakow, Poland, and is a professional member of the Institute of Geologists of Ireland and the International Association of Hydrogeologists (Irish Group). Monika is experienced with the preparation of land, soils, and geology chapters of Environmental Impact Assessment Reports (EIARs). Shae has also prepared Water Framework Directive (WFD) assessments and environmental constraints mapping for renewable energy and industrial projects.

8.1.3 Relevant Legislation

The following legislation has been considered in the preparation of this chapter:

- Planning and Development Acts 2000 to 2023, as amended;
- Planning and Development Regulations 2001 to 2023, as amended, including the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018); and,
- The Heritage Act 1995, as amended.

8.1.4 Relevant Guidance

The following guidance documents were considered:

- Environmental Protection Agency (EPA) (2022). Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Institute of Geologists of Ireland (IGI) (2013). Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- Good Practice During Wind Farm Construction (Scottish Natural Heritage, 2019).
- Transport Infrastructure Ireland (TII) (formerly NRA) (2009). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- Department of Housing, Planning and Local Government (2018). Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment; and
- European Commission (2017). Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU).

8.2 Methodology

8.2.1 Desk Study

A desk study of the Site was completed covering the subjects of land use, soils, subsoils, bedrock geology, geological heritage, mineral resources and geohazards. The desk study included consultation with the following sources of publicly available data and information:

- Environmental Protection Agency (EPA) database (www.epa.ie).
- Geological Survey Ireland (GSI) datasets (www.gsi.ie):
- Quaternary Sediments (Subsoils);
- Bedrock Geology;
- Geoheritage Audited Sites / County Geological Sites;
- Mineral Localities / Online Minerals Database;
- Aggregate Potential Mapping – granular and crushed rock;
- Landslide Susceptibility; and
- Landslide Events.

- Soils Information System (SIS) – National Soil Map of Ireland, developed by Teagasc, EPA and GSI.
- Historical aerial imagery and mid-19th century 6-inch and 25-inch sheets from Ordnance Survey Ireland.

Publicly available reports (e.g. from GSI) and journal (research) articles were also used and are referenced throughout this chapter.

8.2.2 Baseline Data & Site Investigations

An initial walkover survey of the Site was conducted on 18 and 19 February 2025 by Bébhinn Anders, Colin Fitzgerald, and Henning Moe (refer to **Chapter 9: 'Hydrology & Hydrogeology', Section 9.1.2**, for statements of authority for Colin and Henning). The purpose of the survey was to become familiar with the Site and to confirm features and queries arising from the desk study, to observe existing landforms and surface conditions, and identify any geological, soils or terrain features that could influence the design and construction of the Proposed Project. The walkover also helped identify areas where additional site investigation or design consideration may be required.

Ground investigation programme was subsequently undertaken, comprising the excavation of 33 no. trial pits. Of these, 17 no. trial pits were excavated in October 2025 and 16 no. were excavated in December 2025. All trial pits were excavated under the supervision of Bébhinn Anders and Anna Bannon (MKO).

8.2.3 Scoping & Consultation

As described in **Chapter 2, Section 2.7** of this EIAR, scoping was undertaken during the preparation of this EIAR. The scoping responses informed the content of this chapter. Scoping responses are included in **Appendix 2-1**. Key matters that were raised in respect of land, soils and geology are summarised in **Table 8-1**.

Table 8-1: Summary of Hydrological and Hydrogeological Matters Raised by Consultees

Consultee	Matters Raised	Addressed in Chapter Section
Waterford County Council (CC)	No response	N/A
Inland Fisheries Ireland (IFI)	No response	N/A
Geological Survey Ireland (GSI)	Recommend using the various datasets of the GSI when conducting the EIAR.	Sections 8.3.2 through 8.3.7
Uisce Éireann	No response	N/A
Southeast Region Local Authorities Water Programme (LAPWRO)	No response	N/A
Department of Housing, Local Government and Heritage (DHLGH)	No response	N/A

8.2.4 Impact Assessment Methodology

The assessment of likely significant effects on land, soils and geology considers the sensitivity of the receiving receptors and the nature and magnitude of the predicted changes arising from the construction, operation and decommissioning of the Proposed Project.

The importance (sensitivity) of the land, soils, and geology receptors was assessed using information obtained from the desk study, site walkover and ground investigations. Receptor importance (sensitivity) was classified using the criteria outlined in Error! Reference source not found. below, a

dapted from TII (2009) Guidelines. The criteria have been applied, where relevant, to reflect the characteristics of the Proposed Project and the receiving environment.

Table 8-2: Estimation of Importance (Sensitivity) of Land, Soils, and Geology Receptors

Importance	Criteria	Attribute
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource.
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying site is significant on a local scale.	Contaminated soil on site with previous heavy industrial usage. Large recent landfill site for mixed wastes. Geological feature of high value on a local scale (County Geological Site). Well-drained and/or high fertility soils. Moderately sized existing quarry or pit. Marginally economic extractable. mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and/or soft organic soil underlying site is moderate on a local scale.	Contaminated soil on site with previous light industrial usage. Small recent landfill site for mixed Wastes. Moderately drained and/or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource.
Low	Attribute has a low quality, significance or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying site is small on a local scale.	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

Effects are described in terms of their quality (negative, positive, or neutral), significance, extent, magnitude, probability, duration, frequency and type. The descriptors used to classify the significance of effects are those presented in the Impact Classification Terminology (EPA, 2022), as presented in **Table 1-2** of **Chapter 1** of this EIAR.

The significance of predicted effects was determined by considering the importance (sensitivity) of the receiving receptor together with the magnitude and characteristics of the predicted effect. Professional judgement has been applied throughout the assessment, taking account of the nature and scale of the Proposed Project, the characteristics of the receiving environment, and the relevant guidance provided by the EPA (2022), TII (2009) and IGI (2013). Where appropriate, mitigation measures have been incorporated into the assessment, and the significance of residual effects has been evaluated.

8.3 Existing Environment (Baseline)

8.3.1 Land Use & Topography

The Proposed Project is located within a rural setting in southwest Co. Waterford, approximately 5 km southwest of Dungarvan. The Site covers approximately 1,450 hectares (ha) and comprises the Proposed Wind Farm site and the Proposed Grid Connection site, as described in **Chapter 4, Sections 4.2 and 4.3** of this EIAR.

Current land use within the Proposed Wind Farm site is predominantly commercial forestry and improved agricultural grassland (pasture), together with smaller areas of transitional woodland and scrub associated with forestry operations. Scattered one-off rural dwellings are present along the surrounding local road network. Land use along the Proposed Grid Connection site is primarily confined to the public road corridor and adjoining agricultural land. The surrounding landscape is characterised by a mixture of pastoral agriculture, commercial forestry and low-density rural residential development.

Ground elevation ranges from approximately 301 m OD (metres above Ordnance datum) to 50 m OD, with the highest ground occurring towards the southeastern extent of the Site at Carronadavderg. The topography is characterised by gently undulating to moderately steep upland terrain, interspersed with shallow incised valleys associated with the local drainage network. The Proposed 110kV Underground Cabling Route generally follows lower-lying road corridors between the Proposed Wind Farm and the Proposed 220kV Loop-in Substation.

8.3.2 Soils and Subsoils

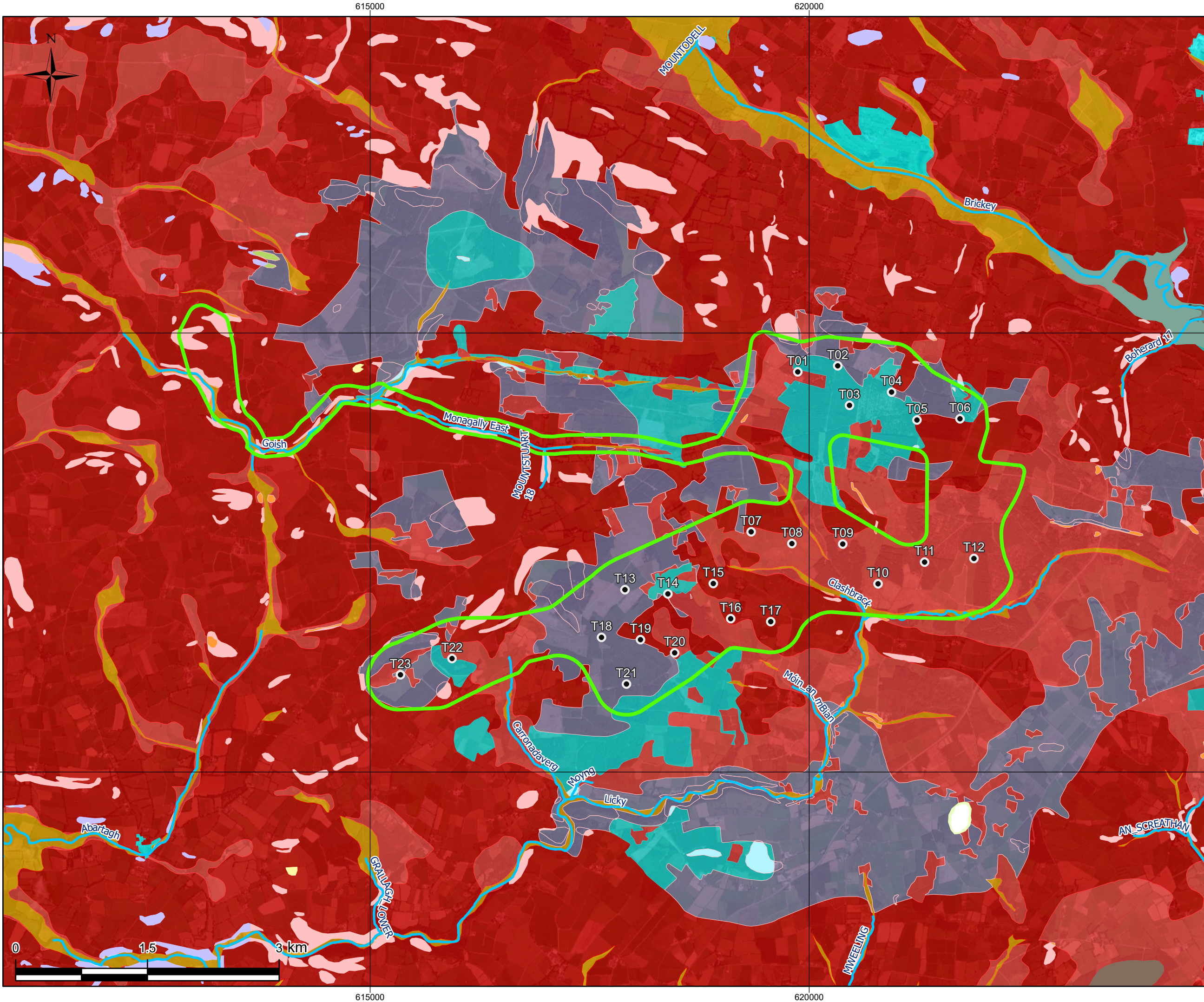
According to the National Soils Map (Teagasc/EPA)¹, the Site is predominantly underlain by poorly drained mineral soils (AminPD), derived from mainly non-calcareous parent materials. Extensive areas of peaty, poorly drained mineral soils (AminPDPT) and shallow, rocky, non-peaty mineral complex soils (AminSRPT) are present across parts of the Proposed Wind Farm site, generally associated with the higher ground.

According to the Teagasc Soils Map, areas of shallow and deep well drained mineral soils (AminSW and AminDW), derived from mainly non-calcareous parent materials and areas of alluvial mineral soils (AlluvMIN) are present locally (**Figure 8-1**). Clayey (gley soils) were observed during the site walkover survey in the southeastern part of the Site, in the direction of the headwaters of the Licky River.

According to GSI Quaternary Sediments (Subsoils) mapping, the majority of the Site is underlain by glacial till derived from Devonian Old Red Sandstone bedrock (TDSs). Alluvial sediments (A) are mapped locally along streams, while areas of bedrock outcrop or subcrop (Rck) are mapped throughout the Site (**Figure 8-2**).

The site walkover and ground investigation generally confirmed the published soils and subsoils mapping but also demonstrate that the Quaternary deposits are locally variable. The trial pits generally encountered soft to stiff, sandy, gravelly silt and clay with lenses or layers of sand and occasional cobbles and boulders. A summary of the ground conditions encountered and the proven depth to bedrock or trial pit termination depth at each investigation location is presented in **Table 8-3**. Detailed trial pit logs, including photos, are included in **Appendix 8-1**.

¹ EPA Maps – National Soils Map of Ireland, Irish Soil Information System (Teagasc/EPA), accessed July 2026



Map Legend

- EIAR Site Boundary
- Proposed Turbine Locations
- Rivers and Streams

Soil Type

- AlluvMIN - Mineral alluvium
- AminDW - Acid Brown Earths / Brown Podzolics
- AminPD - Surface water Gleys / Ground water Gleys Acidic
- AminPDPT - Peaty Gleys Acidic
- AminSP - Surface water Gleys / Ground water Gleys Shallow
- AminSPPT - Peaty Gleys Shallow
- AminSRPT - Podzols Peaty
- AminSW - Lithosols / Regosols
- BminSP - Surface water Gleys / Ground water Gleys Shallow
- BminSRPT - Lithosols Peats
- BminSW - Renzinas / Lithosols Cu
- Raised Bog cutaway/cutover
- FenPT - Fen peat
- Lac - Lacustrine sediments
- Made Ground
- Marine / Estuarine Sediments Water

Spatial Reference
 Name: IRENET95 Irish Transverse Mercator
 Datum: IRENET95
 Projection: Transverse Mercator

SITE LOCATION - NOT TO SCALE

Teagasc Soils Map

Project Title

Enerco Slievegrine Wind Farm

Project No.	Drawing No.	Scale
240740	8-1	1:40,000
Drawn By	Checked By	Date
JG	HM	22/09/2026

Email: info@mkofireland.ie / Website: www.mkofireland.ie

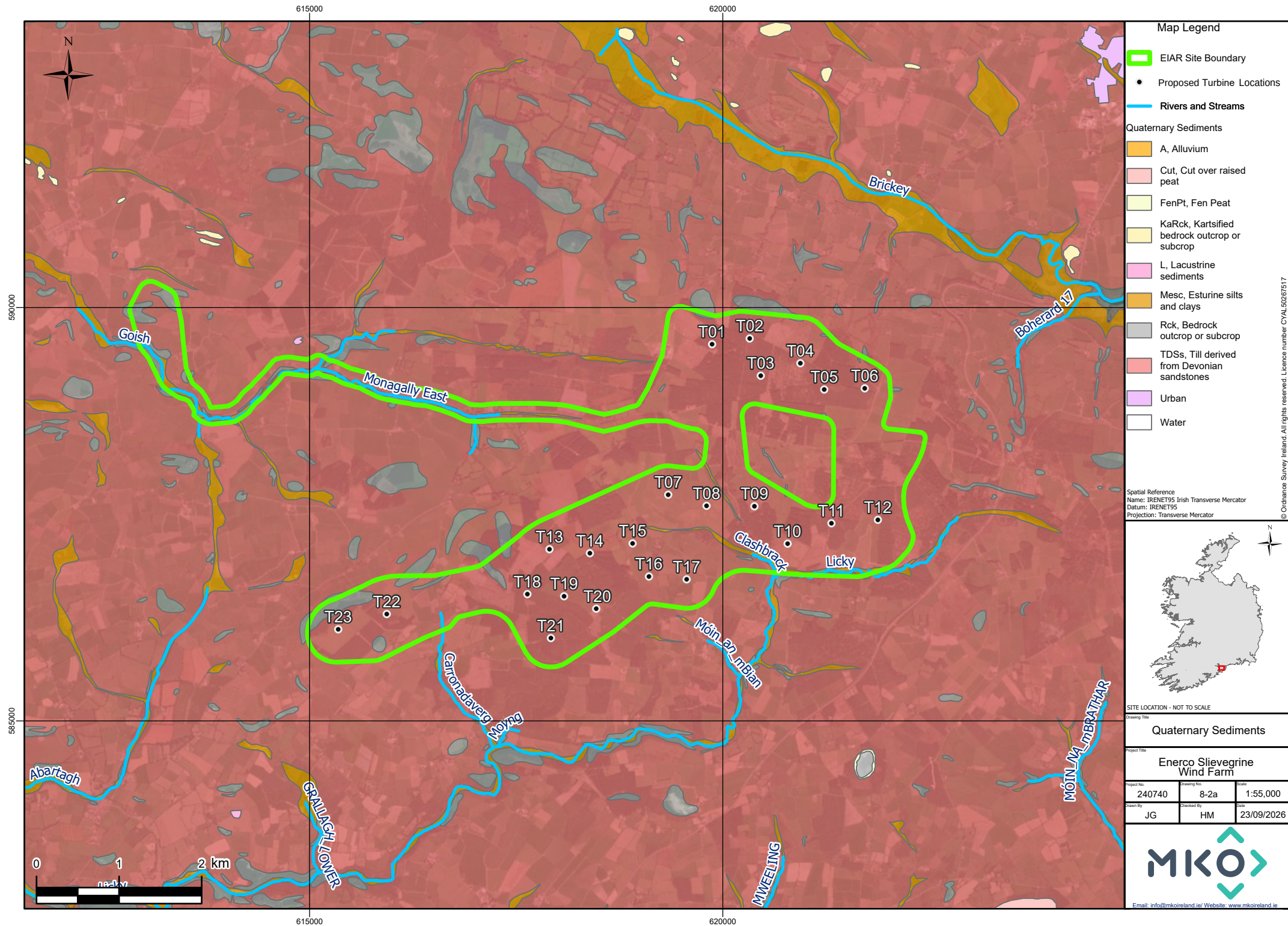


Table 8-3 Summary of Trial Pit Investigation Results

ID	Nat. Grid Easting	Nat. Grid Easting	DtB/ TD (m bgl)	Geological Summary of Subsoils
BP01	217386	86643	1.9	COBBLES AND BOULDERS with much gravelly CLAY
BP02	219593	89730	2.2	Slightly sandy gravelly CLAY over sandy very clayey GRAVEL
BP03	221649	89238	1.7	Slightly sandy very clayey GRAVEL over COBBLES AND BOULDERS with much clayey GRAVEL
BP04	217732	87129	2.0	Slightly sandy very clayey GRAVEL over COBBLES AND BOULDERS with some clayey GRAVEL
BP06	220398	87739	>4.3	Slightly gravelly sandy CLAY over slightly sandy slightly gravelly CLAY over slightly sandy gravelly CLAY
TP01	219899	89490	2.2	Slightly sandy gravelly CLAY
TP01b	220073	89412	2.2	Slightly sandy gravelly silty CLAY over sandy very clayey GRAVEL
TP02	220367	89604	2.1	Slightly sandy slightly gravelly CLAY over slightly gravelly, sandy silty CLAY over clayey very sandy GRAVEL
TP03	220612	89119	3.3	Slightly gravelly slightly sandy CLAY over slightly sandy gravelly CLAY over slightly sandy very clayey GRAVEL
TP04	220988	89344	2.6	Slightly gravelly slightly sandy CLAY over slightly sandy gravelly CLAY over slightly sandy very clayey GRAVEL
TP05	221257	88978	1.8	Slightly sandy gravelly CLAY over COBBLES AND BOULDERS with much slightly sandy gravelly CLAY
TP06	221778	88980	1.8	Slightly gravelly slightly sandy CLAY over slightly sandy slightly gravelly CLAY
TP07	219391	87700	2.2	Slightly gravelly sandy silty CLAY over slightly sandy gravelly CLAY
TP08	219855	87569	>2.7	Slightly gravelly slightly sandy silty CLAY over slightly gravelly sandy silty CLAY over gravelly silty CLAY
TP09	220433	87550	>2.4	Slightly gravelly sandy CLAY over slightly sandy slightly gravelly CLAY
TP10	220856	87170	>2.7	Slightly sandy CLAY over slightly gravelly slightly sandy silty CLAY
TP11	221340	87309	>2.7	Slightly gravelly sandy silty CLAY over very gravelly CLAY over slightly gravelly sandy CLAY over slightly gravelly sandy silty CLAY
TP12a	221844	87324	>3.0	Silty CLAY over slightly gravelly sandy CLAY
TP12b	221926	87389	>2.7	Slightly sandy silty CLAY over slightly gravelly very clayey SAND over slightly gravelly slightly sandy CLAY over slightly gravelly slightly sandy silty CLAY

ID	Nat. Grid Easting	Nat. Grid Easting	DtB/ TD (m bgl)	Geological Summary of Subsoils
TP13	217924	87006	2.9	Clayey very sandy GRAVEL over sandy clayey GRAVEL
TP14	218404	87019	>1.8	Slightly sandy slightly gravelly CLAY over slightly gravelly sandy CLAY over slightly sandy gravelly CLAY
TP15	218961	87106	2.5	Slightly gravelly sandy clayey SILT over clayey silty very sandy GRAVEL over slightly clayey silty sandy GRAVEL over slightly clayey silty slightly sandy GRAVEL
TP16	219157	86711	2.6	Sandy clayey GRAVEL over clayey very sandy GRAVEL
TP17	219609	86677	2.2	Silty very gravelly SAND over clayey sandy GRAVEL
TP18	217692	86512	2.9	Slightly gravelly sandy clayey SILT over COBBLES AND BOULDERS with much clayey silty GRAVEL
TP19	218132	86469	>3.5	Very sandy very silty GRAVEL over silty very sandy GRAVEL over silty sandy GRAVEL
TP20	218518	86319	2.0	Slightly sandy gravelly CLAY over sandy clayey GRAVEL
TP21	217976	85961	>4.4	Slightly gravelly sandy silty CLAY over sandy CLAY
TP23	215415	86086	2.6	Slightly clayey silty sandy GRAVEL over slightly sandy silty GRAVEL over very clayey SAND AND GRAVEL over slightly silty SAND AND GRAVEL over silty very sandy GRAVEL
TP24	215960	86245	1.4	Very silty very gravelly SAND over sandy silty GRAVEL over sandy silty clayey GRAVEL
SS01	220043	88837	2.0	Slightly sandy slightly gravelly CLAY over slightly gravelly sandy silty CLAY over clayey very gravelly SAND
SS02	213106	89929	0.45	Gravelly CLAY
SS03	220115	88161	1.4	Slightly sandy slightly gravelly organic CLAY over slightly sandy gravelly CLAY
Notes: DtB = Depth to Bedrock TD = Termination Depth '>' indicates that bedrock was not encountered and the value represents the maximum depth of the trial pit.				

A shallow, firm to very firm, or soft to firm, clay horizon ('clay pan') was encountered in 19 of the 33 trial pits, generally occurring within approximately 0.6 m below ground level (bgl). The clay is sometimes of a milky-white colour, indicative of mineral leaching. An iron pan is also sometimes present in the trial pits, with mottling beneath, indicative of seasonally fluctuating groundwater levels in the subsoils.

There were no peat layers logged from trial pits across the Site; however, peaty soils were encountered in eight trial pit locations, generally within topsoil. Therefore, no significant quantities of peat were identified at infrastructure locations investigated across the Site which would justify a peat stability risk assessment or similar for the construction phase of the Proposed Project.

More freely draining profiles were also encountered locally and were characterised by sandy gravel and gravelly sand with a relatively low clay content and no distinct ‘clay pan’ horizon.

Proven depth to bedrock ranged from 0.45 m to >4.5 m bgl. At several locations, excavation was terminated before bedrock was met, indicating locally thicker till deposits. The depth to bedrock at these locations therefore exceeds the recorded trial pit depth.

Five potential borrow pit locations were also investigated. Bedrock was encountered between 1.7 m and 2.2 m bgl at four locations, while bedrock was not proven to a depth of 4.3 m bgl at one location. All trial pits were logged in accordance with BS5930:2015+A1:2020². Detailed trial pit logs are provided in **Appendix 8-1**, and the site investigation locations are presented in **Figure 8-3**.

8.3.3 Bedrock Geology

Based on the 1:100,000 scale bedrock map published by GSI, the Site is predominantly underlain by sandstone, mudstone and siltstone of the Ballyquinn Member, Ballytrasna Formation and Gyleen Formation. The Ballyquinn Member comprises grey and red sandstone with red mudstone, the Ballytrasna Formation comprises purple mudstone and sandstone, and the Gyleen Formation comprises sandstone with mudstone and siltstone. A bedrock geology map (GSI) is presented in **Figure 8-4**.

8.3.4 Geological Heritage and Designated Geological Sites

²The GSI Geoheritage Audited Sites dataset (GSI, 2012) identifies one County Geological Site (CGS), Drumslig CGS, within the Site.

Drumslig CGS is located in the southern part of the Proposed Wind Farm site (**Figure 8-5**) and is associated with the historic Drumslig iron mine. The CGS is located approximately 333 m southwest of proposed turbine T10 and approximately 630 m northeast of proposed turbine T17. The geological interest of the Drumslig CGS relates to hematite mineralisation occurring as a vein within the underlying shale bedrock. The mineralisation was historically worked for iron and represents a locally important example of the mineral geology and mining heritage of County Waterford. The CGS is therefore recognised by the GSI as a geological heritage feature of local importance.

No Geological Natural Heritage Areas (NHAs) are located within the Site.

8.3.5 Soil Contamination

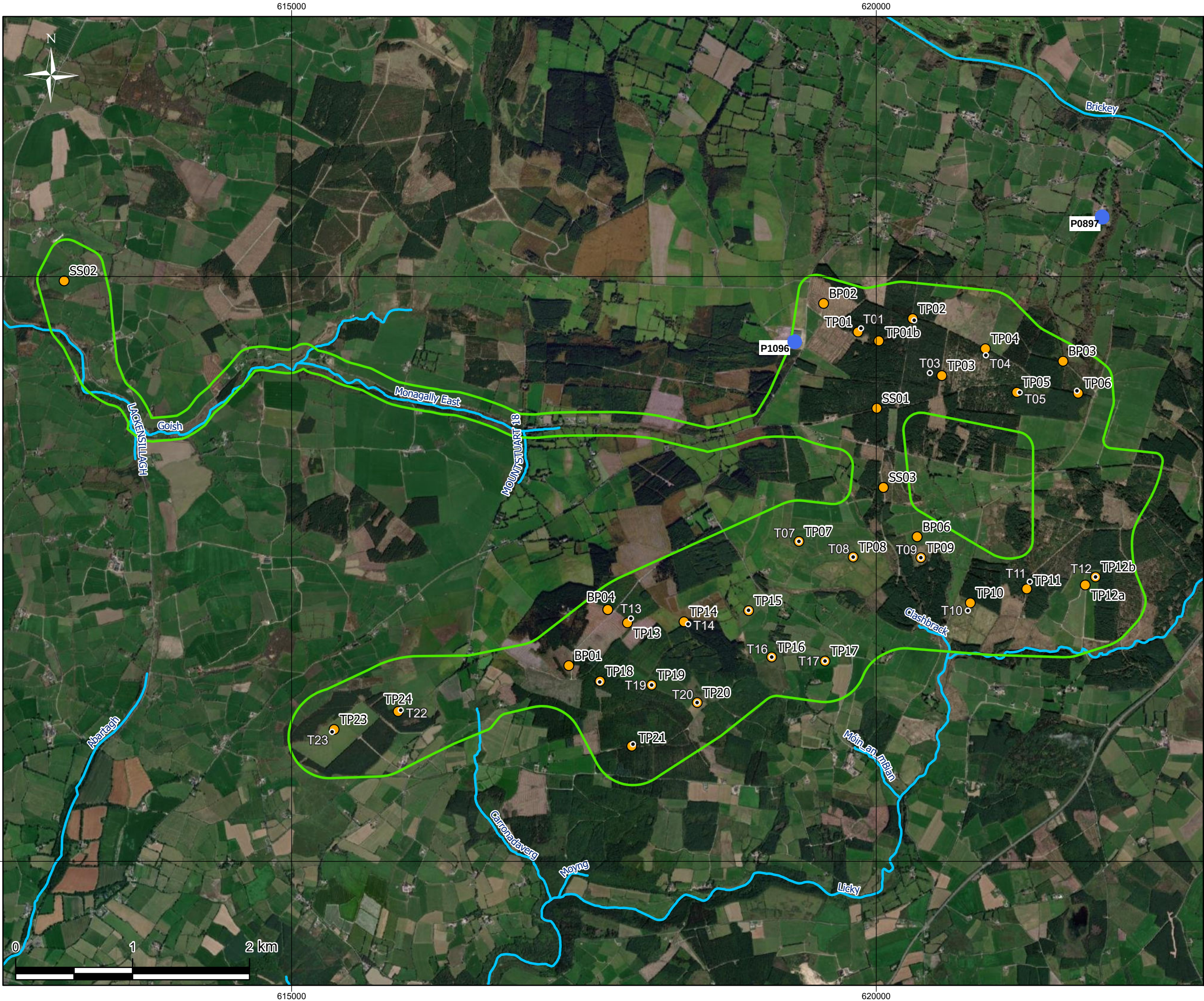
The Site is predominantly agricultural land and commercial forestry. No evidence of historical waste disposal or significant contamination was identified during the site walkover or ground investigation.

According to the EPA Map Viewer, one Industrial Emissions Licensed (IEL) facility, Ashleigh Farms (Waterford) Limited (Licence No. P1096-01), is located within the northern part of the Site, approximately 500 m west of proposed turbine T1. The facility is authorised for an intensive agricultural activity. Its location is shown in **Figure 8-5**.

There are no licensed waste facilities, landfills, or Integrated Pollution Control (IPC) licensed facilities within the Site.

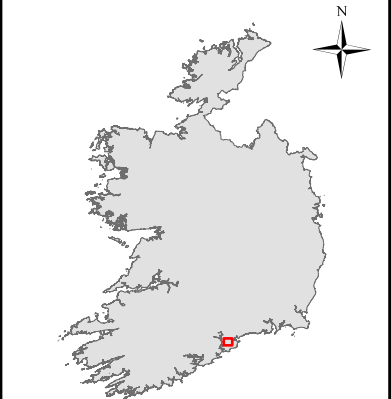
No evidence of contamination associated with the historic Drumslig iron mine was identified.

² BS5930:2015+A1:2020 Code of practice for ground investigations (British Standards Institute 2020)



- Map Legend
- EIAR Site Boundary
 - Proposed Turbine Locations
 - Trial Pits
 - IEL Facility
 - Rivers and Streams

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



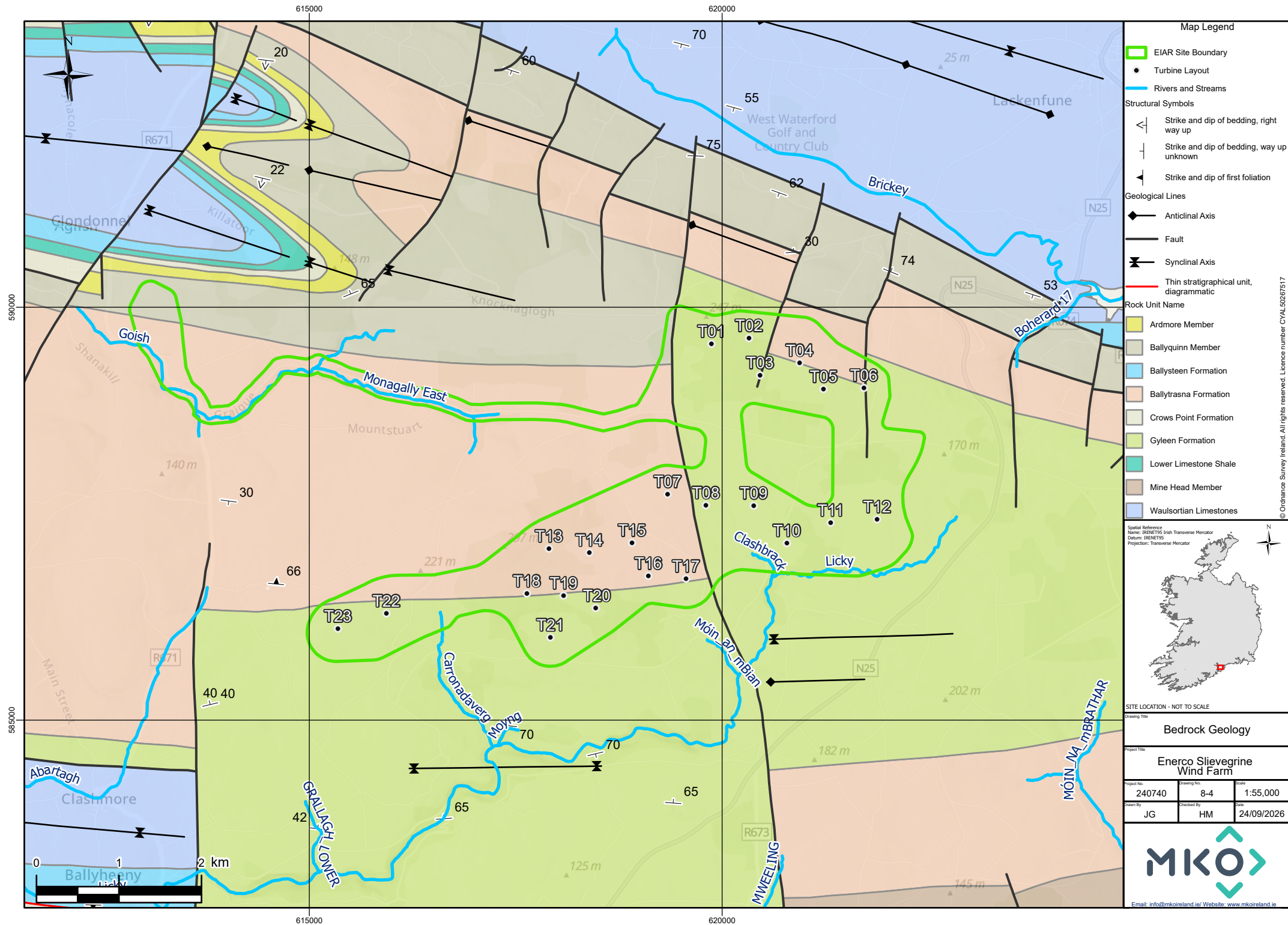
SITE LOCATION - NOT TO SCALE

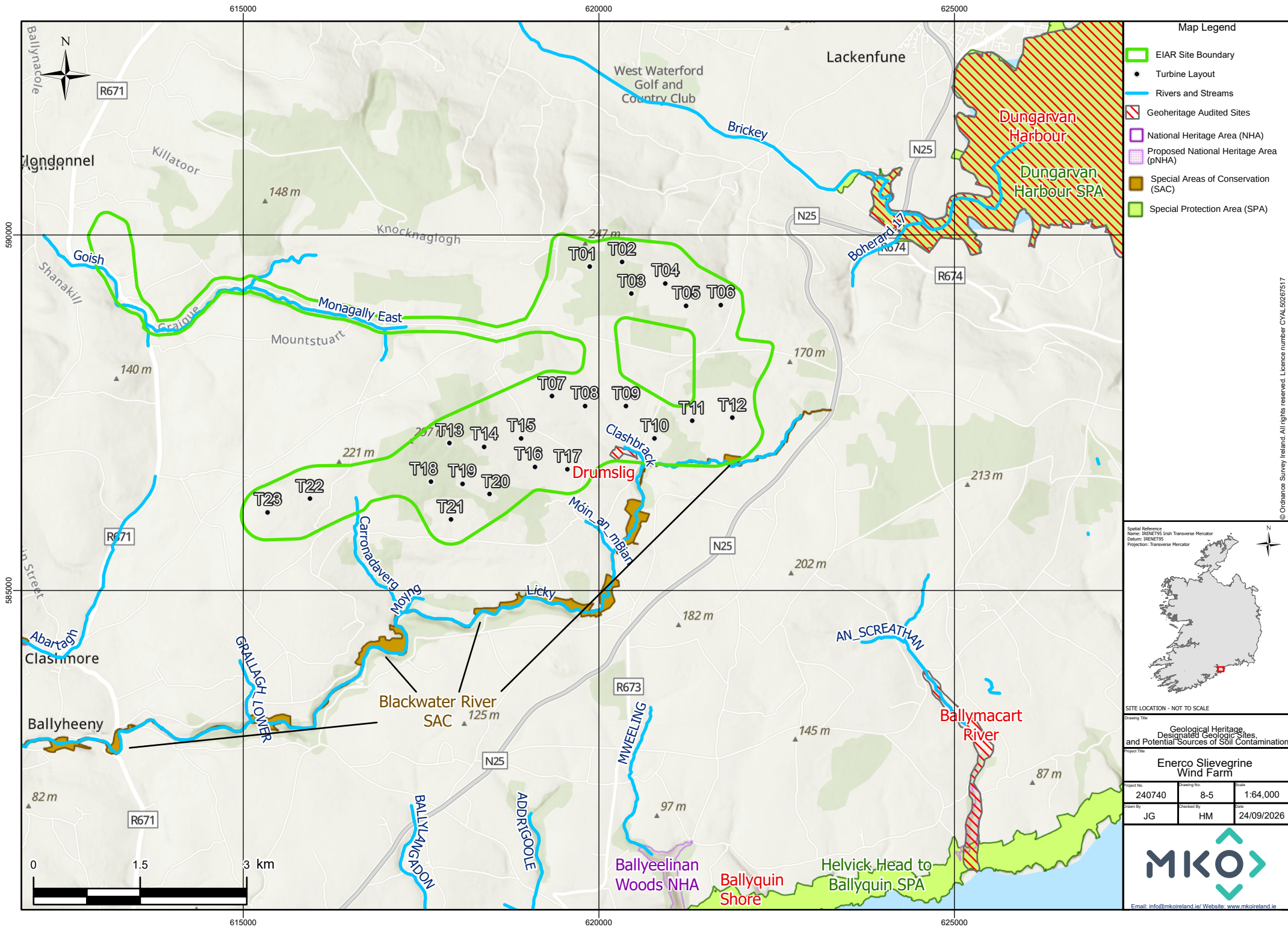
Site Investigation Locations

Project Title		
Enerco Slievegrine Wind Farm		
Project No.	Drawing No.	Scale
240740	8-3	1:30,000
Drawn By	Checked By	Date
JG	HM	24/09/2026



Email: info@mkofireland.ie / Website: www.mkofireland.ie





8.3.6 Economic Geology

The GSI Online Minerals Database indicates that there are no active quarries within the Site. The nearest active quarry, Kareen Quarries Ltd., is located approximately 3.2 km north of the Site. There are two metallic mineral localities within the Site associated with the historic Drumslig iron mine.

According to the aggregate potential map (GSI), the alluvial deposits associated with stream valleys within the Site are classified as having low to very low potential for granular aggregate. The majority of the Site is also classified as having low to very low potential for crushed rock aggregate.

Several bedrock outcrop areas were recorded during the site walkover as having potential for borrow pit development. Subsequent ground investigations confirmed that the bedrock is generally shallow across the proposed borrow pit areas, having potential for providing suitable construction materials for the Proposed Project.

8.3.7 Geohazard

The landslide susceptibility classification (GSI) for the Site has been mapped as Low. No mapped landslide events are recorded within 10 km of the Site.

8.3.8 Receptor Importance/Sensitivity

The assignment of importance/sensitivity of land, soils, and geology receptors within the Site are guided by **Table 8-2** and the baseline information above.

Existing land use within the Site comprises principally commercial forestry, agricultural pastoral land and the public road corridor associated with the Proposed 110kV Underground Cabling Route. These land uses are widespread within the surrounding area and are not considered to represent a scarce or particularly sensitive land resource. Existing land use is therefore considered to be of **low** importance.

The Site is predominantly underlain by poorly drained and peaty mineral soils and heterogeneous glacial till comprising sandy, gravelly silt and clay, with local sand and gravel deposits. These soils and subsoils are typical of the wider area, are not designated for their scientific interest and do not represent a rare geological or soil resource. The soils and subsoils are therefore considered to be of **low** importance. Localised areas of more freely draining mineral soils occur within the Site. However, these do not alter the overall importance assigned to the soil and subsoil receptor.

The underlying bedrock comprises Devonian age sedimentary rocks that have limited economic value. The GSI Aggregate Potential Map indicates that the Site has generally low to very low potential for both granular and crushed rock aggregate. However, the ground investigations identified localised areas of shallow bedrock with the potential to provide suitable construction materials for the Proposed Project. The bedrock geology is therefore considered to be of **medium** importance.

The Drumslig County Geological Site (CGS) is recognised by the GSI for its geological heritage and historic mining interest. In accordance with the assessment criteria, the CGS is considered to be of **high** importance and has been included in the impact assessment.

Based on the above, the land, soils and geological environment within the Site comprises receptors of **low** to **high** importance, with the highest sensitivity associated with the Drumslig CGS.

8.4 Characteristics of the Proposed Project

The Proposed Project will involve excavation of topsoil, subsoil and bedrock to facilitate the construction of turbine foundations and hardstanding areas, access roads, construction compounds, the

meteorological mast, the Proposed 110 kV Substation, the Proposed 220 kV Loop-in Substation, underground cabling, drainage infrastructure and the five proposed borrow pits.

The estimated volume of spoil generated by the principal infrastructure elements is approximately 468,470 m³, including 10% contingency. A breakdown of the estimated volumes for each development component is provided in **Table 4-10** of **Chapter 4**. These volumes comprise topsoil, subsoil and other naturally occurring excavated materials.

Approximately 396,000 m³ of crushed stone is conservatively estimated to be required for construction of the Proposed Project, as detailed in **Table 4-9** of **Chapter 4**. It is intended that most of this material will be obtained from the five proposed borrow pits within the Site. Where sufficient suitable stone is not available from the borrow pits, the needed material will be imported from authorised local quarries. Rock extraction within the borrow pits will be principally undertaken by mechanical rock breaking, with controlled blasting used where necessary.

Suitable bedrock excavated during construction or extracted from the proposed borrow pits and other infrastructure locations will be processed and reused as construction aggregate within the Site. Following extraction, the borrow-pit voids will be progressively backfilled with suitable excavated spoil. Topsoil and suitable subsoil will be stored separately, where practicable, and reused during reinstatement and landscaping works. Remaining suitable material will be used for landscaping, local reinstatement and the formation of linear berms along access roads, where appropriate.

8.5 Likely Significant Effects and Mitigation Measures

8.5.1 Do Nothing Scenario

If the Proposed Project was not carried out, the Site would remain in its current use as commercial forestry and agricultural grassland. No direct effects on land, soils, and geology would occur as a result of the Proposed Project. Existing land use and natural geological processes would continue, and the condition of the land, soils, and geology environments would remain unchanged. Therefore, the 'Do Nothing' scenario is assessed as resulting in a long-term, neutral effect.

If the Proposed Project were not to proceed, the opportunity to capture part of County Waterford's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment, development contributions, rates and investment in the local area would also be lost. On the basis of the positive environmental effects arising from the Proposed Project, the do-nothing scenario was not the chosen option. The existing commercial forestry operations and agricultural activities can and will continue in conjunction with the Proposed Project use of the Site.

Furthermore, the opportunity to create the proposed habitat enhancement areas would be lost. Please see **Appendix 6-4** Biodiversity Management and Enhancement Plan for details.

8.5.2 Construction Phase

The greatest potential for effects on land, soils, and geology will occur during the approximately 18-24 months construction phase, as described in **Chapter 4**. Construction activities will involve land occupation, site clearance, earthworks, excavation, and the handling, storage, and reuse of topsoil, subsoil, bedrock, and other excavated materials.

Based on the baseline conditions described in **Section 8.3**, and the characteristics of the Proposed Project described in **Section 8.4**, the following activities and potential effect pathways have been considered in the assessment:

- Land (land-take)
- Subsoil and bedrock excavation
- Piling works
- Accidental spills, leaks, or other releases
- Geological heritage and designated geological sites

8.5.2.1 Land (Land-Take)

Construction of the Proposed Project will require the permanent and temporary occupation of land. Permanent land-take will be associated principally with the turbine foundations and crane hardstanding areas, access roads, the Proposed 110kV Substation, the Proposed 220kV Loop-in Substation and associated permanent infrastructure. Temporary land-take will be required for working areas, borrow pit operations and underground cable installation. Temporary working areas will be reinstated following completion of the construction works.

The permanent built infrastructure footprint of the Proposed Project is approximately 33.17 ha of existing commercial forestry and agricultural land. However, the majority of the site will remain available for its existing forestry and agriculture uses.

Pathways: Permanent conversion or temporary occupation of land associated with the construction of the Proposed Project.

Receptors: Existing land use (commercial forestry and agricultural grassland) within the Site.

Pre-Mitigation Potential Effect: The permanent development footprint will result in a direct, negative, slight, permanent, likely effect on existing land use. Construction areas will result in a direct, negative, slight, short-term and likely effect for the duration of the construction works.

Proposed Mitigation Measures / Impact Assessment:

The Proposed Project has been designed to minimise permanent land-take by optimising the location of turbines and associated infrastructure and, where practicable, utilising existing forestry tracks and disturbed areas. The Proposed 110kV Underground Cabling Route will be installed predominantly within the existing public road corridor, thereby reducing the requirement for permanent occupation of previously undeveloped land.

Construction compounds, working areas and cable installation corridors will be reinstated following completion of the works. Borrow pit voids will be progressively backfilled with suitable excavated spoil and subsequently reseeded or allowed to revegetate naturally. The construction sequence described in **Chapter 4, Section 4.7.2** also includes the reinstatement of working areas and removal of temporary site facilities following completion of the works.

The permanent infrastructure will occupy approximately 2.29% of the overall Site, and the surrounding commercial forestry and agricultural land will continue in its existing use throughout the operational life of the Proposed Project.

Post-Mitigation Residual Effect: The permanent infrastructure footprint will result in a direct, negative, slight, permanent and likely residual effect on existing land use. Temporary land-take will result in a direct, negative, slight, short-term and likely residual effect during construction, reducing to imperceptible following reinstatement.

Significance of Effects: For the reasons outlined above, no significant effects on existing land use are expected as a result of permanent or temporary land-take. The permanent infrastructure footprint will occupy only a small proportion of the Site, while temporary working areas will be reinstated following completion of the construction works.

8.5.2.2 Subsoil and Bedrock Excavation

Construction of the Proposed Project will require excavation of topsoil, subsoil and locally shallow bedrock to facilitate the construction of turbine foundations, crane hardstands, internal access tracks, construction compounds, the Proposed 110 kV Substation, Proposed 220 kV Loop-in Substation, underground electrical cabling, drainage infrastructure, watercourse crossings and the five proposed borrow pits.

At the proposed borrow pits, extraction will be undertaken by rock breaking or, where necessary, controlled blasting in accordance with the construction methodology described in **Chapter 4, Section 4.8.1.5**.

As described in **Section 8.4**, suitable bedrock extracted during construction will be processed and reused as construction aggregate within the development footprint. Suitable topsoil, subsoil and other excavated materials will be retained for borrow-pit reinstatement, landscaping, local reinstatement and the formation of linear berms, where appropriate. The Proposed Project has therefore been designed to maximise the reuse of suitable excavated materials within the Site and minimise the requirement for imported aggregate or off-site disposal.

The excavation works will permanently alter the existing soil, subsoil and bedrock profile within the development footprint. Temporary effects could also arise from erosion or localised instability of exposed soils, subsoils and stockpiled materials if these are not appropriately managed.

Pathways: Excavation, rock breaking, controlled blasting, handling, temporary storage and relocation of topsoil, subsoil and bedrock.

Receptor: Soils, subsoil and bedrock.

Pre-Mitigation Potential Effects: The excavation works, including rock breaking and controlled blasting, will permanently alter the existing soil, subsoil and bedrock profile within the Site, resulting in direct, negative, slight, permanent and likely effects. Temporary effects could also arise from erosion of exposed soils or localised instability of excavations, borrow-pit faces, temporary stockpiles and spoil-placement areas if these are not appropriately managed, resulting in direct, negative, slight, temporary and likely effects during construction.

Proposed Mitigation Measures:

The following mitigation measures will be implemented during construction:

- Existing forestry roads and access tracks will be upgraded and used where practicable to minimise the extent of new excavation works.
- Excavation will be limited to the minimum extent necessary for the construction of the Proposed Project.
- Controlled blasting, if required, will be designed and undertaken by a suitably qualified specialist blasting contractor in accordance with the methodology and controls described in **Chapter 4, Section 4.8.1.5.2**.
- Stripped topsoil and subsoil will be stored separately, where appropriate, and reused during reinstatement and landscaping works.
- Suitable bedrock extracted from the proposed borrow pits and other infrastructure locations will be processed and reused as construction aggregate within the Proposed Project.

- Excavated spoil will be managed in accordance with the Site Spoil Management Plan, including the reinstatement of borrow pit voids, temporary stockpiling where required, and the reuse of suitable material for landscaping and linear berm construction.
- Temporary stockpiles will be located, managed and stabilised to minimise erosion and localised instability.
- Drainage and sediment-control measures described in **Chapter 9**, the Construction and Environmental Management Plan (CEMP) (**Appendix 4-3**), and the Surface Water Management Plan (**Appendix 4-4**) will be implemented to manage runoff from excavation areas and temporary stockpiles.

Post-Mitigation Residual Effects: The permanent alteration of the soil, subsoil and bedrock profile within the Site will result in direct, negative, slight, permanent and likely residual effects. Following implementation of the proposed mitigation measures, temporary effects associated with erosion or localised instability will be direct, negative, imperceptible, temporary and unlikely.

Significance of Effects: For the reasons outlined above, no likely significant effects on topsoil, subsoil or bedrock are expected from excavation and rock extraction activity. Excavation will be confined to the Proposed Project footprint, while suitable excavated materials will be reused within the Site and temporary excavation and storage areas will be appropriately managed and reinstated.

8.5.2.3 Piling Works

Piling foundations may be required at turbine locations where challenging ground conditions exist. Based on site investigation data, these locations may include T8 to T12, T14, and T21. The requirement for piling at these locations will be determined during post-consent ground investigations and design. An assessment of piling at these turbine locations has been included below.

Mechanisms: Removal of subsoils/bedrock and replacement with pile foundations.

Receptor: Topsoil, subsoil, and bedrock.

Pre-Mitigation Potential Effects: Direct, negative, imperceptible, permanent, unlikely effects on topsoils, subsoils, or bedrock by piling works.

Proposed Mitigation Measures / Impact Assessment: Pile installations will result in the displacement of small volumes of spoil. There will be a permanent loss of geological material from the subsurface due to this, and there are no mitigations to reduce this effect.

These spoil volumes can be easily managed at the Site, with excess spoil being removed for permanent storage in the on-site borrow pit or within the designated spoil management areas. Spoil volumes generated by any potential piling works will only amount to a small percentage of the overall spoil volumes for the Proposed Project.

No mitigation measures are proposed or required for the soils and geological environment. Proposed mitigation to protect the water environment are outlined in Chapter 9.

Post-Mitigation Residual Effects: No mitigation measures are proposed. As such, there will be direct, negative, slight, permanent, unlikely residual effects on topsoils, subsoils, or bedrock by piling works.

Significance of Effects: For the reasons detailed above, no significant effects on subsoils will occur.

8.5.2.4 Accidental Spills, Leaks, or Other Releases

Accidental spills or leaks of fuels, lubricants, hydraulic oils, chemicals, wet concrete, cement washings or wastewater during construction have the potential to contaminate topsoil, subsoil and the underlying bedrock. Refuelling, routine plant operation and maintenance, material storage, concrete works and temporary welfare facilities represent the principal potential sources of contamination.

While a major accidental release would present an immediate contamination risk, the accumulation of smaller spills or leaks during routine construction activities could also result in localised contamination. Petroleum hydrocarbons and other hazardous substances can be toxic and persistent in the environment and may migrate vertically through permeable subsoils or along fractures within the underlying bedrock. In the absence of appropriate controls, accidental releases could therefore affect the geological environment within the construction footprint.

Pathways: Infiltration through topsoil, subsoil with potential migration into fractures within the exposed or shallow bedrock.

Receptor: Topsoil, subsoil and bedrock.

Pre-Mitigation Potential Effects: Direct, negative, slight, brief to temporary, unlikely impact on topsoil, subsoils and bedrock.

Proposed Mitigation Measures:

The following measures will be implemented during the construction.

Hydrocarbons and Chemicals:

- The highest standards of site management will be maintained, with the utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the Site and surrounding environment during construction;
- An Emergency Response Plan for accidental spillages will be implemented as part of the CEMP. All construction staff will be familiar with the emergency procedures and the use of the relevant equipment;
- The ECoW will oversee the pollution prevention measures agreed for the Site to ensure that they are operating safely and effectively, as well as having responsibility for the implementation of Emergency Procedures for spill control measures;
- Where possible, refuelling will occur at an off-site controlled fuelling station;
- On-site refuelling will be undertaken using a fuel truck, with spill kits readily available for accidental leakages or spillages;
- Refuelling will be undertaken by designated, suitably trained personnel only;
- Refuelling of construction machinery will take place using drip trays at all times;
- All plant and machinery will be serviced before being mobilised on-site and will be regularly inspected and maintained to minimise the risk of leaks and spillages;
- Maintenance of construction vehicles or plant will, where practicable, be undertaken off-site;
- Spill response kits will be available at all active work areas, refuelling locations, concrete works and construction compounds, and personnel will be trained in their use;
- Fuels stored on-site will be minimised. Storage areas, where required, will be bunded appropriately for 110% of the fuel storage volume for the time period of construction and fitted with a storm drainage system and an appropriate oil interceptor;
- Concrete batching, washdown and washout activities will take place off-site. Concrete works will be managed to prevent accidental releases to soils or surface waters; and,
- All waste tar material arising from the excavation of the 110kV underground cabling trench and resurfacing of roads will be removed off-site and taken to a licenced waste facility.

Cement-based Products:

- No batching of wet-cement products will occur on-site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- Where possible, pre-cast elements for culvert and watercourse crossings will be used;
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where concrete is delivered on-site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be directed to lined, cement washout ponds before being removed off-site by an appropriately authorised waste collector for disposal at an authorised waste facility. The washout ponds will be covered when not in use to prevent rainwater collecting;
- Weather forecasting will be used to assist in planning large concrete pours, and large pours will be avoided where prolonged periods of heavy rain are forecast;
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event; and,
- At proposed turbine foundations, sand blinding, DPM, and lean-mix blinding are used to vertically contain the concrete. While the concrete is contained laterally by temporary/permanent shuttering. The concrete cures within 72 hrs.

Wastewater Management:

- During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site construction compounds maintained by the providing contractor, and removed off-site on completion of the construction works;
- Water supply for the on-site office and other sanitation will be brought on-site and removed off-site after use to be discharged at a suitable off-site treatment location; and,
- No water will be sourced on-site, nor wastewater discharged on-site.

An emergency response plan for the construction phase to deal with accidental spillages will be included in the CEMP (**Appendix 4-3**).

Post-Mitigation Residual Effects: With the implementation of the proposed mitigation measures, the likelihood of significant contamination of land, soils, subsoil or bedrock arising from accidental spills, leaks or other releases is considered to be very low. Any accidental releases would be contained and remediated. The residual effect is therefore assessed as direct, negative, imperceptible, temporary and unlikely.

Significance of Effects: For the reasons outlined above, no significant effects on topsoil, subsoil or bedrock are expected as a result of accidental spills, leaks or other releases.

8.5.2.5 Geological Heritage and Designated Geological Sites

The Drumslig CGS is located within the Site. However, no elements of the Proposed Project are located within or adjacent to the designated feature. The Proposed Project has been designed to avoid the geological heritage resource, and no excavation, construction or other ground disturbance will occur within the CGS. Consequently, there are no pathways by which the construction works could adversely affect the geological interest of the designated site.

Pathways: No pathway has been identified, as no construction works or ground disturbance will occur within or adjacent to the Drumslig CGS.

Receptor: Drumslig CGS.

Proposed Mitigation Measures: No additional mitigation is required beyond the avoidance incorporated into the Proposed Project layout. The CGS boundary will be clearly identified on the construction drawings, and no works, storage or access will be permitted within it.

Post-Mitigation Residual Effects: None.

Significance of Effects: For the reasons outlined above, no significant effects on the Drumslogh CGS are expected.

8.5.3 Operational Phase

During the operational phase, few potential effects on land, soils and geology are anticipated. Routine activities will comprise periodic inspections and maintenance of the wind turbines, substations, meteorological mast, telecommunications relay mast, access roads, associated infrastructure and electrical equipment. These activities will primarily use the permanent access-road network, and no significant excavation or ground disturbance will be required during normal operation.

As described in **Chapter 4**, the turbine maintenance will include routine inspections, replacement of consumables and oil changes. Maintenance of the site roads will generally comprise the filling of potholes, while drainage maintenance will include the cleaning of drainage ditches where required. Waste arising during turbine and substation servicing, including lubricating and cooling oils, will be recorded and removed off-site for reuse, recycling or disposal at an authorised facility.

Potential effects during the operational phase relate to:

- Accidental leaks or spills of fuels, lubricants or hydraulic fluids associated with maintenance vehicles or equipment; and
- Accidental leakage of transformer insulating oil from the wind turbines or the proposed 110kV and 220kV substations.

Pathways: Direct release to the ground and infiltration through topsoil and subsoil, with potential migration into fractures within shallow or exposed bedrock.

Receptors: Topsoil, subsoil and bedrock.

Pre-Mitigation Potential Effects: Direct, negative, slight, brief to temporary and unlikely effects.

Proposed Mitigation Measures:

The following measures will be implemented during operation:

- Routine inspection and maintenance of the Proposed Project will be undertaken in accordance with the manufacturer's requirements.
- Oils, lubricants and other hazardous materials required during maintenance activities will be appropriately stored, handled and removed off-site following use.
- Waste oils and other maintenance wastes will be recorded and removed for reuse, recycling or disposal at an appropriately authorised facility.
- Spill-response materials will be available during maintenance works, and any accidental release will be contained and cleaned up promptly.
- Contaminated soil, absorbent materials or other materials arising from an accidental spill will be removed and managed by an appropriately authorised waste contractor.
- Transformers and oil-storage tanks within the substations will be provided with concrete bunding capable of containing 110% of the stored oil volume. Turbine transformers will be located within the turbine structures so that any leakage would be contained within the structure and would not discharge directly to the surrounding ground.

- Any aggregate required for access-road maintenance will be sourced from authorised quarries. No further extraction from the proposed borrow pits will be undertaken during the operational phase.

Post-Mitigation Residual Effects: Following implementation of the above mitigation measures, the likelihood of contamination of topsoil, subsoil or bedrock during operation will be very low. The residual effects will therefore be direct, negative, imperceptible, brief to temporary and unlikely.

Significance of Effects: For the reasons outlined above, no significant effects on land, soils or geology are predicted during the operational phase.

8.5.4 Decommissioning Phase

The Proposed Wind Farm has an anticipated operational period of approximately 35 years. At the end of this period, the turbines may be replaced with new technology, subject to the relevant planning and environmental approvals, or the Proposed Wind Farm will be decommissioned in accordance with the Decommissioning Plan included in **Appendix 4-6**.

The potential effects on land, soils and geology during the decommissioning would be similar to those identified for the construction phase but are expected to be of a lower magnitude due to the more limited extent of excavation and ground disturbance. Potential effects may include:

- Localised disturbance and compaction of topsoil and subsoil associated with the movement and operation of decommissioning plant and crane.
- Localised excavation at the cable joint bays to facilitate the removal of the 33 kV electrical cabling.
- Temporary handling and storage of dismantled components and excavated materials.
- Accidental spills or leaks of fuel, oils or hydraulic fluids associated with decommissioning activities.

Upon decommissioning of the Proposed Wind Farm, the Proposed Turbines and the meteorological mast will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. All above ground turbine and mast components would be separated and removed off-site for recycling. Turbine and mast foundations would remain underground and would be covered with earth and allowed to revegetate. Leaving the foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant temporary environment nuisances such as noise, dust and/or vibration. Site roadways will be used during the operational phase by farm machinery and will provide a useful means of extracting the commercial forestry crop which exists on-site and therefore will be retained post decommissioning to facilitate these activities.

The 33kV underground electrical cabling connecting the Proposed Turbines to the Proposed 110kV Substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility. Furthermore, the Proposed 38kV underground cabling will similarly remain in-situ.

The Proposed 110kV Substation and associated 110kV underground electrical cabling along with the Proposed 220kV Loop-in Substation, will remain in place as they will form part of the National Grid under the ownership and control of the ESB and EirGrid.

Pathways: Localised excavation, plant movement, soil compaction, temporary material storage and accidental releases associated with decommissioning activities.

Receptors: Existing land use, soils, subsoil and bedrock within the decommissioning works areas.

Pre-Mitigation Potential Effects: Localised excavation, plant movement and material handling could result in direct, negative, slight, temporary and likely effects on existing land use, soil and subsoil. Accidental spills or leaks could result in direct, negative, slight, brief to temporary and unlikely effects on topsoil, subsoil and bedrock.

Proposed Mitigation Measures: Decommissioning will be undertaken in accordance with the Decommissioning Plan (**Appendix 4-6**) and the relevant environmental legislation, guidance and best practice applicable at the time. The Decommissioning Plan will be reviewed and updated before decommissioning commences to reflect the methodologies, regulatory requirements and environmental standards then in force.

The mitigation measures identified for the construction phase in **Section 8.5.2** will also be implemented during decommissioning, where relevant. In particular, the measures set out in **Section 8.5.2.4** for the prevention and management of accidental spills, leaks and other releases will apply to decommissioning activities, including controls relating to refuelling, plant maintenance, storage and handling of fuels and oils, spill response equipment and emergency procedures.

These measures will include:

- Limiting ground disturbance to the minimum area required for decommissioning.
- Using the existing access roads and hardstanding areas for plant and crane operations.
- Confining plant movement and material storage to designated working areas to minimise soil compaction.
- Appropriately managing and temporarily storing any excavated topsoil and subsoil.
- Reinstating excavated cable-jointing pits and other temporarily disturbed areas following completion of the works.
- Appropriately storing and handling fuels, oils and other potentially contaminating substances.
- Maintaining spill-response materials and implementing emergency procedures in the event of an accidental release.
- Removing contaminated soils, absorbent materials or other contaminated materials using an appropriately authorised waste contractor.

Post-Mitigation Residual Effects: Following implementation of the above mitigation measures and the retention of foundations, cable ducts and permanent electrical infrastructure in situ, the residual effects on land, soils and geology are assessed as direct, negative, slight, temporary and likely. Residual effects associated with accidental spills or leaks will be direct, negative, imperceptible, brief to temporary and unlikely.

Significance of Effects: For the reasons outlined above, no significant residual effects on land, soils or geology are anticipated.

8.5.5 Potential Human Health Effects

Potential effects on human health associated with land, soils and geology would arise primarily through the unlikely event of contamination of soil or ground resulting from accidental spills or leaks of fuels, lubricants, hydraulic fluids or transformer insulating oil during the construction or operational phases of the Proposed Project.

The Proposed Project is not an activity that would routinely generate contamination of land, soils or geology. During construction and decommissioning, fuels, oils and other hazardous materials will be stored, handled and used in accordance with the mitigation measures described in **Section 8.5.2.4** and the CEMP. During operation, maintenance activities will be managed in accordance with relevant health and safety procedures and best practice. In addition, transformer equipment within the wind

turbines will incorporate appropriate containment measures to prevent the release of insulating oil to the surrounding ground.

With the implementation of the proposed mitigation measures, the likelihood of contamination of land, soils or geology is considered to be very low, and no significant pathways exist by which the Proposed Project could result in adverse effects on human health.

The residual effect on human health associated with land contamination is therefore assessed as imperceptible.

8.5.6 Potential Cumulative Effects

The methodology for the cumulative assessment and the projects considered are described in **Chapter 2, Section 2.9** of this EIAR. For land, soils and geology, the cumulative study area is defined by the EIAR Site Boundary, reflecting the predominantly localised nature of effects on these receptors.

The potential for cumulative effects in combination with other existing, permitted and proposed projects has been considered with reference to the projects identified in **Chapter 2** and listed in **Appendix 2-3**. The wider cumulative review includes large-scale developments such as Ballycurreen, Knocknamona, Lyrenacarriga, Moanbrack, Scart Mountain, Dyrick Hill and Woodhouse wind farms, together with quarrying/extractive developments and other planning applications

Cumulative effects on land, soils and geology could arise where projects have overlapping development footprints, affect the same geological receptor, or result in combined disturbance of soil, subsoil or bedrock resources. Given the localised nature of identified land, soils and geology effects and the absence of an overlapping development footprint or shared geological receptor with the projects considered, the review has not identified any such interactions that would result in effects greater than those assessed for the Proposed Project alone.

No significant cumulative effects on land, soils or geology are expected in combination with the other projects considered in **Chapter 2**.

8.5.7 Conclusion

Construction of the Proposed Project will require permanent and temporary land take and the excavation, handling and reuse of topsoil, subsoil and locally occurring bedrock. The permanent infrastructure footprint will result in a slight, permanent effect on existing land use and on the soil, subsoil and bedrock profile within the development footprint. Temporary effects associated with exposed soils, excavations, stockpiles and accidental releases will be controlled through the design of the Proposed Project and the mitigation measures described in this chapter, **Chapter 4**, **Chapter 9**, and the CEMP.

The Proposed Project has been designed to avoid the Drumslogh CGS, and no effects on its geological interest are predicted. Potential operational effects will be limited to unlikely accidental releases during maintenance activities, while decommissioning effects will be localised and of a lower magnitude than those arising during construction.

Following implementation of the proposed mitigation measures, no significant effects on land, soils or geology, including cumulative effects, are predicted during the construction, operational or decommissioning phases of the Proposed Project.

8.5.8

EIA Classification Summary

Please see the below table for a summary of all identified impacts for the Proposed Project relating to Land, Soils and Geology.

Topic	Pre-Mitigation Effect	Mitigation Section Reference	Residual Effect	Significance
Construction Phase				
Land and Land-Take	Permanent land-take: Permanent, Slight, Negative Temporary land-take: Short-term, Slight, Negative	Section 8.5.2.1	Permanent land-take: Permanent, Slight, Negative Temporary land-take: Short-Term, Slight, Negative, reducing to Imperceptible following reinstatement.	Not Significant
Subsoil and Bedrock Excavation	Permanent alteration: Permanent, Slight, Negative Erosion/localised instability: Short-Term, Slight, Negative	Section 8.5.2.2	Permanent alteration: Permanent, Slight, Negative Erosion/localised instability: Short-Term, Imperceptible	Not Significant
Piling Works	Permanent alteration: Permanent, Imperceptible, Negative	Section 8.5.2.3	Permanent alteration: Permanent, Imperceptible, Negative	Not Significant
Accidental Spills, Leaks or Other Releases	Brief to Temporary, Slight, Negative	Section 8.5.2.4	Temporary, Imperceptible, Negative	Not Significant
Geological Heritage – Drumslig CGS	No Effects	Section 8.5.2.5	No Effects	Not Significant
Operational Phase				
Accidental Spills or Leaks during Maintenance	Brief to Temporary, Slight, Negative	Section 8.5.3	Brief to Temporary, Imperceptible, Negative	Not Significant
Decommissioning Phase				
Ground Disturbance	Temporary, Slight, Negative	Section 8.5.4	Temporary, Slight, Negative	Not Significant
Accidental Spills or Leaks	Brief to Temporary, Slight, Negative	Section 8.5.4	Brief to Temporary, Imperceptible, Negative	Not Significant