

Proposed Gathabawn Wind Farm Project

Environmental Impact Assessment Report

Chapter 8: Water



September 2026

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CHAPTER 8 WATER

EIAR 8.1 INTRODUCTION

EIAR 8.1.1 Competent Experts

This Water evaluation was prepared by SLR Environmental Consulting (Ireland) Ltd (SLR) on behalf of Ecopower Developments Ltd (herein referred to as 'the Applicant').

The project team consists of:

Silas Rowe (BSc Earth Sciences) is a Graduate Hydrogeologist and has experience conducting Site investigations and hydrogeological assessments. Silas holds a BSc in Earth Sciences. Silas has worked on various Site investigations including contaminated land and renewable projects. Silas works on a range of projects including quarries, landfills, and renewable energy Wind Farm projects.

Michelle Sherry (BSc, GradCIWEM, MIAH) is a Project Hydrogeologist with SLR's Dublin Water team. Since joining SLR, some of her roles and responsibilities have included undertaking groundwater and surface quality monitoring, well drilling supervision, biological river surveys, collecting and analysing groundwater level logger data Michelle has produced several Land, Soil and Geology and Water chapters for Environmental Impact Assessment Reports (EIAR) and Water Framework Directive (WFD) reports for wind farm projects.

Katherine Van Story (MSc, Applied Environmental Science) is a Project Water Scientist & EIA Practitioner for SLR's Hydrology and Hydrogeology team. Since joining the team in 2025, she has undertaken and prepared EIAR chapters, hydrological constraints reports, Water Framework Directive assessment reports, contributing to planning & environmental reports, analysing hydrological data, desk-based research, surface water quality monitoring and Q survey assessments for a wide range of projects across Ireland.

Kelly Wyness is a Technical Director in SLR's Hydrology and Hydrogeology team with over 20 years' experience leading the planning, consenting and delivery of renewable energy and infrastructure projects across the UK. He provides strategic and technical leadership on complex developments, specialising in hydrology, hydrogeology, flood risk, private water supplies, peatland hydrology and water environment assessment. His experience spans EIA and consenting, discharge of planning conditions, and the construction and operational phases of development. Kelly has a strong track record of leading multidisciplinary teams, delivering robust water environment assessments, and providing expert input to planning submissions, public inquiries and regulatory approvals.

Peter Glanville (PhD (Geomorphology), PGeo, EurGeol, MCIWEM) is a Technical and Project Director in the Water (Hydrology and Hydrogeology) team in SLR's Dublin office. He has over 25 years' experience in environmental consulting including hydrology, geomorphology and geology and is a Professional Geologist (PGeo. EurGeol.) with the Institute of Geologists of Ireland and is a member of CIWEM. Peter's specialist experience is in the field of water assessments, hydrological monitoring (hydrology and hydrogeology) and hydromorphology. He has overseen the design and practical implementation of field scientific monitoring programmes, supported the management, analysis and interpretation of the scientific data collected, and written and reviewed the resultant technical reports. Peter has worked on a wide range of projects in the minerals and mining, power, commercial and infrastructure sectors. He leads as project manager on multi-disciplinary projects and also acts as project director for multi-disciplinary teams.

EIAR 8.1.2 Project Description

The Proposed Gathabawn Wind Farm comprises 12 wind turbines located across two Site areas in County Kilkenny, the Ballylehaun Area (7 turbines, T1–T7) and the Ballyring Area (5 turbines, T8–T12).

The development includes associated turbine hardstands and foundations, two Control Buildings, a meteorological mast and LiDAR unit, internal Wind Farm cabling, Site access roads (8 km in total, comprising 6.7 km of new road and 1.3 km of upgraded farm track), two temporary construction compounds, and two on-Site borrow pits (Ballylehaun and Ballyring Lower).

The Gathabawn Wind Farm Project also includes the Candidate Gathabawn Grid Connection, which, while subject to a separate future planning application, is assessed within this chapter to inform the cumulative evaluation of the Whole Project. The Candidate Gathabawn Grid Connection comprises underground cabling (UGC) connecting the Ballylehaun and Ballyring Control Buildings (Ballylehaun-Ballyring UGC), a new substation at Parksgrove townland (Parksgrove Substation), underground cabling from Ballyring to Parksgrove Substation (Ballyring-Parksgrove UGC), and underground cabling from Parksgrove Substation to the existing EirGrid Ballyragget Substation at Moatpark (Parksgrove-Moatpark UGC).

The Ballylehaun-Ballyring UGC crosses two EPA watercourses. One crossing (over the Gorteennamuck Stream, W1) will utilise an existing pipe culvert; the other (over the Gorteenahilla River, W2) is crossed by Horizontal Directional Drilling (HDD) at an existing masonry bridge.

The Ballyring-Parksgrove UGC crosses three EPA watercourses, the Lismaine Stream (W3), the Lisdowney Stream (W4) and the Ballyconra Stream (W5). These crossings will be by open-cut trenching using a dam-and-overpump methodology and construction work will be restricted to the months of July, August or September when lower flows would be expected.

The Parksgrove-Moatpark UGC crosses the River Nore (W6) by HDD beneath the riverbed. The N77 National Road is also crossed by HDD along this route.

Surface water management during construction will be provided by an integrated Site drainage network, incorporating 50m buffer zones around EPA waterbodies, separation of clean and dirty water and sediment control measures (check dams, silt fencing, settlement ponds) prior to controlled discharge.

Non-potable water for welfare facilities will be imported from local municipal supply during construction and decommissioning and supplied via rainwater harvesting systems at the Control Buildings and Parksgrove Substation during operation.

EIAR 8.1.3 Sources of Information

The desk study involved the examination of several datasets to determine the hydrological, geological and hydrogeological setting of the area, as seen in Table 8-1.

Table 8-1: Sources of Baseline Information for Water

Statutory Consultees
• Uisce Éireann • Inland Fisheries Ireland • Geological Survey of Ireland • Office of Public Works • NPWS (Ecology)
Desktop Sources
• Irish Soils Information System – Teagasc (http://gis.teagasc.ie/soils/) • GSI Groundwater Data Viewer – Bedrock Geology (https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228)

• GSI Groundwater Body description documents (https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx) • OSi Discovery Series Mapping • Environmental Protection Agency (www.epa.ie) • Water Framework Directive data (www.epa.ie) • Office of Public Works FloodInfo (https://www.floodinfo.ie/) • Met Éireann • National Parks and Wildlife Service • Kilkenny County Development Plan 2021-2027 Review of the other EIA Report Chapters: • Chapter 5: Description of the Development • Chapter 7: Soils • Chapter 13: Biodiversity
Fieldwork
• Site walkover undertaken by SLR to identify any constraints related to the water environment (August 2025) • Biological and physiochemical surface water quality monitoring in downstream watercourses (Ecopower) • Borehole survey at the Ballylehaun Section in 2021 (Ecopower) • Trial pit investigations in August 2021, March 2023, August 2026 across the Site – 30 no. trial pits were completed by Ecopower

Table 8-2: Consultation Response table

Consultee	Summary of Key Issues	Where Addressed in Chapter
Uisce Éireann, EIA Scoping Response, 29 February 2024	An existing Uisce Éireann abstraction point is located downstream of the proposed development at Freshford. The EIAR must consider all direct, indirect and cumulative effects on this abstraction point.	Noted. The abstraction point is identified in Section EIAR 8.3.2.1.6 (Groundwater Abstractions) and assessed in Section 8.4 (Water Supply).

EIAR 8.1.4 Methodology Used

The scope of this work will investigate if there are any hydrological or hydrogeological links to sensitive water receptors within the study area for this assessment, as outlined in EIAR 8.2.1. The scope of work will also investigate if there are any hydrological or hydrogeological links to sensitive water receptors and the length of the Candidate Gathabawn Grid Connection.

Existing information on the geology, groundwater and surface water features of the Gathabawn area and its surrounds was collated and evaluated.

The scope of this chapter includes:

- A Site walkover to identify any constraints related to the water environment;
- An assessment of the existing water (groundwater and surface water) in the study area surrounding the Proposed Development;
- An assessment of the potential impact of the Proposed Development and associated ancillary works on surface water and groundwater, and;
- Where necessary, recommendation(s) of mitigation measures to reduce or eliminate any potential significant adverse impacts.

Surface water quality monitoring was commissioned and undertaken by the Applicant, with the resulting data provided to SLR for review and assessment as part of this chapter. SLR has not undertaken any surface water

quality sampling or laboratory analysis. The findings presented herein reflect SLR's independent evaluation of the data supplied.

The evaluation for Water herein has been carried out in accordance with the following:

- Institute of Geologists Ireland (2013) Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- The National Roads Authority (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- The Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports; and
- The Department of Heritage and Local Government and the Office of Public Works (2009) The Planning System and Flood Risk Management Guidelines for Planning Authorities.

This methodology has been used to determine the importance and sensitivity of receptors, and the magnitude and significance of potential impacts. The methodology can be found in full in **Appendix 8.1: Methodology for the evaluation of Water**. The author's extensive experience with EIA preparation and water management also informs this report.

A list of guidelines and legislation which were taken into account during the evaluation of this chapter is also included in **Appendix 8.1**.

EIAR 8.1.5 Statement on Certainty and Sufficiency of Information Provided

A clear documentary trail is provided throughout this chapter and chapter appendices to the competency of data and methods used and the rationale for selection of same.

The information used to compile this chapter is collated from data and documents generated by public bodies and statutory agencies and from Site-specific investigations. The criteria used for Water (hydrology and hydrogeology) appraisals are derived from the Institute of Geologists Ireland (2013) guidance document and the directives, legislation, regulations, guidelines and technical standards outlined in **Appendix 8.1**. All documentation used is referenced at the end of the chapter.

For the avoidance of doubt, the following naming system for waterbodies and catchments follows the EPA and WFD names for waterbodies and catchments, as provided on <https://gis.epa.ie/EPAMaps/>.

In respect of Water, no specific material limitations or difficulties were encountered during the course of the studies carried out to inform the assessment of impacts of the Gathabawn Wind Farm Project.

EIAR 8.2 SENSITIVE ASPECTS OF WATER

EIAR 8.2.1 Zone of Influence/Study Areas

The area or Zone of Influence (ZOI) of influence around the proposed Gathabawn Wind Farm Project within which the sensitive aspects of the environment could be affected by the Project is called the Study Area herein. The extent of the Study Area for the Sensitive Aspects of the Water environment is outlined in Table 8-3 below.

Waterbodies and Designated Areas that have a potential hydrological connection to the Whole Proposed Gathabawn Windfarm project have been assessed in the Water Framework Directive (WFD) Assessment Report also, see [Appendix 8.3](#).

The majority of the Facilitating Works (FW) for the Turbine Delivery Route (TDR) are within the Ballylehaun and Ballyring turbine clusters except for FW8, located c. 1.5km southwest of T11 and FW9, located c. 0.9km west of T8. Hence, FW8 and FW9 will be assigned a separate 2km study area to the main turbine areas.

While the Candidate Gathabawn Grid Connection Route (CGGC) from Ballyring Area to the EirGrid Ballyragget Substation will be subject to a separate planning application at a future date, it is still considered as part of this EIAR in order to facilitate the cumulative evaluation of the Whole Gathabawn Windfarm Project.

Table 8-3: Study Area of the Project in Relation to Sensitive Aspects of the Water Environment

Sensitive Aspect	ZOI/Study Area	Justification for the Study Area extent
River Waterbodies	Within 5km of the Ballylehaun Area Red Line Boundary. Within 2km of the Ballyring Area and all other aspects of the Proposed Development The construction works boundary of the candidate grid connection.	As per the Institute of Geologists of Ireland (2013) guidelines, the minimum distance of 2 km from the Site boundary has been applied to the Ballyring Area. Per guidelines and industry standards, an increased minimum distance of 5 km has been applied to the Ballylehaun Area due to the presence of karst systems in the local area.
Groundwater Bodies	Within 5km of the Ballylehaun Area Red Line Boundary. Within 2km of the Ballyring Area and all other aspects of the Proposed Development. The construction works boundary of the candidate grid connection	
Designated Sites	Within 5km of the Ballylehaun Area Red Line Boundary. Within 2km of the Ballyring Area and all other aspects of the Proposed Development. The construction works boundary of the candidate grid connection	
Water Supply – groundwater and surface water abstractions	Within 5km of the Ballylehaun Area Red Line Boundary. Within 2km of the Ballyring Area and all other aspects of the Proposed Development.	

Sensitive Aspect	ZOI/Study Area	Justification for the Study Area extent
	The construction works boundary of the candidate grid connection.	

EIAR 8.2.2 Overview of Water in the Local Environment

Water relates to the hydrology and hydrogeology in the area of the proposed Gathabawn Wind Farm Project Site. Hydrology is the term used for surface water features within regional and local catchments. Hydrogeology is the distribution and flow of groundwater in the local groundwater bodies and aquifers.

The hierarchy of surface water catchments subdivision in Ireland under the WFD are:

- WFD Catchments;
- WFD Sub Catchments; and
- WFD River Sub Basins.

The WFD catchments within the Study Area are set out in Table 8-4 below.

Table 8-4: WFD Waterbodies Within the Study Area

WFD Catchment	WFD Sub Catchment	WFD River Sub Basin
Nore (15)	Goul_SC_010	GOUL_060 (T1 – T3)
		GOUL_050 (T4 – T7)
Nore (15)	Nore_SC_070	GORTEENAHILLA_010 (T8, T10 – T12)
		NORE_150 (T9)

The Ballylehaun-Ballyring UGC and Ballyring-Parksgrove UGC are also within the Nore Catchment and the Nore_SC_070 Subcatchment. The Grid Connection Route from Parksgrove substation to Ballyragget 110kV substation crosses into the Nore_SC_060 Subcatchment. This is considered part of the Candidate Grid Connection Route within this assessment.

The Ballylehaun-Ballyring UGC runs through the GORTEENAHILLA_010 River Sub Basin (RBS) and the Ballyring-Parksgrove UGC runs through the GORTEENAHILLA_010, NORE_150, NORE_140, NORE_130 and the NORE_120 RBS where the UGC connects with the EirGrid Ballyragget substation.

Designated Sites occur within the Study Area. The proposed CGGC to the Ballyragget 110kV substation crosses the River Nore which is an SAC, SPA, pNHA and a salmonid river protected under S.I. No. 293 of 1988 (see [Chapter 13: Biodiversity](#)).

The Durrow Groundwater Body (GWB) underlies turbines T1 - T5 and the Lisdowney GWB underlies T6 and T7 in the Ballylehaun Area. Lisdowney GWB underlies all turbines within the Ballyring Area (T8 – T12). The Ballyring-Parksgrove UGC and Parksgrove-Moatpark UGC are underlain by the Lisdowney GWB, Durrow GWB and the Kilkenny - Ballynakill Gravels GWB.

The Cullahill Group Water Scheme (GWS) is located c. 4.5 km northeast of T1 and the Balief GWS is located c. 3 km south of T6. The NORE_120 river water body, over which the CGGC crosses to connect to the Ballyragget substation, is designated as drinking water abstraction waterbody.

According to the Geological Survey Ireland (GSI) online well database, there are a number of registered private water supplies at farms and houses in the overall study area. Individual water supplies are common in rural areas where there is no mains water supply.

EIAR 8.3 BASELINE ENVIRONMENT

The context, characteristics, importance and sensitivity of the baseline environment, and the trends and evolution thereof, in relation to *the hydrology and hydrogeology within the Study Area and hydrologically connected Designated Sites* are described in the subsections below.

The result of fieldwork and desktop surveys are summarised in the sections below, illustrated on the mapping listed below, with the detailed data included in the Appendices listed:

EIAR Figures (included at the end of this Chapter):

Figure 8-1a: Proposed Gathabawn Windfarm: Surface Water Features & River Sub Basins

Figure 8-1b: Grid Connection Route: Surface Water Features & River Sub Basins

Figure 8-2a: Proposed Gathabawn Windfarm: Bedrock Aquifers

Figure 8-2b: Candidate Gathabawn Grid Connection: Bedrock Aquifers

Figure 8-3a: Proposed Gathabawn Windfarm: WFD Groundwater Bodies

Figure 8-3b: Candidate Gathabawn Grid Connection: WFD Groundwater Bodies

Figure 8-4a: Proposed Gathabawn Windfarm: GSI Groundwater Vulnerability

Figure 8-4b: Candidate Gathabawn Grid Connection: GSI Groundwater Vulnerability

Figure 8-5a: Proposed Gathabawn Windfarm: GSI Karst Features

Figure 8-5b: Candidate Grid Connection: GSI Karst Features

Figure 8-6: Proposed Gathabawn Windfarm: Surface Water Quality Monitoring Locations

Figure 8.7: Other Projects Scoped-In for the Water Cumulative Evaluations

EIAR Appendices (included at the end of this Chapter):

Appendix 8.1: Methodology for the evaluation of Water

Appendix 8.2: Surface Water Quality Monitoring Results

Appendix 8.3: Water Framework Directive Assessment

Appendix 8.4: Flood Risk Assessment

EIAR 8.3.1 Hydrology Baseline

EIAR 8.3.1.1 Regional & Local Hydrology

Proposed Gathabawn Wind Farm:

The Whole Proposed Gathabawn Wind Farm is located within the Hydrometric Area/Catchment No. 15 - the Nore of the Irish River Network System. The Proposed Gathabawn Wind Farm is located within two WFD Sub Catchments. The 7 turbine Ballylehaun Area lies within the Goul_SC_010 Sub Catchment (WFD ID 15_15), and the 5 turbine Ballyring Area, and the temporary turbine delivery works at FW8 and FW9 lies within the Nore_SC_070 Sub Catchment (WFD ID 15_21), see [Figure 8-1a](#).

There are several streams within the study area of both turbine areas:

- The Coolnacrutta stream (WFD ID GOUL_050) at its closest point is c. 0.5 km southwest from the Ballylehaun Area and is a tributary to the Goul River;
- The Gorteenahilla (WFD ID GORTEENAHILLA_010) flows in a southeasterly direction, c. 0.9 km east of T7 at its closest point, and it's tributary, Gorteenamuck (WFD ID GORTEENAHILLA_010), is c. 0.6 km northeast of T7;
- The Ballyring Upper stream (WFD ID GORTEENAHILLA_010) runs in a southerly direction c. 0.7km west of T11 and converges with the Gorteenahilla (WFD ID NUENNA_020) c. 1.2 km southwest of T11 which continues to flow in a southeasterly direction towards the Nuenna River (WFD ID NUENNA_020) and finally, to the River Nore (WFD ID NORE_150);
- The Foyle South stream, another tributary to the Gorteenahilla is located c. 2.2 km southeast of T6 and

- c. 1.5 km southwest of T11; and
- A tributary stream of the River Nore (WFD ID NORE_150) at its closest point is c. 0.4 km north of T9, runs in a southeasterly direction into the River Nore c. 7 km downstream.

There are no proposed road infrastructure water crossings within the Ballylehaun and Ballyring turbine areas.

Gathabawn Candidate Grid Connection:

The Ballylehaun–Ballyring UGC crosses the Gorteenamuck stream (W1 - existing pipe culvert), Gorteenahilla stream (W2 - existing masonry bridge) and an unmarked drain, downstream of the Ballyring Upper Stream. The proposed turbine delivery haul route crosses the Gorteenahilla and the Ballyring Upper streams.

The Ballyring–Parksgrove UGC and the Ballylehaun–Ballyring UGC are within the Nore_SC_070 Sub Catchment (WFD ID 15_21). The grid connection between Parksgrove substation and Ballyragget 110kV substation is within the Nore_SC_060 Sub Catchment.

The Ballyring–Parksgrove UGC crosses the Lismaine stream (WFD ID NORE_150), the Lisdowney stream (WFD ID NORE_140) and the Ballyconra (WFD ID NORE_140). The Parksgrove–Moatpark UGC crosses the River Nore (WFD ID NORE_120), see [Figure 8-1b](#).

EIAR 8.3.1.1.1 Designated and Protected Sites hydrologically connected via river waterbodies

Proposed Gathabawn Wind Farm:

In the context of Designated Sites, a review of the Environmental Protection Agency (EPA) and the National Parks and Wildlife Services (NPWS) data shows that the Nore catchment has the following designations downstream of the proposed Gathabawn Wind Farm Project development:

Designated Sites within the Study Area

- Cullahill Mountain SAC/pNHA, located along northern border of Ballylehaun Area construction works;
- Spahill and Clomantagh Hill SAC/pNHA, c. 1.3 km southwest of T6; and
- Galmoy Fen SAC/pNHA, c. 4.6 km west of T2.

There are no designated Sites within 2 km of the temporary Facilitating Works (FW) for the Turbine Delivery Route (TDR) at FW8 and FW9.

Other Designations:

- The River Barrow and River Nore SAC/ River Nore SPA / Inchbeg pNHA, located at their closest point c. 7 km downstream of the Proposed Development, are indirectly hydrologically connected to the Site via the NORE_150 tributary stream;
- Gales Hill Nature Reserve (adjacent to the Cullahill Mountain SAC);
- The Loughans SAC is c. 6 km south of the Proposed Development at its closest point and is not considered to be hydrologically connected to the Site;
- The Lisbigney Bog SAC is c. 11 km northeast of the Proposed Development at its closest point and is not considered to be hydrologically connected to the Site.

The Loughans SAC and Lisbigney Bog SAC designations are located outside the Study Area established for this assessment, which has been extended 5 km distance to specifically account for the potential for karst-related hydrogeological connectivity at the Site. Given this extended study area already incorporates a conservative allowance for karst flow, and neither Site falls within it, no hydrological or hydrogeological connection to the Proposed Development is identified. This Site is accordingly scoped out of further assessment.

Gale's Hill Nature Reserve within and adjacent to the Cullahill Mountain Special Area of Conservation (SAC) and comprises an area of c. 67 ha. The Nature Reserve is a Site of high ecological significance comprising nationally important species-rich grassland habitats.

Wetland Survey Ireland Site:

- The Wetlands Survey Ireland reveal there is a wetland (Tentore - MIW_KK77) immediately along the red line boundary at the Ballyring Area, c. 0.2km west of T8. The wetland habitats present at the Site are wet grassland and scrub with an unknown conservation value as further surveys need to be undertaken. East of the Ballyring Area, c. 0.3km east of T12, there is another wetland (Clontubbrid - MIW_KK76) consisting of artificial pond, wet grassland and scrub wetland habitats. It is also of unknown conservation value due to lack of survey data.

Hydrological connectivity between the Gathabawn Wind Farm Project and downstream designated Sites is detailed in Table 8-5 below.

Candidate Gathabawn Grid Connection:

Designated Sites that the candidate grid connection works to Ballyragget substation interacts with include designations along the River Nore, i.e. River Nore SPA, River Barrow and River Nore SAC, River Nore/Abbeyleix Woods Complex pNHA, Designated Salmonid River (S.I. 292 of 1988).

EIAR 8.3.1.2 Natural Watercourses and Wet Drainage Channels at the Project Site

Proposed Gathabawn Wind Farm:

Manmade agricultural drainage ditches occur around the edges of some agricultural grassland fields, mainly at the Ballyring Area. With the exception of a wet drainage channel on the most southeasterly section of the Ballyring Area, the farm drains run dry for at least part of the year. There are two existing drainage channels within the Ballyring Area which will be intercepted during the construction phase, D01 and D02, refer to Figure 5.11.2 in [Chapter 5: Description of the Development](#) for the location of existing drainage channels.

There are no identified drainage features at the Ballylehaun Area that will be within 25m of any construction Site works at Ballylehaun.

All identified drainage features in the Ballylehaun Area were found to be dry and no constraints were identified. At the Ballyring Area, there were occasional agricultural field drains which were observed to contain small volumes of water during walkover site surveys.

The Ballylehaun and Ballyring turbine areas will not involve any water crossings.

Candidate Gathabawn Grid Connection:

There are a number of field drains along the Gathabawn Candidate Grid Connection.

There are two water crossings along the Ballylehaun–Ballyring UGC, W1 (Gorteenamuck) and W2 (Gorteenahilla). These are an existing pipe culvert (W1) and a masonry bridge (W2). The Ballyring-Parksgrove UGC works crosses three waterbodies, W3 (Lismaine - NORE_150), W4 (Lisdowney Stream - NORE_140) and W5 (Ballyconra - NORE_140). The Parksgrove-Moatpark UGC works involve one water crossing (Nore – NORE_120).

EIAR 8.3.1.3 Interaction of the Project with Sub-Catchments, Sub-Basins, EPA Watercourses and Designated Sites

Table 8-5 provides an overview of the extent of the Gathabawn Wind Farm Site boundary footprint and the associated infrastructure/elements within each WFD mapped sub-catchment and sub-basin. The local streams and rivers which the proposed development drains into, and the separation distance to the nearest EPA watercourse and to downstream Designated Sites are also included. The relevant sub-catchments and sub-basins for the Candidate Gathabawn Grid Connection is provided in Table 8-6.

Table 8-5: Proposed Gathabawn Wind Farm - Sub-Catchments, Sub-Basins and Local Watercourse details

Sub-catchment	Sub-Basin/WFD Waterbody	Site Boundary per sub-basin (ha.)	Elements of the Project within this Sub-Basin	Local Watercourses Draining Works Areas	EPA /EU Code	Distance of Nearest EPA Watercourse to Site Boundary	Distance from Site boundary to nearest Designated Site
Goul_SC_010	Goul_050	83.9	4 no. turbines (T4, T5, T6, T7), borrow pit no. 1 (part), met mast, Wind Farm Site roads and drainage network, internal Wind Farm cabling	Coolnacrutta 1 st Order	15C50/ IE_SE_15G020360	c. 0.5 km south from Site boundary	Cullahill Mountain SAC/pNHA is immediately north of Ballylehaun Area. C. 1.3 km south from Site boundary
	Goul_060	65.6	3 no. turbines (T1, T2, T3), Wind Farm Site roads and drainage network, internal Wind Farm cabling, construction compound no. 1, temporary blade storage area	Goul 4 th Order	15G02/ IE_SE_15G020500	c. 1.2 km west from Site boundary	8.3 km to River Barrow and River Nore SAC 8.7 km to River Nore SPA 13.8 km to River Nore/Abbeyleix Woods Complex pNHA
Nore_SC_070	Gorteenahilla_010	96.7	4 no. turbines (T8, T10, T11, T12), Borrow pit no. 1 (part), Wind Farm control buildings, , Wind Farm Site roads and drainage network, internal Wind Farm cabling, construction compound no. 2	Gorteenamuck 1 st Order	15G39/ IE_SE_15G080300	c. 0.2km south from the Site Boundary	12.5 km to River Barrow and River Nore SAC 12.5 km to River Nore SPA
				Gorteenahilla 2 nd Order	15G08/ IE_SE_15G080300	c.23m east from the Site Boundary at FW8	11.5 km to River Barrow and River Nore SAC 11.5 km to River Nore SPA
				Ballyring_Upper 1 st Order	15B73/ IE_SE_15G080300	c, 5m east from the Site boundary at FW9	10 km to River Barrow and River Nore SAC 10 km to River Nore SPA
	Nore_150	11.7	1 no. turbine (T9), borrow pit no. 2, LiDAR unit, Wind Farm Site roads and drainage network, internal Wind Farm cabling	Lismaine 1 st Order	15L16/ IE_SE_15N011700	c. 0.3km north from Site boundary	7.4 km to River Barrow and River Nore SAC 7.5 km to River Nore SPA
	Nuenna_020	5.6	Part of the red line boundary	Gorteenahilla 2 nd Order	15G08/ IE_SE_15N020400	c. 0.9km southwest from Site boundary	8.7 km to River Barrow and River Nore SAC 8.7 km to River Nore SPA

* Stream order is a measure of the relative size of streams. The smallest tributaries are referred to as a first-order stream

Table 8-6: Candidate Gathabawn Grid Connection - Sub-Catchments, Sub-Basins and Local Watercourses

Sub-catchment	Sub-Basin	Site Boundary per sub-basin (ha.)	Elements of the Project within this Sub-Basin	Local Watercourses Draining Works Areas	EPA /EU Code	Distance of Nearest EPA Watercourse to Site Boundary	Distance from Site boundary to nearest Designated Site
Nore_SC_070	Gorteenahilla_010	1.7	Ballylehaun-Ballyring UGC	Ballyring_Upper 1 st Order	15B73/IE_SE_15G080300	Watercourse crosses the Ballyring-Parksgrove Underground Cabling	10.8km to River Barrow and River Nore SAC 10.8km to River Nore SPA Cullahill Mountain SAC/pNHA is immediately north of UGC works at the Ballylehaun Area.
	Nore_150	4.2	Ballyring-Parksgrove Underground Cabling	Lismaine 1 st Order	15L16/IE_SE_15N011700	Watercourse crosses the Ballyring-Parksgrove Underground Cabling	6.8km to River Barrow and River Nore SAC 6.8km to River Nore SPA
	Nore_140	4.1	Ballyring-Parksgrove Underground Cabling	Lisdowney (Stream) 3 rd Order	15L02/IE_SE_15N011600	Watercourse crosses Ballyring-Parksgrove Underground Cabling	3km to River Barrow and River Nore SAC 3kmkm to River Nore SPA
				Ballyconra 1 st Order	15B86/IE_SE_15N011600	Watercourse crosses Ballyring-Parksgrove Underground Cabling	2.3km to River Barrow and River Nore SAC 2.3km to River Nore SPA
	Nore_130	2.8	Downstream from Ballyring-Parksgrove Underground Cabling	Nore 6 th Order	15N01/IE_SE_15N011500	c. 0.2km southeast from Ballyring-Parksgrove Underground Cabling	0.2km to River Barrow and River Nore SAC 0.2km to River Nore SPA 0.2km to River Nore/Abbeyleix Woods Complex pNHA
	Nore_120	3.7	Parksgrove Substation c, Ballyring-Parksgrove Underground Cabling, Parksgrove-Moatpark Underground Cabling	Nore 6 th Order	15N01/IE_SE_15N011400	Watercourse crosses Parksgrove-Moatpark Underground Cabling	0m to River Barrow and River Nore SAC 0m to River Nore SPA 0m to River Nore/Abbeyleix Woods Complex pNHA
Nore_SC_060	Nore_120	2.8	Parksgrove-Moatpark Underground Cabling	Nore 6 th Order	15N01/IE_SE_15N011400	Watercourse crosses Parksgrove-Moatpark Underground Cabling	0m to River Barrow and River Nore SAC 0m to River Nore SPA 0m to River Nore/Abbeyleix Woods Complex pNHA

* Stream order is a measure of the relative size of streams. The smallest tributaries are referred to as first-order stream

EIAR 8.3.1.4 Existing Surface Water Quality**EIAR 8.3.1.4.1.1 EPA Q-Ratings in downstream catchments**

As part of the Water Framework Directive (WFD) Monitoring Programme, approximately one third of the major rivers in Ireland and their more important tributaries are surveyed and assessed each year by EPA ecologists. A complete survey cycle is completed every three years. The Sites are scored on a five-point system developed by the EPA called the Biological Q rating system. The Q-Rating is a water quality rating system based on both the habitat and the invertebrate community assessment and is divided into status categories ranging from Q0-1 (Poor) to Q4-5 (Good/High). EPA Q-rating status data for EPA monitoring points in downstream catchments are shown in Table 8-7 below. The location of these EPA monitoring points is illustrated on [Figure 8-6](#).

Site specific baseline biological water quality monitoring has also been carried out at the Proposed Development by RSK Inis Environmental which is discussed in Section 8.3.4.1.2 below.

Table 8-7: EPA Q-Rating and WFD River Waterbody Status

Sub-Catchment	Sub-basin /WFD Waterbody	EPA Monitoring Location	Q-Rating Year	Q-Rating Status	WFD Status (2019-2024)	Risk Result (3 rd Cycle)
Nore_SC_070	Gorteenahilla_010	<u>RS15G080300</u> Downstream of works at FW8 and FW9.	2025	Q3-4 (Moderate)	Moderate	At Risk
Goul_SC_010	Goul_050	<u>RS15G020360</u> c. 2.4 km northwest of Site	2025	Q3-4 (Moderate)	Moderate	At Risk
Gathabawn Candidate Grid Connection						
Nore_SC_060 / Nore_SC_070	Nore_120	<u>RS15N011380</u> Upstream of cable works at the River Nore.	2020	Q3-4 (Moderate)	Moderate	At Risk
Nore_SC_060 / Nore_SC_070	Nore_120	<u>RS15N011400</u> Downstream of cable works at the River Nore.	2020	Q3-4 (Moderate)	Moderate	At Risk
Nore_SC_070 / Nore_SC_080	Nore_130	<u>RS15N011450</u> Downstream of cable works at the River Nore.	2022	Q4 (Good)	Good	Not at Risk

EIAR 8.3.1.4.2	Surface Water Sampling Results
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Surface water quality sampling was undertaken by Ecopower at 16 no. locations associated with the Gathabawn Wind Farm Project in May 2025 with a second round of monitoring carried out in December 2025 and January 2026. The Round 1 water samples were tested by Independent Analytical Supplies Ltd (IAS Laboratories) while the Round 2 the samples were tested by Complete Laboratory Solutions (CLS) Ltd.

The sample locations were categorised by sub-catchment and their relationship to the Whole Gathabawn Wind Farm Project. Sampling locations A1 – A4 are in the Goul_SC_010 sub-catchment in which the Ballylehaun Area is located in. All of the B and C sampling locations are located within the Nore_SC_070 Subcatchment. B1 – B6 are downstream of the Ballyring Area, while B4 – B6 are also downstream of the turbine delivery facilitating works, FW8 and FW9. Locations C1 – C3 are located along the Ballylehaun–Ballyring UGC and C4 – C6 are located along the Ballyring-Parksgrove UGC and Parksgrove-Moatpark UGC.

The surface water quality results were provided to SLR for screening against Environmental Quality Standards¹ (EQS) and Salmonid regs., unless otherwise stated.

A summary of the water quality results is provided in Table 8-8 and Table 8-9 below. The location of the sampling points are identified on [Figure 8-6](#). Refer to [Appendix 8.2](#) for all lab results. 8 no. sampling locations are located within the Study Area and have been focused on for the purposes of this assessment; these are sampling locations A1, A2, A3, B1, B4, C1, C2, and C3.

IAS Laboratories reported nitrate and nitrite as N whereas CLS reported the concentrations as nitrate as NO₃ and nitrite as NO₂. To enable direct comparison between sampling rounds, the Round 1 results were converted to nitrate as NO₃ and nitrite as NO₂. Similarly, during Round 2, the orthophosphate lab results were reported as mg/l as P. hence, these results were converted to orthophosphate as PO₄ to enable comparison of results between rounds.

Sampling location C1 was dry during the May 2025 sampling round so no biological or chemistry results were undertaken during this round.

Field hydrochemistry measurements were taken by Ecopower at all 16 no. locations on the 21st September 2026 with a YSI ProDSS water monitoring probe for a range of parameters including pH, temperature, conductivity, dissolved oxygen and turbidity. The results are presented in Table 8-10 below. Sites B2, C1, C5 were dry at the time of sampling and Sites B1 and C3 had no running water, so readings were collected from standing water at these locations. It is considered that the absence of flowing water at Sites B1 and C3 has impacted the field readings obtained.

Aquatic surveys were carried out in July 2025 by RSK Inis Environmental (authors of [Chapter 13: Biodiversity](#), see Section EIAR 13.3.7). The results from these surveys were used to provide a baseline set of Q-values. These Q-values can be used for comparative studies during the lifetime of the proposed Gathabawn Windfarm Project.

¹ Inland Surface Water S.I. No. 272 of 2009 and S.I. No. 77 of 2019 (Surface Water Regulations 2009 (as amended)) and the Salmonid Waters Regulations 1988

Table 8-8: Surface Water Monitoring Results – Ecopower Round 1 (May 2025)

Parameter	EQS	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6
BOD (mg/L)	≤1.3 (high) to ≤1.5 (good)^	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	-	<1	<1	<1	2	<1
Ammonia as N (mg/L)	≤0.04 (high) to ≤0.065 (good)^	0.03	0.007	0.009	0.01	0.008	0.028	0.017	0.007	0.008	0.016	-	0.015	0.081	0.012	0.026	0.009
Chloride (mg/L)	250	12.6	13.8	20	20.1	14.4	15.8	20.5	15	16.2	23.2	-	12	17.9	16.5	25.9	32.2
Nitrate as NO ₃ (mg/L)	> 8***	13.73	14.66	13.99	12.27	6.33	2.43	15.85	9.08	29.45	16.65	-	6.02	4.36	16.87	7.35	10.63
Nitrite as NO ₂ (mg/L)	≤0.05+ *	0.02	0.02	0.03	0.02	0.02	0.03	0.03	0.02	0.02	0.03	-	0.02	0.03	0.04	0.05	0.02
Orthophosphate as PO ₄ (mg/L)	≤0.025 (high) to ≤0.035 (good)^ **	<0.03	<0.03	<0.03	<0.03	0.093	0.063	<0.03	<0.03	<0.03	<0.03	-	<0.03	0.113	<0.03	0.394	<0.03
Suspended Solids (mg/L)	≤25+	3	4	2	<2	<2	<2	38	3	2	<2	-	<2	8	<2	6	<2
TON as N (mg/L)	-	3.1	3.32	3.17	2.78	1.43	0.557	3.59	2.05	6.66	3.77	-	1.36	0.995	3.83	1.68	2.41
Total Nitrogen as N (mg/L)	-	2.88	3.63	4.18	3.92	1.53	0.742	3.77	1.88	5.63	4.94	-	1.37	1.68	3.41	2.11	2.81
Total Phosphorus as P (mg/L)	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	0.08	<0.05	0.16	<0.05

Parameter	EQS	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6
Turbidity (N.T.U)	-	0.3	2.3	0.6	0.7	0.9	1.8	7.9	0.5	0.3	0.8	-	1	3.8	0.9	1	0.8
2025 Aquatic Survey – Biological Water Quality Results (Q value)		Q2-3	Q3	Q3	Q3-4	Q3	Q2-3	Q3	Q3-4	Q3	Q3	-	Q3	Q3	Q3	-	Q3

[^]S.I. No. 272/2009 – European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (as amended)

⁺S.I. No. 293/1988 – European Communities (Quality of Salmonid Waters) Regulations, 1988

* Laboratory results for Nitrite were received as mg N/L, while the environmental quality standard in S.I. No. 293/1988 is given as mg NO₂/L.

** Laboratory results for Orthophosphate were received as mg PO₄/L, while the environmental quality standard in S.I. No. 272/2009 is given as mg P/L.

As per the threshold used by the EPA when assessing nitrate concentrations. At concentrations <4 mg/l are indicative of High status and concentrations ≤ 8 mg/l are indicative of Good status.* S.I. No. 99 of 2023 – European Union (Drinking Water) Regulations.

Table 8-9: Surface Water Monitoring Results – Ecopower Round 2 (December 2025/January 2026)

Parameter	EQS	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6
BOD (mg/L)	≤1.3 (high) to ≤1.5 (good)^	1	1	1	1	1	1	1	1	1	<1	1	2	1	1	2	<1
Ammonia Nitrogen (mg/L NH ₃ -N)	≤0.04 (high) to ≤0.065 (good)^	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.06	0.02	<0.02	0.04	0.02	0.02	<0.02	<0.02	0.04	0.07
Chloride (mg/L)	250****	13.36	11.63	21.42	21.8	14.32	18.13	26.92	16.48	17.78	25.52	7.02	13.18	14.93	18.09	25.59	29.25
Nitrate (mg/L NO ₃)***	>8	21.12	19.8	26.8	25.04	25.52	15.75	21.47	17.07	26.84	29.88	<4.4	11.44	10.56	22.88	46.42	21.91
Nitrite (mg/L NO ₂)	≤0.05 ⁺	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.16	<0.1
Orthophosphate PO ₄ (mg/L P)	≤0.025 (high) to ≤0.035 (good)^	0.031	0.031	0.031	0.031	0.061	0.061	0.061	0.031	0.031	0.061	0.031	0.031	0.061	0.031	0.092	0.092
Suspended Solids (mg/L)	≤25 ⁺	<5	6	<5	<5	6	<5	7	<5	10	6	<5	<5	<5	<5	<5	5
TON (mg/L N)	-	4.8	4.5	6.1	5.7	5.8	3.6	4.9	3.9	6.1	6.8	<1	2.6	2.4	5.2	10.6	5
Total Nitrogen (mg/L)	-	2.8	5.5	5.8	5.8	6.1	3.3	5.4	3.8	5.2	7.8	<0.5	3	3.7	5.5	8.1	5.3
Total Phosphorous (mg/L P)	-	0.02	0.03	0.05	0.05	0.05	0.07	0.04	0.05	0.04	0.03	0.03	0.04	0.05	0.03	0.12	0.03
Turbidity (N.T.U)	-	0.27	0.31	<0.2	<0.2	3.36	0.38	2.85	1.28	1.08	<0.2	<0.2	2.98	3.29	1.68	0.22	0.42
2025 Aquatic Survey – Biological Water Quality Results (Q value)		Q2-3	Q3	Q3	Q3-4	Q3	Q2-3	Q3	Q3-4	Q3	Q3	-	Q3	Q3	Q3	-	Q3

[^]S.I. No. 272/2009 – European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (as amended)

⁺S.I. No. 293/1988 – European Communities (Quality of Salmonid Waters) Regulations, 1988

***As per the threshold used by the EPA when assessing nitrate concentrations. At concentrations <4 mg/l are indicative of High status and concentrations ≤ 8 mg/l are indicative of Good status.

**** S.I. No. 99 of 2023 – European Union (Drinking Water) Regulations.

Table 8-10: Surface Water Field Monitoring Results (Ecopower September 2026)

Parameter	EQS	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6
pH	≥6 to ≤9 ⁺	7.5	7.9	7.9	8.1	7.5	-	7.8	7.8	8	7.5	-	8.1	7.6	8.1	-	7.9
Temperature (°C)	-	15.3	17.1	16	16.7	18.8	-	16.5	17.4	15.5	16.4	-	19	20.5	18.8	-	17.6
Conductivity (µS/cm)	-	391.8	374.2	507	473.9	274.3	-	429.9	352.5	398.1	384.7	-	322.8	303.2	376.2	-	373.8
Dissolved Oxygen (%)	≥80% to ≤120% [^]	95.8	94	105.2	108.3	70.4	-	90.3	108.1	103.8	82.8	-	100.4	71.8	100.9	-	99.9
Turbidity (FNU)	-	1.3	5.4	0	0.5	0.7	-	7.4	0.2	2.6	0.4	-	1.4	11.3	2.4	-	2.6

[^]S.I. No. 272/2009 – European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (as amended)

⁺S.I. No. 293/1988 – European Communities (Quality of Salmonid Waters) Regulations, 1988

Sites B2, C1, C5 were dry at the time of sampling and Sites B1 and C3 had no running water, so readings were collected from standing water at these locations. It is considered that the absence of flowing water at Sites B1 and C1 has impacted the field readings obtained.

During Round 1, sampling locations with the Study Area (A1, A2, A3, B1, B4, C2 and C3) did not exceed the EQS for concentration of suspended solids.

During Round 1, sampling location C3 did not achieve at least Good status for its ammonia conditions. Chloride concentrations at sampling locations A1, A2, A3, B1, B4, C2 and C3 were below the Drinking Water Regulations (S.I. No. 99 of 2023, as amended) threshold value of 250 mg/l.

During Round 1, scoped in sampling locations did not exceed the EQS for concentration of BOD. During Round 2, sampling location C2 did not achieve Good status for BOD.

The EPA state that rivers with a nitrate concentration above 8 mg/l NO₃ are at risk of not achieving Good status². During Round 1, Good status nitrate conditions were achieved in sampling locations B1, C2 and C3, while sampling locations A1, A2, A3 and B4 recorded concentrations above this threshold, indicating a risk of not achieving Good status. During Round 2, C1 achieved Good status for its nitrate conditions at a concentration of <4.4 mg/l.

During Round 1, C3 recorded a concentration of 0.08 mg/l for Total Phosphorus and hence, did not achieve Good status (≤ 0.035 mg/l) as per the SW Regulations EQS. It should be noted, however, that the Limit of Detection (LOD) for Total Phosphorus (<0.05 mg/l) was above the SW Regulations threshold of 0.035 mg/l for Good status during Round 1, meaning Good status could not be confirmed at sampling locations A1, A2, A3, B1, B4 and C2, where concentrations were reported below this LOD.

During Round 2, the LOD was below the SW Regulations EQS, and Good status or above for Total Phosphorus was achieved in sampling locations A1, A2 and C1. Sampling locations A3, B1, B4 and C2 did not achieve Good status for Total Phosphorus during this round.

During Round 1, there were several exceedances of the threshold value (EPA IGV) of 0.03mg/l among the scoped sampling locations. At sampling location B1, adjacent to the Ballyring-Parksgrove UGC crossing of the Lismaine stream, a concentration of 0.093mg/l was recorded. At sampling location C3, west of the Ballyring Section and immediately adjacent to facilitating works FW9, a concentration of 0.113mg/l was recorded. Sampling locations A1, A2, A3, B4 and C2 achieved Good status for their orthophosphate conditions during Round 1.

During Round 2, sampling locations B1 and C3 again failed to achieve Good status, recording concentrations of 0.061mg/l each. Sampling locations A1, A2, A3, B4 and C2 achieved Good status for their orthophosphate conditions during Round 2.

There are no screening criteria for Total Nitrogen as N, Total Organic Nitrogen as N and turbidity

ElAR 8.3.1.5 Rainfall

Historical rainfall data, obtained from Met Éireann (www.met.ie), indicates that the long-term average rainfall (LTA) for the Oak Park rainfall station, located c. 41 km north east of the Site, is 851 mm/yr for the period between 1991 to 2020. The average monthly rainfall values for the period 1981 to 2021 are shown in Table 8-11.

Table 8-11: Monthly Rainfall Averages (mm) 1991 to 2020 for Oak Park

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AAR*
80.3	62.5	61.7	57.5	56.4	60.1	61.2	69.3	67.9	92.6	92.5	89.1	80.3

*AAR – Annual Average Rainfall

² <https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/Water-quality-monitoring-report-on-Nitrogen-and-Phosphorus-in-Irish-Waters-2025.pdf>

No Long-Term Average (LTA) annual rainfall data is available for Oak Park rainfall station. The nearest Met Éireann station with LTA data is Casement, which is located c. 87 km north-east of the Proposed Development. The most recent period published is 1991-2020. The LTA annual rainfall for Casement was recorded as 783.5 mm/yr for the 1991-2020 period and the LTA monthly rainfall for the period 1991-2020 is shown in Table 8-12.

Table 8-12: LTA (1991-2020) Monthly Rainfall (mm) for Casement Weather Station

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
65	55.2	51.8	55.3	59.1	65.7	59.4	71.2	61.6	81.6	81.9	75.7

According to Met Éireann's Past Weather Statement, 2025 was defined as being the second warmest year on record, with above average rainfall at most stations. The first eight months of the year were relatively dry but the last four months were much wetter. The majority monthly rainfall totals across Ireland were above their LTA in 2025.

EIAR 8.3.1.6 Water Framework Directive

The EU Water Framework Directive (WFD) became EU law in December 2000 and provides for a single European framework to assess water quality (Ecological status) and allows for the comparison of results across European Member States. The WFD covers rivers, lakes, estuaries or transitional waters, coastal waters as well as groundwaters.

A WFD Assessment (WFDA) has been prepared as part of this EIAR, see [Appendix 8.3](#). The WFDA report and assessment identifies the relevant WFD water bodies which have the potential to be impacted by the proposed development, identifies if the requirements of the WFD are being met and assesses whether the proposed development activities will:

- Cause a deterioration in WFD status of a water body; and/or
- Hinder a programme of measures (PoM) designed to bring about Good Status for a water body.

Based on the findings from the assessment undertaken here, it is considered that the proposed development at Gathabawn, with the above mitigation measures in place, will:

- not result in a deterioration in the WFD status of the identified surface water and groundwater bodies; and
- not hinder any PoM designed to bring about the Good Status of a waterbody.

EIAR 8.3.1.7 Flooding

A Site-Specific Flood Risk Assessment (SSFRA) has been prepared for the Proposed Development, which is provided in [Appendix 8.4](#). The SSFRA has concluded the Proposed Development Site and the Candidate Gathabawn Grid Connection is not at risk of fluvial, pluvial or groundwater flooding.

The Site is generally classified as a 'Less Vulnerable' development under the Flood Guidelines because, except for the substation and key electrical infrastructure which is classified as 'Highly Vulnerable' development. Notwithstanding this the Site is located in Flood Zone C which is at a Low Risk of flooding.

Based on the Stage 1 Flood risk screening undertaken as part of this assessment, it is considered that flood risk to the Site is low.

The Flood Guidelines require that development must not increase flood risk elsewhere. Precipitation onto the Site naturally percolates through the permeable subsoils, there is no discharge of storm water to external drainage networks or watercourses, and the development does not involve any modification to a watercourse. Any surface water created by the increased impermeable area introduced as part of the

Proposed Development will be retained and discharged in an appropriate manner, as outlined within the Drainage Strategy produced for the Site. Therefore, it is considered that the Proposed Development will not increase flood risk in the surrounding catchment.

Based on the SSFFRA undertaken here, the following conclusions are made:

- i. the Site is not considered to be at risk to flooding; and
- ii. the Proposed Development will not increase flood risk elsewhere in the catchment.

Based on the screening and assessment undertaken in the SSFRA it is considered that the Proposed Development and Site is compliant with the requirements of the flood guidelines.

EIAR 8.3.2 Hydrogeology Baseline

EIAR 8.3.2.1 Soils and Geology

EIAR 8.3.2.1.1 Soils and Subsoils

Details on soils and soil management can be found in [Chapter 7: Soils](#) of this EIA Report, see Chapter 7. A summary of the soils, subsoils and geology is provided below.

The Irish Soil Information System soil mapping project identifies various Soil Associations in Ireland.

Proposed Gathabawn Wind Farm:

The majority of the Gathabawn Wind Farm Project Site, including 3 no. turbines at the Ballylehaun Section and all of the turbines at the Ballyring Section, is covered by the Crosstown Association Group. However, the most westerly Ballylehaun Section turbines (T1 – T4) are covered by the Elton Association Group.

- The Elton Association Group is classified as ‘Fine loamy drift with limestones.’
- The Crosstown Association Group is classified as ‘Fine loamy drift with siliceous stones.’

The Ballylehaun Section sits on karstic limestone bedrock at surface, covering 5 of its 7 turbines, with the remainder and surrounding area mostly Carboniferous limestone till interspersed with sands/gravels, alluvium, peat and exposed bedrock. The Ballyring Section is mainly Carboniferous shale/sandstone till with intermittent exposed bedrock, transitioning to limestone till further southeast.

Candidate Gathabawn Grid Connection:

From Ballyring, the candidate grid connection route runs over the Crosstown, Elton and River Association Group's between the Ballyring Control Building and EirGrid Ballyragget Substation. The Parksgrove Substation and the existing Ballyragget Substation are also underlain by the Elton Association Group.

Subsoils underlying the underground cable comprise, from west to east, shales and sandstone till, bedrock at surface, limestone till, limestone sands and gravel, and river alluvium. The Parksgrove Substation and the existing Ballyragget Substation are also underlain by limestone sands and gravel.

EIAR 8.3.2.1.2 Geology

Proposed Gathabawn Wind Farm:

The Ballylehaun Section is partly underlain by the Ballyadams Formation (4 of the 7 no. turbines, T1 to T4), and Clogrenan Formation (1 of the 7 no. turbines, T5). The Ballyadams formation is lithologically described as ‘*Crinoidal wackestone/packestone limestone*’ while the Clogrenan Formation is lithologically described as a ‘*Cherty, muddy, calcarenitic limestone*’. The eastern part of the Ballylehaun Section (2 of the 7 no. turbines,

Table 8-13: GSI Groundwater Vulnerability Rating

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High permeability (sand / gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)	(Sand/Gravel aquifers only)	(< 30 m radius)
Extreme (E)	0-3.0 m	0-3.0 m	0-3.0 m	0-3.0 m	-
High (H)	>3.0 m	3.0-10.0 m	3.0-5.0 m	>3.0 m	N/A
Moderate (M)	N/A	>10.0 m	5.0-10.0 m	N/A	N/A
Low (L)	N/A	N/A	>10.0 m	N/A	N/A
Notes: (i) N/A= not applicable (ii) Precise permeability value cannot be given at present. (iii) Release point of contaminants is assumed to be 1-2m below ground surface.					

The groundwater vulnerability beneath the Gathabawn Wind Farm Site is shown in **Figure 8-4a** and the vulnerability is generally classified as 'Extreme (X) – Bedrock at surface'. The majority of the Ballylehaun turbines (T3 – T7) are classified as 'Extreme (X) – Bedrock at surface', and Turbines T1 and T2 are classified as 'Extreme (E)'. The majority of the Ballyring turbines (T8 – T10) are classified as 'Extreme (X) – Bedrock at surface'. Turbine T11 is classified as 'Extreme (E)' and Turbine T12 is located in an area of 'High (H)' vulnerability.

The ground underlying the FW8 turbine delivery works is classified as having Low (L) to Moderate (M) vulnerability and FW9 is classified as Moderate (M) to High (H) vulnerability.

Lisdowney GWB is deemed an aquifer of 'Extreme' vulnerability with 70% of the aquifer near surface. However, towards the centre of the GWB, the vulnerability gradationally trends to 'Low' at its very centre.

Durrow GWB is deemed an aquifer of 'Extreme' vulnerability along its northeast inner border, southern inner border, and entire western inner border. It reduces to high and occasionally moderate away from this border. Variations in vulnerability can be generally attributed to the parts of the aquifer that are near surface.

In total, 14 no. trial holes were carried out at the Gathabawn Windfarm Site in August 2021, eight trial holes carried out in March 2023 and nine trial holes were carried out in August 2026. No groundwater or water infiltration was noted in any of the trial holes. For more information regarding the trial pits, refer to Chapter 7: Soils of this EIAR.

Candidate Gathabawn Grid Connection:

The Ballylehaun-Ballyring UGC is underlain by both the Durrow and Lisdowney GWB. The Ballyring–Parkgrove UGC is underlain by three GWBs, Lisdowney, Durrow and the Kilkenny – Ballynakill Gravels GWB. The Parksrove-Moatpark UGC is underlain entirely by the Kilkenny – Ballynakill Gravels GWB.

The groundwater vulnerability underlying the majority of the Ballylehaun–Ballyring UGC is classified as Moderate (M). However, the vulnerability ranges from Moderate (M) to Rock at Surface (X).

The vulnerability rating underlying Ballyring–Parkgrove UGC ranges from Low (L) to Rock at Surface (X). The Parksrove-Moatpark UGC has a groundwater vulnerability of High (H).

The locational context of the Candidate Grid Connection within the groundwater bodies is illustrated on **Figure 8-3b**, Bedrock Aquifers are shown in **Figure 8-2b**, and Groundwater Vulnerability is shown in **Figure 8-4b**.

EIAR 8.3.2.1.4	Groundwater Interaction with Designated Sites
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Proposed Gathabawn Wind Farm:

There is potential for groundwater linkages between the Site and Designated Areas via subsurface groundwater flows. The potential for groundwater connectivity will be greater in the Site area underlain by the Ballyadams Formation which is classified as a Karstified (diffuse) Bedrock Aquifer (Rkd) - 'Regionally Important Aquifer, see [Figure 8-2a](#). The diffuse nature of the karstified aquifer suggests that karstified groundwater flows mainly occur in the near surface hence groundwater flow predominantly occurs in this upper zone. Studies show a continuous water table does not exist, indicating that flow in the aquifer may be shallow through a diffuse network of conduits, in this aquifer.

There are a number of Designated Sites within the study area however only one is designated as a Groundwater Dependent Terrestrial Ecosystems (GWDTE) and that is the Galmoy Fen SAC/pNHA, located c. 4.6 km west of T2. The designated fen is located to the west of the Goul River which forms a hydrological boundary between the proposed windfarm Site and the designated area.

The Cullahill Mountain SAC is immediately adjacent to the Ballylehaun Area of the Wind Farm; the SAC designation for the Site is an upland grassland which is protected for orchid species and grass species and is not therefore a GWDTE.

Candidate Gathabawn Grid Connection:

The Gathabawn Grid connection route to the east runs over a poor aquifer, and a Karstified (diffuse) Bedrock Aquifer (Rkd) adjacent to the River Nore and Ballyragget Village. There are no Designated Sites along the route, except for the River Nore SAC and SPA which runs along the river channel itself. The River Nore SAC and SPA designations do not include GWDTE except for examples of tufa springs at Dysart Wood, Co. Laois, which is a significant distance upstream of the connection route and there is therefore no groundwater connectivity present.

The Ballylehaun-Ballyring UGC is also located adjacent to the boundary of Cullahill Mountain SAC and pNHA and Gales Hill Nature Reserve for c.400m of its route from the Ballylehaun Control Building.

EIAR 8.3.2.1.5	Karst
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Proposed Gathabawn Wind Farm:

Based on a review of the GSI Karst database there are no identified karst geological features at the Proposed Gathabawn Wind Farm Site, see [Figure 8-5a](#).

Karst geology at the Site is discussed in detail in above sections relating to Groundwater Bodies and Aquifers, and also Groundwater Interaction with Designated Sites.

The Site area underlain by the Ballyadams Formation, which is classified as a Karstified (diffuse) Bedrock Aquifer (Rkd) - 'Regionally Important Aquifer, see [Figure 8-2a](#), has the potential for Karst Geology. However, the karst aquifer is classified as being of diffuse nature where karstified groundwater flows mainly occur in the near surface hence groundwater flow predominantly occurs in this upper zone. Studies show a continuous water table does not exist, indicating that flow in the aquifer may be through a diffuse network of conduits, in this aquifer.

The closest karst feature to the Gathabawn Windfarm Project is an enclosed depression located approximately 2.4 km to the southeast of T4. There is a linear row of four springs c. 2.7 km south of T6., as shown on [Figure 8-5a](#). There is a cluster of swallow holes c. 3 km south of T6 and up to 23 enclosed depressions in the same area south of Ballylehaun Area near Clomantagh Hill.

There is no evidence of karst features at surface in the borehole logs which indicate a typically very thin weathered bedrock horizon of between 1m and 2m only overlying competent strong limestones with no evidence of near surface karst features. One potential karst feature was identified at depth in borehole BH3 conducted at the site, see Chapter 7 of this EIAR. BH3 was to a depth of 21m BGL, and between 17 and 21m depth the borehole encountered “firm dark-brown, clay void infill”, possibly indicative of an infilled karst feature.

There are no karst features within 2km of the Ballyring Area.

Candidate Gathabawn Grid Connection:

There is a cluster of karst features located southwest of Ballyragget town. One of these karst features, an enclosed depression is located c. 2 km from the Ballyring–Parksgrove UGC at its closest point. The other karst features are more than 2 km away from any aspects of the candidate grid connection, see [Figure 8-5b](#).

EIAR 8.3.2.1.6	Groundwater Abstractions
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Groundwater Source Protection Areas:

Proposed Gathabawn Wind Farm:

The Proposed Gathabawn Wind Farm Site is not located within the groundwater catchment (i.e. groundwater source protection zone) of any mapped Public Water Supply (PWS) or National Federation of Group Water Schemes (NFGWS) registered groundwater source.

A review of the EPA, GSI and NFGWS databases show that the Balief GWS is located c. 2.9km south of T6. The NFGWS database reveals a cluster of four Group Water Schemes in this area, sourced from groundwater, with between 13 and 63 domestic connections. Cullahill GWS is located c. 4.5km northeast of T1. The NFGWS database reveals this is a groundwater sourced GWS with 80 domestic connections.

Candidate Gathabawn Grid Connection:

The Candidate Gathabawn Grid Connection is not located within any source protection area of a PWS or GWS. The nearest Source Protection Zone (SPZ) is the Ballyconra PWS located approximately 0.4 km northwest of the Parksgrove Substation.

Uisce Éireann/Group Water Scheme Wells:

Proposed Gathabawn Wind Farm:

There are no Uisce Éireann or Group Water Scheme groundwater abstraction points within the study area, as per information received from Uisce Éireann (see [Chapter 3: Consultation](#)). There are three Uisce Éireann abstraction points in the vicinity of Freshford town, however they are more than 5 km from the Gathabawn Windfarm Site.

Candidate Gathabawn Grid Connection:

Uisce Éireann has identified an existing water abstraction point located downstream of the Candidate Gathabawn Grid Connection at Freshford. The Gorteenahilla watercourse, which is crossed by the Ballylehaun-Ballyring UGC, discharges into the Nuenna River within Freshford village, approximately 3.4km south of the Ballyring Area. The abstraction point is therefore hydrologically connected to the Site via this pathway.

Uisce Éireann have a water abstraction point registered with the EPA immediately downstream of the Horizontal Directional Drill works at the River Nore for the Parksgrove-Moatpark UGC. The abstraction point is located at ITM coordinates 644412, 670956. The EPA has also marked this section of the River Nore as a river that is abstracted for the purposes of drinking water in accordance with European Communities (Drinking Water) (No. 2) Regulations 2007 (SI no. 278/2007).

Local private groundwater supplies:**Proposed Gathabawn Wind Farm:**

The GSI has a database of recorded groundwater wells for County Kilkenny. However, the Well Database is not a comprehensive record of all private wells in the County as it is not updated and is a number of years out of date now. For example, the GSI Well Database does not include newer developments with groundwater wells and supplies.

Therefore, a conservative approach was adopted here for the baseline and it is assumed that all private dwelling in the vicinity of the proposed development Site has a well water supply associated with it, regardless of the presence of public water pipes along the adjacent public roads, or not.

Candidate Gathabawn Grid Connection:

A similar conservative approach to local private groundwater supplies along the proposed grid connection route.

The conservative approach was adopted here for the baseline and it is assumed that all private dwellings in the vicinity of the candidate grid connection has a well water supply associated with it, regardless of the presence of public water pipes along the adjacent public roads, or not.

EIAR 8.3.2.1.7 Groundwater Body Quality - WFD Status (2019-2024)

Proposed Gathabawn Wind Farm:

The EPA is the governing body in Ireland who classifies GWBs under the WFD. Groundwaters are classified into two status classes, Good and Poor, reflecting chemical and quantitative conditions.

The Gathabawn Wind Farm Project exists within two separate Groundwater Bodies (GWBs) which are the Durrow GWB and Lisdowney GWB.

The Durrow GWB has been assessed as having 'Good' status for 2019 - 2024 (latest reporting cycle) but during the Third WFD Cycle, it was reported as 'At risk' of not achieving its WFD objectives by 2027 due to nutrient pollution as a result of agricultural pressures.

The Lisdowney GWB was assigned a 'Good' WFD status and was labelled as 'Not at risk' of not achieving its WFD objectives by 2027.

Candidate Gathabawn Grid Connection:

The Candidate Gathabawn Grid Connection runs through the Durrow and Lisdowney GWB but it also runs through the Kilkenny – Ballynakill Gravels GWB which was assigned a 'Good' WFD status and was labelled as 'Not at risk' of not achieving its WFD objectives by 2027.

EIAR 8.3.3 Existing Sources of Impacts

The occurrence of existing pollution or environmental damage in the study area of the Whole Gathabawn Wind Farm Project has been considered for potential to act as an existing source of impacts to Water.

The following existing sources of pollution have been identified that currently impact the water receptors associated with the Whole Gathabawn Wind Farm Project:

- Nutrient pressures from agricultural activities (Durrow GWB, Goul_050, Goul_060, Gorteenahilla_010, Nuenna_020);
- Forestry related pressures (Gorteenahilla_010);
- Sediment pollution from morphological and hydromorphological pressures (Goul_060); and
- Organic pollution from urban waste water (Nuenna_020).

EIAR 8.3.4 Importance, Sensitivity and Vulnerability to Change**EIAR 8.3.4.1 Importance**

The importance of the sensitive aspects of Water has been evaluated based on the EPA guidelines (2022), IGI guidelines (2013) and the NRA guidelines (2009), which are included in [Appendix 8.1](#).

Table 8-14: Existing Environment -Significance and Sensitivity

No.	Existing Environment	Significance	Sensitivity	Existing Environment Significance / Sensitivity Rating (H/M/L/N)
1	Water courses associated with the Proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection.	Gorteenahilla, Gorteenamuck, Ballyring Upper Coolnacrutta waterbodies are associated with the Ballylehaun Area and the Ballylehaun–Ballyring UGC. All four streams are of Moderate WFD status and ‘At risk’. Lismaine, Lisdowney, Ballyconra and River Nore are associated with the Ballyring-Parksgrove UGC and Parksgrove-Moatpark UGC. Lismaine is Moderate WFD status and ‘Not at Risk’. Lisdowney and Ballyconra are Good status and ‘Not at risk’. The River Nore is Moderate status and ‘At risk’.	The Ballylehaun–Ballyring UGC crosses the Gorteenahilla and Gorteenamuck and a drain upstream from the Ballyring Upper. The Ballyring–Parksgrove UGC crosses the Lismaine, Lisdowney and Ballyconra waterbodies. The Parksgrove–Moatpark UGC crosses the River Nore.	High for the River Nore – Attribute has a high quality or status on an international scale Medium for all other watercourses - Attribute has a medium quality or value on a local scale
2	Durrow GWB / Bedrock aquifer beneath the Proposed Development Area	Durrow GWB is located under the Ballylehaun Area (T1 – T5) and a small portion of the Ballyring–Parksgrove UGC. Durrow GWB is a Regionally Important Karstified Bedrock Aquifer (Rkd). Good WFD and “At risk”.	Bedrock aquifers may be in hydraulic continuity with surface water courses through groundwater - surface water interactions (recharge and discharge).	High - Attribute has a high quality or value on a local scale as it is a Regionally Important Karstic Bedrock Aquifer.
3	Lisdowney GWB / Bedrock aquifer beneath the Proposed Development Area	Lisdowney GWB underlies Ballyring Area, T6 and T7 in the Ballylehaun Area, Ballylehaun–Ballyring	Bedrock aquifers may be in hydraulic continuity with surface water courses, but it is unlikely there will be any major groundwater - surface	Low - Attribute has a low quality or value on a local scale as it is a Poor Bedrock Aquifer

No.	Existing Environment	Significance	Sensitivity	Existing Environment Significance / Sensitivity Rating (H/M/L/N)
		UGC and the FW8 and FW9 turbine works Lisdowney GWB is a Poorly Productive Bedrock Aquifer. Good WFD status and "Not at risk",	water interactions in this GWB.	
4	Public Water Supply Scheme and Group Water Schemes – Balief GWS, Cullahill GWS and Ballyconra PWS.	The Balief GWS Source Protection Zone (SPZ) is located approximately 3.7 km south of T5. Cullahill GWS SPZ is located c. 4.6km northeast of T1. Ballyconra Public Water Supply Scheme source protection area in vicinity of Parksgrove-Moatpark UGC works across the River Nore.	Bedrock aquifer at Proposed Development Area may be in hydraulic continuity with water supply boreholes.	High – Attribute with high quality or value on a local scale as source protection area for public water supply scheme.
5	Designated Sites	Cullahill Mountain SAC / pNHA immediately adjacent to Ballylehaun Area. Spahill and Clomantagh Hill SAC / pNHA located approximately 1.3 km from T6. Galmoy Fen SAC / pNHA located c. 4.6 km west of T2. The Parksgrove-Moatpark UGC involves works across the River Nore SAC/SPA/pNHA/ Salmonid River.	Designated Sites may be in hydrogeological continuity with the Proposed Development.	High - Attribute has a high quality or value on an international scale with SAC and SPA status and on a national scale with pNHA status.

EIAR 8.3.5 Climate Change effects to Water

Modelled Climate Change (CC) for Ireland suggests that the climate in the future climate could will be characterised by in increased rainfall followed by periods of drought, potentially resulting in increased surface water runoff and groundwater level variations with wider seasonal ranges. CC has the potential for reduced stream and river flows in the summer with increased flooding in winter months, resulting in greater risk of sediment run-off and contamination flowing downstream, particularly where rainfall and flood flows occur directly after extended dry periods.

Research by Maynooth University (Maynooth University, n.d.) indicates that by the 2080's, winter flows are likely to increase on average by between 13% to 30% for some rivers. Modelled reductions in summer flows of about 20% on average are simulated, with a potential reduction of up to 35% for some rivers. Modelled changes in in low flows indicate an average reduction of between c. 21% and 38% for some rivers.

EIAR 8.3.6 Evolution of the Baseline Environment (the 'Do-Nothing' scenario)

If the Whole Gathabawn Wind Farm Project does not proceed, the Proposed Development Site will remain in its current condition, consisting predominantly of agricultural grassland with associated hedgerows and farm tracks. Existing agricultural land use is expected to continue, including associated land management practices and existing farm drainage arrangements. No changes to the current land use, drainage patterns or water management measures would occur as a result of the 'Do Nothing' Scenario.

Under the 'Do Nothing' Scenario, the existing baseline hydrological and hydrogeological conditions described above would be expected to continue. Surface waters draining the Site would continue to discharge to the Coolnacrutta, Gorteennamuck, Gorteenahilla and associated waterbodies via the existing network of streams and drainage channels. The current WFD status classifications for these surface waterbodies, including the 'At Risk' status of Gorteennamuck and Gorteenahilla, would remain unchanged in the absence of the Proposed Development, as would the status of the Durrow and Lisdowney Groundwater Bodies. No new mitigation or enhancement measures affecting surface water, groundwater or adjacent protected areas would be implemented, and the pressures currently affecting local water quality would continue without separate third-party intervention.

As detailed above, baseline conditions in the study area may continue to be influenced over time by climate change, independently of whether the Proposed Development proceeds. The 'At Risk' waterbodies within the study area, and the karstified areas of the Durrow Groundwater Body given the short and localised nature of its groundwater flow paths, may be particularly sensitive to the projected changes in seasonal flow and recharge patterns. As no changes to land management, drainage infrastructure or water control measures would be implemented under the 'Do Nothing' Scenario, existing surface water and groundwater systems would continue to respond to these trends naturally.

EIAR 8.4 IMPACT OF THE PROPOSED DEVELOPMENT

This Section comprises an evaluation of the impacts of the proposal on the receiving Water environment.

EIAR 8.4.1 Criteria and Methodology

The criteria used for impact evaluation in this report is based on the National Roads Authority's *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009)* and the Institute of Geologists Ireland (IGI) *Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements (2013)* and the EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022). The methodology for determining the significance of impacts to Water is based on the importance of the attribute (sensitive aspect) and the magnitude of the impact, as outlined in [Appendix 8.1](#).

EIAR 8.4.2 Source-Pathway-Receptor

The following sources of impacts and pathways for these impacts to the identified receptors (sensitive aspects) of Water are listed below.

EIAR 8.4.2.1 Sources of Potential Impact:

Construction Phase

- Excavations, earthworks and groundworks (associated with the excavation of soils and bedrock to construct turbine bases (foundations) and crane hardstanding areas, substation compound base, met mast base, new and upgraded Site access roads, Site entrances, temporary hardstanding areas, and the opening, excavation and reinstatement of the borrow pits;
- Dewatering during watercourse crossing works;
- Movement and storage of overburden;
- Installation of Site drainage network;
- Use of cementitious material (concrete);
- Use of machinery and vehicles - source of hydrocarbons; and
- Storage of oils, fuels and wastes (including wastewater) at the temporary construction compound.

Operational Phase

- Use of machinery and vehicles - source of hydrocarbons;
- Storage of topsoil in permanent overburden berms;
- Maintenance groundworks for access road/hardstand/drainage maintenance;
- Storage of oils, fuels and wastes; and
- Storage of wastewater in a wastewater holding tanks.

Decommissioning Phase

- Use of machinery and vehicles – source of hydrocarbons;
- Removal of hydrocarbons from turbines;
- Groundworks to reinstate drainage network, turbine hard standing areas and foundations using soils stored in adjacent overburden berms;
- Removal (by pulling) of underground cables from ducts.

EIAR 8.4.2.2 Pathways:

- Runoff, drainage and surface water discharge routes;
- Direct excavations;
- Soil/subsoil pore space; and

- Groundwater flow paths.

ElAR 8.4.2.3 Receptors:

- River Waterbodies;
- Groundwater Bodies;
- Water Supplies (surface water and groundwater); and
- Designated Sites.

ElAR 8.4.3 Overview of the impacts to Water

A summary of the findings of the evaluation of the effects of the Whole Gathabawn Wind Farm Project on Water are listed in Table 8-15 below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

The evaluations follow this summary table

The following effects are evaluated in detail to determine whether or not they are likely to be Significant.

Table 8-15: Outline of Assessed Impacts

RIVER WATERBODIES	ElAR Section:
Reduction in surface water quality from sediment release	8.4.5.1
Reduction in surface water quality from accidental spillage of oil, fuels and cement	8.4.5.2
GROUNDWATER IMPACTS	
Reduction in Groundwater Quality due to sedimentation, contamination by hydrocarbons and cement-based compound	8.4.5.3
DESIGNATED SITES IMPACTS	
Reduction in water quality in Designated Sites	8.4.5.4

All of the remaining potential effects of the proposed Gathabawn Wind Farm Project on Water receptors are not considered likely to result in a significant adverse effect on the receptors. Therefore, a short evaluation of these effects is provided in Section ElAR 8.4.6, with a summary of these impacts provided in Table 8-16 below; as a result, the potential effects below have been scoped out of the detailed impact assessment.

Table 8-16: List of potential effects which are not considered to have a significant adverse effect on water receptors

Effects of the Proposed Development which will not be significant	Phase	Impact Significance – See Section EIAR 8.4.6
RIVER WATERBODIES IMPACTS		
Increase in risk of flooding due to increase in surface water run-off and sediment release	C	Slight – Not Significant
Changes to surface water quantities due to increased runoff rates and/or changes to drainage patterns	C, O, D	Imperceptible
Reduction in surface water quality during the operational phase	O	Imperceptible
Hydromorphological effects due to watercourse crossing works (Candidate Gathabawn Grid Connection)	C	Imperceptible
GROUNDWATER BODIES IMPACTS		
Reduction in groundwater levels from dewatering of turbine base excavations	C	Not Significant
Reduction in groundwater quality due to contamination by hydrocarbons	O, D	Not Significant
Alteration of groundwater levels and/or flow paths	O, D	Not Significant
WATER SUPPLY IMPACTS		
Reduction in groundwater quality at Water Supply Schemes from sediment release / accidental spillage	C	Not Significant
Reduction in groundwater quality at local domestic water supplies from sediment release / accidental spillage	C	Not Significant to Slight – Not Significant
Reduction in water quality at the Uisce Éireann abstraction point, Freshford	C	Not Significant
Reductions in surface water <i>quality</i> at local groundwater wells	O, D	Not Significant
Reductions in water <i>quantity</i> at local groundwater wells	O, D	Not Significant
DESIGNATED SITES IMPACTS		
Potential erosion or flow regime effects to Designated Sites (Hydromorphology)	C	Imperceptible
Changes to drainage regimes and water quantities in all downstream Designated Sites	O, D	Imperceptible
Reduction in water quality in downstream/downslope Designated Sites	O, D	Imperceptible

EIAR 8.4.4 Evaluation of Impacts to Water**EIAR 8.4.4.1 Reduction in surface water quality from sediment release**

Sensitive Aspect: River Waterbodies

Importance: **High** for the River Nore**Medium** for all other associated watercourses (as per Section EIAR 8.3.4)**Impact Source(s)****Construction:**

Excavations, earthworks and groundworks, trenching, drill pit dewatering, movement and storage of overburden, erosion of soils, installation of Site drainage system.

Operational:

Routine maintenance works at the Whole Proposed Development Site, storage of topsoil in permanent overburden berms,

Impact**Pathway(s)**

Runoff, drainage, and surface water discharge routes

Overview of Potential Impact:

The release of suspended solids to surface watercourses could increase the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality of downstream water bodies. Furthermore, substances such as phosphorus, heavy metals, pesticides and other organic compounds can bind themselves to soil particles and potentially can enter water bodies via suspended solids.

Examination of the Impact:**Proposed Gathabawn Wind Farm Impact:****Construction phase:**

The Whole Gathabawn Wind Farm Project will require earthworks resulting in the removal of vegetation cover and excavation of soils. The risk of release of suspended solids to nearby surface water bodies is primarily a consequence of the physical disturbance of the ground during the construction phase. If not correctly compacted, exposed and disturbed ground may increase the risk of erosion and subsequent sediment laden surface water runoff. While the Coolnacrutta, River Goul, Foyle South and Ballyring Upper water bodies are downstream of the two turbine Areas and the FW8/FW9 turbine delivery route works, there is no direct hydrological connectivity to the Coolnacrutta or River Goul, and while the Foyle South and Gorteenahilla will be c.90m and c.23m from Facilitating Works FW8 respectively, and the Ballyring Upper will be c.5m from Facilitating Works FW9, the works at these locations will be small scale and temporary. Therefore, it is considered that with no mitigation, the magnitude is small, effect is temporary, short term, unlikely, small negative and the significance of the effect will be Not Significant.

Operational phase:

There is potential for surface water quality reduction via sediment release during the operational phase as a result of Site access and during maintenance works which may involve periodic maintenance of the site roads and drainage network. Therefore, it is considered that with no mitigation, the magnitude is negligible, the effect is temporary to short term, unlikely, moderate, negative and the significance of the effect is **Slight to Not Significant**

Candidate Gathabawn Grid Connection Impact:**Construction Phase:**

The Gorteenamuck and Gorteenahilla are particularly vulnerable as the Ballylehaun–Ballyring UGC will cross these streams which are both of Moderate WFD status and 'At risk'. The crossing at Gorteenamuck (W1) will utilise an existing pipe culvert and the crossing at Gorteenahilla (W2) will be crossed by Horizontal Directional Drilling (HDD) under the bed of the watercourse. Excavations associated with cable trenches and joint bay chambers; the requirement for instream works at W3 (Lismaine Stream), W4 (Lisdowney Stream) and W5 (Ballyconra Stream); the use of horizontal directional drilling to cross the River Nore; and the location of the Parksgrove Substation it is evaluated that the worst-case magnitude of suspended solid release is negligible in the Lismaine, Lisdowney and Ballyconra streams, and small in the main channel of the River Nore. The effect is

negative, temporary to short term, unlikely and the significance of effect is **Slight to Not Significant** for Lismaine, Lisdowney and Ballyconra and **Moderate** for the River Nore. It is considered that with no mitigation, the magnitude is small, effect is temporary, short term, unlikely, moderate, negative and the significance of the effect is **Moderate** for the Gorteennamuck and Gorteenahilla.

Operational Phase:

During the operational phase, the Candidate Gathabawn Grid Connection will require minimal maintenance activity, limited to periodic inspection of the underground cabling via jointing chambers and Joint Bays, and infrequent testing works. No excavation or ground disturbance is anticipated during routine operation, and the drilled/trenched cable routes will have fully reinstated and revegetated by this stage. Therefore, it is considered that the potential for sediment release during the operational phase of the Candidate Gathabawn Grid Connection is negligible, and the significance of effect is **Imperceptible**.

Impact Magnitude	Negligible to Small	Impact Significance – Whole Project: (pre-mitigation)	Not Significant to Moderate
Mitigation and Monitoring Measures: Even though Significant impacts are not predicted, the following mitigation and monitoring measures will be implemented as best practice environmental management.			
Design	Avoidance of on-Site sensitive hydrology features by constraints mapping (i.e. buffer zones)		
Design	Construction and installation of the Site drainage network (<i>see Planning Drawings Pack: Planning Drawings: GWF-03.2, GWF-03.3, GWF-03.4, GWF-03.6 and GWF-03.7</i>)		
Design	Implementation of the Surface Water Management Plan (<i>see Environmental Management Plan 2026</i>)		
WM29 GM26	<u>Environmental Management Plan:</u> The construction of the development will be carried out in accordance with an Environmental Management Plan (EMP), which will include all mitigation measures and monitoring arrangements for the Project. An Environmental Clerk of Works will be appointed, independent of the Contractor, and will carry out weekly audits on EMP compliance. If non-compliance is detected, then, prompt corrective action will be agreed with the Contractor, with a view to the swift and effective resolution of any deviations from the EMP requirements. The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP and the requirements of the Environmental Clerk of Works. Furthermore, if a significant unforeseen environmental effect takes place, then, the Environmental Clerk of Works will have a 'stop-works' authority to temporarily stop works at the works location until the issue is resolved.		
WM02 GM02	<u>Water Quality Monitoring:</u> Confirmatory surface water quality monitoring will be carried out prior to the commencement of construction works at the water quality monitoring locations to determine the current status of surface water quality in downstream watercourses. This monitoring will include laboratory analysis of water samples which will be carried out by an independent and appropriately certified laboratory. The monitoring of water quality parameters and collection of samples will be undertaken by the Environmental Clerk of Works, who will be appropriately trained on the required monitoring methods and the use, calibration and maintenance of all monitoring equipment used. Records will be kept of biological and chemical monitoring undertaken carried out prior to the commencement of construction works.		
WM12 GM12	The <u>Environmental Management Team</u> will monitor construction works for compliance with the Environmental Management Plan. The project Environmental Management Team which includes an Environmental Clerk of Works, the Project Ecologist and specialists as required such as archaeologists, invasive species specialists and hydrologists, who are independent of the site contractors. The Environmental Management Team will report to the owner's Project Manager.		
WM14 GM14	<u>Engineer Supervision:</u> a suitably qualified engineer will supervise all excavations and construction works.		
WM20 GM20	<u>Liaison with Contractor:</u> The Project Ecologist will liaise with the Contractor on a weekly basis regarding the upcoming schedule of works and will advise the Contractor of any particular ecological protection requirements at specific locations on Site.		

WM72	<u>Dust control:</u> Dust minimisation measures will be implemented during the construction works as follows: • The Site roads will be regularly inspected and swept to remove build up of mud and aggregate materials from their surface, • any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and windy conditions. • Vehicles delivering material with dust potential will be enclosed or covered with tarpaulin to restrict the escape of dust. • Public roads in the vicinity of the Site will be regularly inspected for cleanliness, and cleaned as necessary
WM33 GM30	<u>Excavation of Materials:</u> The excavation of earth materials during the construction stage will be kept to a minimum. The excavation of materials will be completed in accordance with best practices for the management and treatment of such materials. (i.e. British Standards BS6031:2009 Code of Practice for Earthworks) and MAFF (2000) Good Practice for Handling Soils).
WM34 GM31	<u>Storage of Overburden:</u> During construction works, excavated material will be removed for temporary or permanent storage at designated berms. All storage berms will be placed more than 50m away from any watercourse or wet drainage feature. Temporary silt control methods such as silt fencing or curtains will be placed around all overburden storage areas and/or installed between the bermans and local watercourses or wet drainage channel, depending on the location, and the existing vegetative between the berms and watercourse / drainage features will be left in place.
WM31	<u>Control of Movement of Machinery/Vehicles:</u> Construction traffic, personnel and materials will be restricted to the hardcore surfaces, particularly with respect to the newly constructed access roads. This means that machinery will be kept on the Wind Farm Site roads and hardstanding areas, and, aside from advancing excavations, will avoid moving onto areas not delineated on the Site drawings.
GM28	<u>Control of Movement of Machinery/Vehicles:</u> Construction traffic, personnel and materials will be restricted to within the construction works area fence and will avoid moving onto areas not delineated on the site drawings.
GM36	<u>At Parksgrove Substation, a permanent surface water drainage network</u> will be installed at the substation compound and along the associated access road, and will ensure that all surface water runoff from the access road and new the hardstand areas will be captured and treated prior to discharge/release. The drainage infrastructure will not be installed during heavy or prolonged rainfall events or when the soil is waterlogged. The site drainage network will include check dams and settlement ponds which will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas. Water will be released to surrounding vegetation via buffered outfall weirs.
WM45 GM37	Where dewatering of excavations is required, there will be no direct discharge of treated water into any watercourse or drain or directly pumped onto adjacent habitats. Rather, all pumped water will be discharged via a silt bag or infiltration trench or settlement pond, as appropriate, to surrounding vegetation.
WM96 GM86	<u>Surface water quality monitoring</u> of watercourses downstream of the works will be carried out monthly for the first six months post construction, and thereafter annually during the Operational Years 1, 2, 3, 4 and 5, and then every 5 years thereafter, to record any change to baseline trends. Samples will be analysed by an appropriately certified laboratory and the resulting report submitted to Kilkenny County
WM43	<u>Drainage network:</u> Windfarm site roads and hardstanding areas are designed to have a permanent surface water drainage network in place. Temporary works areas, such as turning heads, borrow pits and compounds will have a temporary surface water drainage network in place during works. The drainage infrastructure will not be installed during heavy or prolonged rainfall events or when the soil is waterlogged. The site drainage network will ensure that all surface water runoff from upgraded roads and new road surfaces (including hardstand areas) will be captured and treated prior to discharge/release. Transverse drains ('grips') will be constructed, where appropriate, in the surface layer of access tracks to divert any runoff into swales/track side drains; The site drainage network

	will include check dams and settlement ponds which will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas. Water will be released to surrounding vegetation at regular intervals via buffered outfall weirs, which also form part of the drainage network.
WM15	<u>Drainage Network Inspections:</u> The windfarm drainage network will be inspected regularly during the construction phase under the following schedule: Daily visual inspections by the Contractor; weekly inspections by the Environmental Management team; Event based inspections by the Contractor as follows: >10 mm/hr (i.e. high intensity localised rainfall event); or >25 mm in a 24 hour period (heavy frontal rainfall lasting most of the day); or, rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). All inspections will include all elements of the drainage systems to ensure that the systems are operating correctly. Inspections will examine the functioning of the various elements of the drainage system, and if evidence of sedimentation or scouring and any changes in the drainage water including discolouration, odour, oily sheen or the presence of litter, then the required corrective maintenance or actions will be identified and will be implemented immediately the Contractor. Weekly site inspections of the drainage network will be carried out by members of the Environmental Management Team during construction phase and for a period of 6 months following construction. If monitoring identifies sediment or contaminant polluted waters, then the Environmental Clerk of Works will establish the cause of the pollution, and if caused by the Project, then the Environmental Clerk of Works will have a 'stop-works' authority to temporarily stop construction works at the Project site and the Contractor will implement the necessary actions and measures to resolve the cause of the pollution.
GM15	<u>Inspections of the drainage network around the Parksgrove Substation</u> will be conducted regularly during the construction phase under the following schedule: Daily visual inspections by the Contractor; weekly inspections by the Environmental Management team; Event based inspections by the Contractor as follows: >10 mm/hr (i.e. high intensity localised rainfall event); or >25 mm in a 24 hour period (heavy frontal rainfall lasting most of the day); or, rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). Inspections will examine the functioning of the various elements of the drainage system, and if evidence of sedimentation or scouring and any changes in the drainage water including discolouration, odour, oily sheen or the presence of litter, then the required corrective maintenance or actions will be identified and will be implemented immediately the Contractor.
WM17	<u>Additional WQ Monitoring at D2:</u> At Drain D2, monitoring of Q values and sediment build up will be carried out immediately downstream of the diversion works on this farm drainage channel. This monitoring will also be conducted as part of surface water monitoring before and after the crossing works in order to confirm that the Q values and sediment levels return to baseline levels. Prior to dam being removed at D2, where sediment build up poses significant downstream effects on the watercourse, this sediment will be removed.
GM17	<u>At W3, W4 and W5, monitoring of Q values and sediment build up</u> will be carried out immediately downstream of the dam locations during crossing works. This monitoring will be conducted throughout the construction works and also conducted as part of surface water monitoring in order to confirm that the Q values and sediment levels return to baseline levels. Prior to dam being removed at W3, W4 or W5, where sediment build up poses significant downstream effects on the watercourse, this sediment will be removed.
GM32	<u>Protection of Soils in Berms;</u> All storage berms will be graded and sealed following emplacement. Topsoil and subsoil will be stockpiled separately. Re-seeding of permanent berms will be carried out as soon as practical in these areas. Construction works areas along cable routes in agricultural lands will be reseeded as soon as practical after reinstatement. Measures such as silt curtains around the bases of these areas and sediment traps will also be incorporated to prevent runoff of suspended solids, dust and soil erosion, if required.
WM42 GM35	<u>Weather forecasts</u> will be consulted in advance of works. If there is heavy prolonged rainfall or if an exceptional rainfall event occurs, then construction works will cease until peak flows have subsided.

WM41 GM34	<u>Protection of watercourses and existing drains:</u> Additional mitigation measures will be deployed within 50m of watercourses or wet drainage features, including the placement of silt trapping arrangements along preferential surface water flowpaths, and temporary drain blocking in existing drains. Works will not take place within this 50m zone during prolonged heavy or exceptional rainfall events.
<u>Effectiveness of Mitigation and Monitoring Measures:</u> The mitigation measures identified above represent proven, industry-standard best practice for the management of sediment-related risk during the construction of wind energy developments in Ireland. Their effectiveness derives from three complementary mechanisms: • avoidance and reduction at source, through constraints-led design, watercourse buffer zones, and controlled management of overburden; • interception and treatment of any sediment-laden runoff that is generated, through the Site drainage network, silt fencing, and settlement infrastructure, prior to release; and • verification, through the ongoing surveillance of an independent Environmental Clerk of Works with stop-works authority, supported by a programme of surface water quality monitoring at locations downstream of the works.	
Following the implementation of the mitigation measures in relation to preventing reducing surface water quality as a result of sediment release, it is considered that the magnitude will decrease to negligible and the significance of effect will decrease to slight to not significant	
Residual Impact Significance (<i>post-mitigation</i>):	
Not Significant	

EIAR 8.4.4.2 Reduction in surface water quality from accidental spillage of oil, fuels and cement products

Sensitive Aspect:	River Waterbodies
Importance:	High for the River Nore Medium for all other associated watercourses (as per Section EIAR 8.3.4)
Impact Source(s)	Excavations, earthworks and groundworks, excavation dewatering, movement and storage of overburden, installation of Site drainage system, use/presence of fuels, oils & chemicals, use of machinery on Site, refuelling, cement/concrete for foundations
Impact Pathway(s)	Surface water/groundwater flow paths and downstream watercourses

Overview of Potential Impact:

Water quality can be affected by contaminants and/or nutrients becoming entrained in surface water runoff from construction works areas and excavations. An increase in these pollutants in downstream waterbodies could potentially result in a decrease in water quality in downstream waterbodies and in downstream Designated Sites.

Petroleum hydrocarbons accidentally spilled during refuelling of plant/machinery or as a result of leakages from plant, machinery or vehicles is a pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. Hydrocarbons have a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Concrete and other cement-based products are corrosive and have potential to result in very fine, highly alkaline silt (pH 11.5). Entry of cement-based products into the Site drainage system, into surface water runoff, and hence to downstream watercourses represents a risk to the aquatic environment, while water quality can be affected through changes to pH levels. A pH range of $\geq 6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a pH unit.

Examination of the Impact:

Proposed Gathabawn Wind Farm:

Construction Phase:

During the construction phase, there is potential for a pollution event to affect surface water and local groundwater bodies impacting on their water quality, particularly water bodies which flow through the Site and adjacent to the Site boundary. Contamination of surface water runoff from machinery, leakage and spills of chemicals from vehicle use and the construction of hardstanding also have the potential to affect surface water bodies. Potential pollutants include oils, fuels and cement. This would have a negative effect on the receptor and the resulting degradation of the water quality.

Due to separation distances of the main works from local streams and rivers, and the absence of instream works, it is considered that the magnitude of any potential contamination impacts would be Moderate in a worst-case scenario. While works at Facilitating Works FW9 will be c. 5 m from the Ballyring Upper stream, it is considered that due to the short duration of works at this location, the worst-case potential impact will be negative, temporary to short term, Moderate significance. Therefore, it is considered that the potential worst-case impact of the Proposed Gathabawn Windfarm will be negative, temporary to short term, **Moderate significance**.

Operational Phase:

During the operational phase, the potential for accidental spillage of oils and fuels is limited to routine and unscheduled maintenance activities at the turbines and Control Buildings. Volumes of fuels and oils present on-Site at any time will be low, and oil-containing equipment (turbine transformers) will be appropriately banded. Therefore, it is considered that the magnitude of any contamination impact during the operational phase will be Negligible, and the significance of effect will be Imperceptible.

Candidate Gathabawn Grid Connection:**Construction Phase:**

Due to the linear nature of underground cabling, the much smaller scale of works compared to the Wind Farm, and brief instream works at three local streams, and taking into account the presence of drilling pits >50m from the River Nore, it is considered that the magnitude of any contamination impacts would be Low-Negligible in a worst-case scenario. Therefore, it is considered that the potential worst-case impact of the Candidate Gathabawn Grid Connection will be negative, temporary to short term, **Slight Significance to Not Significant**.

Operational Phase:

During the operational phase, potential for accidental spillage is limited to biennial testing of the underground cabling at jointing chambers and routine maintenance at the Parksgrove Substation. Volumes of fuels and oils on-Site at any time will be low, and the substation transformer will be appropriately bunded. Therefore, it is considered that the magnitude of any contamination impact during the operational phase will be Negligible, and the significance of effect will be Imperceptible.

Whole Project Impact: Taking into account the presence of both windfarm works and candidate grid connection works in the Nore_150 (Lismaine, 1st order stream); and the spread of the remaining windfarm and candidate grid connection works across different sub-basins to each other, overall, it is considered that the effects of the whole project, under worst-case scenarios, will be temporary-short-term, negative, **Not Significant to Moderate significance of impact**.

Impact Magnitude	Moderate to Low	Impact Significance - Whole Project: (pre-mitigation)	Moderate to Not Significant
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Mitigation and Monitoring Measures: Even though Significant impacts are not predicted, the following mitigation and monitoring measures will be implemented as best practice environmental management.

Design	Avoidance of on-Site sensitive hydrology features by constraints mapping (i.e. buffer zones)
Design	Construction and installation of the Site drainage network (<i>see Planning Drawings Pack: Planning Drawings: GWF-03.2, GWF-03.3, GWF-03.4, GWF-03.6 and GWF-03.7</i>)
Design	Implementation of the Surface Water Management Plan (<i>see Environmental Management Plan 2026</i>)
WM18 GM18	<u>Fit for Purpose:</u> All plant and machinery which will be used during construction will be fit for purpose and in good working order prior to mobilisation to works areas. The plant and machinery will be regularly inspected by the Contractor for leaks and maintained in good working order for the duration of the works.
WM34 GM31	<u>Storage of Overburden:</u> During construction works, excavated material will be removed for temporary or permanent storage at designated berms. All storage berms will be placed more than 50m away from any watercourse or wet drainage channel. Temporary silt control methods such as silt fencing or curtains will be placed around all overburden storage areas and/or installed between the berms and local watercourses or wet drainage channel, depending on the location, and the existing vegetative between the berms and watercourse / drainage features will be left in place.
WM35	<u>Protection of Soils in Berms;</u> All storage berms will be graded and sealed following emplacement. Topsoil and subsoil will be stockpiled separately. Where possible, the upper vegetative layer (where still present) of excavated soil will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the stored spoil within the storage areas. Re-seeding will also be carried out in these areas. Measures such as interceptor ditches around the bases of these areas, and silt curtains will also be incorporated where required to prevent runoff of suspended solids, dust and soil erosion.
WM47	<u>Concrete control procedures</u> will be implemented and will include the following: No concrete batching will take place on site, all concrete will be ready-mixed and delivered just-in-time.

	• The pouring of concrete will be scheduled for dry days. If a sudden rainfall event should occur, then suitable covers will be ready and available at the pour site to cover the concrete. • The pour site will be kept free of standing water. • All operators involved in pouring concrete will be trained and experienced in working with concrete. • Run-off from wind turbine foundation concrete pours will not be permitted to flow over adjacent lands or enter drainage channels. The run-off will be contained within the foundation area and pumped into a skip to settle out; settled solids will be appropriately disposed of off-site. • The Contractor will not permit the discharge of cement contaminated waters to the construction phase drainage system, onto adjacent lands or directly to any artificial drain or watercourse. • Concrete trucks will be washed out at the supplier's facilities and not on site. The only concrete washing that will occur on site is the hand washing of the chutes at the rear of the trucks. Washing of chutes will only take place at the designated area and into a Roadside Concrete Washout unit.
GM44	<u>Concrete control procedures</u> will be implemented and will include the following: • All concrete will be ready-mixed and delivered to site just-in-time; • Dry granular cement will be used in UGC cable trenches; • The pouring of concrete will be scheduled for dry days. If a sudden rainfall event should occur, then plastic covers will be ready and available at the pour site to cover the concrete. • The pour site will be kept free of standing water; • Designated trained operator experienced in working with concrete will be employed during concrete pouring; • Concrete trucks will be washed out at the supplier's facilities and not on site. The only concrete washing that will occur on site is the hand washing of the chutes at the rear of the trucks. Washing of chutes will only take place at the designated area and into a Roadside Concrete Washout unit. • No discharge of cement contaminated waters to any artificial drain or watercourse will be allowed.
WM48	<u>Refuelling control procedures</u> will be implemented and will include the following: • On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser carried on a double axel refuelling trailer, will be refuelled off-site, and will be towed around the site by a 4x4 vehicle to where machinery is located. The 4x4 vehicle will carry fuel absorbent material and pads in the event of any accidental spillage. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. • In addition, spill response apparatus including spill-kits and fuel absorbent mats will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment and in the implementation of the Emergency Response Plan, as contained in the Environmental Management Plan. • The fuel bowser will be parked on a level area, away from main traffic activity, in a designated part of the construction compounds when not in use. Taps, nozzles or valves associated with mobile fuel bowser will be fitted with a lock system. Only designated trained and competent operatives will be authorised to refuel plant on site. A Permit to Fuel system will be put in place. • There will be no refuelling of vehicles or plant permitted within 100m of a watercourse or wet drainage channel or local spring/well.
GM45	<u>Fuel/Oil control procedures</u> will be implemented and will include the following: On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double axel custom-built refuelling trailer, will be refuelled off-site, and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will carry

	fuel absorbent material and pads in the event of any accidental spillage. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. In addition, spill response apparatus including spill-kits and fuel absorbent mats will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment and in the implementation of the Emergency Response Plan, as contained in the Environmental Management Plan. The fuel bowser will be parked on a level area, away from main traffic activity, in a designated part of the construction compound when not in use. Taps, nozzles or valves associated with mobile fuel bowser will be fitted with a lock system. Only designated trained and competent operatives will be authorised to refuel plant on site. A Permit to Fuel system will be put in place.
GM46	<u>Along the cable routes, there will be no refuelling</u> of plant or machinery within 100m of a watercourse or wet drainage channel or local spring/well.
WM19 GM19	<u>Fuel, oil and chemical stores</u> including tanks and drums will be regularly inspected for leaks and signs of damage.
WM16 GM16	<u>Surface water quality monitoring</u> of watercourses downstream of the works will be carried out at regular intervals by the Environmental Management team during the construction phase. Laboratory analysis of water samples will also be undertaken as part of the monitoring programme by an independent and appropriately certified laboratory. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan which forms part of the Gathabawn Windfarm Project Environmental Management Plan. Surface water quality monitoring will include Total Suspended Solids [TSS] monitoring, with readings above 25mg per litre (as specified in the Salmonid Waters Regulations, SI 293 of 1988) triggering a non-compliance issue, and resultant remedial action by the construction Contractor, in line with the EMP. Records will be kept of biological and chemical monitoring undertaken before, during and after the works, and will be made available upon request to any authorised person as defined under the Local Government (Water Pollution) Acts.
WM50 GM48	<u>Overnight parking</u> of plant and machinery will only be permitted at an existing hard-core surface at locations which are greater than 50m from watercourse/drainage features/Cullahill Mountain SAC. Drip trays and fuel traps will be used under and around parked plant and machinery to contain any potential leaks.
Effectiveness of Mitigation and Monitoring Measures: The mitigation measures identified above reduce the risk of contaminant release through prevention and, where a release nonetheless occurs, containment. Refuelling controls, inspection and maintenance of plant and machinery, and bunding of fuel and oil storage areas reduce the likelihood of hydrocarbons entering the environment; concrete control procedures, including the designated wash-out area, similarly limit the potential for cement-related contamination at source. Should an accidental leak or spill occur, on-Site spill response equipment enables its rapid capture, containment, and removal for off-Site disposal. In combination, these measures break or substantially limit the pathway between the identified sources and the receptor. With the implementation of the mitigation measures outlined above, the residual effect on downstream water quality is considered to be negative, imperceptible, indirect, short-term and temporary	
Residual Impact Significance (post-mitigation):	
Imperceptible	

EIAR 8.4.4.3 Reduction in Groundwater Quality due to sedimentation, and/or contamination by hydrocarbons and/or cement-based compounds

Sensitive Aspect: Groundwater Bodies

Importance: **High** (as per Section EIAR 8.3.4)

Impact Source(s) Excavation works and erosion of soils (sediment/turbid waters), presence of machinery, oils and fuels, cement-based compounds

Impact Pathway(s) Groundwater flow paths – Particularly in the Karstified Aquifer

Overview of Potential Impact:

The primary risk to groundwater at the proposed project Site would be from hydrocarbon spillage, leakages at excavation areas. These are potential impacts common to all construction Sites (such as road works and industrial Sites). An increase in turbidity levels in groundwater is another potential groundwater quality effect where bedrock excavations are carried out (i.e. borrow pits and turbine foundations). Cement based compounds also have the potential to alter groundwater hydrochemistry with regard alkalinity.

Examination of the Impact:

Proposed Gathabawn Wind Farm:

Construction Phase:

There is potential to affect groundwater quality in underlying bedrock beneath the windfarm Site through vertical migration. Areas of exposed bedrock will be localised, principally at turbine base excavations and the two on-Site borrow pits.

Groundwater conditions differ between the two Site areas. The Ballylehaun Area is underlain by karstic limestone bedrock, recorded at or near surface at several turbine locations (T1 to T5), with subsoil cover frequently thin or absent, limiting protection against vertical contaminant migration due to low permeability soils and subsoils. The Ballyring Area is underlain predominantly by siltstone bedrock beneath firm to stiff silt subsoils, with depth to bedrock recorded between 0.75m and 2.15m across trial pit locations, generally providing greater cover of lower permeability till than at Ballylehaun.

The potential for contaminants such as sediment, hydrocarbons or cement-based compounds to migrate rapidly and with limited attenuation is therefore considered greater at Ballylehaun, where shallow diffuse flow through karstified bedrock can bypass the natural filtration typical of intergranular aquifers. At Ballyring, the Poorly Productive aquifer classification and greater subsoil cover support a lower potential for vertical migration to groundwater.

Overall, it is evaluated that effects to groundwater quality as a result of the Proposed Gathabawn Windfarm will be temporary, unlikely, negative, of Medium-Low magnitude and therefore of **Slight significance**.

Operational Phase:

Groundworks during the operational phase will be limited to biannual maintenance of the Windfarm Site roads and drainage network, with no new excavation into bedrock anticipated. Given the absence of fresh bedrock exposure, the potential for contaminant migration to groundwater during operation is considered lower than during construction. It is considered that the magnitude of impact during the operational phase will be Negligible, and the significance of effect will be **Not Significant**.

Candidate Gathabawn Grid Connection:

Construction Phase:

There is also potential to affect groundwater quality in the underlying bedrock aquifers along the Candidate Grid Connection route during trench excavation and also at compound excavations at the Parksgrove Substation. Overall, due to the shallow depth of excavations for cable trenches and the progressive linear nature of the works with ongoing backfilling of the cable trench and restoration, it is evaluated that effects to groundwater quality as a result of the Candidate Gathabawn Grid Connection will be temporary, unlikely, negative, of Low-Negligible magnitude and therefore of **Slight significance to Not Significant**.

Operational Phase:

No excavation into bedrock is anticipated during routine operation. It is considered that the magnitude of impact during the operational phase will be Negligible, and the significance of effect will be **Not Significant**

Whole Project Impact:

Taking into account the presence of both Windfarm works and candidate grid connection works within the Durrow and Lisdowney Groundwater Bodies, and the location of the remaining windfarm and candidate grid connection works across different groundwater bodies to each other, overall, it is considered that the effects of the whole project, under worst-case scenarios, will be temporary to short-term, negative, and of **Slight to Moderate significance of impact**

Impact Magnitude	Low – Medium to Low – Negligible	Impact Significance: (pre-mitigation)	Slight – Moderate (Proposed Development Site) Slight – Not Significant (GCR)
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Mitigation and Monitoring Measures: Even though Significant impacts are not predicted, the following mitigation and monitoring measures will be implemented as best practice environmental management.

Design	No batching of concrete on Site
Design	Avoidance of mapped karst features via constraints-led siting (nearest karst feature located 2.4km from the Site at Ballylehaun; no karst features within 2km of Ballyring)
WM33 GM30	<u>Excavation of Materials:</u> The excavation of earth materials during the construction stage will be kept to a minimum. The excavation of materials will be completed in accordance with best practices for the management and treatment of such materials. (i.e. British Standards BS6031:2009 Code of Practice for Earthworks, and MAFF (2000) Good Practice for Handling Soils).
WM34 GM31	<u>Storage of Overburden:</u> During construction works, excavated material will be removed for temporary or permanent storage at designated berms. All storage berms will be placed more than 50m away from any watercourse or wet drainage channel. Temporary silt control methods such as silt fencing or curtains will be placed around all overburden storage areas and/or installed between the berms and local watercourses or wet drainage channel, depending on the location, and the existing vegetative between the berms and watercourse / drainage features will be left in place.
WM45 GM37	Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain or directly onto adjacent habitats. Rather, all pumped water will be discharged to local vegetation via a silt bag or infiltration trench or settlement pond, as appropriate, to surrounding vegetation.
WM47	<u>Concrete control procedures</u> will be implemented and will include the following: • No concrete batching will take place on site, all concrete will be ready-mixed and delivered just-in-time. • The pouring of concrete will be scheduled for dry days. If a sudden rainfall event should occur, then suitable covers will be ready and available at the pour site to cover the concrete. • The pour site will be kept free of standing water. • All operators involved in pouring concrete will be trained and experienced in working with concrete. • Run-off from wind turbine foundation concrete pours will not be permitted to flow over adjacent lands or enter drainage channels. The run-off will be contained within the foundation area and pumped into a skip to settle out; settled solids will be appropriately disposed of off-site. • The Contractor will not permit the discharge of cement contaminated waters to the construction phase drainage system, onto adjacent lands or directly to any artificial drain or watercourse. • Concrete trucks will be washed out at the supplier's facilities and not on site. The only concrete washing that will occur on site is the hand washing of the chutes at the rear of

	the trucks. Washing of chutes will only take place at the designated area and into a Roadside Concrete Washout unit.
WM48	<u>Refuelling control procedures</u> will be implemented and will include the following: - On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser carried on a double axel refuelling trailer, will be refuelled off-site, and will be towed around the site by a 4x4 vehicle to where machinery is located. The 4x4 vehicle will carry fuel absorbent material and pads in the event of any accidental spillage. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. - In addition, spill response apparatus including spill-kits and fuel absorbent mats will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment and in the implementation of the Emergency Response Plan, as contained in the Environmental Management Plan. - The fuel bowser will be parked on a level area, away from main traffic activity, in a designated part of the construction compounds when not in use. Taps, nozzles or valves associated with mobile fuel bowser will be fitted with a lock system. Only designated trained and competent operatives will be authorised to refuel plant on site. A Permit to Fuel system will be put in place. - There will be no refuelling of vehicles or plant permitted within 100m of a watercourse or wet drainage channel or local spring/well.
WM49 GM47	<u>Storage of Fuels, Oils and Chemicals</u>: All fuels or oils or chemicals, required during construction, will be stored in a designated, bunded, locked storage area within the temporary compounds. All fuel, oil and chemical storage areas will be bunded appropriately to 110% of the volume of oils/fuels each area contains for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area. Fuel, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage. Safety data sheets for all chemicals used will be kept on-Site. An emergency response plan for the construction phase to deal with accidental spillages will be contained within the Environmental Management Plan.
WM36	<u>Protection of Karst</u>: A suitably qualified geotechnical engineer who is experienced with limestone and karst conditions will review the results of the pre-construction detailed geotechnical investigations, and will design the turbine foundations taking into account the results of the detailed investigations. The geotechnical engineer will inspect each turbine foundation excavation for evidence of a fracture network and will set out the required methods and mitigation measures to prevent cementitious material leaching into the bedrock.
<u>Effectiveness of Mitigation and Monitoring Measures</u>: The mitigation measures identified above reduce the potential pathway for contaminant release through best practice storage, use and handling of oils, fuels and cement based compounds, strict controls during concrete handling, drainage controls, and emergency response procedures for spills and leaks. In combination, these measures break or substantially limit the pathway between the identified sources and the groundwater receptor. It is noted that at Ballylehaun, where bedrock is karstified and subsoil cover is thin or absent, the attenuation capacity relied upon by standard mitigation measures is reduced; residual risk in this area is therefore not assumed to be equivalent to Ballyring	
With the implementation of the mitigation measures outlined above, the residual effect on groundwater quality is considered to be negative, of reduced magnitude, indirect, short-term and temporary at both Site areas, with the magnitude of effect reducing to negligible at the Ballyring and Ballylehaun areas.	
Residual Impact Significance (post-mitigation):	
Not Significant	

EIAR 8.4.4.4 Reduction in Water Quality or Quantity in Designated Sites

Sensitive Aspect:	Designated Sites
Importance:	High (Designated Sites) (as per Section EIAR 8.3.4)
Impact Source(s)	Surface Water: Excavations, earthworks and groundworks, excavation dewatering, movement and storage of overburden, wind/physical erosion of soils, installation of Site drainage system Groundwater: Excavations and erosion of soils (sediment/turbid waters), presence of machinery, oils and fuels, cement-based compounds
Impact Pathway(s)	Runoff, drainage, and surface water discharge routes Groundwater flow paths

Overview of Potential Impact:

The construction of the Gathabawn Wind Farm Project could potentially result in the release of suspended solids, hydrocarbons and concrete into downstream Designated Sites via Site run-off. An increase in these pollutants in downstream waterbodies could potentially result in a decrease in water quality in Designated Sites. It is noted that secondary effects on water-dependant species and habitats is examined in [Chapter 13: Biodiversity](#).

Suspended Solids are small particles in water that neither dissolve nor settle by gravity, such as clay, silt, sand or organic matter. The soils exposed in excavation areas or in overburden storage areas can be eroded by wind and rain and the particles of soil could become entrained in surface water runoff. Sediment may also become entrained in groundwater runoff in excavations. The release of suspended solids to surface watercourses could increase the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality of downstream water bodies. An increase in sediment in downstream waterbodies can also potentially change the morphology of watercourses, and can affect aquatic habitats and species. Furthermore, substances such as phosphorus, heavy metals, pesticides and other organic compounds can bind themselves to soil particles and potentially can enter water bodies via suspended solids.

Hydrocarbons are a pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. Hydrocarbons have a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. Entry of cement-based products into the Site drainage system, into surface water runoff, and hence to downstream watercourses represents a risk to the aquatic environment, while water quality can be affected through changes to pH levels. A pH range of $\geq 6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a pH unit.

Examination of the Impact:**Locational Context**

Cullahill Mountain SAC and pNHA, and the overlapping Gales Hill Nature Reserve, are located immediately adjacent to the Ballylehaun Area. Only the Ballylehaun Area and the Ballylehaun-Ballyring UGC are hydrologically connected to these Sites; the Ballyring Area is scoped out of further analysis in relation to Cullahill Mountain.

Two wetlands of unknown conservation value are also identified adjacent to the Ballyring Area: Tentore (MIW_KK77), c.0.2km west of T8, and Clontubbrid (MIW_KK76), c.0.3km east of T12.

The River Barrow and River Nore SAC, River Nore SPA and Inchbeg pNHA are indirectly hydrologically connected to the Proposed Development, at their closest point c.7km downstream, via the NORE_150 (Lismaine) tributary stream. The Candidate Gathabawn Grid Connection crosses these designations directly, with cabling installed under the River Nore by horizontal directional drilling and also crosses a Designated Salmonid River (S.I. 292 of 1988) along its route to Ballyragget.

Galmoy Fen SAC and pNHA and Spahill and Clomantagh Hill SAC and pNHA are not hydrologically connected to the Whole Project works areas and are scoped out of further analysis.

Proposed Gathabawn Wind Farm :**Construction Phase:**

Cullahill Mountain SAC, pNHA and Gales Hill Nature Reserve protect semi-natural dry grasslands and scrubland facies on calcareous substrates and are an important orchid Site. Water runoff from the Ballylehaun Area will be captured within the Site drainage system, preventing dirty water reaching these designated Sites, which are also generally upslope of the windfarm works and separated by stone walls and banks.

Groundwater flow at the Site is a close reflection of surface topography, with the overall flow direction being to the southwest across the Durrow Groundwater Body. As Cullahill Mountain SAC, pNHA and Gales Hill Nature Reserve lie upslope of the Ballylehaun Area works, groundwater flow at this location is directed away from, rather than toward, the designated Sites. In addition, groundwater flow paths within the karstified Durrow GWB are considered short, localised and shallow, occurring through a diffuse network of conduits rather than a continuous water table. On this basis, it is considered unlikely that localised, short-term drawdown associated with turbine base excavations at Ballylehaun would propagate upgradient to affect the water table sustaining Cullahill Mountain SAC. It is therefore considered that the magnitude of effect to the water environment in the Cullahill Mountain SAC designation, arising from the Proposed Gathabawn Windfarm, will be Low, and the significance of effect will be **Not Significant**.

The Proposed Gathabawn Windfarm is indirectly hydrologically connected to the River Barrow and River Nore SAC, River Nore SPA and Inchbeg pNHA. The closest connection is via the Nore_150 sub-basin and the Lismaine Stream, associated with Turbine T9, Borrow Pit No. 2 and the LiDAR unit, at a distance of c.7.4km to 7.5km from these designations. All other Windfarm-specific sub-basins are more distant, ranging from c.8.3km to 13.8km via the Goul catchment.

Given the indirect nature of this connection and the substantial travel distance involved, it is considered that there is potential for attenuation of any sediment or contaminant loading prior to reaching the River Nore designations. On this basis and taking into account the evaluations at EIAR 8.4.4.1 to 8.4.4.3, it is considered that the magnitude of effect to water quality in the River Nore designation, arising from the Proposed Gathabawn Windfarm, will be Low, and the significance of effect will be **Slight to Not Significant**.

Operational Phase:

Groundworks during operation will be limited to biannual maintenance of Site roads and drainage, with no new excavation into bedrock. Given the absence of fresh ground disturbance, the potential for effects on Designated Sites during operation is considered lower than during construction. It is considered that the magnitude of impact during the operational phase will be Negligible, and the significance of effect will be **Imperceptible**.

Candidate Gathabawn Grid Connection**Construction Phase:**

The Candidate Gathabawn Grid Connection, including the Ballylehaun-Ballyring Underground Cabling (Cable Link), is connected to the River Barrow and River Nore SAC, River Nore SPA and River Nore/Abbeyleix Woods Complex pNHA at varying distances along its route. The Ballylehaun-Ballyring Cable Link, within the Gorteenahilla_010 sub-basin, lies c.10km to 12.5km from these designations. Along the Ballyring-Parksgrove and Parksgrove-Moatpark Underground Cabling, the connection becomes progressively direct: upstream tributary crossings at Ballyconra and Lisdowney lie at c.2.3km and c.3km respectively, while at the Parksgrove-Moatpark crossing itself (Nore_120 sub-basin), the works are located at 0m from the boundary of all three designations, with the crossing routed beneath the River Nore by horizontal directional drilling. The immediately downstream Nore_130 sub-basin lies at a further distance of only c.0.2km. The route also involves instream works at three tributary streams (Lismaine, Lisdowney, Ballyconra) crossed by open-cut trenching.

No instream works are proposed within the boundary of the SAC or SPA itself; on this basis it is considered that there is limited potential for direct negative impact to the riverbanks within any designated Site from the candidate grid connection works including the River Nore crossing itself which is addressed at EIAR Section 8.4.5.1 (physical alteration of riverbanks).

Given the direct spatial interaction with the designated Site boundaries at the River Nore crossing, the potential for effects to water quality in the River Nore designations arising from the Candidate Gathabawn Grid Connection is considered greater than for the Proposed Gathabawn Windfarm, and is principally governed by the effectiveness of the horizontal directional drilling methodology in avoiding disturbance to the riverbed and banks.

The magnitude and significance of construction impacts for sediment/contamination risk and flow regime change arising from the River Nore HDD crossing is considered to be **Minor** in magnitude and of **Moderate**

Significance. For the minor stream crossings, the potential impact is considered to be of Low-Negligible magnitude and therefore is **Not Significant**.

Operational Phase:

Operational activity along the Candidate Gathabawn Grid Connection will be limited to infrequent inspection and testing of the underground cabling at jointing chambers and Joint Bays, and routine maintenance at the Parksgrove Substation. No excavation or ground disturbance is anticipated during routine operation, and the underground cabling beneath the River Nore and its associated designated Sites will remain permanently in place with no further construction activity at this location. It is considered that the magnitude of impact during the operational phase will be Negligible, and the significance of effect will be **Imperceptible**.

Impact Magnitude	Low – Moderate	Impact Significance – Whole Project: (pre-mitigation)	Moderate to Not Significant
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Mitigation and Monitoring Measures: Even though Significant impacts are not predicted, the following mitigation and monitoring measures will be implemented as best practice environmental management.

Design	Avoidance of the Cullahill Mountain SAC, pNHA and Nature Reserve. No overlap with their boundaries
Design	No permanent hardstanding area within the River Barrow & River Nore SAC or SPA boundaries. Works limited to temporary works only within the boundary of these designations and HDD drilling beneath the River Nore for the cable.
Design	50m buffer zone along the River Nore, drill pits located outside of this buffer.
WM34 GM31	<u>Storage of Overburden:</u> During construction works, excavated material will be removed for temporary or permanent storage at designated berms. All storage berms will be placed more than 50m away from any watercourse or wet drainage channel. Temporary silt control methods such as silt fencing or curtains will be placed around all overburden storage areas and/or installed between the berms and local watercourses or wet drainage channel, depending on the location, and the existing vegetative between the berms and watercourse / drainage features will be left in place.
WM41 GM34	<u>Protection of watercourses and existing drains:</u> Additional mitigation measures will be deployed within 50m of watercourses or wet drainage features, including the placement of silt trapping arrangements along preferential surface water flowpaths, and temporary drain blocking in existing drains. Works will not take place within this 50m zone during prolonged heavy or exceptional rainfall events.
WM43	<u>Drainage network:</u> Windfarm site roads and hardstanding areas are designed to have a permanent surface water drainage network in place. Temporary works areas, such as turning heads, borrow pits and compounds will have a temporary surface water drainage network in place during works. The drainage infrastructure will not be installed during heavy or prolonged rainfall events or when the soil is waterlogged. The site drainage network will ensure that all surface water runoff from upgraded roads and new road surfaces (including hardstand areas) will be captured and treated prior to discharge/release. Transverse drains ('grips') will be constructed, where appropriate, in the surface layer of access tracks to divert any runoff into swales/track side drains; The site drainage network will include check dams and settlement ponds which will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas. Water will be released to surrounding vegetation at regular intervals via buffered outfall weirs, which also form part of the drainage network.
GM28	<u>Control of Movement of Machinery/Vehicles:</u> Construction traffic, personnel and materials will be restricted to within the construction works area fence and will avoid moving onto areas not delineated on the site drawings.
GM36	At Parksgrove Substation, a permanent surface water drainage network will be installed at the substation compound and along the associated access road, and will ensure that all surface water runoff from the access road and new the hardstand areas will be captured and treated prior to discharge/release. The drainage infrastructure will not be installed during heavy or prolonged rainfall events or when the soil is waterlogged. The site drainage network will include check dams and settlement ponds which will settle suspended solids in water runoff while also slowing down

	the rate of water run-off from these areas. Water will be released to surrounding vegetation via buffered outfall weirs.
WM45 GM37	Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain or directly onto adjacent habitats. Rather, all pumped water will be discharged to local vegetation via a silt bag or infiltration trench or settlement pond, as appropriate, to surrounding vegetation.
WM47	<u>Concrete control procedures</u> will be implemented and will include the following: • No concrete batching will take place on site, all concrete will be ready-mixed and delivered just-in-time. • The pouring of concrete will be scheduled for dry days. If a sudden rainfall event should occur, then suitable covers will be ready and available at the pour site to cover the concrete. • The pour site will be kept free of standing water. • All operators involved in pouring concrete will be trained and experienced in working with concrete. • Run-off from wind turbine foundation concrete pours will not be permitted to flow over adjacent lands or enter drainage channels. The run-off will be contained within the foundation area and pumped into a skip to settle out; settled solids will be appropriately disposed of off-site. • The Contractor will not permit the discharge of cement contaminated waters to the construction phase drainage system, onto adjacent lands or directly to any artificial drain or watercourse. • Concrete trucks will be washed out at the supplier's facilities and not on site. The only concrete washing that will occur on site is the hand washing of the chutes at the rear of the trucks. Washing of chutes will only take place at the designated area and into a Roadside Concrete Washout unit.
GM44	<u>Concrete control procedures</u> will be implemented and will include the following: • All concrete will be ready-mixed and delivered to site just-in-time; • Dry granular cement will be used in UGC cable trenches; • The pouring of concrete will be scheduled for dry days. If a sudden rainfall event should occur, then plastic covers will be ready and available at the pour site to cover the concrete. • The pour site will be kept free of standing water; • Designated trained operator experienced in working with concrete will be employed during concrete pouring; • Concrete trucks will be washed out at the supplier's facilities and not on site. The only concrete washing that will occur on site is the hand washing of the chutes at the rear of the trucks. Washing of chutes will only take place at the designated area and into a Roadside Concrete Washout unit. • No discharge of cement contaminated waters to any artificial drain or watercourse will be allowed.
WM48	<u>Refuelling control procedures</u> will be implemented and will include the following: • On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser carried on a double axel refuelling trailer, will be refuelled off-site, and will be towed around the site by a 4x4 vehicle to where machinery is located. The 4x4 vehicle will carry fuel absorbent material and pads in the event of any accidental spillage. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. • In addition, spill response apparatus including spill-kits and fuel absorbent mats will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment and in the implementation of the Emergency Response Plan, as contained in the Environmental Management Plan. • The fuel bowser will be parked on a level area, away from main traffic activity, in a

	designated part of the construction compounds when not in use. Taps, nozzles or valves associated with mobile fuel bowser will be fitted with a lock system. Only designated trained and competent operatives will be authorised to refuel plant on site. A Permit to Fuel system will be put in place. There will be no refuelling of vehicles or plant permitted within 100m of a watercourse or wet drainage channel or local spring/well.
GM45	<u>Fuel/Oil control procedures</u> will be implemented and will include the following: On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double axel custom-built refuelling trailer, will be refuelled off-site, and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will carry fuel absorbent material and pads in the event of any accidental spillage. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. In addition, spill response apparatus including spill-kits and fuel absorbent mats will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment and in the implementation of the Emergency Response Plan, as contained in the Environmental Management Plan. The fuel bowser will be parked on a level area, away from main traffic activity, in a designated part of the construction compound when not in use. Taps, nozzles or valves associated with mobile fuel bowser will be fitted with a lock system. Only designated trained and competent operatives will be authorised to refuel plant on site. A Permit to Fuel system will be put in place.
GM46	Along the cable routes, there will be no refuelling of plant or machinery within 100m of a watercourse or wet drainage channel or local spring/well.
WM49 GM47	<u>Storage of Fuels, Oils and Chemicals:</u> All fuels or oils or chemicals, required during construction, will be stored in a designated, bunded, locked storage area within the temporary compounds. All fuel, oil and chemical storage areas will be bunded appropriately to 110% of the volume of oils/fuels each area contains for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area. Fuel, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage. Safety data sheets for all chemicals used will be kept on-site. An emergency response plan for the construction phase to deal with accidental spillages will be contained within the Environmental Management Plan.
WM02 GM02	<u>Water Quality Monitoring:</u> Confirmatory surface water quality monitoring will be carried out prior to the commencement of construction works at the water quality monitoring locations to determine the pre-construction status of surface water quality in downstream watercourses. This monitoring will include laboratory analysis of water samples which will be carried out by an independent and appropriately certified laboratory. The monitoring of water quality parameters and collection of samples will be undertaken by the Environmental Clerk of Works, who will be appropriately trained on the required methods and the use, calibration and maintenance of all monitoring equipment used. Records will be kept of biological and chemical monitoring undertaken carried out prior to the commencement of construction works.
GM41	<u>HDD Control of Works:</u> The horizontal directional drilling works will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works and will supervise the drilling works including the drilling pressures and the implementation of any

	contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized watertight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; • In the event of break-out occurring in the stream/river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; • In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the Whole Gathabawn Windfarm Project Environmental Management Plan.		
GM15	<u>Inspections of the drainage network around the Parksgrove Substation</u> will be conducted regularly during the construction phase under the following schedule: Daily visual inspections by the Contractor; weekly inspections by the Environmental Management team; Event based inspections by the Contractor as follows: >10 mm/hr (i.e. high intensity localised rainfall event); or >25 mm in a 24 hour period (heavy frontal rainfall lasting most of the day); or, rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). Inspections will examine the functioning of the various elements of the drainage system, and if evidence of sedimentation or scouring and any changes in the drainage water including discolouration, odour, oily sheen or the presence of litter, then the required corrective maintenance or actions will be identified and will be implemented immediately the Contractor.		
WM96 GM86	<u>Surface water quality monitoring</u> of watercourses downstream of the works will be carried out monthly for the first six months post construction, and thereafter annually during the Operational Years 1, 2, 3, 4 and 5, and then every 5 years thereafter, to record any change to baseline trends. Samples will be analysed by an appropriately certified laboratory and the resulting report submitted to Kilkenny County Council.		
<u>Effectiveness of Mitigation and Monitoring Measures:</u> The mitigation measures identified above reduce the risk to Designated Sites through avoidance at source and interception of any residual runoff. Design measures avoid direct overlap with the Cullahill Mountain SAC, pNHA and Nature Reserve, and restrict permanent works within the River Barrow and River Nore SAC and pNHA boundaries; Site drainage, overburden storage and watercourse protection measures capture and treat sediment-laden runoff before release; and concrete, refuelling and chemical storage controls limit the potential for contamination at source. Hydromorphological reinstatement following the tributary instream works restores channel character and flow. In combination, these measures break or substantially limit the pathway between the identified sources and the designated Site receptors, with baseline and ongoing water quality monitoring in place to verify their effectiveness.			
<table border="1"> <tr> <td>Residual Impact Significance (<i>post-mitigation</i>):</td><td>Imperceptible</td></tr> </table>		Residual Impact Significance (<i>post-mitigation</i>):	Imperceptible
Residual Impact Significance (<i>post-mitigation</i>):	Imperceptible		

EIAR 8.4.5 Impacts to Water which will not be Significant

All of the remaining effects of the proposed Gathabawn Wind Farm Project on Water will not be significant. A short evaluation of these effects is provided below.

EIAR 8.4.5.1 Evaluation of the Effects on River Waterbodies**Increase in risk of flooding due to increase in surface water run-off and sediment release (C):**

Slight – Not Significant. Access track construction, construction of the turbine foundations and other new, hard surfaces have the potential to result in a small increase in surface water run-off in the catchments associated with the Proposed Gathabawn Windfarm, and at the Parksgrove Substation and along the new access road in Moatpark. An increase in run-off has the potential to result in soil erosion and consequently sediment release into nearby receiving watercourses.

Risk of an increase in downstream flooding is considered to be low, given the permanent hardstanding footprint of 6.6ha relative to the overall catchment areas, and the design of the Site drainage network to manage and attenuate surface water run-off (see EIAR 8.4.4.1). Temporary, short-term, unlikely, slight – not significant, negative.

Changes to surface water quantities due to increased runoff rates and/or changes to drainage patterns (C, O, D):

Imperceptible impact. The permanent hardstanding footprint of the Wind Farm (6.6ha) represents a small proportion of the overall works area. The Site drainage network has been designed to reflect existing drainage regimes and surface water flow paths, incorporating clean water cross drains, check dams, settlement ponds and buffered outfalls to attenuate and treat run-off prior to release. On this basis, no material change to surface water quantities, the existing drainage regimes or flow paths is anticipated as a result of the proposed development.

Hydromorphological effects due to watercourse crossing works (C):

Imperceptible (Proposed Gathabawn Wind Farm). The Ballylehaun and Ballyring turbine areas do not involve any water crossings. It is not proposed to change the dimensions or course of any surface water body as part of this development.

The Candidate Gathabawn Grid Connection will require 6 no. watercourse crossings: the Ballylehaun-Ballyring UGC will cross the Gorteenamuck (W1) by trenching over/under the existing culvert and cross the Gorteenahilla (W2) by Horizontal Directional Drilling under the existing masonry bridge. The Ballyring-Parksgrove UGC will cross the Lismaine (W3), Lisdowney Stream (W4) and Ballyconra (W5) by trenching across the watercourse, while the Parksgrove-Moatpark UGC will cross the River Nore by HDD. As no instream works will occur at W1, W2 or W6, there is no potential for Hydromorphological impacts to these watercourses. In relation to W3 – W5, as these watercourses typically have low flows or no flows (season dependent, W3 and W5 were dry/had no flowing water upon inspection in September 2026), with the watercourses reinstated following cable trenching works, it is considered that the impact will be No Adverse impact on the hydromorphology. The cable will be laid beneath the River Nore SAC and the river channel itself using HDD and therefore there will be no adverse impact on the hydromorphology of the river.

Reduction in Surface Water Quality during the Operational Phase (O):

Imperceptible impact. During the operational phase, the potential for silt-laden runoff is much reduced compared to the construction phase, and in addition, all permanent drainage controls will be in place, and the disturbance of ground and excavation works will be completed. Some minor maintenance works will be

required periodically, such as maintenance of the Site entrance, internal roads and hardstand areas. These works would be of a very minor scale, brief duration and infrequent, and it is considered that the levels of suspended sediment in surface water runoff will be negligible.

Where major component replacement (e.g. blade replacement) is required, works will take place inside the Site drainage network, as a result, volumes of suspended sediment in surface water runoff will be negligible. Due to the very small number of vehicles associated with operational phase works, and as no refuelling works are envisaged on Site during operation, the potential for significant fuel spillages is negligible.

Overall, the magnitude of potential decreases in water quality during the operational phase is evaluated as Negligible.

EIAR 8.4.5.2 Evaluation of the Effects on Groundwater Bodies

Reduction in groundwater levels from dewatering of turbine base excavations (C):

Ballyring Area:

Not Significant. Dewatering excavations for turbine bases has the potential to impact on local groundwater levels; however, impacts are not anticipated to be significant given the underlying Poorly Productive aquifer and the localised, short-term nature of any dewatering required. Temporary, short-term, unlikely and Not Significant.

Ballylehaun Area:

Not Significant. Dewatering excavations for turbine bases has the potential to impact on local groundwater levels only in the vicinity of any foundation works only; however, the Potential impacts are not anticipated to be significant given the underlying bedrock is competent and only one potential karst feature has been identified, at depth, in the boreholes with a very shallow weathered bedrock horizon of between 1m and 2m only overlying competent strong limestones. Any potential impact on the groundwater body and aquifer would be the localised, short-term nature of any dewatering. Temporary, short-term, unlikely and Not Significant.

Reduction in groundwater quality due to contamination by hydrocarbons (O, D):

Not Significant. Due to the minimal groundworks (limited to the annual maintenance of hardstanding areas/roads and the drainage network), small volumes of oils which will be on Site, and the low numbers of vehicles and machinery on Site, it is considered that any impacts will be Not Significant. Best practice fuel and oil control measures will be implemented during the operational and decommissioning phases.

Potential impacts are not anticipated to be significant given the underlying bedrock is competent and only one potential karst feature has been identified, at depth, in the boreholes with a very shallow weathered bedrock horizon of between 1m and 2m only overlying competent strong limestones. Any potential impact on the groundwater quality and aquifer would be the localised, short-term nature during construction. Temporary, short-term, unlikely and Not Significant.

Alteration of groundwater levels and/or flow paths (O, D):

Ballyring Section:

Not Significant. No dewatering is anticipated during the operational phase or decommissioning works, as any excavations will be minimal and very shallow, limited to annual maintenance of hardstanding areas/roads and the drainage network. Decommissioning earthworks will involve reinstating the turbine hardstand and foundation areas using soils stored in the long-term storage berms.

No impacts to groundwater levels or flow paths are expected to occur.

Ballylehaun Section:

Not Significant. No dewatering is anticipated during the operational phase or decommissioning works, as any excavations will be minimal and very shallow, limited to annual maintenance of hardstanding areas/roads and the drainage network. Decommissioning earthworks will involve reinstating the turbine hardstand and foundation areas using soils stored in the long-term storage berms. The karst groundwater flow paths are shallow and diffuse only with relatively short flow paths.

No impacts to groundwater levels or flow paths are expected to occur.

EIAR 8.4.5.3 Evaluation of the Effects on Water Supply**Reduction in groundwater quality at Water Supply Schemes from sediment release / accidental spillage (C):**

Not Significant. Potential to affect groundwater quality in Public and Group Water Schemes located at distance through vertical migration followed by lateral migration. Impact is unlikely, as areas of exposed bedrock will be localised, and any leakage or spillage will be accidental only and of limited volume. Potential to affect groundwater quality at Water Supply Schemes along the Candidate Gathabawn Grid Connection route during trench excavation. Due to the separation distance of windfarm works from Water Supply Schemes (2.9km from the Balief GWS and 4.5km from the Cullahill GWS), the limited volume of any potential pollutant used on site and that any accidental spills which may occur would be very small, and the shallow trench excavation for the Parksgrove-Moatpark UGC within c.0.4km of the Ballyconra PWS, the effect is considered to be temporary, short-term, unlikely and negative, with a significance of Slight to Not Significant.

Reduction in water quality at the Uisce Éireann abstraction point at Freshford (C):

Not Significant. The abstraction point is located downstream of the Site, connected via the Gorteenahilla watercourse and its confluence with the Nuenna River, approximately 3.4km south of the Ballyring Area. Gorteenahilla is crossed directly by the Ballylehaun-Ballyring UGC and is subject to the sediment and pollution control measures identified at EIAR 8.4.4.1 and 8.4.4.2, including watercourse buffer zones, sediment and spill controls, and construction phase water quality monitoring. Given the mitigation measures already committed to at this crossing, and the travel distance to the abstraction point allowing for further attenuation, the effect is considered to be temporary, short-term, unlikely and negative, with a significance of Not Significant.

Reduction in groundwater quality at local domestic water supplies from sediment release / accidental spillage (C):

Not Significant. Potential to affect groundwater quality in domestic water supplies in the wider area through vertical migration followed by lateral migration. Impact is unlikely, as areas of exposed bedrock will be localised, and any leakage or spillage will be accidental only and of limited volume. The effect is considered to be temporary, short-term, unlikely and negative, with a significance of Not Significant (Proposed Development Site) to Slight – Not Significant (CGGC).

Reductions in surface water quality at local groundwater wells (O, D):**Proposed Gathabawn Wind Farm:**

Not Significant. Due to the absence of excavations into bedrock during the operational or decommissioning phases, the very small numbers of machinery or vehicles on Site, and the minimal disturbance of ground, limited mainly to bi-annual maintenance of the Wind Farm roads and drains, no changes to surface water or groundwater quality are evaluated to occur at downslope wells.

Candidate Gathabawn Grid Connection:

Not Significant. Operational activity is limited to infrequent inspection and testing of the underground cabling at jointing chambers and Joint Bays, and routine maintenance at the Parksgrove Substation, with no excavation anticipated. On this basis, no changes to surface water or groundwater quality at downslope wells are evaluated to occur.

Reductions in surface water *quantity* at local groundwater wells (O, D):

Not Significant. No dewatering will be required during operation or decommissioning; the Wind Farm drainage network will remain in place, maintaining drainage regimes. No impacts to water quantities at local groundwater wells are anticipated.

EIAR 8.4.5.4 Evaluation of the Effects on Designated Sites**Potential flow regime effects to Designated Sites (C):**

Imperceptible impact. Water runoff from the Ballylehaun Area will be captured within the Site drainage system, preventing any potentially contaminated storm surface water reaching Cullahill Mountain SAC, pNHA and Gales Hill Nature Reserve; both these protected areas are generally upslope of the Wind Farm works. The Site drainage network incorporates clean water cross drains, check dams, settlement ponds, buffered outfalls and natural vegetation filters.

There will be no change to existing drainage regimes at the Site or groundwater flow paths as a result of the proposed development and therefore there will be no impact on the Cullahill Mountain SAC, pNHA and Gales Hill Nature Reserve from surface water or groundwater.

There is no hydrological linkage or pathway between the Site and the Galmoy Fen SAC/pNHA, c. 4.6 km west of T2, as the River Goul forms a hydraulic boundary for surface water and groundwater between the Site and the Fen.

There will be no site runoff or discharge to either the Tentore and Clontubbrid designated wetland sites. Therefore, it is considered that there will be no impact on the hydrology of these two sites.

Changes to drainage regimes and water quantities in all downstream Designated Sites (O, D): Proposed Gathabawn Wind Farm:

Imperceptible. The Windfarm is indirectly hydrologically connected to the River Barrow and River Nore SAC, River Nore SPA and Inchbeg pNHA via the Nore_150 sub-basin and Lismaine Stream, at a distance of c.7.4km to 7.5km. Given this indirect connection and the distance involved, together with the design of the Site drainage network to maintain existing flow paths and attenuate run-off, no material change to drainage regimes or water quantities within these designated Sites is anticipated as a result of the operation or decommissioning of the Proposed Gathabawn Windfarm. During the operational and decommissioning phases, groundworks will be limited to minor maintenance activities, further reducing the potential for any change to downstream flow regimes.

There will be no site runoff or discharge to either the Tentore and Clontubbrid designated wetland sites. Therefore, it is considered that there will be no impact on the hydrology of these two sites.

In relation to the Candidate Gathabawn Grid Connection, it is not anticipated that the shallow cable trenching works at c. 1.3m depth, will affect drainage regimes or water quantities in downstream Designated Sites as the underground cabling will be primarily located within the public road or under agricultural grassland with shallow trenches which will be backfilled with excavated material or aggregates on a rolling basis and will not materially alter the drainage regime from baseline conditions. Design of the drainage network at the Parksgrove Substation will maintain existing flow paths and attenuate run-off, with no material change to

drainage regimes or water quantities. The cable will be laid beneath the River Nore SAC and the river channel itself using HDD and therefore there will be no adverse impact on the designated site.

Reduction in water quality in downstream/downslope Designated Sites (O, D):

Imperceptible impact. Cullahill Mountain SAC, pNHA and Gales Hill Nature Reserve are located immediately adjacent to the Ballylehaun Area; however, these Sites are upslope of the Windfarm works and separated by stone walls and banks, with any runoff from the Ballylehaun Area captured within the Site drainage system before it could reach them. On this basis, potential effects to water quality at these Sites during operation and decommissioning are considered Imperceptible. For the River Barrow and River Nore SAC, River Nore SPA and River Nore/Abbeyleix Woods Complex pNHA, the Proposed Gathabawn Wind Farm is connected only indirectly, via the Nore_150 pathway at c.7.4km to 7.5km, allowing for attenuation of any residual contaminant loading over this distance; the effect during operation and decommissioning is therefore considered Slight to Not Significant.

There will be no site runoff or discharge to either the Tentore and Clontubbrid designated wetland sites. Therefore, it is considered that there will be no impact on the hydrology of these two sites.

The Candidate Gathabawn Grid Connection interacts directly with these designations at the Parksgrove-Moatpark UGC crossing, where the HDD works will be close to the Site boundary. The River Nore is designated a Salmonid Water under S.I. No. 292 of 1988, requiring a pH range of 6 to 9, with no artificial variation exceeding 0.5 of a pH unit. Concrete control procedures, including the exclusion of on-Site batching and the containment of concrete pours, together with refuelling and chemical storage controls, will prevent the release of cement-based or hydrocarbon contaminants capable of altering the pH of the watercourse. On this basis, no material effect on compliance with the Salmonid Water Regulations is anticipated.

EIAR 8.4.5.5 Summary of Impact Findings with Mitigation

Based on the assessment of potential impacts undertaken here it is considered that with mitigation measures, there are no Significant Adverse impacts on the surface water and groundwater receiving environment arising out of the proposed Gathabawn Windfarm and the Candidate Gathabawn Grid Connection.

EIAR 8.4.6 Environmental Protection Measures

In addition to the mitigation measures identified in Section EIAR 8.4.5, additional measures which form part of standard Wind Farm construction/operation will be implemented during the construction/operation/decommissioning of the development to protect the Water environment and avoid/reduce these not significant effects. These environmental protection measures are identified below and are included in the Environmental Management Plan 2026 for the Whole Gathabawn Wind Farm Project.

Measure ID	Description of Protection Measure
WM44	<u>On-Site Borrow Pits:</u> It is proposed that bedrock won from the on-site borrow pits during the construction phase will be used to construct the sub-base layer of proposed upgraded and new access roads and hardstand areas. Once installed the sub-base layer will be overlain by a capping layer of clean high-grade bedrock, such as limestone.
WM46	<u>Isolation of flow:</u> Works in wet drainage channels will not be undertaken without isolation of flow within the drain. The water will be isolated from the works by over pumping, flume (pipe) or channel diversion methods.

GM38	<u>Any replacement culverts under the public road</u> (if required), will be sized to cope with a minimum 100-year flood event. In all cases, culverts will be oversized to allow mammals to pass through the culvert. The replacement of drain crossing structures will be carried out in accordance with the Office of Public Works (OPW) Guidelines Construction, Replacement or Alteration of Bridges and Culverts (2013), and also with the Department of Transport, Tourism & Sport Guidelines for Managing Openings in Public Roads (April 2017). Crossings will be designed to meet IFI's <i>Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters 2016</i> and <i>OPW's Design Guidance For Fish Passage On Small Barriers (2021)</i>.
GM39	<u>In-stream works – isolation of flow and electrofishing:</u> In-stream works at W3, W4 and W5 will not be undertaken without isolation of flow within the watercourse by over-pumping through a flume (pipe). The Project Ecologist will supervise all watercourse crossing works at W1 to W6 inclusive. A pre-works survey will be carried out by the Project Ecologist to identify any electrofishing requirements at the watercourses, and if required electrofishing of the isolated section will be carried out under licence prior to the commencement of excavation works.
GM40	<u>Instream works at W3, W4 and W5</u> will be followed by site-specific reinstatement measures to ensure the restoration of flow character and morphology within the affected reach. Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margin to stabilise banks, add flood protection and provide riparian buffer.
GM42	<u>Protective Barrier:</u> Prior to works commencing along the Parksgrove-Moatpark UGC, a silt curtain will be installed immediately inside the road boundary fence for the entire length of the UGC within the verge, and where the UGC enters agricultural land, a double silt curtain will be installed on the outside of the construction works area upto and around the drilling pit on the western side of the river. On the eastern side of the River Nore, prior to works commencing, a silt curtain will be installed along the entire length of the access road from the R432, with a double silt fence installed beyond the construction works area boundary upto and around the drilling pit on the eastern side of the river.
GM43	<u>Only precast concrete or double skinned HDPE pipes</u> will be used for new drain crossing structures, if required, along the Ballylehaun-Ballyring UGC. Only precast concrete chambers will be used at Joint Bays.
GM49	<u>In-stream works (W3, W4 and W5)</u> will only be undertaken during the IFI specified period (July, August and September) and will be carried out in accordance with the <i>Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters</i> (IFI, 2016). As requested by IFI during preplanning consultations for the windfarm, a site-specific method statement for each crossing will be provided to IFI and OPW at least one month ahead of works at each crossing.
WM96 GM86	<u>Surface water quality monitoring:</u> Water quality monitoring of watercourses downstream of the works will be carried out monthly for the first six months post construction, and thereafter annually during the Operational Years 1, 2, 3, 4 and 5, and then every 5 years thereafter, to record any change to baseline trends. Samples will be analysed by an appropriately certified laboratory and the resulting report submitted to Kilkenny County Council.
WM97 GM87	<u>Inspections of Drainage System:</u> The Asset Manager will inspect the Wind Farm Site drainage system during quarterly site inspections, and any necessary repairs or maintenance works carried out promptly.
GM90	<u>Fuel/Oil control procedures</u> will be implemented and will include the following: All fuels or oils, required during operation, will be stored in a designated, bunded, locked storage area within the substation compound. All fuel storage areas and the transformer at Parksgrove Substation will be bunded appropriately to 110% of the volume of oils/fuels

	relevant for each area/or for the transformer. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area. Fuel, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage. Safety data sheets for all chemicals used will be kept on-site.
WM111	<u>WQ and Soil Protection at Turbine Delivery Facilitating Works locations:</u> During any reopening/re-widening of site entrances or facilitating works locations, any topsoil removed to reveal the hardcore underneath will be stored in an adjacent temporary deposition area, sealed to prevent erosion, and a silt curtain will be erected downslope of this deposition area. Following the completion of the transportation, the hardcore area will be covered over once again using the soil in the deposition area. The area will be reseeded/replanted as appropriate to the location. The area will be fenced from livestock until revegetation has occurred.
WM115	<u>Fuel/Oil control procedures</u> will be implemented and will include the following: On Site re-fuelling of machinery (if required) will be carried out using a mobile double skinned fuel bowser. The fuel bowser, double-axle custom-built refuelling trailer, will be refuelled off-site, and will be towed onto the site by a 4x4 vehicle to where machinery is located. The 4x4 vehicle will carry fuel absorbent material and pads in the event of any accidental spillage. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. In addition, spill response apparatus including spill-kits and fuel absorbent mats will be stored in each turbine and stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment and in the implementation of the Emergency Response Plan, as contained in the Environmental Management Plan. All fuels or oils, required during operation, will be stored in a designated, bunded, locked COSHH storage area at the control buildings. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment will be contained within the bunded area. Fuel, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage. Safety data sheets for all chemicals used will be kept on-Site.
WM128 GM104	<u>Weather forecasting</u> warnings will be consulted in advance of works, and decommissioning works will not take place during periods of prolonged heavy rain or exceptional rainfall events.
GM105	There will be no <u>refuelling of plant or machinery</u> within 100m of a watercourse, wet drainage channel or private well/spring. Any re-fuelling of machinery on site will be carried out using a mobile double skinned fuel bowser. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment.
WM133	<u>Fuel Controls:</u> Overnight parking of plant and machinery will only be permitted at the turbine locations. There will be no refuelling of vehicles or plant permitted within 100m of a watercourse or drainage feature or within 100m of the Cullahill Mountain SAC or the Gales Hill Nature Reserve. Any re-fuelling of machinery on site will be carried out using a mobile double skinned fuel bowser which will carry fuel absorbent material and pads in the event of any accidental spillages. In addition, spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment.
GM102	<u>Storage of Overburden:</u> During any reopening of jointing chambers in agricultural lands, topsoil removed to reveal the jointing chamber cover underneath will be stored in an adjacent temporary deposition area, covered to protect it from weathering, and a silt fence will be erected around this deposition area.
WM134 GM103	<u>Protection of WQ and Soils:</u> During decommissioning works, topsoil removed will be stored in an adjacent temporary deposition area, sealed to protect it from weathering, and a silt curtain will be erected around this deposition area.

EIAR 8.5 CUMULATIVE EFFECTS WITH OTHER PROJECTS

For the assessment of cumulative effects, any other permitted or proposed and unbuilt projects in proximity to the Site (energy or other) have been considered where they have the potential to generate an in-combination or cumulative impact with the Whole Gathabawn Wind Farm Project.

The details of projects considered in the cumulative assessment are presented in [Appendix 5.4: Scoping of Other Projects for Consideration of Cumulative Effects](#), which comprises the cumulative long list of projects. The short list of these projects, scoped in for detailed cumulative assessment in this chapter, is set out in Table 8-17 below. These projects were selected on the basis that they are considered to have the potential for cumulative impacts with the Whole Gathabawn Wind Farm Project or share a sub-catchment with either the Proposed Development or the Candidate Gathabawn Grid Connection (i.e. the Goul_SC_010, Nore_SC_070 and Nore_SC_060).

Only potential cumulative effects with projects located upstream of the Gathabawn Wind farm Site have been assessed here as it is considered that given the size of the Nore catchment and the flows in the Nore, the catchment of the river at Kilkenny City is c. 1,750 km² and the 50%ile flow is estimated to be c. 19m³/sec, then any cumulative effects are considered to be imperceptible on the water environment and have not been considered. See [Figure 8.7: Other Projects Scoped-In for the Water Cumulative Evaluations](#).

Table 8-17: Shortlisted Projects for Potential Assessment of Cumulative Effects

Other Project	Status	Sub-catchment(s)	Reason for Inclusion
Lisdowney Wind Farm	Operational	Nore_SC_070	Already constructed; no construction phase overlap, but scoped in for operational phase cumulative assessment given shared sub-catchment
Battery Energy Storage Development 1, Moatpark	Consented	Nore_SC_060	Not yet constructed; potential for construction phase overlap with the Whole Gathabawn Windfarm Project
Battery Energy Storage Development 2, Moatpark	Consented	Nore_SC_060	Not yet constructed; potential for construction phase overlap with the Whole Gathabawn Windfarm Project
Ballynalacken Wind Farm and Grid Connection	Consented	Nore_SC_060, Nore_SC_080, Dinin[North]_SC_010	Not yet constructed; potential for construction phase overlap with the Whole Gathabawn Windfarm Project
Seskin Wind Farm and Grid Connection	Under appeal, An Coimisiún Pleanála	Nore_SC_060, Nore_SC_070	Not yet consented; potential for construction phase overlap with the Whole Gathabawn Windfarm Project
Briskalagh Grid Connection	Consented	Nore_SC_060, Nore_SC_070	Not yet consented; potential for construction phase overlap with the

Other Project	Status	Sub-catchment(s)	Reason for Inclusion
			Whole Gathabawn Windfarm Project
Killoshulan Wind Farm and Grid Connection	Potential (not in planning)	Nore_SC_070, Nore_SC_060	Potential project not yet in planning, potential for construction phase overlap with the Whole Gathabawn Windfarm Project
Littleton Wind Farm Grid Connection	In Planning	Goul_SC_010, Nore_SC_070, Nore_SC_060	Not yet constructed; potential for construction phase overlap with the Whole Gathabawn Windfarm Project
Tirlán Dairy Processing Facility & Water Treatment Plant	Operational	Nore_SC_070	Already constructed; no construction phase overlap but scoped in for operational phase cumulative assessment given shared sub-catchment

EIAR 8.5.1 Evaluation of Potential Cumulative Impacts with Individual Other Projects

The shortlisted projects share the following sub-catchments with the Whole Gathabawn Windfarm Project: Nore_SC_060 and Nore_SC_070. Lisdowney Wind Farm and Tirlán Dairy Processing Facility and Water Treatment Plant are located within Nore_SC_070. Battery Energy Storage Development 1 and 2 at Moatpark, Ballynalacken Wind Farm and Grid Connection, Seskin Wind Farm and Grid Connection, Littleton Wind Farm Grid Connection, Potential Killoshulan Wind Farm and Grid Connection and Briskalagh Grid Connection are all located within Nore_SC_060; Seskin Wind Farm and Grid Connection, Littleton Wind Farm Grid Connection, the Potential Killoshulan Wind Farm and Grid Connection and Briskalagh Grid Connection also extend into Nore_SC_070. The Littleton Wind Farm Grid Connection is also within the Goul_SC_010. While Ballynalacken Wind Farm and Grid Connection also spans Nore_SC_080 and Dinin[North]_SC_010, no part of the Whole Gathabawn Wind Farm Project falls within either of these sub-catchments, and these are therefore not relevant to the cumulative assessment. Cumulative impacts on WFD waterbodies within Nore_SC_060 and Nore_SC_070 are considered in detail below, with the evaluation of cumulative impacts for each Other Project summarised in Table 8-18.

Goul_SC_010

The Littleton Wind Farm Grid Connection is the only Other Project included for cumulative assessment in the Goul_SC_010 sub-catchment.

Nore_SC_060

Battery Energy Storage Development 1 and 2 at Moatpark, Ballynalacken Wind Farm and Grid Connection, Seskin Wind Farm and Grid Connection, Littleton Wind Farm Grid Connection, the potential Killoshulan Wind Farm Grid Connection and Briskalagh Grid Connection are all located within Nore_SC_060, the sub-catchment also draining the Parksgrove Substation and the Parksgrove-Moatpark Underground Cabling element of the Candidate Gathabawn Grid Connection.

Given that these projects and the Candidate Gathabawn Grid Connection drain into shared waterbodies within Nore_SC_060, there is potential for cumulative pressure without mitigation measures. However, with the embedded mitigation measures outlined in this chapter, cumulative impacts within Nore_SC_060 are considered **low**.

Nore_SC_070

Lisdowney Wind Farm, Seskin Wind Farm and Grid Connection, Tirlán Dairy Processing Facility and Water Treatment Plant, the potential Killoshulan Wind Farm and Grid Connection and Briskalagh Grid Connection are located within Nore_SC_070, the sub-catchment which drains the majority of the Proposed Gathabawn Wind Farm via the Ballylehaun-Ballyring UGC route. Lisdowney Wind Farm's Site roads comprise permeable stone, and combined with its relatively small footprint (4 turbines), any increase in surface water runoff will not contribute to changes in drainage regimes or flows in combination with the Gathabawn Wind Farm Project.

Given that both the Proposed Gathabawn Wind Farm and these Other Projects drain into this shared sub-catchment, there is potential for cumulative pressure without mitigation. With the embedded mitigation measures outlined in this chapter, cumulative impacts within Nore_SC_070 are considered **low**.

Table 8-18: Evaluation of potential cumulative impacts with Other Projects

Other Project	Evaluation of Cumulative Impact
Proposed Gathabawn Wind Farm	
Lisdowney Wind Farm (operational)	No potential Cumulative impacts are expected during the construction phase of Gathabawn Wind Farm as the Lisdowney Wind Farm is already constructed. Imperceptible cumulative impacts during the operational phase of Gathabawn Wind Farm as the Lisdowney Wind Farm roads comprise permeable stone roads, combined with the relatively small extent of the Wind Farm footprint (4 turbines), any increases in surface water runoff are considered to be Neutral, and will not contribute to changes in drainage regimes or flows in combination with the Gathabawn Wind Farm Project.
Ballynalacken Windfarm (consented) Seskin Wind Farm and Grid Connection [Laois/Kilkenny] (under appeal, ACP) Killeshulán Wind Farm and Grid Connection (potential)	The construction stages of these windfarm projects and the Gathabawn Wind Farm are considered unlikely to overlap and therefore given the mitigation measures in place for both projects to protect the water environment it is considered that any potential cumulative impacts will be neutral and there will be no Significant Adverse impacts on the water environment. Where there is an overlap in construction timing then mitigation measures will be in place at the sites including a project specific CEMP to ensure there is no adverse impact on the water environment. Neutral cumulative impacts during the operational phase of Gathabawn Windfarm as these Projects will have a drainage management plan and any increases in surface water runoff are considered to be Imperceptible and will not contribute to measurable changes in drainage regimes or flows in combination with the Gathabawn Windfarm Project.
Projects in the Parksgrove/Moatpark Area: • BESS1 & 2, Moatpark (consented) • EirGrid Substation Compound Extension • Ballynalacken WF Grid Connection (consented) • Briskalagh WF Grid Connection (consented) • Littleton WF Grid Connection (in planning) • Killeshulán WF Grid Connection (potential) • Tirlán Dairy Processing Facility and Water Treatment Plant (operational)	It is considered that the potential cumulative impacts at regional scale will be neutral due to the size and scale of these projects relative to the proposed Gathabawn Windfarm. The construction stages of the consented developments and potential developments, and the Gathabawn Windfarm are considered unlikely to overlap and therefore given the mitigation measures in place for both projects to protect the water environment it is considered that any potential cumulative impacts will be neutral and there will be no Significant Adverse impacts on the water environment. Neutral cumulative impacts as these projects mainly comprise underground grid connections which will not contribute to cumulative effects during their operation and therefore the potential cumulative impacts at regional scale will be neutral. The Tirlán WWTP will be operating under a discharge licence with Emission Limit Values (ELV's), and therefore there will be no significant cumulative effects with the Gathabawn Windfarm Project. The hardcore compound will be finished in aggregate which will be permeable and won't contribute to increases in surface water flow rates in receiving watercourses.
Developments in the Wider Regional Area:	The construction stages of the consented development and the Gathabawn Wind Farm are considered unlikely to overlap and therefore given the mitigation measures in place for both projects to protect the water

Other Project	Evaluation of Cumulative Impact
Proposed Gathabawn Wind Farm	
• Coolglass Wind Farm (consented) • Garrylaun Mining Project (consented) • Kilderry Solar Farm (consented) • Clara Energy Storage Project (consented) • Large Housing Developments in the environs of Kilkenny City	environment it is considered that any potential cumulative impacts will be neutral and there will be no Significant Adverse impacts on the water environment. Neutral cumulative impacts during the operational phase of Gathabawn Wind Farm these projects will have their own drainage management plans. The Gathabawn Wind Farm site generally comprises permeable aggregate roads and compounds and drainage systems will be installed as part of standard construction practices; therefore, it is considered that there will be no cumulative impacts with these developments are located in separate sub-catchments to the Whole Gathabawn Wind Farm Project.

EIAR 8.5.2 Potential Cumulative Impact Evaluation

In relation to cumulative effects during the construction, operation and decommissioning phases of the Proposed Gathabawn Wind Farm, the Candidate Gathabawn Grid Connection and the identified other projects, the cumulative effects are considered below here.

The main likelihood of cumulative effects with other projects or activities will relate to surface water quality rather than groundwater.

The surface water setting of the project Site is characterised by small streams within the site area and the River Goul and River Nore to the west and east of the site respectively. There is no process water used on site and only natural storm runoff requires management on the site in terms of quantity and quality going to the receiving watercourses. The volume of natural storm runoff from the site will be small in relation to the overall regional flows in the River Nore catchment. Therefore, it is considered that the collective cumulative impacts with regard surface water quality and quantity arising from the Proposed Gathabawn Windfarm Project in-combination with the identified Other Projects are assessed as being unlikely to occur and any potential significant cumulative impacts will be neutral.

The groundwater setting of the project Site is characterised by a regionally important aquifer and a poorly productive aquifer. The shallow and near surface nature of construction activities, collective cumulative impacts with regard groundwater quality or quantity arising from the Proposed Gathabawn Windfarm Project in-combination with the identified Other Projects are assessed as being unlikely to occur and any potential significant cumulative impacts will be neutral.

The measures outlined here in this EIAR to protect the water environment also protect designated areas from any potential adverse impacts. Therefore it is considered that there will be no cumulative adverse impacts on designated areas either, which could arise.

As detailed in the evaluations in Table 8-18 above, it is considered that the Proposed Gathabawn Windfarm Project will not result in any potential significant cumulative impacts with any of the Other Projects identified.

EIAR 8.5.2.1 Construction Phase

With the implementation of the proposed mitigation measures during the Construction Phase (both for the proposed project and for the other developments), it is considered that there will be no adverse cumulative effects when considered collectively or in combination with any other large scale infrastructure developments identified here.

EIAR 8.5.2.2 Operational Phase

With the implementation of the proposed mitigation measures during the Operational Phase (both for the proposed project and for the other developments), it is considered that there will be no adverse cumulative effects when considered collectively or in combination with any other large scale infrastructure developments identified here.

EIAR 8.5.2.3 Decommissioning Phase

With the implementation of the proposed mitigation measures during the Decommissioning Phase (both for the proposed project and for the other developments), it is considered that there will be no adverse cumulative effects when considered collectively or in combination with any other large scale infrastructure developments identified here.

EIAR 8.5.2.4 Summary of Potential Cumulative Effects on Receptors

Considering the nature of the surface water and groundwater receiving environment and geographical factors, with mitigation measures for the proposed development and other identified developments, it is considered that there will be no cumulative effects associated with the construction, operation or decommissioning phases of the Proposed Gathabawn Wind Farm Project when considered cumulatively and in combination with the other identified developments assessed here.

In terms of identified surface water and groundwater receptors the potential cumulative and in combination effects with the other identified developments assessed are outlined here:

- The potential cumulative impact on River Waterbodies at a local sub-catchment scale is assessed as being **Not Significant**;
- The potential cumulative impact on River Waterbodies at the regional scale is assessed as being **Not Significant**;
- The potential cumulative impact on Public and private Water Supplies is assessed as being **Not Significant**;
- The cumulative impact on Designated and Protected area is assessed as being **Not Significant**;

It is assessed here that any potential adverse cumulative impacts to the Water environment arising from the construction, operation or decommissioning of the Gathabawn Wind Farm both cumulatively and in combination with the identified projects will be Not Significant.

EIAR 8.6 Water Summary

EIAR 8.6.1 Surface Water

The Gathabawn Windfarm site is located within the River Nore catchment. The Ballylehaun Area lies within the River Goul Sub Catchment (Goul_SC_010) of the Nore and the Ballyring Area lies within the Nore_SC_070 Sub Catchment of the Nore.

There are several streams within the Gathabawn study including the Coolnacrutta Stream, the Gorteenahilla Stream, the Ballyring Upper Stream, the Foyle South Stream and the Lismaine Stream which flows into the River Nore.

At the Windfarm site there are manmade agricultural drainage ditches occur around the edges of some agricultural grassland fields, mainly at the Ballyring Site, with a wet drainage channel on the most southeasterly section of the Ballyring Site; the agricultural drainage ditches can dry up for at least part of the year. There are two existing drainage channels within the Ballyring Area which will be intercepted during the Windfarm construction phase.

There are no identified drainage features at the Ballylehaun Area that will be within 25m of any construction Site works. Identified drainage features in the Ballylehaun Area were found to be dry and no constraints were identified in terms of the proposed development.

The Ballylehaun and Ballyring infrastructure areas will not involve any new water crossings. There are two existing water crossings along the Ballylehaun-Ballyring Underground Cabling route at Gorteenamuck and Gorteenahilla townlands. The Ballyring-Parksgrove UGC crosses the Lismaine Stream, Lisdowney Stream and Ballyconra Stream, while the Parksgrove-Moatpark UGC crosses the River Nore.

During each phase of the proposed Gathabawn Windfarm activities have the potential to affect the hydrological regime or water quality downstream of the Site. Potential effects could potentially arise from sediment in runoff and other pollutants such as hydrocarbons and cement-based compounds, particularly during the construction phase. During the operational phase, the potential for impacts to surface water bodies is greatly reduced as the requirement for groundworks will be limited to maintenance requirements only. For decommission a specific Site Decommissioning Plan will be prepared and will set out all methods and required mitigation to protect the water environment.

Surface water drainage measures are outlined in the Drainage Management Plan. Pollution control and other preventative measures have been incorporated into the project design and proposed as mitigation to minimise significant impacts on surface water quality. The surface water drainage plan will be the principal means of significantly reducing sediment runoff arising from construction activities and to control runoff rates. The key surface water control measure is that there will be no direct discharge of runoff into local watercourses or into the existing drainage networks. Preventative measures also include fuel and concrete management and a waste management plan which will be incorporated into the site Surface Water Management Plan.

It is assessed that with mitigation measures any potential adverse effects to surface water quality or quantity will be Not Significant.

EIAR 8.6.2 Groundwater

The Gathabawn Wind Farm Site is located within the Durrow Groundwater Body (Ballylehaun Area) and the Lisdowney GWB (Ballyring Area plus Turbines T6 and T7). The Candidate Gathabawn Grid Connection is also partially located in the Kilkenny – Ballynakill Gravels GWB.

The Durrow GWB at the Ballylehaun Area is classed as a Karstified (diffuse) Regionally Important bedrock Aquifer. Karstification mainly occurs in the near surface hence groundwater flow predominantly occurs in this upper zone. Studies show a continuous water table does not exist, indicating that flow in the aquifer may be through a diffuse network of shallow conduits, owing to water table level fluctuations through the year. Recharge in the aquifer will be diffuse and local. discharge will be via large springs that are close to main river channels or directly into the.

The Lisdowney GWB at the Ballyring Area plus Turbines T6 and T7, is classed as Poorly Productive Bedrock Aquifer (PI), consisting of bedrock which is generally unproductive except for local zones. Groundwater flows will be a close reflection of surface topography and are considered to be short because the area of the GWB is small and the bedrock is not considered to constitute a major aquifer. The recharge in this aquifer is diffuse local recharge. Discharge will be to local surface water bodies as well as to the karstic aquifer.

Based on a review of the GSI Karst database and walkover survey there are no identified karst geological features at the Proposed Gathabawn Wind Farm Site.

Due to the nature of windfarm developments without the requirement for dewatering except during the turbine construction phase when very local dewatering may be required for foundation construction, then the potential effects on groundwater bodies in terms of quality and quantity are generally imperceptible. The primary risk to groundwater would be from oil spillage and leakages at turbine foundations or during construction plant refuelling. These potential impacts apply to all construction Sites; and potential contamination sources will be carefully managed on Site during the construction, operational and decommissioning phases of the development and measures are proposed within the EIAR to deal with any potential impacts arising.

It is assessed that with mitigation measures any potential adverse effects to groundwater quality or quantity will be Not Significant.

EIAR 8.6.3 Water Supplies

The Gathabawn site is not located in a mapped Public Water Supply or National Federation of Group Water Schemes registered groundwater source. Groundwater abstractions for private water supplies are expected in the vicinity of the Gathabawn Wind Farm Site to serve one off residences and farms in the local area.

The Geological Survey Ireland (GSI) well database indicates there are a number of private water supplies at farms and houses in the overall study area. Individual water supplies are common in rural areas where there is no mains water supply. It should be noted that the GSI well database is not current or comprehensive. A conservative approach was adopted for the assessment it is assumed that all private dwellings in the vicinity of the proposed development have a well water supply associated with it, regardless of the presence of public water pipes along the adjacent public roads, or not.

There is the potential to impact on local water supply quality during the construction phase, however mitigation measures will be in place to manage potential contaminants on site during construction. During the operational phase, the potential for impacts to groundwater supplies greatly reduced as the requirement for groundworks will be limited to the maintenance activities at the Wind farm site only which will only require minor volumes of hydrocarbons on Site.

It is assessed that with mitigation measures any potential adverse effects to water supplies will be Not Significant.

EIAR 8.6.4 Designated Areas

There are a number of designated and protected sites within the vicinity of the site, including the:

- Cullahill Mountain SAC/pNHA;
- Spahill and Clomantagh Hill SAC/pNHA;
- Galmoy Fen SAC/pNHA;
- The River Barrow and River Nore SAC / River Nore SPA / Inchbeg pNHA;
- Gales Hill Nature Reserve - adjacent to the Cullahill Mountain SAC / /pNHA;

Cullahill Mountain SAC and the Gales Hill Nature Reserve are upgradient of the wind farm site and runoff from the Site will be captured within the Site drainage system, preventing any potentially contaminating water reaching these designated Sites. As Cullahill Mountain SAC, pNHA and Gales Hill Nature Reserve lie upslope of the Ballylehaun Area works, groundwater flow at this location is directed away from, rather than toward, the designated Sites. In addition, groundwater flow paths within the karstified Durrow GWB are considered short, localised and shallow, occurring through a diffuse network of conduits rather than a continuous water table. It is considered unlikely that localised, short-term drawdown associated with turbine base excavations would adversely impact on the SAC and Nature Reserve.

Galmoy Fen SAC/pNHA is a Groundwater Dependent Terrestrial Ecosystems. The fen is located to the west of the Goul River which forms a hydrological boundary between the proposed wind farm Site and the designated area. There will be no adverse impact in the fen arising from the development.

It is assessed that with mitigation measures any potential adverse effects to Designated Sites will be Not Significant.

EIAR 8.6.5 Mitigation Measures

Measures to minimise any potential adverse impact on the water environment include:

- fuel, oil and concrete control procedures;
- surface water quality monitoring;
- the installation of the Site drainage network with regular inspections to ensure effectiveness;
- the provision of secure bunding for fuels and oils at the temporary construction compound; and
- the appointment of a site Environmental Manager with a 'stop-works' authority should a significant unforeseen environmental effect take place.

EIAR 8.6.6 Assessment Findings

It is assessed here that the potential impacts of the Proposed Gathabawn Windfarm on the water environment, both alone and cumulatively with other identified projects identified here, will not be significant adverse and with mitigation measures the potential impacts are assessed as being Not Significant.

EIAR 8.7 Glossary and List of Abbreviations**Glossary of Terms**

Term	Definition
Aquifer	A permeable geological stratum or formation that can both store and transmit water in significant quantities.
Baseflow	Water which enters streams/rivers from groundwater flow and maintains streamflow during dry periods.
Gathabawn Windfarm	Twelve wind turbines are proposed for two areas – seven turbines in the Ballylehaun area and five turbines in the Ballyring area. In addition to the turbines and their hardstanding areas, the windfarm also includes site access roads, two Control Buildings; a met mast, underground cabling, temporary works to facilitate turbine deliveries, and other associated and ancillary works.
Candidate Gathabawn Grid Connection	Underground cabling between the Ballylehaun and Ballyring Areas (Ballylehaun-Ballyring UGC), underground cabling from the Ballyring Area (from Ballyring Control Building) to a new substation at Parksgrove (Ballyring-Parksgrove UGC), the Parksgrove Substation, and underground cabling from the substation to the existing Eirgrid Ballyragget Substation in Moatpark (Parksgrove-Moatpark UGC).
Groundwater	Water under a pressure greater than atmospheric pressure which is present in the saturated zone of the soil.
Groundwater Body	A distinct volume of groundwater within an aquifer or system of aquifers, which is hydraulically isolated or partially isolated from nearby groundwater bodies.
Permeability	The rate at which a fluid flows through a porous medium under the hydraulic head operating within the medium. Usually, the greater the porosity, the greater the permeability.
Surface Water Runoff	Overland flow of water as a result of rainfall.
Saturated Zone	The zone below the groundwater table in which all the soil pores and rock fractures are filled with water. It underlies the unsaturated zone (see below).
Spring	A flow of groundwater on the ground surface that occurs where the water table intercepts the ground surface.
Storativity	Storativity is a dimensionless measure of the volume of water that will be discharged from an aquifer per unit area of the aquifer and per unit reduction in hydraulic head.
Surface Water Catchment	The surface area determined by topographic features within which falling rain will contribute to run-off at a particular point under consideration.
Suspended Sediments	Particulate solids (i.e. sand, clay, silt) entrained in surface water flow.
Unsaturated Zone	The zone below the land surface and above the groundwater table which contains water and air in the open spaces, or pores.

List of Abbreviations

Abbreviation	Full Term
AAR	Annual Average Rainfall
AE	Actual Evaporation
BOD	Biological Oxygen Demand
CFRAM	Catchment Flood Risk Assessment and Management
DWPA	Drinking Water Protected Area
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ER	Effective Rainfall
FT	Fehily Timoney and Company
GSI	Geological Survey of Ireland
HA	Hydrometric Area
HDD	Horizontal Directional Drilling
HES	Hydro-Environmental Services
IFI	Inland Fisheries Ireland
OHL	Overhead Line
OPW	Office of Public Works
NHA	Natural Heritage Area
PE	Potential Evapotranspiration
pNHA	Proposed Natural Heritage Area
PWS	Public Water Supply
SAC	Special Areas of Conservation
SPA	Special Protection Area
SWB/GWB	Surface Water Bodies / Groundwater Bodies
SWMP	Surface Water Management Plan
TSS	Total Suspended Solids
WFD	Water Framework Directive
WWTP / WTP	Wastewater Treatment Plant

ElAR 8.8 Reference List for Water

Environmental Protection Agency (2010) Establishment of Groundwater Source Protection Zones Glanbia (Ballyragget) Water Supply Scheme Ballyconra Boreholes. Deakin, J., Dillon, J., Kelly, C., Meehan, R.

Environmental Protection Agency (2021) HydroNet (Digital-Map).

Geological Survey of Ireland (2007) Lisdowney GWB: Summary of Initial Characterisation, Fernandez, N.

ElAR 8.9 List of Figures

List of Figures (overleaf)

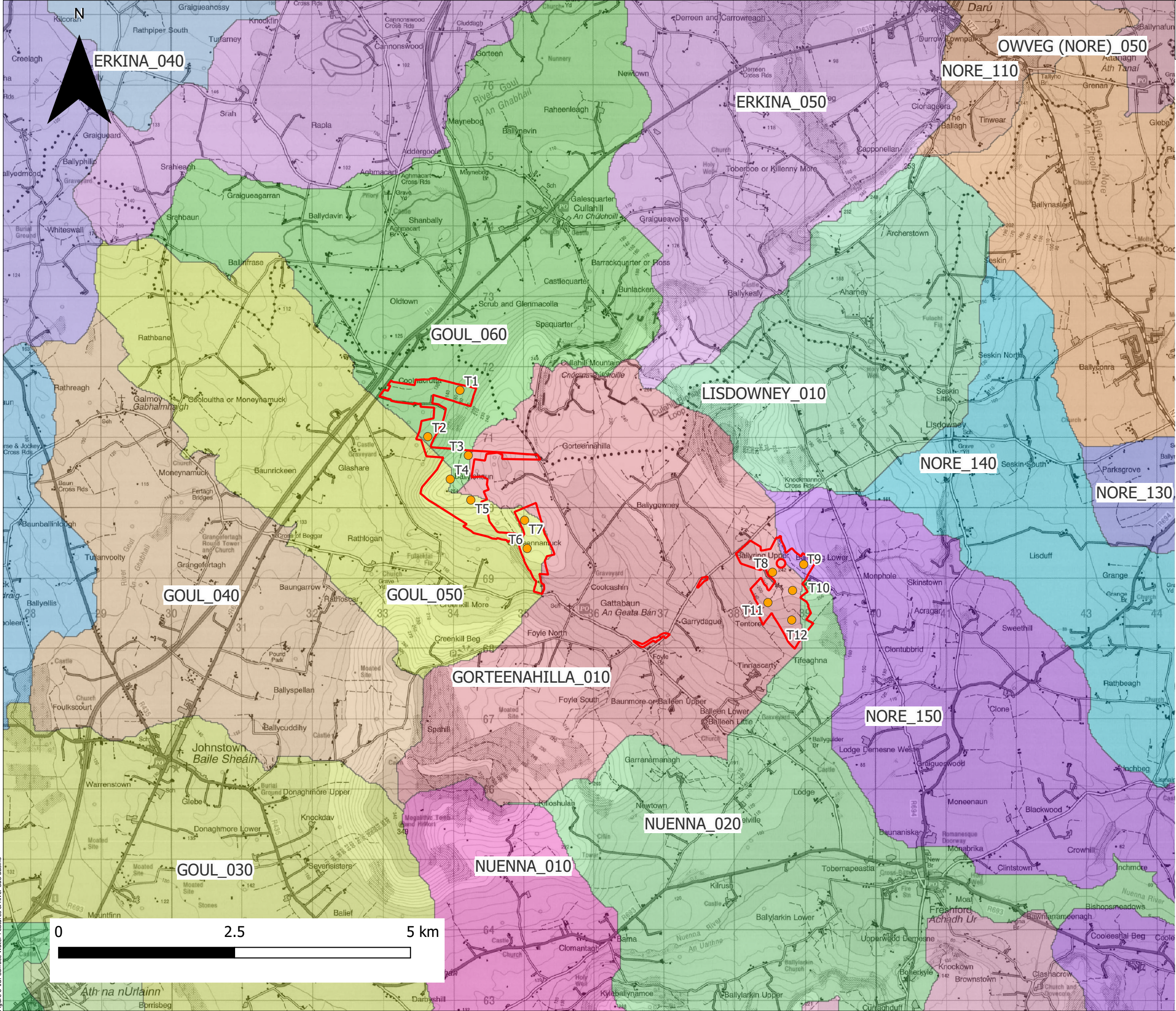
Figure 8-1a	Proposed Gathabawn Windfarm: Surface Water Features & River Sub Basins
Figure 8-1b	Grid Connection Route: Surface Water Features & River Sub Basins
Figure 8-2a	Proposed Gathabawn Windfarm: Bedrock Aquifers
Figure 8-2b	Candidate Gathabawn Grid Connection: Bedrock Aquifers
Figure 8-3a	Proposed Gathabawn Windfarm: WFD Groundwater Bodies
Figure 8-3b	Candidate Gathabawn Grid Connection: WFD Groundwater Bodies
Figure 8-4a	Proposed Gathabawn Windfarm: GSI Groundwater Vulnerability
Figure 8-4b	Candidate Gathabawn Grid Connection: GSI Groundwater Vulnerability
Figure 8-5a	Proposed Gathabawn Windfarm: GSI Karst Features
Figure 8-5b	Candidate Grid Connection: GSI Karst Features
Figure 8-6	Proposed Gathabawn Windfarm: Surface Water Quality Monitoring Locations
Figure 8.7	Other Projects Scoped-In for the Water Cumulative Evaluations

ElAR 8.10 List of Appendices

List of Appendices (overleaf)

Appendix	Title
Appendix 8.1	Methodology for the evaluation of Water
Appendix 8.2	Surface Water Quality Monitoring Results
Appendix 8.3	Water Framework Directive Assessment
Appendix 8.4	Flood Risk Assessment

Figures



Notes:

1. Basemap: OSI Discovery Series Sheet 60
2. Surface Water River Layer Source: Environemntal Protection Agency
3. Infrastructure: Supplied By Ecopower Ltd.

LEGEND:

- Proposed Gathabawn Turbines
- Red Line Boundary

River Sub Basins

- ARDREAGH_010
- ARIGNA (KILKENNY)_010
- BAUNBALLINLOUGH STREAM_010
- ERKINA_040
- ERKINA_050
- GORTEENAHILLA_010
- GOUL_020
- GOUL_030
- GOUL_040
- GOUL_050
- GOUL_060
- LISDOWNNEY_010
- NORE_110
- NORE_120
- NORE_130
- NORE_140
- NORE_150
- NUENNA_010
- NUENNA_020
- OWVEG (NORE)_050
- RATHDOWNNEY STREAM_010

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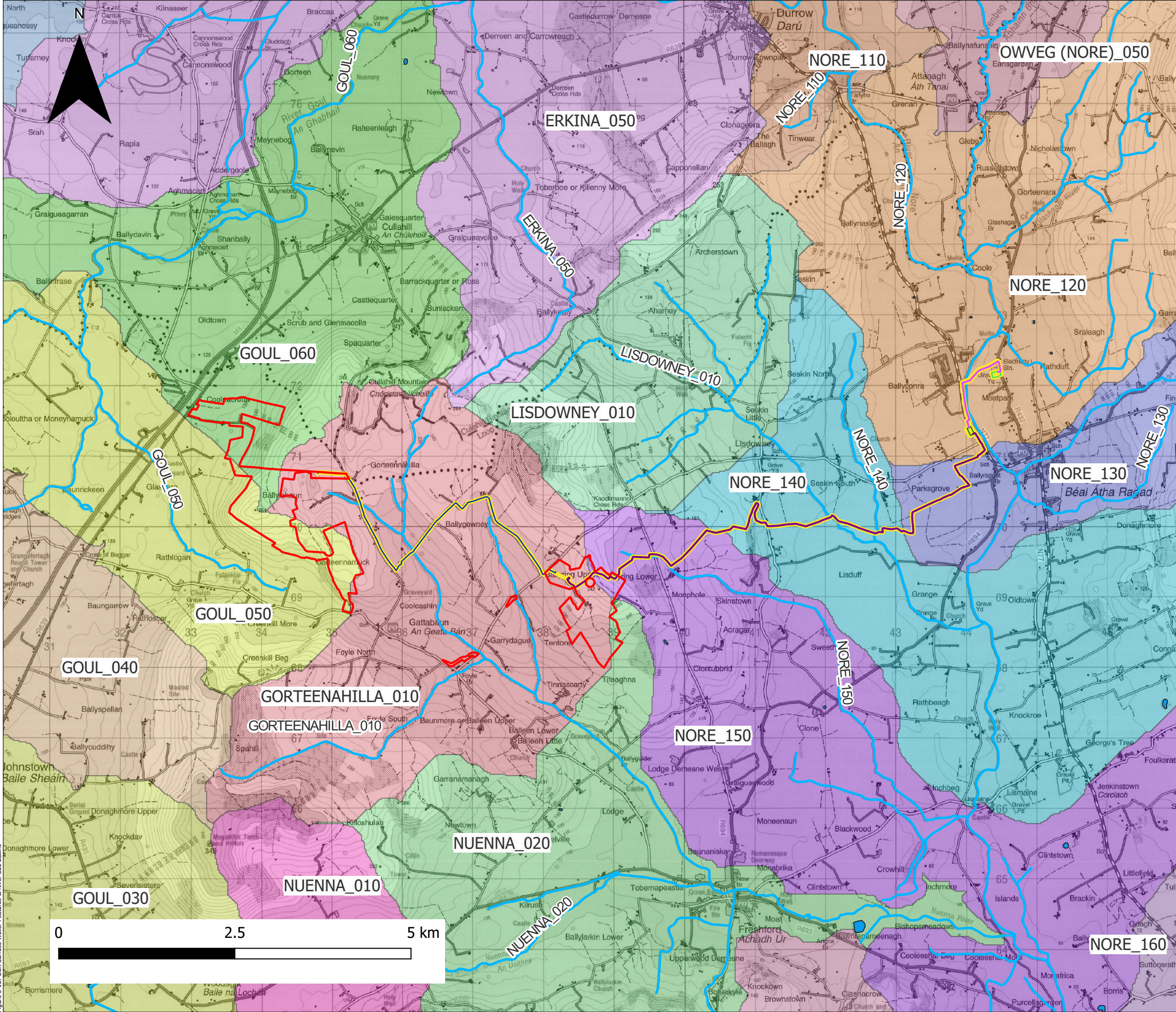
Gathabawn Wind Farm

Drawing Title

Proposed Gathabawn Windfarm: Surface Water Features & River Sub Basins

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09/2026	09/2026	09/2026	09/2026
Drawing Number	Rev.		
Figure 8-1a	02		

Figure 8-1a: Surface Water Features & River Sub Basins



Notes:
1. Basemap: OSI Discovery Series Sheet 60
2. Surface Water River Layer Source: Environemntal Protection Agency
3. Infrastructure: Supplied By Ecopower Ltd.

- LEGEND:
- Red Line Boundary
 - Ballylehaun-Ballyring Underground Cabling
 - Ballyring - Parksgrove Underground Cabling
 - Parksgrove - Moatpark Underground Cabling
 - EirGrid Ballyragget Substation
 - Parksgrove Substation
 - Construction Works Boundary -
 - Candidate Grid Connection
 - EPA Surface River Waterbodies
 - Lakes

- River Sub Basins
- ARIGNA (KILKENNY)_010
 - ERKINA_040
 - ERKINA_050
 - GORTEENAHILLA_010
 - GOUL_030
 - GOUL_040
 - GOUL_050
 - GOUL_060
 - LISDOWNNEY_010
 - NORE_110
 - NORE_120
 - NORE_130
 - NORE_140
 - NORE_150
 - NORE_160
 - NUENNA_010
 - NUENNA_020
 - OWVEG (NORE)_050

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Grid Connection Route: Surface Water
Features & River Sub Basins

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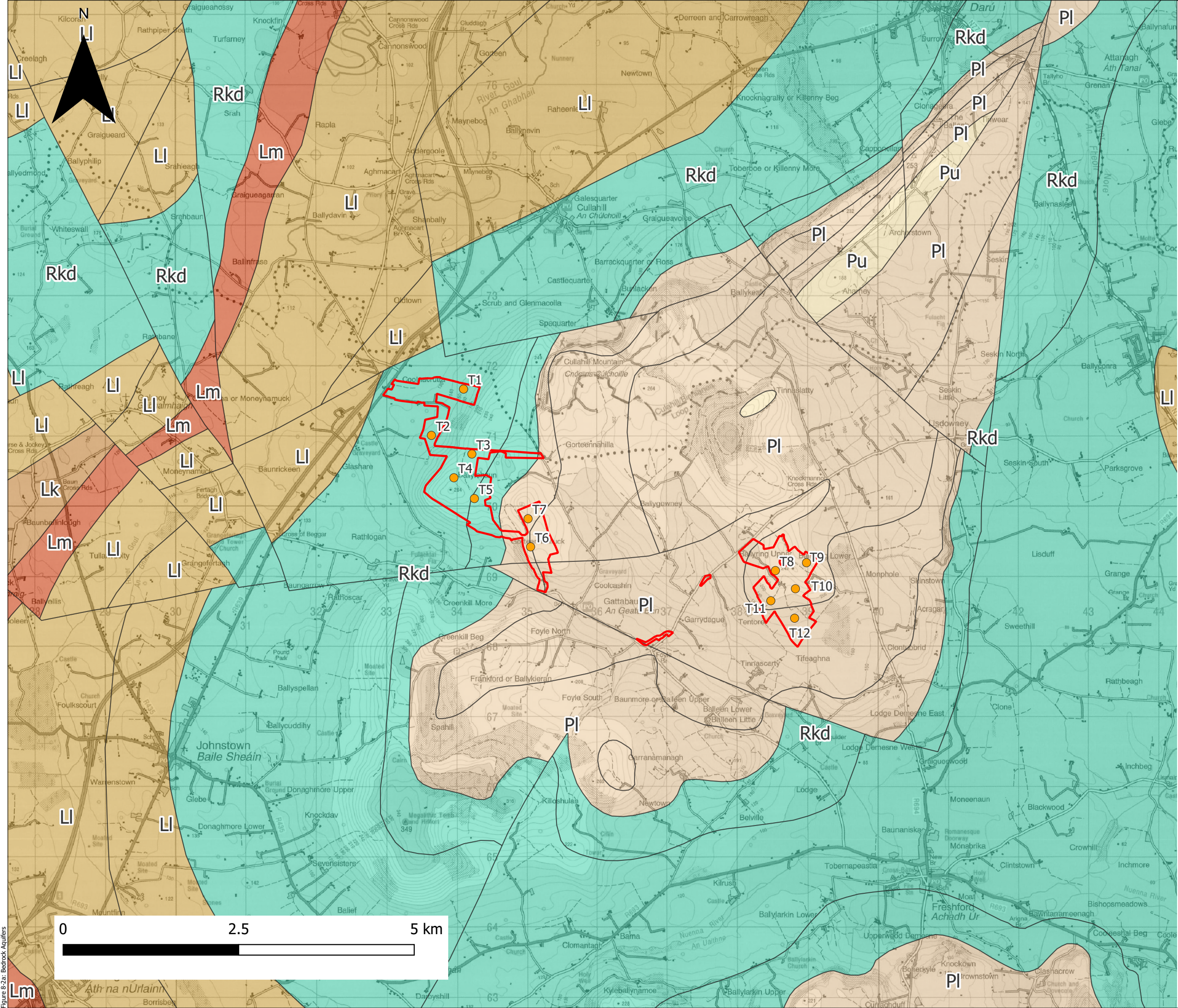
Drawing Number

Figure 8-1b

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02

Figure 8-1b: GCI Surface Water Features & River Sub Basins



- Notes:
- 1. Basemap: OSI Discovery Series Sheet 60
 - 2. Aquifer Layer Source: Geological Survey Ireland
 - 3. Infrastructure: Supplied By Ecopower Ltd.

LEGEND:

- Proposed Gathabawn Turbines
- ▭ Red Line Boundary

GSI Bedrock Aquifers

- Lk Locally Important Aquifer - Karstified
- LI Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Lm Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- PI Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu Poor Aquifer - Bedrock which is Generally Unproductive
- Rkd Regionally Important Aquifer - Karstified (diffuse)



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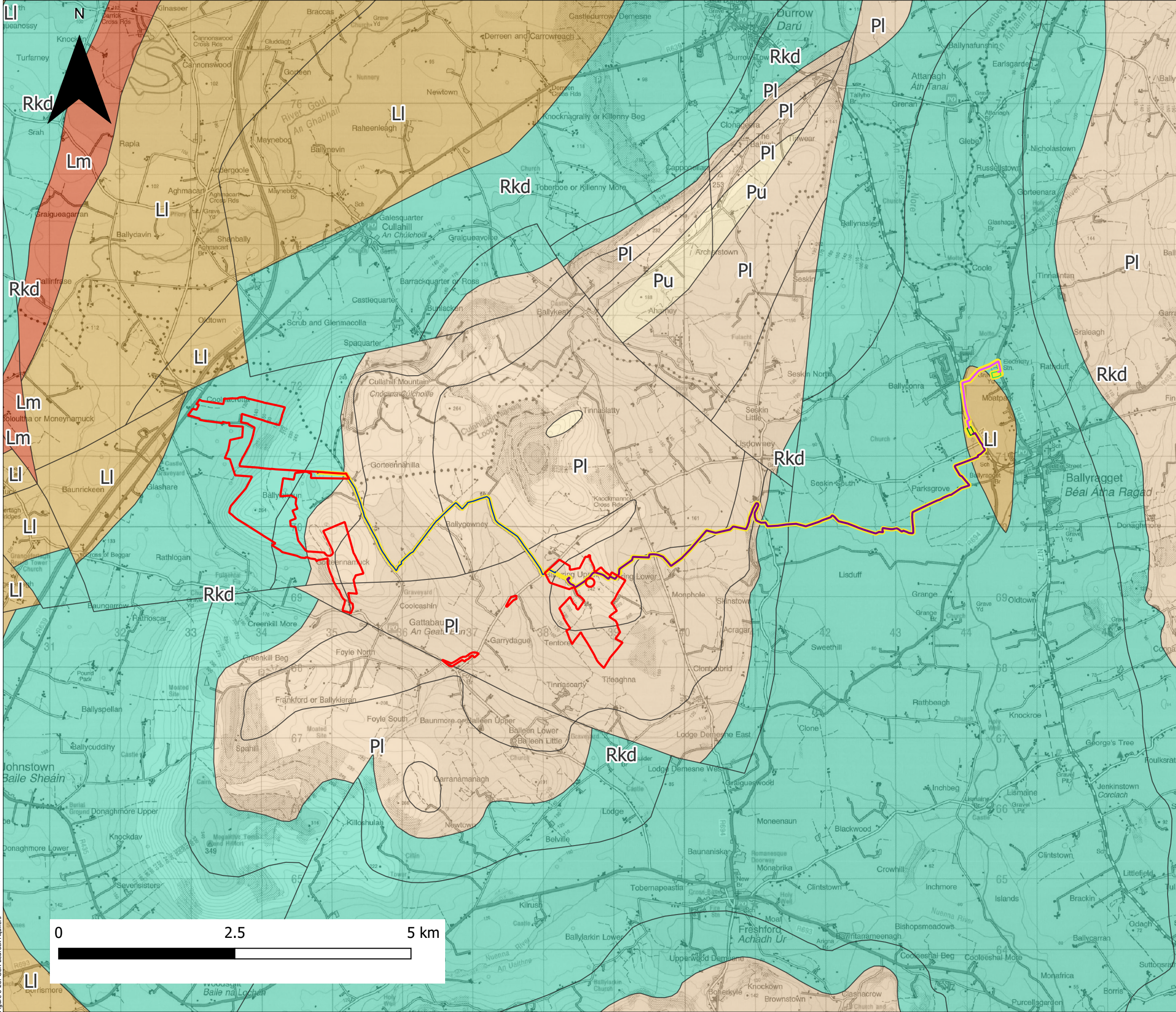
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Drawing Title
Proposed Gathabawn Windfarm: Bedrock Aquifers

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Date 09/2026	Date 09/2026	Date 09/2026	Date 09/2026
Drawing Number Figure 8-2a			Rev. 02

Figure 8-2a: Bedrock Aquifers



Notes:
1. Basemap: OSI Discovery Series Sheet 60
2. Aquifer Layer Source: Geological Survey Ireland
3. Infrastructure: Supplied By Ecopower Ltd.

- LEGEND:
- Red Line Boundary
 - Ballylehaun-Ballyring Underground Cabling
 - Ballyring - Parksgrove Underground Cabling
 - Parksgrove - Moatpark Underground Cabling
 - EirGrid Ballyragget Substation
 - Parksgrove Substation
 - Construction Works Boundary - Candidate Grid Connection

- GSI Bedrock Aquifers
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 - Lm Locally Important Aquifer - Bedrock which is Generally Moderately Productive
 - PI Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
 - Pu Poor Aquifer - Bedrock which is Generally Unproductive
 - Rkd Regionally Important Aquifer - Karstified (diffuse)



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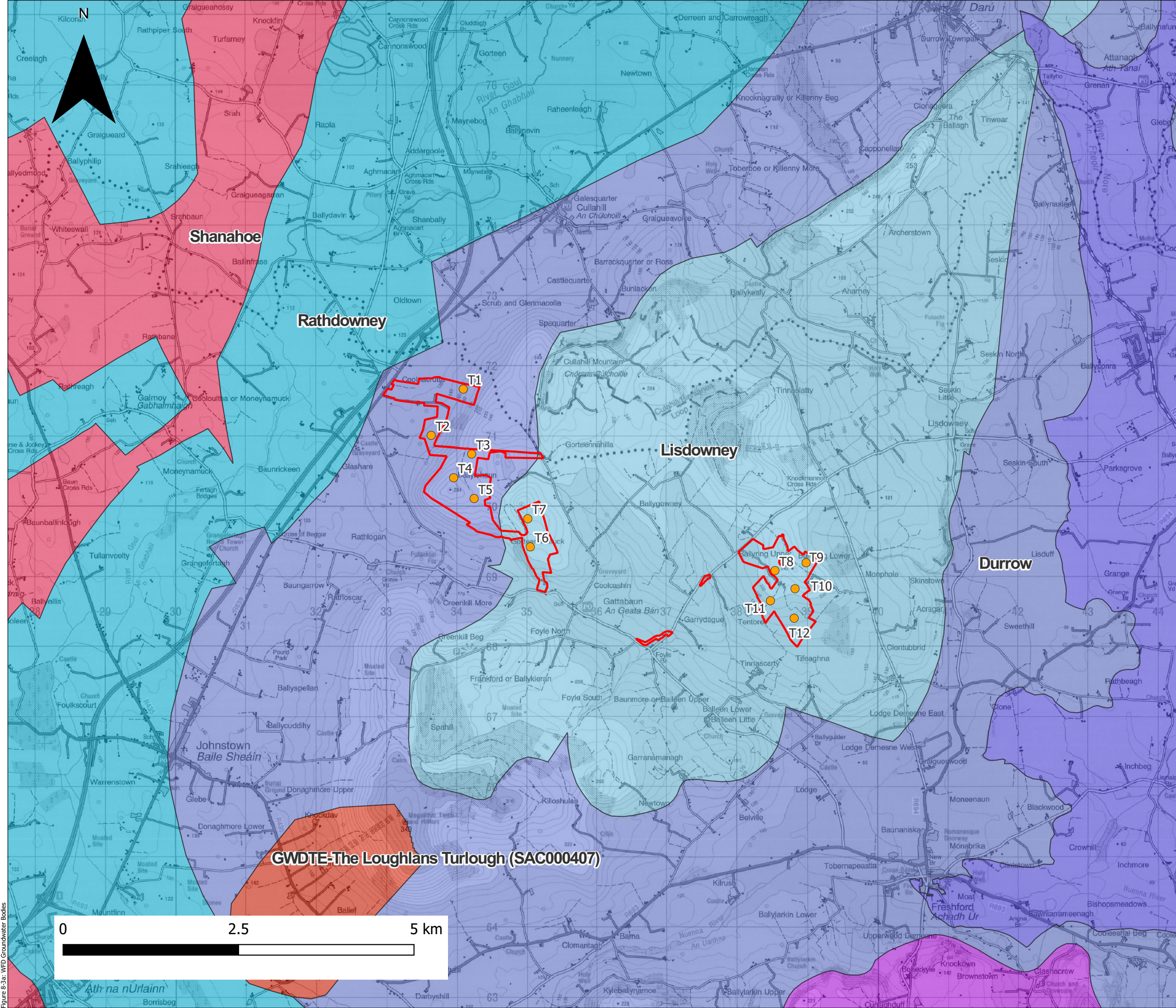
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Drawing Title
Candidate Gathabawn Grid Connection:
Bedrock Aquifers

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Date 09/2026	Date 09/2026	Date 09/2026	Date 09/2026



- Notes:
- 1. Basemap: OSI Discovery Series Sheet 60
 - 2. Groundwater Bodies Layer Source: Geological Survey Ireland
 - 3. Infrastructure: Supplied By Ecopower Ltd.

LEGEND:

- Proposed Gathabawn Turbines
- Red Line Boundary

WFD Groundwater Bodies

- Ballingarry
- Durrow
- GWDTE-The Loughlans Turlough (SAC000407)
- Kilkenny-Ballynakill Gravels
- Lisdowney
- Rathdowney
- Shanahoe

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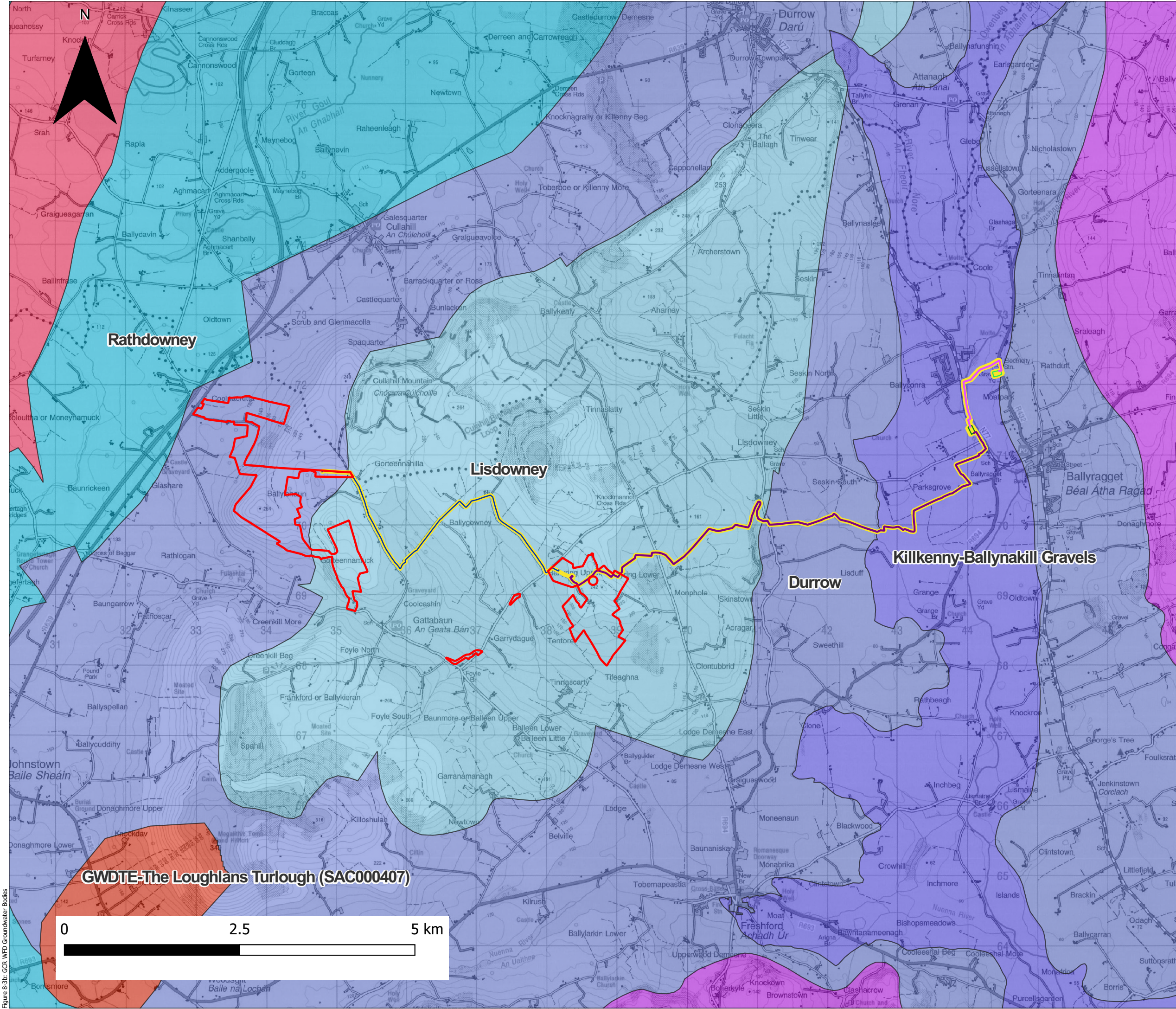
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Drawing Title
Proposed Gathabawn Windfarm: WFD Groundwater Bodies

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Date 09/2026	Date 09/2026	Date 09/2026	Date 09/2026
Drawing Number Figure 8-3a			Rev. 02

Figure 8-3a: WFD Groundwater Bodies



- Notes:
1. Basemap: OSI Discovery Series Sheet 60
 2. Groundwater Bodies Layer Source: Geological Survey Ireland
 3. Infrastructure: Supplied By Ecopower Ltd.

- LEGEND:
- Red Line Boundary
 - Ballylehaun-Ballyring Underground Cabling
 - Ballyring - Parksgrove Underground Cabling
 - Parksgrove - Moatpark Underground Cabling
 - EirGrid Ballyragget Substation
 - Parksgrove Substation
 - Construction Works Boundary - Candidate Grid Connection

- WFD Groundwater Bodies
- Ballingarry
 - Durrow
 - GWDTE-The Loughlans Turlough (SAC000407)
 - Kilkenny-Ballynakill Gravels
 - Lisdowney
 - Rathdowney
 - Shanahoe



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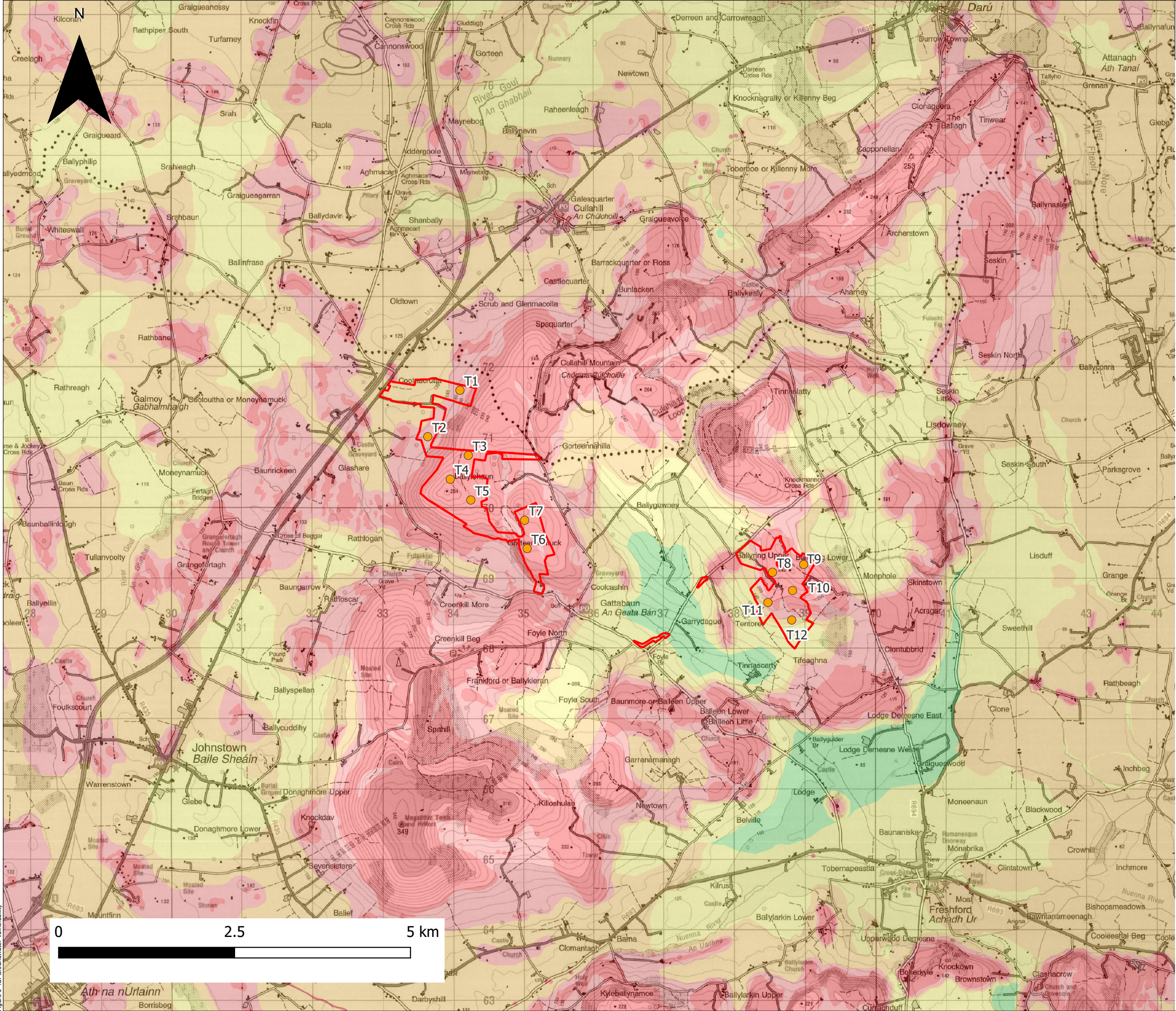
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Drawing Title

Candidate Gathabawn Grid Connection: WFD Groundwater Bodies

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		KW	PG
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Drawing Number	Rev.		
Figure 8-3b	02		

Figure 8-3b: GCD WFD Groundwater Bodies



- Notes:
1. Basemap: OSI Discovery Series Sheet 60
 2. Groundwater Vulnerability Layer Source: Geological Survey Ireland
 3. Infrastructure: Supplied By Ecopower Ltd.

LEGEND:

- Proposed Gathabawn Turbines
- Red Line Boundary

GSI Groundwater Vulnerability

- X - Rock at or near Surface or Karst
- E - Extreme
- H - High
- M - Moderate
- L - Low



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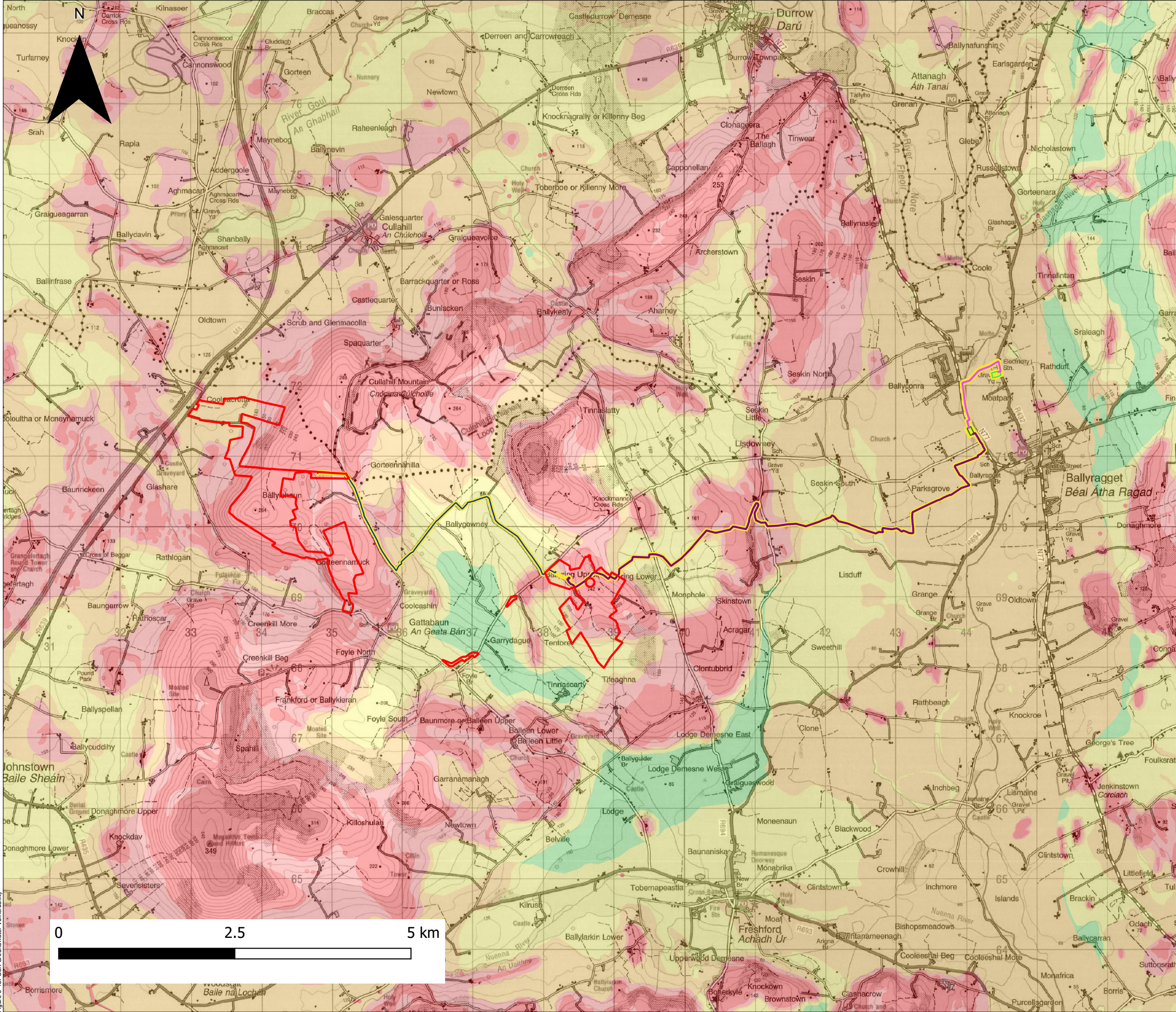
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Groundwater Vulnerability**

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Notes:
1. Basemap: OSI Discovery Series Sheet 60
2. Groundwater Vulnerability Layer Source: Geological Survey Ireland
3. Infrastructure: Supplied By Ecopower Ltd.

- LEGEND:
- Red Line Boundary
 - Ballylehaun-Ballyring Underground Cabling
 - Ballyring - Parksgrove Underground Cabling
 - Parksgrove - Moatpark Underground Cabling
 - EirGrid Ballyragget Substation
 - Parksgrove Substation
 - Construction Works Boundary - Candidate Grid Connection
- GSI Groundwater Vulnerability
- X - Rock at or near Surface or Karst
 - E - Extreme
 - H - High
 - M - Moderate
 - L - Low



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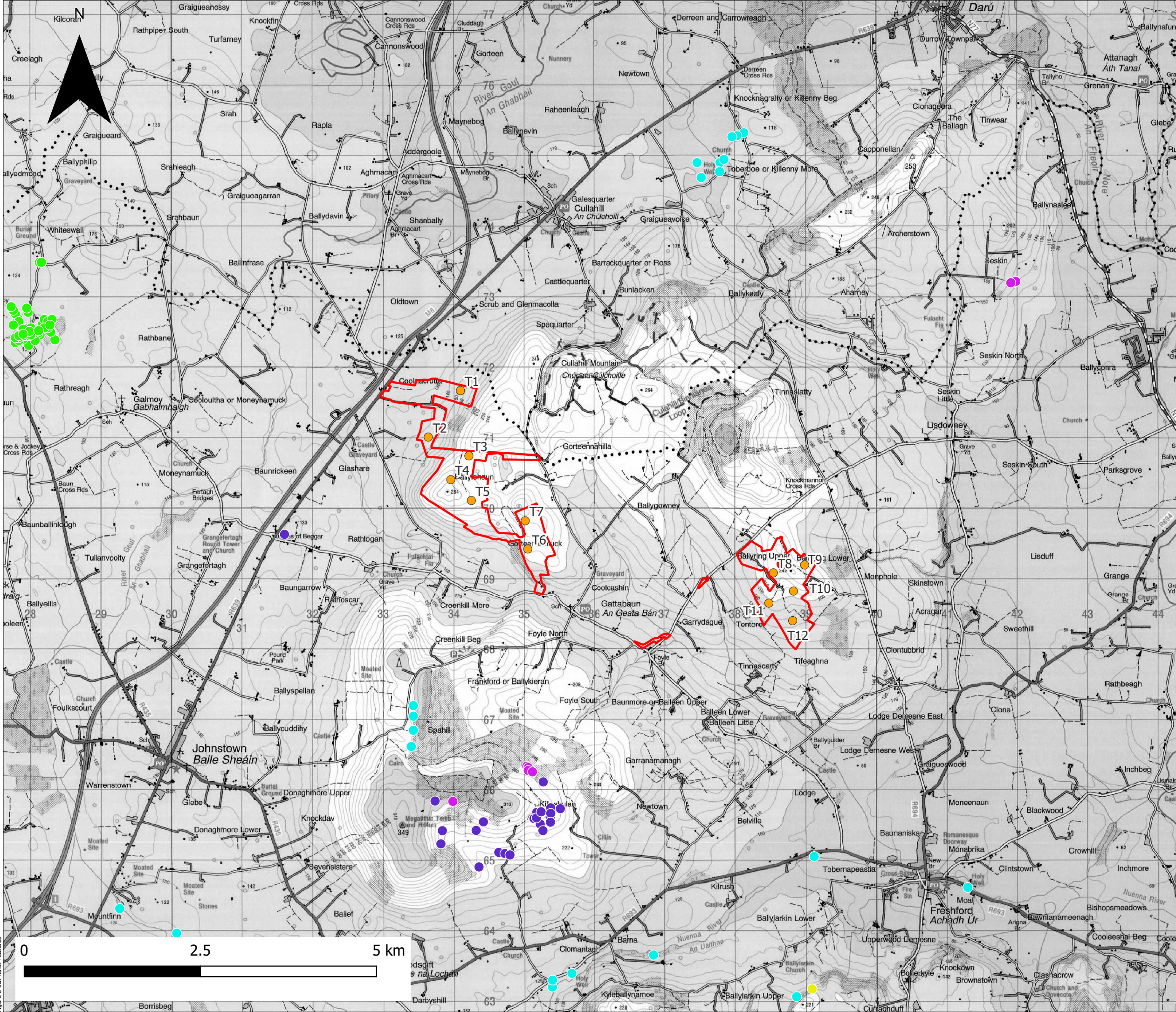
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MCOB	MCOB	KW	PG
Date	Date	Date	Date
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Drawing Number

Figure 8-4b

Rev.

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Notes:

1. Basemap: ESRI Satellite Imagery
2. Karst Layer Source: Geological Survey Ireland
3. Infrastructure: Supplied By Ecopower Ltd.

LEGEND:

- Proposed Gathabawn Turbines
- Red Line Boundary

GSI Karst Features

- Borehole
- Cave
- Enclosed Depression
- Spring
- Swallow Hole
- Turlough

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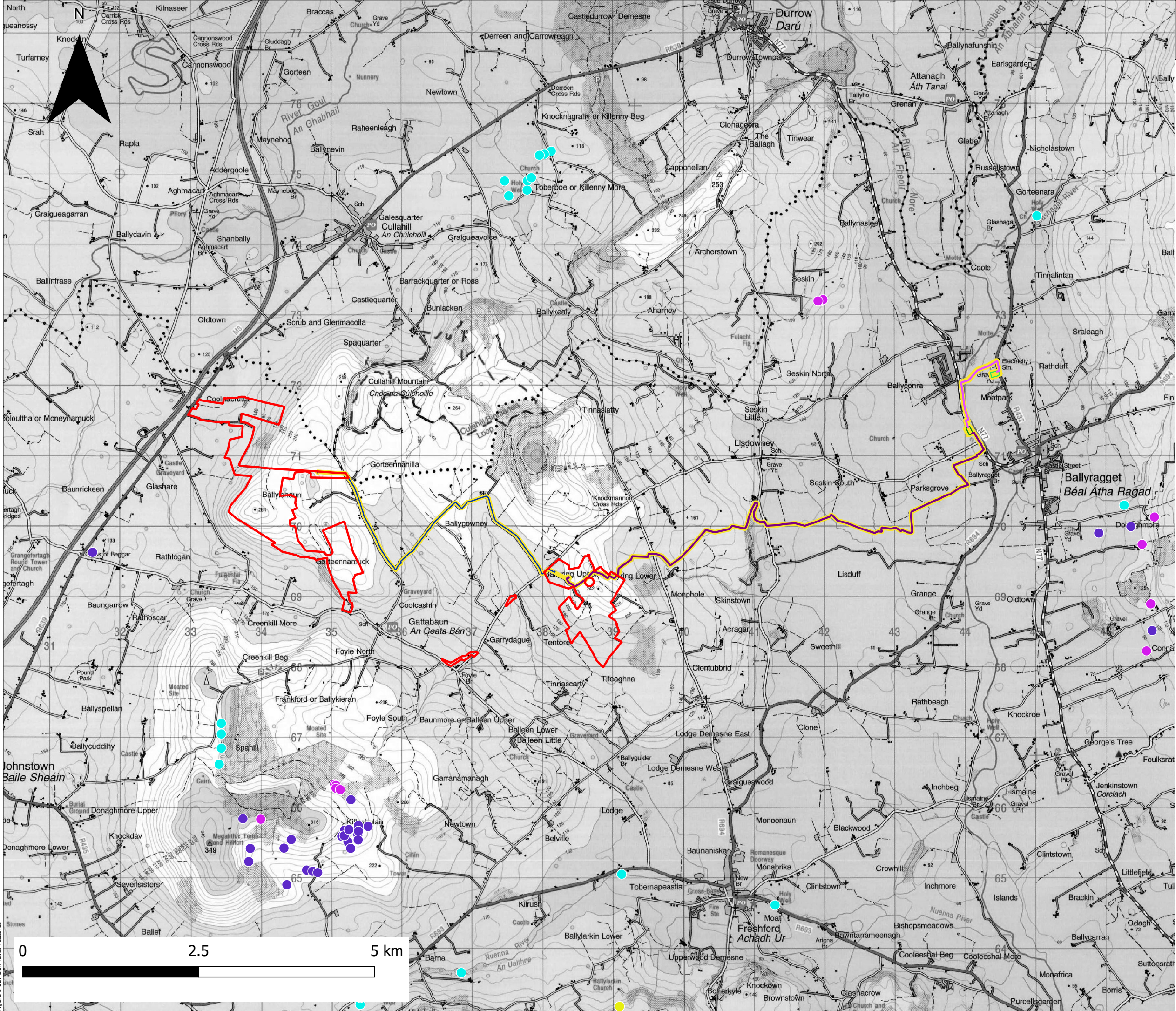
Project
Gathabawn Wind Farm

Drawing Title
Proposed Gathabawn Windfarm: GSI Karst Features

Scale 1:50,000	@A3	SLR Project No. 501.065883.00001	
Designed MCOB	Drawn MCOB	Checked KW	Authorised PG
Date 09/2026	Date 09/2026	Date 09/2026	Date 09/2026

Drawing Number Figure 8-5a	Rev. 02
-------------------------------	------------

Figure 8-5a: Karst Features



Notes:

1. Basemap: ESRI Satellite Imagery
2. Karst Layer Source: Geological Survey Ireland
3. Infrastructure: Supplied By Ecopower Ltd.

LEGEND:

- Red Line Boundary
- Ballylehaun-Ballyring Underground Cabling
- Ballyring - Parksgrove Underground Cabling
- Parksgrove - Moatpark Underground Cabling
- EirGrid Ballyragget Substation
- Parksgrove Substation
- Construction Works Boundary - Candidate Grid Connection

GSI Karst Features

- Cave
- Enclosed Depression
- Spring
- Swallow Hole
- Turlough

ECOPOWER

Zetec House,
Purcellsinch IDA Business Park,
Dublin Road, Kilkenny,
R95 PX5X, Ireland

2		09/26	MCOB	KW	PG
Rev	Amendments	Date	By	Chk	Auth

SLR

SLR Consulting Ireland
7 Dundrum Business Park,
Windy Arbour,
Dublin,
Ireland,
D14 N2YZ

www.slrconsulting.com

Client
Ecopower Ltd.

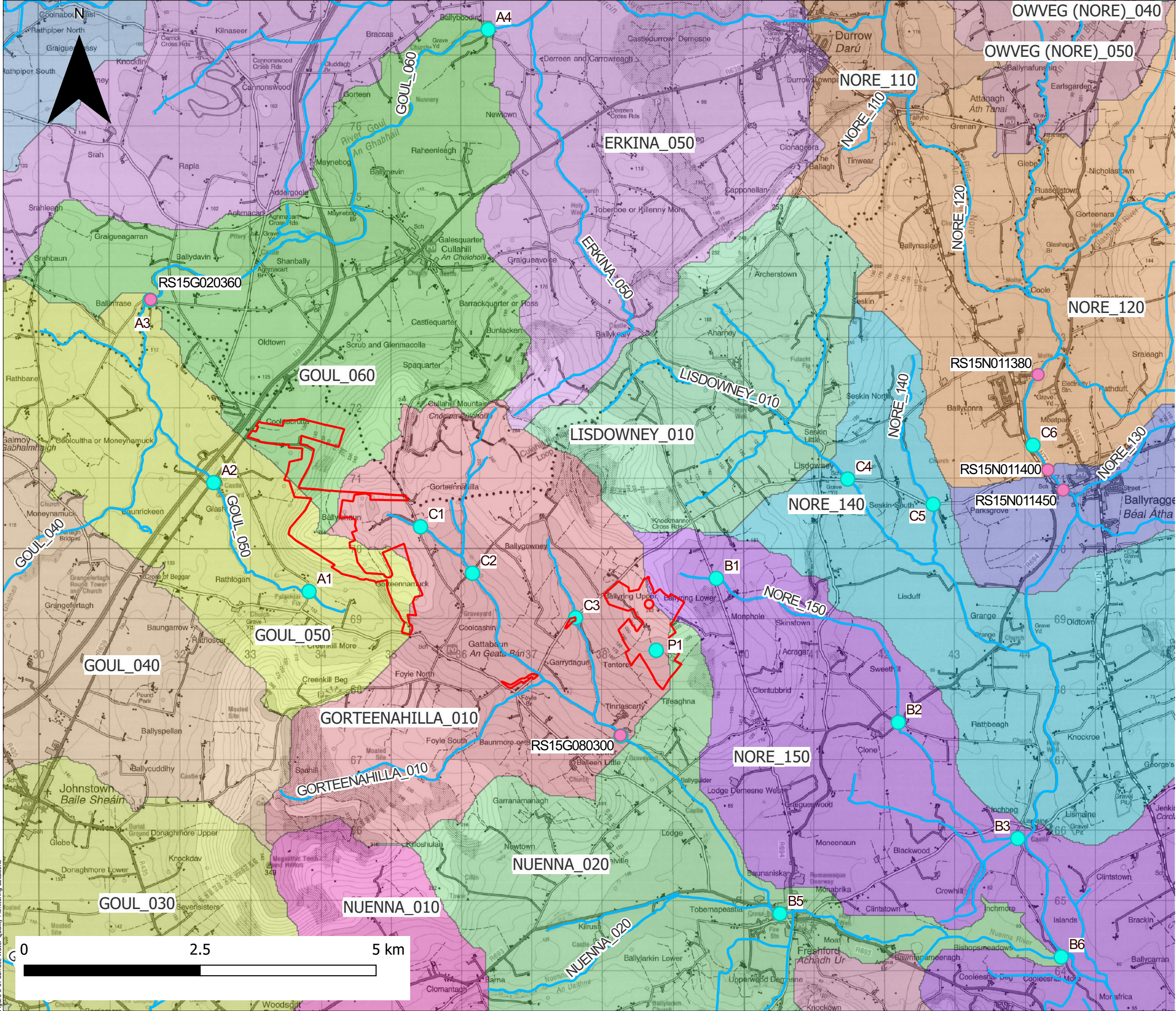
Project
Gathabawn Wind Farm

Drawing Title
Candidate Grid Connection: GSI Karst Features

Scale 1:50,000	@A3	SLR Project No. 501.065883.00001	
Designed MCOB	Drawn MCOB	Checked KW	Authorised PG
Date 09/2026	Date 09/2026	Date 09/2026	Date 09/2026

Drawing Number Figure 8-5b	Rev. 02
-------------------------------	------------

Figure 8-5b: GCI Karst Features



Notes:

1. Basemap: ESRI Satellite Imagery
2. EPA monitoring locations Layer Source: EPA
3. Infrastructure: Supplied By Ecopower Ltd.

LEGEND:

- Red Line Boundary
- Surface Water Quality Monitoring Locations
- EPA Water Monitoring Stations

River Sub Basins

- ARDREAGH_010
- ARIGNA (KILKENNY)_010
- ERKINA_040
- ERKINA_050
- GORTEENAHILLA_010
- GOUL_030
- GOUL_040
- GOUL_050
- GOUL_060
- LISDOWNEY_010
- NORE_110
- NORE_120
- NORE_130
- NORE_140
- NORE_150
- NUENNA_010
- NUENNA_020
- OWVEG (NORE)_040
- OWVEG (NORE)_050

ECOPOWER

Zetec House,
Purcellsinn IDA Business Park,
Dublin Road, Kilkenny,
R95 PX5X, Ireland

1		09/26	ND	KW	PG
Rev	Amendments	Date	By	Chk	Auth

SLR

SLR Consulting Ireland
7 Dundrum Business Park,
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Ireland,
D14 N2YZ

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Client
Ecopower Ltd.

Project
Gathabawn Wind Farm

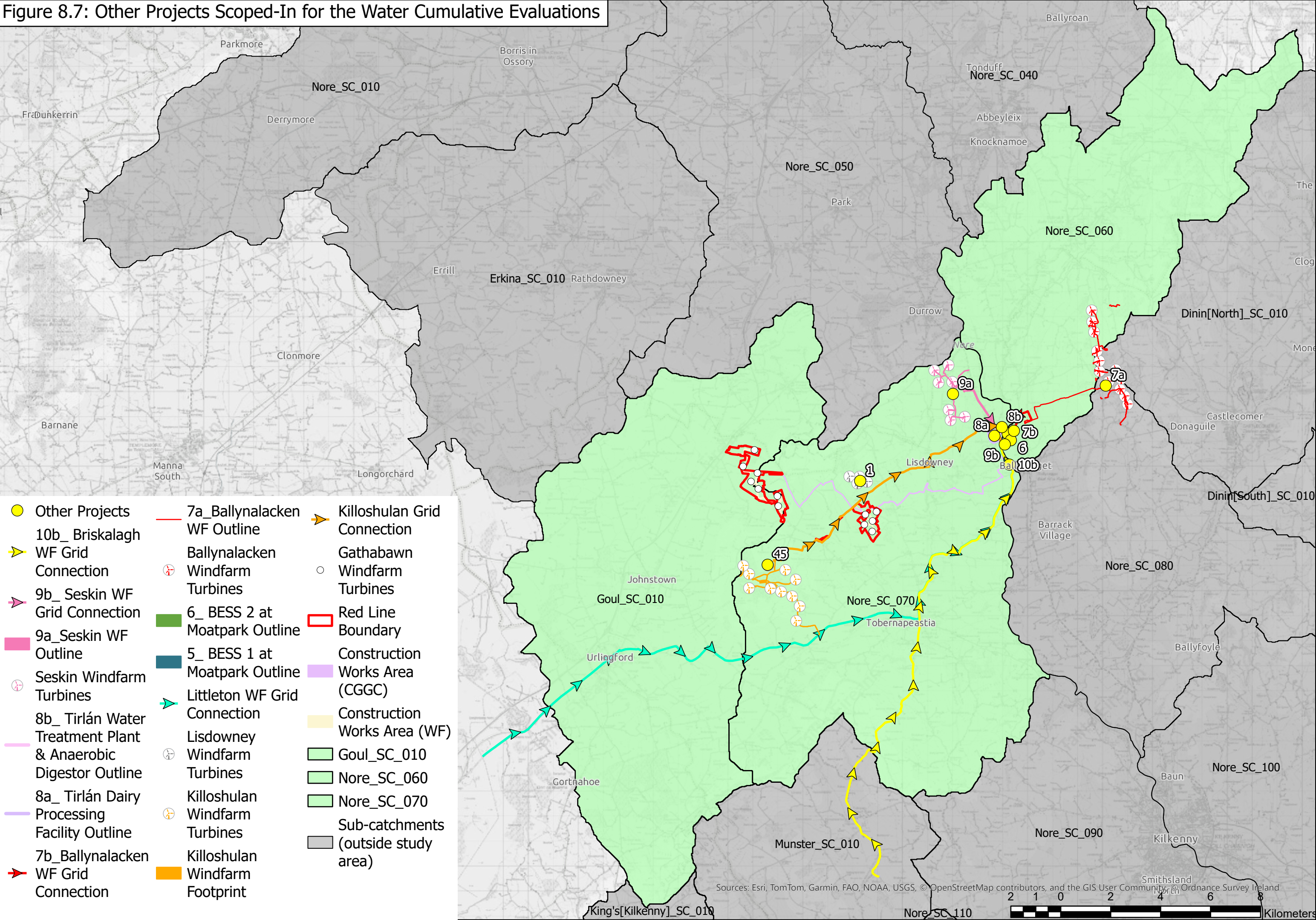
Drawing Title
Proposed Gathabawn Windfarm: Surface Water Quality Monitoring Locations

Scale 1:50,000	@A3	SLR Project No. 501.065883.00001	
Designed ND	Drawn ND	Checked KW	Authorised PG
Date 09/2026	Date 09/2026	Date 09/2026	Date 09/2026
Drawing Number Figure 8-6			Rev. 01

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Figure 8-6: Surface Water Quality Monitoring Locations

Figure 8.7: Other Projects Scoped-In for the Water Cumulative Evaluations



Appendix to Chapter 8: Water

Appendix 8.1: Methodology for the evaluation of Water

Contents

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A8.1.3	Irish Government Acts, National Legislation and Regulations	2
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A8.1 Methodology for the evaluation of Water

A8.1.1 Introduction

This Appendix has been prepared to outline the methodology for the evaluation of water, including the legislation, policy and guidance that is relevant to the assessment of hydrology and hydrogeology for the Proposed Development; and the criteria for determining sensitivity and significance.

This Appendix should be read in conjunction with **Chapter 8: Water** of the Environmental Impact Assessment (EIA) Report which contains a detailed description of the local hydrology and hydrogeology, the embedded mitigation incorporated in the Proposed Development design, and an assessment of potential impacts on surface water and groundwater receptors.

A8.1.2 EU Directives

- Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014;
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy;
- Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration;
- Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks; and
- Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries.

A8.1.3 Irish Government Acts, National Legislation and Regulations

- S.I. No. 349 of 1989, European Communities (Environmental Impact Assessment) Regulations, and subsequent amendments (S.I. No. 84 of 1994, S.I. No. 352 of 1998, S.I. No. 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001);
- The Planning and Development Acts, 2000 to 2009, The Planning and Development (Amendment) Act 2010, S.I. 600 of 2001 Planning and Development Regulations and subsequent amendments including, S.I. No. 364 of 2005 and S.I. 685 of 2006.

National legislation on the protection of the water environment. Since 2000 water management in EU member states has primarily been directed by the Water Framework Directive (2000/60/EC) and the associate 'daughter' Groundwater Directive (2006/118/EC). Irish legislation implementing these, and other relevant directives currently includes:

- S.I. No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010 and amendments (S.I. No. 389 of 2011 and S.I. No. 149 of 2012);
- European Union (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014);
- S.I. No. 278 of 2007 European Communities (Drinking Water) (No. 2) Regulations;
- S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations 2009 and amendment (S.I. No. 327 of 2012);
- S.I. No. 684 of 2007 Waste Water Discharge (Authorisation) Regulations, 2007, as amended (S.I. No. 231 of 2010);
- S.I. No. 122 of 2010 European Communities (Assessment and Management of Flood Risks) Regulations

2010;

- S.I. No. 457 of 2008 European Communities (Environmental Liability) Regulations which bring into force the European Liability Directive (2004/35/EC);
- European Union (Planning and Development) (Environmental Impact Assessment) (No. 2) Regulations 2018 (S.I. No. 404 of 2018);
- Local Government (Water Pollution) Acts 1977 to 1998;
- European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988);
- European Communities (Quality of Shellfish Waters) Regulations, 2006 (S.I. No. 268 of 2006) and amendments (S.I. No. 55 and 464 of 2009), and;
- Bathing Water Quality Regulations, 2008 (S.I. No. 79 of 2008) and amendments (S.I. No. 351 of 2011 and S.I. No. 163 of 2016);

A8.1.4 Guidelines

- Irish Wind Energy Association (2012): Best Practice Guidelines for the Irish Wind Energy Industry
- CIS (2007). Common Implementation Strategy (CIS) for the Water Framework Directive (2000/60/EC) Guidance on preventing or limiting direct and indirect inputs in the context of the Groundwater Directive 2006/118/EC. Guidance Document No. 17.
- CIS (2010). Common Implementation Strategy (CIS) for the Water Framework Directive (2000/60/EC). Guidance on risk assessment and the use of conceptual models for groundwater. Guidance document No. 26.
- DEHLG (2009). Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities.
- DELG/EPA/GSI (1999). Groundwater Protection Schemes. Document prepared jointly by the Geological Survey of Ireland (GSI), the Environmental Protection Agency, and the Department of Environment, Heritage and Local Government.
- EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EPA (2010b). Methodology for Establishing Groundwater Threshold Values and the Assessment of Chemical and Quantitative Status of Groundwater, Including and Assessment of Pollution Trends and Trend Reversal.
- EPA (2011). Guidance on the Authorisation of Discharges to Groundwater. Version 1, December 2011.
- EPA (2003). Towards Setting Guideline Values for the Protection of groundwater in Ireland. Interim Report.
- EPA (2006). Ireland Water Framework Directive Monitoring Programme.
- Fitzsimons, V., Daly, D. and Deakin, J. (2003). Draft GSI guidelines for assessment and mapping of groundwater vulnerability to contamination. Groundwater Chapter, Geological Survey of Ireland.
- GSI (2006). Criteria used in aquifer classification. Available from <http://www.gsi.ie/Programmes/Groundwater/Aquifer+Classification.htm>
- IGI (2007). Guidelines on Water Well Construction. Available from <http://www.gsi.ie/Programmes/Groundwater/Aquifer+Classification.htm>
- GI (2013). Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements. Kilroy, G., Dunne, F., Ryan, J., O'Connor, A., Daly, D., Craig, M., Coxon, C., Johnston, P. and Moe, H. (2008). A Framework for the Assessment of Groundwater – Dependent Terrestrial Ecosystems under the Water Framework Directive. Environmental Research Centre Report Series No. 12.
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works in an Adjacent to Waters.
- DEHLG (2009). The Planning System and Flood Risk Management- Guidelines for Planning Authorities.
- RDEHLG (2018). River Basin Management Plan 2018-2021.
- Good Practice During Wind Farm Construction (Scottish Natural Heritage, 2010).
- Wind Energy Development Guidelines for Planning Authorities (2006) Technical Standards
 - British Standards (2015). Code of Practice for Ground Investigations BS5930:2015.
- CIRIA (2007). The SuDS Manual. (C697). CIRIA publication, February 2007.

- CIRIA (2015). Environmental good practice on Site guide (C741)
- CIRIA (2001). Control of water pollution from linear construction projects (C648)
- SLR Standard operating Procedures (SoP) for surface water and groundwater sampling: o 090330 Hydro SOP Number 1107 0 V 1 0 Drilling Supervision & Monitoring Well Construction; o 090330 Hydro SOP Number 1102 0 V1 0 Surface Water Sampling; o 201015 Hydro SOP 1101 V3 Groundwater Sampling

A8.1.5 Assessing Significance

The significance of likely effects of the project has been assessed by considering two factors: the sensitivity of the receiving environment and, the magnitude of impact should that effect occur. The assessment methodology has also been informed by the assessor's experience of carrying out such assessments for renewable energy developments, knowledge of water environment characteristics in Ireland and cognisance of good practice.

This approach provides a mechanism for identifying the areas where mitigation measures are required and for identifying mitigation measures appropriate to the significance of effects presented by the proposed development. Criteria for determining the significance of effect are presented in Table 1, Table 2, and Diagram 1^{1,2}.

A8.1.6 Sensitivity of Receptor

The sensitivity of the receiving environment (i.e. baseline quality of the receiving environment) is defined as its ability to absorb an effect without a detectable change and can be considered through a combination of professional judgement and a set of pre-defined criteria which are set out in Table 1. Receptors in the receiving environment only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

Table 1: Criteria for Assessing Sensitivity of Receptor

Sensitivity	Definition
HIGH	• Water Framework Directive Water Body Classification High – Good or is close to the boundary of a classification Moderate to Good, or Good to High; • receptor is of high ecological importance or national or international value (e.g. Site of Special Interest (SSSI), Special Area of Conservation (SAC), habitat for protected species which may be dependent upon the geology or hydrology of the development area; • receptor is at high risk from flooding above 1% Annual Exceedance Probability (AEP) and/or waterbody acts as an active floodplain or flood defence; • receptor is used for public and/or private water supply.
MEDIUM	• Water Framework Directive - Water Body Classification Moderate or is close to the boundary of a classification Low to Moderate; • receptor is at moderate risk from flooding (0.1% to 1% AEP) but does not act as an active floodplain or flood defence.
LOW	• Water Framework Directive - Water Body Classification Poor or Bad; • receptor is at low risk from flooding (less than 0.1% AEP); and • receptor not used for water supplies (public or private).

¹ Guidelines on procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009)

² Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022).

A8.1.7 Magnitude of impact

The magnitude of impact would depend upon whether the likely effect would cause a fundamental, material or detectable impact. In addition, the timing, scale, size, and duration of the likely effect resulting from the project are also determining factors. The criteria that have been used to assess the magnitude of impact are defined in Table 2.

Table 2: Criteria for Assessing Magnitude of Impact

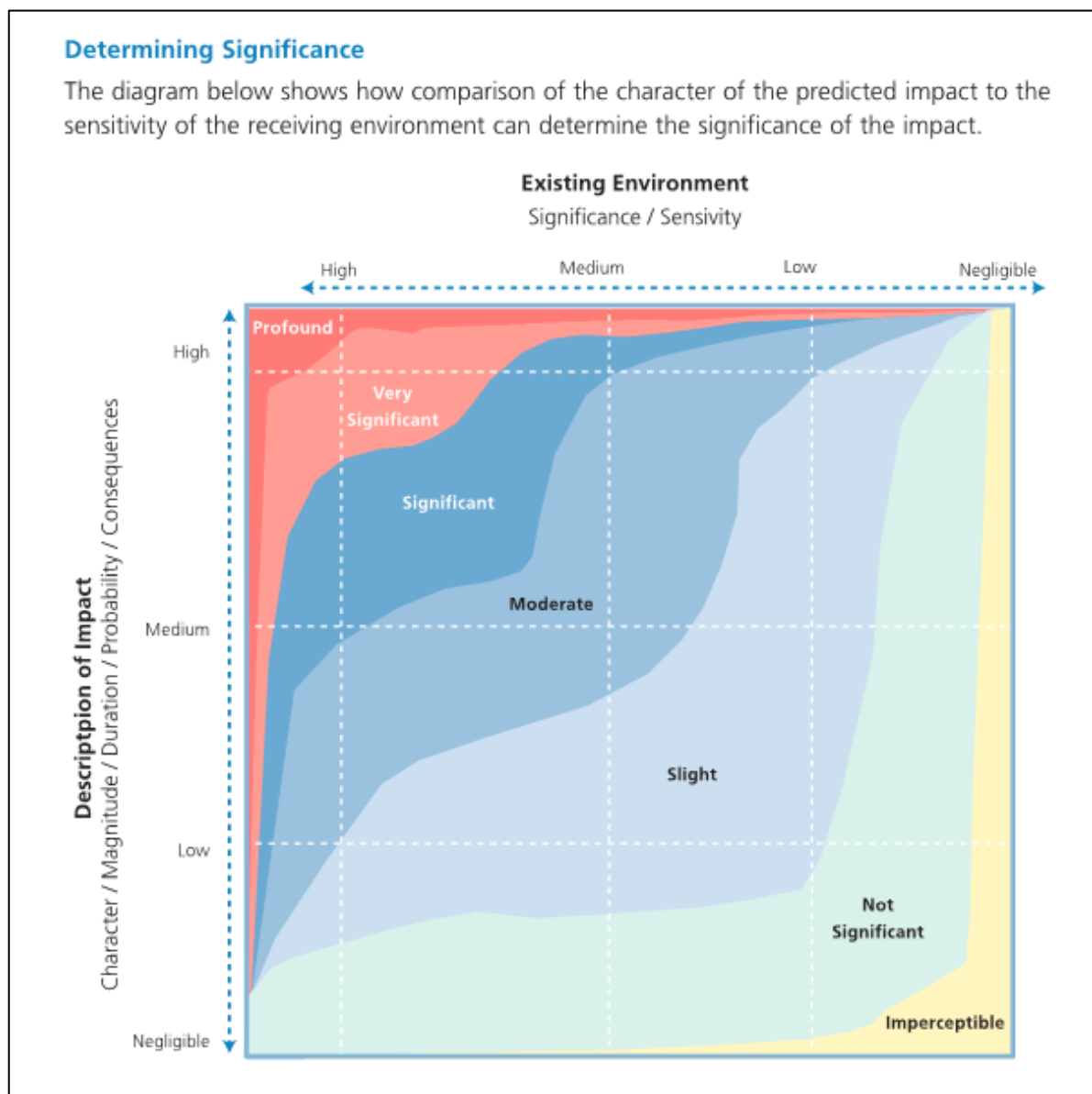
Magnitude	Criteria	Definition
Major	Results in loss of attribute	Fundamental (long term or permanent) changes to the baseline hydrology such as: • wholesale changes to watercourse channel, route, hydrology or hydrodynamics; • changes to the Site resulting in an increase in runoff with flood potential and also significant changes to erosion and sedimentation patterns; • major changes to the water chemistry.
Moderate	Results in impact or integrity of attribute or loss of part of attribute	Material but non-fundamental and short to medium term changes to baseline hydrology and water quality, such as: • some fundamental changes to watercourses, hydrology or hydrodynamics. Changes to Site resulting in an increase in runoff within system capacity; • moderate changes to erosion and sedimentation patterns; • moderate changes to the water chemistry of surface runoff.
Minor	Results in minor impacts on attribute	Detectable but non-material and transitory changes to the baseline hydrology and hydrogeology such as: • minor or slight changes to the watercourse, hydrology or hydrodynamics; • changes to Site resulting in slight increase in runoff well within the drainage system capacity; • minor changes to erosion and sedimentation patterns; • minor changes to the water chemistry of surface water runoff and groundwater; and • minor changes to groundwater levels, flow regime and risk of groundwater flooding.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity	No perceptible changes to the baseline hydrology and water quality such as: • no alterations, or very minor changes with no impact to watercourses, hydrology, hydrodynamics, erosion and sedimentation patterns; • no pollution or changes in water chemistry to either groundwater or surface water; and • no alteration to groundwater recharge or flow mechanisms.

A8.1.8 Significance of Effect

The sensitivity of the receptor, together with the magnitude of impact, determines the significance of effect. This can be categorised into a level of significance as identified in Diagram 1 below.

The significance of effect provides a guide to assist in decision making. However, it should not be considered as a substitute for professional judgement and interpretation. In some cases, the sensitivity of the receiving environment or the magnitude of impact cannot be quantified with certainty and therefore professional judgement remains the most robust method of identifying the significance of a likely effect.

Diagram 1: Significance of Effect



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

Appendix to Chapter 8: Water

Appendix 8.2: Surface Water Quality Monitoring Result

Table of Contents

- Surface Water Results taken May 2025, analysed by CLS
- Surface Water Results taken December 2025 and January 2026, analysed by IAS

App. 8.2 Surface Water Quality Monitoring Result

- Surface Water Results taken May 2025,
analysed by CLS

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596293
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878850	Site A1 14.05.25	Ammonia as N	I,R	0.03	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	12.6	mg/l
		Nitrate as N Calculated	I,R	3.10	mg/l
		Nitrite as N	I,R	<0.005	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	3	mg/l
		TON as N	I,R	3.1	mg/l
		Total Nitrogen as N	I,R	2.88	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.3	N.T.U.



Approved by:

Ann Marie Nee

AnnMarie Nee
Environmental Account
Manager

See below for test specifications and accreditation status.

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 est. is an estimated count.

CLS will test food, water and swabs samples within 24 hours of receipt.

Where samples have been taken by the Client, results apply to the samples as received.

In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

*Analysis carried out in a GMP approved, FDA inspected facility (MedPharma site only).

**Laboratory Analysis, Sampling, Food Safety Monitoring and Analysts on Contract are all ISO 9001 certified.

Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878850	Site A1 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596294
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878851	Site A2 14.05.25	Ammonia as N	I,R	0.007	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	13.8	mg/l
		Nitrate as N Calculated	I,R	3.31	mg/l
		Nitrite as N	I,R	0.006	mg/l
		Orthophosphate as PO ₄	I,R	<0.03	mg/l
		Suspended Solids	I,R	4	mg/l
		TON as N	I,R	3.32	mg/l
		Total Nitrogen as N	I,R	3.63	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	2.3	N.T.U.



Approved by:

Ann Marie Nee

AnnMarie Nee
Environmental Account
Manager

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 est. is an estimated count.

CLS will test food, water and swabs samples within 24 hours of receipt.

Where samples have been taken by the Client, results apply to the samples as received.

In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

*Analysis carried out in a GMP approved, FDA inspected facility (MedPharma site only).

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878851	Site A2 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596295
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878852	Site A3 14.05.25	Ammonia as N	I,R	0.009	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	20	mg/l
		Nitrate as N Calculated	I,R	3.16	mg/l
		Nitrite as N	I,R	0.008	mg/l
		Orthophosphate as PO ₄	I,R	<0.03	mg/l
		Suspended Solids	I,R	2	mg/l
		TON as N	I,R	3.17	mg/l
		Total Nitrogen as N	I,R	4.18	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.6	N.T.U.



Approved by:

Ann Marie Nee

AnnMarie Nee
Environmental Account
Manager

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 Where samples have been taken by the Client, results apply to the samples as received.

In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

*Analysis carried out in a GMP approved, FDA inspected facility (MedPharma site only).

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878852	Site A3 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596296
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878853	Site A4 14.05.25	Ammonia as N	I,R	0.01	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	20.1	mg/l
		Nitrate as N Calculated	I,R	2.77	mg/l
		Nitrite as N	I,R	0.007	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	<2	mg/l
		TON as N	I,R	2.78	mg/l
		Total Nitrogen as N	I,R	3.92	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.7	N.T.U.



Approved by:

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Manager

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 est. is an estimated count.
 CLS will test food, water and swabs samples within 24 hours of receipt.
 Where samples have been taken by the Client, results apply to the samples as received.

In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

*Analysis carried out in a GMP approved, FDA inspected facility (MedPharma site only).

**Laboratory Analysis, Sampling, Food Safety Monitoring and Analysts on Contract are all ISO 9001 certified.

Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878853	Site A4 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596297
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878854	Site A5 14.05.25	Ammonia as N	I,R	0.014	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	21.2	mg/l
		Nitrate as N Calculated	I,R	2.87	mg/l
		Nitrite as N	I,R	0.008	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	2	mg/l
		TON as N	I,R	2.88	mg/l
		Total Nitrogen as N	I,R	4.43	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.6	N.T.U.



Approved by:

Ann Marie Nee

AnnMarie Nee
Environmental Account
Manager

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In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878854	Site A5 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596298
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878855	Site B1 14.05.25	Ammonia as N	I,R	0.008	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	14.4	mg/l
		Nitrate as N Calculated	I,R	1.43	mg/l
		Nitrite as N	I,R	<0.005	mg/l
		Orthophosphate as PO4	I,R	0.093	mg/l
		Suspended Solids	I,R	<2	mg/l
		TON as N	I,R	1.43	mg/l
		Total Nitrogen as N	I,R	1.53	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.9	N.T.U.



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In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878855	Site B1 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596299
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878856	Site B2 14.05.25	Ammonia as N	I,R	0.028	mg/l
		BOD Automated	I,R	2	mg/l
		Chloride	I,R	15.8	mg/l
		Nitrate as N Calculated	I,R	0.548	mg/l
		Nitrite as N	I,R	0.009	mg/l
		Orthophosphate as PO4	I,R	0.063	mg/l
		Suspended Solids	I,R	<2	mg/l
		TON as N	I,R	0.557	mg/l
		Total Nitrogen as N	I,R	0.742	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	1.8	N.T.U.



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In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878856	Site B2 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596300
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878857	Site B3 14.05.25	Ammonia as N	I,R	0.017	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	20.5	mg/l
		Nitrate as N Calculated	I,R	3.58	mg/l
		Nitrite as N	I,R	0.009	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	38	mg/l
		TON as N	I,R	3.59	mg/l
		Total Nitrogen as N	I,R	3.77	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	7.9	N.T.U.



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In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878857	Site B3 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596301
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878858	Site B4 14.05.25	Ammonia as N	I,R	0.007	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	15	mg/l
		Nitrate as N Calculated	I,R	2.05	mg/l
		Nitrite as N	I,R	<0.005	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	3	mg/l
		TON as N	I,R	2.05	mg/l
		Total Nitrogen as N	I,R	1.88	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.5	N.T.U.



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In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878858	Site B4 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596302
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878859	Site B5 14.05.25	Ammonia as N	I,R	0.008	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	16.2	mg/l
		Nitrate as N Calculated	I,R	6.65	mg/l
		Nitrite as N	I,R	<0.005	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	2	mg/l
		TON as N	I,R	6.66	mg/l
		Total Nitrogen as N	I,R	5.63	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.3	N.T.U.



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In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878859	Site B5 14.05.25	Good condition	14/05/2025

**Mass balance of nitrogen components, possible sample matrix interference.

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 599311
 Date of Receipt : 13/06/2025
 Start Date of Analysis : 13/06/2025
 Date of Report : 08/07/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1888846	Site B6- 12.06.2025	Ammonia as N	I,R	0.016	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	23.2	mg/l
		Nitrate as N Calculated	I,R	3.76	mg/l
		Nitrite as N	I,R	0.01	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	<2	mg/l
		TON as N	I,R	3.77	mg/l
		Total Nitrogen as N	I,R	4.94	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.8	N.T.U.



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In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1888846	Site B6- 12.06.2025	Good condition	12/06/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596303
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878860	Site C2 14.05.25	Ammonia as N	I,R	0.015	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	12	mg/l
		Nitrate as N Calculated	I,R	1.36	mg/l
		Nitrite as N	I,R	<0.005	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	<2	mg/l
		TON as N	I,R	1.36	mg/l
		Total Nitrogen as N	I,R	1.37	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	1.0	N.T.U.



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In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878860	Site C2 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596304
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878861	Site C3 14.05.25	Ammonia as N	I,R	0.081	mg/l
		BOD Automated	I,R	1	mg/l
		Chloride	I,R	17.9	mg/l
		Nitrate as N Calculated	I,R	0.985	mg/l
		Nitrite as N	I,R	0.01	mg/l
		Orthophosphate as PO4	I,R	0.113	mg/l
		Suspended Solids	I,R	8	mg/l
		TON as N	I,R	0.995	mg/l
		Total Nitrogen as N	I,R	1.68	mg/l
		Total Phosphorus as P	I,R	0.08	mg/l
		Turbidity	I,R	3.8	N.T.U.



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In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878861	Site C3 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596305
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878862	Site C4 14.05.25	Ammonia as N	I,R	0.012	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	16.5	mg/l
		Nitrate as N Calculated	I,R	3.81	mg/l
		Nitrite as N	I,R	0.011	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	<2	mg/l
		TON as N	I,R	3.83	mg/l
		Total Nitrogen as N	I,R	3.41	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.9	N.T.U.



Approved by:

Ann Marie Nee

AnnMarie Nee
Environmental Account
Manager

See below for test specifications and accreditation status.

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 est. is an estimated count.

CLS will test food, water and swabs samples within 24 hours of receipt.

Where samples have been taken by the Client, results apply to the samples as received.

In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

*Analysis carried out in a GMP approved, FDA inspected facility (MedPharma site only).

**Laboratory Analysis, Sampling, Food Safety Monitoring and Analysts on Contract are all ISO 9001 certified.

Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878862	Site C4 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596306
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878863	Site C5 14.05.25	Ammonia as N	I,R	0.026	mg/l
		BOD Automated	I,R	2	mg/l
		Chloride	I,R	25.9	mg/l
		Nitrate as N Calculated	I,R	1.66	mg/l
		Nitrite as N	I,R	0.016	mg/l
		Orthophosphate as PO4	I,R	0.394	mg/l
		Suspended Solids	I,R	6	mg/l
		TON as N	I,R	1.68	mg/l
		Total Nitrogen as N	I,R	2.11	mg/l
		Total Phosphorus as P	I,R	0.16	mg/l
		Turbidity	I,R	1.0	N.T.U.



Approved by:

Ann Marie Nee

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Environmental Account
Manager

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Where samples have been taken by the Client, results apply to the samples as received.

In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

*Analysis carried out in a GMP approved, FDA inspected facility (MedPharma site only).

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878863	Site C5 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596307
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878864	Site C6 14.05.25	Ammonia as N	I,R	0.009	mg/l
		BOD Automated	I,R	<1	mg/l
		Chloride	I,R	32.2	mg/l
		Nitrate as N Calculated	I,R	2.4	mg/l
		Nitrite as N	I,R	0.005	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	<2	mg/l
		TON as N	I,R	2.41	mg/l
		Total Nitrogen as N	I,R	2.81	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.8	N.T.U.



Approved by:

Ann Marie Nee

AnnMarie Nee
Environmental Account
Manager

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Where samples have been taken by the Client, results apply to the samples as received.

In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

*Analysis carried out in a GMP approved, FDA inspected facility (MedPharma site only).

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878864	Site C6 14.05.25	Good condition	14/05/2025

CERTIFICATE OF ANALYSIS

Client : James Carroll
 Ecopower Developments Limited
 Zetec House Purcellsinch IDA Business Park
 Dublin Road
 Kilkenny R95 PX5X

Report No. : 596309
 Date of Receipt : 15/05/2025
 Start Date of Analysis : 15/05/2025
 Date of Report : 26/05/2025
 Order Number : Gathabawn
 Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1878866	Site P1 14.05.25	Ammonia as N	I,R	0.019	mg/l
		BOD Automated	I,R	1	mg/l
		Chloride	I,R	16.7	mg/l
		Nitrate as N Calculated	I,R	<0.1	mg/l
		Nitrite as N	I,R	<0.005	mg/l
		Orthophosphate as PO4	I,R	<0.03	mg/l
		Suspended Solids	I,R	3	mg/l
		TON as N	I,R	<0.1	mg/l
		Total Nitrogen as N	I,R	0.656	mg/l
		Total Phosphorus as P	I,R	<0.05	mg/l
		Turbidity	I,R	0.9	N.T.U.



Approved by:

Ann Marie Nee

AnnMarie Nee
Environmental Account
Manager

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Where samples have been taken by the Client, results apply to the samples as received.

In-House Test	Specification	Expanded Measurement of Uncertainty	17025	GMP/FDA*	ISO**
Ammonia as N	Konelab CLS 40	+/- 15.2 %	Yes	No	Yes
BOD Automated	CLS 214	+/- 20.29%	Yes	No	Yes
Chloride	Konelab CLS 36	+/- 7.81%	Yes	No	Yes
Nitrate as N Calculated	Konelab CLS 39	+/- 15.41%	Yes	No	Yes
Nitrite as N	Konelab CLS 37	+/- 4.54%	Yes	No	Yes
Orthophosphate as PO4	Konelab CLS 35	+/- 10.05%	Yes	No	Yes
Suspended Solids	CLS 13	+/- 22.64%	Yes	No	Yes
TON as N	Konelab CLS 38	+/- 15.32%	Yes	No	Yes
Total Nitrogen as N	CLS 152	+/- 12.34%	Yes	No	Yes
Total Phosphorus as P	CLS 151	+/- 6.92%	Yes	No	Yes
Turbidity	CLS 30	+/- 13.69%	Yes	No	Yes

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Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1878866	Site P1 14.05.25	Good condition	14/05/2025

App. 8.2 Surface Water Quality Monitoring Result

- Surface Water Results taken December 2025 and January 2026, analysed by IAS

Test Report

Lab Report Number: 51942S001

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	A1	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	13.36	mg/l
Ammonia Nitrogen	SOP 2130	<0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	21.12	mg/l NO ₃
Orthophosphate P	SOP 2135	<0.01	mg/l P
Total Phosphorus	SOP 2126	0.02	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	4.8	mg/l N
Total Nitrogen	SOP 2075	2.8	mg/l
Turbidity	SOP 2022	0.27	NTU

Signed: 
Delia Lowery - Senior Laboratory Techr

Date: 19/12/2025

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Test Report

Lab Report Number: 51942S002

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	A2	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	11.63	mg/l
Ammonia Nitrogen	SOP 2130	<0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	19.80	mg/l NO ₃
Orthophosphate P	SOP 2135	<0.01	mg/l P
Total Phosphorus	SOP 2126	0.03	mg/l P
Total Suspended Solids	SOP 2016	6	mg/l
Total Oxidised Nitrogen	SOP 2137	4.5	mg/l N
Total Nitrogen	SOP 2075	5.5	mg/l
Turbidity	SOP 2022	0.31	NTU

Signed: 
Delia Lowery - Senior Laboratory Techr

Date: 19/12/2025

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Test Report

Lab Report Number: 51942S003

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	A3	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	21.42	mg/l
Ammonia Nitrogen	SOP 2130	<0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	26.80	mg/l NO ₃
Orthophosphate P	SOP 2135	<0.01	mg/l P
Total Phosphorus	SOP 2126	0.05	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	6.1	mg/l N
Total Nitrogen	SOP 2075	5.8	mg/l
Turbidity	SOP 2022	<0.20	NTU

Signed: 
Delia Lowery - Senior Laboratory Techr

Date: 19/12/2025

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Test Report

Lab Report Number: 51942S004

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	A4	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	21.80	mg/l
Ammonia Nitrogen	SOP 2130	<0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	25.04	mg/l NO ₃
Orthophosphate P	SOP 2135	0.01	mg/l P
Total Phosphorus	SOP 2126	0.05	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	5.7	mg/l N
Total Nitrogen	SOP 2075	5.8	mg/l
Turbidity	SOP 2022	<0.20	NTU

Signed: 
Delia Lowery - Senior Laboratory Techr

Date: 19/12/2025

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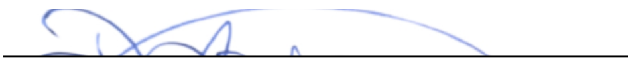


Test Report

Lab Report Number: 51942S005

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	A5	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	3	mg/l
Chloride	SOP 2131	21.59	mg/l
Ammonia Nitrogen	SOP 2130	0.07	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	25.43	mg/l NO ₃
Orthophosphate P	SOP 2135	0.01	mg/l P
Total Phosphorus	SOP 2126	0.08	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	5.8	mg/l N
Total Nitrogen	SOP 2075	5.9	mg/l
Turbidity	SOP 2022	<0.20	NTU

Signed:  Date: 19/12/2025

Delia Lowery - Senior Laboratory Techr

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Test Report

Lab Report Number: 51942S006

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	B1	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	14.32	mg/l
Ammonia Nitrogen	SOP 2130	<0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	25.52	mg/l NO ₃
Orthophosphate P	SOP 2135	0.02	mg/l P
Total Phosphorus	SOP 2126	0.05	mg/l P
Total Suspended Solids	SOP 2016	6	mg/l
Total Oxidised Nitrogen	SOP 2137	5.8	mg/l N
Total Nitrogen	SOP 2075	6.1	mg/l
Turbidity	SOP 2022	3.36	NTU

Signed: 
Delia Lowery - Senior Laboratory Techr

Date: 19/12/2025

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Test Report

Lab Report Number: 51942S007

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	B2	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	18.13	mg/l
Ammonia Nitrogen	SOP 2130	0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	15.75	mg/l NO ₃
Orthophosphate P	SOP 2135	0.02	mg/l P
Total Phosphorus	SOP 2126	0.07	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	3.6	mg/l N
Total Nitrogen	SOP 2075	3.3	mg/l
Turbidity	SOP 2022	0.38	NTU

Signed: 
Delia Lowery - Senior Laboratory Techr

Date: 19/12/2025

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Test Report

Lab Report Number: 52518S001

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	PETER BRETT	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0601-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	06/01/2026
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	06/01/2026
Sample Reference:	GATHABAWN WINDFARM	Date Analysis Commenced:	06/01/2026
Sample Description:	GATHABAWN WINDFARM-SITE B3	Date Certificate Issued:	22/01/2026

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	26.92	mg/l
Ammonia Nitrogen	SOP 2130	0.06	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	21.47	mg/l NO ₃
Orthophosphate P	SOP 2135	0.02	mg/l P
Total Phosphorus	SOP 2126	0.04	mg/l P
Total Suspended Solids	SOP 2016	7	mg/l
Total Nitrogen	SOP 2075	5.4	mg/l
Turbidity	SOP 2022	2.85	NTU
Total Oxidised Nitrogen	SOP 2137	4.9	mg/l N

Signed: Declan Keegan
Declan Keegan - Senior Laboratory Tec

Date: 22/01/2026

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Test Report

Lab Report Number: 51942S008

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	B4	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	16.48	mg/l
Ammonia Nitrogen	SOP 2130	0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	17.07	mg/l NO ₃
Orthophosphate P	SOP 2135	0.01	mg/l P
Total Phosphorus	SOP 2126	0.05	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	3.9	mg/l N
Total Nitrogen	SOP 2075	3.8	mg/l
Turbidity	SOP 2022	1.28	NTU

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Delia Lowery - Senior Laboratory Techr

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Test Report

Lab Report Number: 51942S009

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	B5	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	17.78	mg/l
Ammonia Nitrogen	SOP 2130	<0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	26.84	mg/l NO ₃
Orthophosphate P	SOP 2135	0.01	mg/l P
Total Phosphorus	SOP 2126	0.04	mg/l P
Total Suspended Solids	SOP 2016	10	mg/l
Total Oxidised Nitrogen	SOP 2137	6.1	mg/l N
Total Nitrogen	SOP 2075	5.2	mg/l
Turbidity	SOP 2022	1.08	NTU

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Test Report

Lab Report Number: 52518S002

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	PETER BRETT	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0601-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	06/01/2026
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	06/01/2026
Sample Reference:	GATHABAWN WINDFARM	Date Analysis Commenced:	06/01/2026
Sample Description:	GATHABAWN WINDFARM-SITE B6	Date Certificate Issued:	22/01/2026

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	<1	mg/l
Chloride	SOP 2131	25.52	mg/l
Ammonia Nitrogen	SOP 2130	0.04	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	29.88	mg/l NO ₃
Orthophosphate P	SOP 2135	0.02	mg/l P
Total Phosphorus	SOP 2126	0.03	mg/l P
Total Suspended Solids	SOP 2016	6	mg/l
Total Nitrogen	SOP 2075	7.8	mg/l
Turbidity	SOP 2022	<0.20	NTU
Total Oxidised Nitrogen	SOP 2137	6.8	mg/l N

Signed: Declan Keegan
Declan Keegan - Senior Laboratory Tec

Date: 22/01/2026

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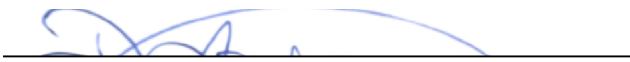


Test Report

Lab Report Number: 51942S010

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	C1	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	7.02	mg/l
Ammonia Nitrogen	SOP 2130	0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	<4.4	mg/l NO ₃
Orthophosphate P	SOP 2135	0.01	mg/l P
Total Phosphorus	SOP 2126	0.03	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	<1.0	mg/l N
Total Nitrogen	SOP 2075	<0.5	mg/l
Turbidity	SOP 2022	<0.20	NTU

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Test Report

Lab Report Number: 51942S011

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	C2	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	2	mg/l
Chloride	SOP 2131	13.18	mg/l
Ammonia Nitrogen	SOP 2130	0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	11.44	mg/l NO ₃
Orthophosphate P	SOP 2135	0.01	mg/l P
Total Phosphorus	SOP 2126	0.04	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	2.6	mg/l N
Total Nitrogen	SOP 2075	3.0	mg/l
Turbidity	SOP 2022	2.98	NTU

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Test Report

Lab Report Number: 51942S012

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	C3	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	14.93	mg/l
Ammonia Nitrogen	SOP 2130	<0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	10.56	mg/l NO ₃
Orthophosphate P	SOP 2135	0.02	mg/l P
Total Phosphorus	SOP 2126	0.05	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	2.4	mg/l N
Total Nitrogen	SOP 2075	3.7	mg/l
Turbidity	SOP 2022	3.29	NTU

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Test Report

Lab Report Number: 51942S013

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	C4	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2131	18.09	mg/l
Ammonia Nitrogen	SOP 2130	<0.02	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	22.88	mg/l NO ₃
Orthophosphate P	SOP 2135	<0.01	mg/l P
Total Phosphorus	SOP 2126	0.03	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	5.2	mg/l N
Total Nitrogen	SOP 2075	5.5	mg/l
Turbidity	SOP 2022	1.68	NTU

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Test Report

Lab Report Number: 51942S014

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	JAMES	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0312-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	02/12/2025
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	03/12/2025
Sample Reference:	SURFACE WATER 02/12/2025	Date Analysis Commenced:	03/12/2025
Sample Description:	C5	Date Certificate Issued:	19/12/2025

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	2	mg/l
Chloride	SOP 2131	25.59	mg/l
Ammonia Nitrogen	SOP 2130	0.04	mg/l NH ₃ -N
Nitrite	SOP 2134	0.16	mg/l NO ₂
Nitrate	SOP 2138	46.42	mg/l NO ₃
Orthophosphate P	SOP 2135	0.03	mg/l P
Total Phosphorus	SOP 2126	0.12	mg/l P
Total Suspended Solids	SOP 2016	<5	mg/l
Total Oxidised Nitrogen	SOP 2137	10.6	mg/l N
Total Nitrogen	SOP 2075	8.1	mg/l
Turbidity	SOP 2022	0.22	NTU

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Test Report

Lab Report Number: 52518S003

Customer ID:	ECO.P1	Analysis Type:	99A (99A)
Contact Name:	PETER BRETT	Delivery By:	CUSTOMER
Company Name:	ECO POWER	Sample Card Number:	0601-ECO1
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	Condition on Receipt:	Acceptable
		Sample Date:	06/01/2026
		Sample Time:	
Sample Type:	SURFACE WATER	Date Sample Received:	06/01/2026
Sample Reference:	GATHABAWN WINDFARM	Date Analysis Commenced:	06/01/2026
Sample Description:	GATHABAWN WINDFARM-SITE C6	Date Certificate Issued:	22/01/2026

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	<1	mg/l
Chloride	SOP 2131	29.25	mg/l
Ammonia Nitrogen	SOP 2130	0.07	mg/l NH ₃ -N
Nitrite	SOP 2134	<0.10	mg/l NO ₂
Nitrate	SOP 2138	21.91	mg/l NO ₃
Orthophosphate P	SOP 2135	0.03	mg/l P
Total Phosphorus	SOP 2126	0.03	mg/l P
Total Suspended Solids	SOP 2016	5	mg/l
Total Nitrogen	SOP 2075	5.3	mg/l
Turbidity	SOP 2022	0.42	NTU
Total Oxidised Nitrogen	SOP 2137	5.0	mg/l N

Signed: Declan Keegan
Declan Keegan - Senior Laboratory Tec

Date: 22/01/2026

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Water Framework Directive Assessment

Proposed Gathabawn Windfarm, Co. Kilkenny

Ecopower Developments Limited

Zetec House, Purcellsinch IDA Business Park, Dublin
Road, Kilkenny, R95 PX5X

Prepared by:

SLR Environmental Consulting (Ireland) Ltd

7 Dundrum Business Park, Windy Arbour, Dublin, D14
N2Y7

SLR Project No.: 501.065883.00001

25 September 2026

Revision: 0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
0 DRAFT	5 March 2026	MS	DB	
0	25 September 2026	AH	KW	PG

Basis of Report

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1.0 Introduction

SLR Environmental Consulting (Ireland) Ltd. (SLR) has been appointed by Ecopower Ltd to prepare a Water Framework Directive Assessment (WFDA) report. The WFDA will assess WFD waterbodies in the study area of the proposed Gathabawn Windfarm to compliment 'Chapter 8: Water' in the Environmental Impact Assessment Report (EIAR).

The proposed Gathabawn Windfarm will comprise a total of 12 turbines, grouped into two sections: the Ballylehaun section (7 turbines) and the Ballyring section (5 turbines). The development will also include the turbine hardstanding areas, the site access roads, 2 control buildings, 1 met mast, underground cabling, temporary works to facilitate turbine deliveries and other associated and ancillary works.

1.1 Background and Regulatory Context

This WFD assessment report sets out the potential implications of the proposed Gathabawn Windfarm development for the objectives of the WFD. It identifies the relevant water bodies which have the potential to be impacted by the proposed development, identifies if the requirements of the WFD are being met and assesses whether the proposed development activities will:

- Cause a deterioration in WFD status of a waterbody; and
- Hinder a programme of measures (PoM) designed to bring about Good Status for a water body.

The proposed development is assessed here in terms of the potential risk to cause or result in a deterioration in the status or hinder the effectiveness of the programme of measures¹ (PoM) as set out in the River Basin Management Plan (RBMP) to achieve good status in water bodies.

1.2 Site Setting

1.2.1 Location

The proposed Gathabawn Windfarm is located within County Kilkenny on two areas of high ground – at Ballylehaun and at Ballyring, with ITM Coordinates E 634018, N 670411, and E 638632, N 668784, respectively. The overall development footprint of the proposed Gathabawn Windfarm site is c. 260 ha, see **Figure WFDA-01**. The Ballylehaun Section, consisting of Turbines T1-T7, the met mast, and the Ballylehaun Control Building, will be based in the townlands of Glashare, Coolnacrutta, Ballylehaun and Gorteenamuck. The Ballyring section, consisting of turbines T8-T12, the LiDAR unit, and the Ballyring Control Building, will be in the townlands of Ballyring Upper and Tentore. The proposed Gathabawn Windfarm also includes two areas of facilitating works (FW8 and FW9) along the turbine delivery route between the Ballylehaun Area and Ballyring Area.

The proposed Gathabawn Windfarm is in rural countryside with lands enclosed by hedgerows or stone walls. There are farmsteads and one-off housing located in the open countryside and generally the commercial, civic and community services are in the surrounding small towns and villages. Farming in the area is predominantly grassland supporting dairy and beef cattle

¹ Department of Housing, Local Government and Heritage. Water Action Plan 2024 A River Basin Management Plan for Ireland. Appendix 1: Programme of Measures: Further information on the environmental measures to 2027



and to a lesser degree sheep farming and tillage. There is existing hardcore area in the designated Ballyring Control Building location.

Although not included as part of the application, the Candidate Gathabawn Grid Connection is situated in Co. Kilkenny, routed along the public road between Ballylehaun and Ballyring, and across private lands between Ballyring and the existing EirGrid Ballyragget Substation in Moatpark.

1.3 Proposed Development

The proposed Gathabawn Windfarm development will consist of:

- Ballylehaun Section: 7 three-bladed wind turbines (rotor diameter of 136 m, hub height of 102 m for T1-5 and 82 m for T6 and T7 – thus giving an overall height of 170 m for T1-T5 and 150 m for T6 and T7), and associated works including turbine foundations, hardstanding areas, windfarm roads and drainage networks, internal underground cabling, electrical control building, 1 lattice met mast (30 m in height) and ancillary and associated works, in the townlands of Glashare, Coolnacrutta, Ballylehaun and Gorteenamuck;
- Ballyring Section: 5 three-bladed wind turbines (rotor diameter of 136 m, hub height of 82 m for T9 and 102 m for T8, T10, T11 and T12 – thus giving an overall height of 150 m for T9 and 170 m for T8, T10, T11 and T12) and associated works including turbine foundations, hardstanding areas, windfarm roads and drainage networks, internal underground cabling, electrical control building, 1 LiDAR unit, and ancillary and associated works, in the townlands of Ballyring Upper and Tentore; and
- Other ancillary works including site entrances, site drainage network, temporary borrow pits, temporary construction compounds (parking spaces, offices and canteen, storage area for waste and materials, oil and fuel storage area, toilet block within integrated sealed wastewater holding tanks, and temporary waste water storage tank for potable water), temporary blade set down areas, local public road widening works, temporary widening of site access points, and landscaping and reinstatement works.

The Candidate Gathabawn Grid Connection will consist of:

- Ballylehaun-Ballyring Underground Cabling (UGC) - Underground cabling 5.6 km in length between the Ballylehaun Control Building and Ballyring Control Building, installed under windfarm site roads and under public road;
- Ballyring-Parksgrove UGC – Underground cabling 8.8 km in length between the Ballyring Control Building and Parksgrove Substation. The cabling will be installed under agricultural lands, hardcore areas and along the public road corridor;
- Parksgrove-Moatpark UGC – Underground cabling c.1.5 km in length connecting the Parksgrove Substation to the EirGrid Ballyragget Substation. This cabling will cross the N77 National Road and River Nore, and then go through agricultural lands and public road; and
- Parksgrove Substation – A new EirGrid specification 110kV substation at Parksgrove townland.



1.4 Sources of information for WFD assessment

The information used in the preparation of this impact assessment is set out in Table 1 below.

Table 1: Sources of Information

Data	Dataset
Surface Water	• Tailte Éireann Discovery Series Mapping; • Environmental Protection Agency Maps and Water Maps; and • Water Framework Directive.
Groundwater	• GSI Groundwater Data Viewer; • GSI Groundwater body description documents; and • Environmental Protection Agency Maps and Water Maps
Protected Areas, Environmental Pressures	• Environmental Protection Agency Maps

1.5 Supporting site documents

This WFD Assessment report has been prepared with regard to the assessments undertaken in support of the planning application for the proposed Gathabawn Windfarm development and in particular:

- The Environmental Impact Assessment Report (EIAR) for the planning application for the proposed Gathabawn Windfarm development, specifically, 'Chapter 8: Water' (Hydrology and Hydrogeology), prepared by SLR (September 2026). The EIAR includes details of the geology, hydrogeology and hydrology at the site.

1.6 Statement of authority

This WFD Assessment report was prepared by SLR Environmental Consulting (Ireland) Ltd. The project team consists of:

- Michelle Sherry – SLR Project Hydrogeologist, BSc. (Environmental Bioscience), MIAH, GCIWEM;
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2.0 Water Framework Directive

2.1 Legislation

The Water Framework Directive (WFD) (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy) (the 'Water Framework Directive') was adopted and came into force in 2000 and sought to align provisions for water resource protection in response to emerging scientific data on widespread degradation of quality. It establishes a legislative framework for the protection of surface waters (including rivers, lakes, transitional waters (Article 2 of 2000/60/EC defines 'Transitional waters' which for the purposes of this Advice Note are referred to as estuarine waters) and coastal waters) and groundwater throughout the EU.

The EU Water Framework Directive² (WFD) became EU law in December 2000 and provides for a single European approach to assessing water quality (Ecological status) and allows for the comparison of results across Europe.

The WFD requires all Member States to protect and improve water quality in all waters so that we achieve Good Ecological Status by 2015 or, at the latest, by 2027. It was given legal effect in Ireland by the European Communities (Water Policy) Regulations³. The Directive requires that management plans be prepared on a river basin basis and specifies a structured method for developing these plans.

The WFD identifies where actions are required to achieve Good Ecological status or maintain water bodies which are already Good or High Ecological status. Water bodies can be restored to Good and High Ecological status by using targeted actions and measures to reduce the impact of human activities on them.

For heavily modified or artificial water bodies, which are incapable of achieving Good Ecological Status without impairing an existing specified water use, the environmental objective is to achieve Good Ecological Potential.

The WFD requires that management plans are prepared on a river basin basis and specifies a structured method for developing these plans.

2.2 River Basin Management Plans

The WFD requires the consideration of a single system of water resource management through characterisation, protection and enhancement of water resources considered within the context of a river basin district (RBD) with the production of a River Basin Management Plan (RBMP) by the Environmental Protection Agency (EPA).

The RBMPs describe the current state of the water environment for each RBD, the pressures effecting the water environment, the objectives for protecting and improving it, and the Programme of Measures (PoM) needed to achieve the statutory environmental objectives of the WFD. RBMPs are subject to a six-year planning cycle and are to be routinely reviewed and updated to ensure compliance with the overall WFD objectives.

² Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

³ European Communities (Water Policy) regulations 2003 (SI No. 722 of 2003).



2.2.1 River Basin Management Plan for Ireland 2022-2027

The current RBMP for Ireland⁴ states that while substantial progress has been made in the management of water services and how we work together to protect, restore and improve water quality with the improvement in some areas and aspects of water quality, many water bodies are still subject to mounting environmental pressures and overall water quality is in decline primarily due to nutrient pollution.

The RBMP states that due to the overall decline in water quality, stronger measures are now required which will improve overall water quality. The sustainable management of water resources is important to address and adapt to the impacts of climate change, with many of the required measures having co-benefits for climate mitigation and biodiversity. Protecting and restoring water quality in Ireland will most of all need measures to address:

- the loss of agricultural nutrients to water;
- the need for continued improvement in wastewater treatment; and
- re-establish natural free-flowing conditions in more rivers.

The plan states that Ireland's water resources and services face challenges on a number of fronts including a continued need for investment in infrastructure and increasing demand for water services due to urbanisation, population and economic growth. These challenges are set against a backdrop of widespread, rapid and intensifying climate change.

River sub-basin boundaries in the vicinity of the proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection route are outlined in **Figure WFDA-02**.

⁴ Department of Housing, Local Government and Heritage (2024). Water Action Plan 2024. A River Basin Management Plan for Ireland.



3.0 WFD Assessment Methodology

3.1 Overview

In order to be compliant with the requirements of the WFD, any activity which has the potential to have an impact on WFD water bodies must be assessed to determine whether it could cause deterioration in the ecological status or potential of a water body. This WFD assessment report has been prepared for the construction and operational phases of the proposed Gathabawn Windfarm and the Candidate Gathabawn Grid Connection.

This assessment identifies the potential source-pathway-receptor relationships between the proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection and WFD waterbody receptors and considers the inherent risks that could arise from construction and operational activities. The assessment also assumes the implementation of embedded mitigation measures, standard environmental management controls and recognised industry good practice that form part of the proposed development design and construction methodology.

Such measures include, but are not limited to, drainage management measures, pollution prevention controls, sediment and erosion control measures, water quality protection measures and environmental monitoring. Further details are provided in 'Chapter 8: Water' in the EIAR for this proposed development.

The identification of potential impacts and deterioration pathways is intended to demonstrate the mechanisms by which WFD receptors could be affected in the absence of mitigation, while the assessment of WFD compliance and the likelihood of deterioration is undertaken taking account of the mitigation measures and environmental controls that inherently form part of the proposed Gathabawn Windfarm. Determination of the overall risk of deterioration is therefore considered in the context of a project designed and constructed in accordance with industry good practice and environmental management requirements.

The determination of the Risk of Deterioration category (Negligible, Low, Medium, or High) is based on consideration of site-specific factors, including proximity to the waterbody, the presence and nature of hydrological pathways, bedrock geology, surrounding infrastructure, and the duration and persistence of the activity.

The decommissioning of the wind farm will be relatively straightforward and will involve the dismantling of structures and reinstatement of the land over subterranean structures. The decommissioning process would involve:

- Decommissioning and dismantling electrical plant and apparatus;
- Removal of underground cables;
- Dismantling the turbines; and
- Reinstatement and restoration of the windfarm site.

There are no toxic residues from the windfarm decommissioning process and therefore there would be no requirement for site clean-up or rehabilitation and no legacy waste to be considered and there are no anticipated direct or indirect impacts during the post-operational phase. Therefore, the post-operational phase has been screened out of this WFD assessment.

The assessment has been undertaken on surface waterbody and groundwater body (GWB) receptors which are either at, or are in close proximity to, the proposed Gathabawn Windfarm. The proposed Gathabawn Windfarm site boundary was assessed with a 2 km buffer around



it. As the site boundary is partially within regionally important karstic bedrock aquifer, these areas were assessed within a buffer area of 5 km. The surface waterbodies and the groundwater bodies crossed by the Candidate Gathabawn Grid Connection were also assessed here.

Potential receptors have been identified based on a review of the sources set out in Table 1 above and they are set out below in Table 2 and in **Figure WFDA-01** and **Figure WFDA-03**.

Table 2: Potential Receptors included in WFD Assessment

Receptor Type	List of Identified Receptors	Pathway
WFD surface waterbodies	Gorteennamuck EPA Name: GORTEENAHILLA_010 WFD ID: IE_SE_15G080300	Surface watercourse within 1 km and to the east of turbines T3-T5 and flows in a south easterly direction. This watercourse is also crossed by the Ballylehaun-Ballyring Underground Cabling (UGC) trenching over/under a culvert.
	Ballygowney EPA Name: GORTEENAHILLA_010 WFD ID: IE_SE_15G080300	Surface watercourse within 2 km and to the east of turbines T3 and T7, flowing in a southerly direction.
	Gorteenahilla EPA Name: GORTEENAHILLA_010 WFD ID: IE_SE_15G080300	Surface watercourse within 1 km of the Ballylehaun site boundary, within 1 km of the Ballyring site boundary, within c. 23 m of facilitating works FW8, and within 1 km of facilitating works FW9. It flows in a south easterly direction. This watercourse is also crossed by the Ballylehaun-Ballyring UGC using the Horizontal Directional Drilling (HDD) method.
	Cullahill_Mountain EPA Name: GORTEENAHILLA_010 WFD ID: IE_SE_15G080300	Surface watercourse within 2 km of the Ballylehaun site boundary, east of turbine T2. It flows in a south westerly direction.
	Foyle_South EPA Name: GORTEENAHILLA_010 WFD ID: IE_SE_15G080300	Surface watercourse within 3 km south east of T6, within 90m of facilitating works FW8, within 800 m of facilitating works FW9 and within 1.4 km of T11. It flows in a north easterly direction and joins the Gorteenahilla stream.
	Ballyring Upper EPA Name: GORTEENAHILLA_010 WFD ID: IE_SE_15G080300	Surface watercourse within 1 km and to the west of turbines T11 and T12, and within 5 m of facilitating works FW9. It flows in a south easterly direction.
	Goul EPA Name: GOUL_040	Surface watercourse within 3 km of the Ballylehaun site boundary, west



Receptor Type	List of Identified Receptors	Pathway
	WFD ID: IE_SE_15G020300	of Turbine T4 and T5. It flows in a north easterly direction joining to GOUL_050, west of the site.
	Baunballinlough Stream EPA Name: GOUL_040 WFD ID: IE_SE_15G020300	Surface watercourse within 5 km of the Ballylehaun site boundary, south west of Turbine T4 and T5. It flows in an easterly direction joining to GOUL_040.
	Baugarrow EPA Name: GOUL_050 WFD ID: IE_SE_15G020360	Surface watercourse within 2 km of the Ballylehaun site boundary, west of Turbine T4 and T5. It flows in a north easterly direction, away from the site.
	Baunrickeen EPA Name: GOUL_050 WFD ID: IE_SE_15G020360	Surface watercourse within 3 km of the Ballylehaun site boundary, west of Turbine T4 and T5. It flows in a north easterly direction, away from the site.
	Coolnacrutta EPA Name: GOUL_050 WFD ID: IE_SE_15G020360	Surface watercourse within 500m and to the southwest of turbines T6 and T7, flowing in a north westerly direction.
	Cooloultha_or_Moneynamuck EPA Name: GOUL_050 WFD ID: IE_SE_15G020360	Surface watercourse within 2 km of the Ballylehaun site boundary, north west of T1, flowing in a south easterly direction.
	Goul EPA Name: GOUL_050 WFD ID: IE_SE_15G020360	Surface watercourse within 2 km of the Ballylehaun site boundary, north west of Turbine T1. It flows in a northerly direction.
	Maynebog EPA Name: GOUL_050 WFD ID: IE_SE_15G020360	Surface watercourse within 3 km of the Ballylehaun site boundary, north of Turbine T1. It flows in an easterly direction.
	Goul EPA Name: GOUL_060 WFD ID: IE_SE_15G020500	Surface watercourse within 3 km of the Ballylehaun site boundary, north of Turbine T1. It flows in a north easterly direction.
	Maynebog EPA Name: GOUL_060 WFD ID: IE_SE_15G020500	Surface watercourse within 3 km of the Ballylehaun site boundary, north of Turbine T1. It flows in a northerly direction and connects to the Goul stream (GOUL_060), flowing in an easterly direction.
	Shanbally 15 EPA Name: GOUL_060 WFD ID: IE_SE_15G020500	Surface watercourse within 3 km of the Ballylehaun site boundary, north of Turbine T1. It flows in a north easterly direction and connects to



Receptor Type	List of Identified Receptors	Pathway
		the Maynabog stream (GOUL_060), flowing in an easterly direction.
	Raheenleagh 15 EPA Name: GOUL_060 WFD ID: IE_SE_15G020500	Surface watercourse within 3 km of the Ballylehaun site boundary, north of Turbine T1. It flows in a westerly direction.
	Lismaine EPA Name: NORE_150 WFD ID: IE_SE_15N011700	Surface watercourse within 1 km and to the northeast of turbines T8 – T10, and within 500m of T9 which flows in an easterly direction. It is also within 4 km of the Ballylehaun site boundary. The majority of groundwater baseflow from the site is to the River Nore. This watercourse is also crossed by the Ballyring-Parksgrove UGC by trenching across the watercourse (dam and overpump).
	Clomantagh Lower EPA Name: NUENNA_010 WFD ID: IE_SE_15N020100	Surface watercourse within 4 km of the Ballylehaun site boundary, and to the south of turbine T5. It flows downstream in a south easterly direction.
	Gorteenahilla EPA Name: NUENNA_020 WFD ID: IE_SE_15N020400	Surface watercourse within 1 km of the site boundary, and to the south west of turbines T11 and T12. It is also within 2 km of facilitating works FW8 and FW9 and is within 3 km of the Ballylehaun site boundary. It flows downstream in a south easterly direction.
	Newtown [Goul] EPA Name: ERKINA_050 WFD ID: IE_SE_15E010550	Surface watercourse within 2 km of the Ballylehaun site boundary, northeast of turbine T1, and flows in a north easterly direction.
	Addergoole 15 EPA Name: ERKINA_050 WFD ID: IE_SE_15E010550	Surface watercourse within 4 km of the Ballylehaun site boundary, north of Turbine T1. It flows in a northerly direction.
	Oldglass EPA Name: ERKINA_050 WFD ID: IE_SE_15E010550	Surface watercourse within 5 km of the Ballylehaun site boundary, northwest of Turbine T1. It flows in a north easterly direction.
	Lisdowney (Stream) EPA Name: LISDOWNEY_010 WFD ID: IE_SE_15L020100	Surface watercourse within 2 km of the Ballylehaun site boundary, northeast of turbine T1, and flows in a north easterly direction. This watercourse is also crossed by the Ballyring-Parksgrove UGC by



Receptor Type	List of Identified Receptors	Pathway
		trenching across the watercourse (dam and overpump).
	Tinnaslatty EPA Name: LISDOWNEY_010 WFD ID: IE_SE_15L020100	Surface watercourse within 5 km of the Ballylehaun site boundary, east of turbine T1, and within 2 km of the Ballyring site boundary, flowing in a north easterly direction.
	Seskin_North EPA Name: LISDOWNEY_010 WFD ID: IE_SE_15L020100	Surface watercourse within 4 km of the Ballylehaun site boundary, east of turbine T3, and within 2 km of the Ballyring site boundary, flowing in a north easterly direction.
	Ballyconra EPA Name: NORE_140 WFD ID: IE_SE_15N011600	Surface watercourse within 4 km of the Ballyring site boundary, east of turbine T9, flowing in a southerly direction. This watercourse is also crossed by the Ballyring-Parksgrove UGC by trenching across the watercourse (dam and overpump).
	Nore EPA Name: NORE_120 WFD ID: IE_SE_15N011400	Surface watercourse within c. 5.5 km of the Ballyring site boundary, northeast of turbine T9, flowing in a southerly direction. This watercourse is also crossed by the Parksgrove-Moatpark UGC by using the HDD method.
WFD groundwater bodies	Lisdowney GWB WFD ID: IE_SE_G_088	Groundwater recharge at site to the poor bedrock aquifer within the Lisdowney GWB.
	Durrow (GWB) WFD ID: IE_SE_G_156	Groundwater recharge at site to regionally important karstic bedrock aquifer within the Durrow GWB.
	Rathdowney (GWB) WFD ID: IE_SE_G_114	Rathdowney GWB is within 200 m of the Ballylehaun site boundary and is a poorly productive, locally important bedrock aquifer.
	Shanahoe GWB WDF ID: IE_SE_G_119	Shanahoe GWB is within 3 km of the site boundary and is a locally important karstified (diffuse) bedrock aquifer. Groundwater may travel from the Durrow GWB to the Shanahoe GWB due to the karstified bedrock.
	GWDTE-The Loughlans Turlough GWB WFD ID: IE_SE_G_134	GWDTE-The Loughlans Turlough GWB is within 4 km of the Ballylehaun site boundary and is a locally important karstified (diffuse) bedrock aquifer. Groundwater may



Receptor Type	List of Identified Receptors	Pathway
		travel from the Durrow GWB to the GWDTE-The Loughlans Turlough GWB due to the karstified bedrock.
	Kilkenny-Ballynakill Gravels GWB WFD ID: IE_SE_G_163	Kilkenny-Ballynakill Gravels GWB is a regional important gravel karst (diffuse) aquifer. The Candidate Gathabawn Grid Connection is within this GWB, and it is within 4 km to east of the Ballyring site boundary.

3.2 Period of assessment

This report considers the baseline period for the assessment of the proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection as of September 2026. The assessment considers the risk of deterioration in WFD status over the course of the current River Basin Planning Cycle and the PoM in the current RBMP, and in relation to the baseline conditions under the WFD Cycle 3 2022-2027.

3.3 Development phases for assessment

In order to consider the effects of the construction and operational phases, the periods of assessment in this WFD Assessment are as follows:

- **Construction Phase:** The construction phase (c. 1-2 years) for the proposed Gathabawn Windfarm as outlined in the EIAR will include: turbine construction and erection with associated works including turbine foundations, hardstanding areas, windfarm roads and drainage networks, internal underground cabling, electrical control buildings, 1 lattice met mast, 1 LiDAR unit, and ancillary and associated works such as construction of the temporary construction compounds, local public road widening and site access points, and landscaping and reinstatement works.

Construction of the Candidate Gathabawn Grid Connection is expected to take 12-18 months and will include: construction of the Parksgrove Substation including compound construction, fit out of control buildings and electrical works, and cable trenching, joint bay construction, horizontal direction drilling and cable pulling and commissioning for the underground cabling.

- **Operation Phase:** the wind turbines will stay in place until the end of its expected 35-year operational period. After 35 years, the windfarm could continue operating as is and be repowered using the latest wind turbine technology at the time or the turbines and apparatus can be decommissioned and dismantled.

The Parksgrove Substation will be operated and maintained as part of EirGrid's substation operation and maintenance programme. The underground cabling will be inspected every 1-2 years, including checks and inspections via the joint bays.



3.4 Consideration of spatial and temporal scale

For the surface waterbodies being assessed, in terms of the scale of the waterbodies and their catchment, it is considered that there may be a risk of deterioration from the construction works as there is indirect hydrological pathways from the site to surface waterbodies in the vicinity. There will be no direct discharge from the proposed site to the surface waterbodies. However, there is an indirect pathway via groundwater baseflow or surface runoff to the surface waterbodies, as well as direct hydrological connectivity between the Candidate Gathabawn Grid Connection and 6 watercourses: the Gorteennamuck (GORTEENAHILLA_010), Gorteennahilla (GORTEENAHILLA_010), Lismaine (NORE_150), Lisdowney (Stream) (NORE_140), Ballyconra (NORE_140) and Nore (NORE_120).

Direct hydrological pathways are present between the site and the Durrow and Lisdowney GWBs due to the infiltration of stormwater to ground. An indirect pathway also exists to the Shanahoe GWB, the Rathdowney GWB, as the karstified bedrock aquifer underlying the Durrow GWB can promote enhanced groundwater flow and connectivity, facilitating the transfer of infiltrating water to the adjoining GWBs. In terms of the scale of the Durrow GWB (c. 17324.56 ha), the Lisdowney GWB (c. 5417.12 ha), the Rathdowney GWB (c. 52047.82 ha) the Shanahoe GWB (c. 8,144.45 ha). There will be low risk of change in groundwater volume in the groundwater bodies as any dewatering would only be required for short time at the turbine foundations in the Lisdowney and Durrow GWBs. There is the potential for deterioration in groundwater quality during the construction and operational phases of the proposed Gathabawn Grid Connection with no mitigation measures in place. However, the site excavation areas are small relative to the overall groundwater body area. For the Killkenny-Ballynakill Gravels GWB (c. 6348.38 ha), the Candidate Gathabawn Grid Connection Route will not affect the groundwater body as the trenching will be shallow (c. 1.3 m).

In terms of the temporal scale, the construction phase of the proposed Gathabawn Windfarm (c. 12 months) and Candidate Gathabawn Grid Connection (c.12-18 months) would be conducted over a relatively short time period compared to the six-year WFD River Basin Planning (RBP) cycle. However, the overall proposed development operational life is 35 - 40 years and therefore will span multiple RBP cycles.

The location of the proposed Gathabawn Windfarm and the Candidate Gathabawn Grid Connection in relation to the identified surface water bodies under consideration and listed in Table 2 and are shown in **Figure WFDA-01**.



4.0 WFD Assessment

4.1 Assessment of Nearby Water Bodies

The proposed Gathabawn Windfarm will not include any direct discharge of surface water to the nearby surface waterbodies. Hence, the site's potential risk or impact on the WFD objectives of the surface water bodies will be negligible to medium with mitigation measures in place. The windfarm development will not need to excavate below the water table, but will include direct infiltration into groundwater bodies, so the sites potential risk or impact on the WFD objectives of the groundwater bodies will be low, with mitigation measures in place.

The proposed Gathabawn Windfarm will utilise existing natural drainage, where water currently infiltrates into the local ground, as well as drainage management features implemented as part of the development e.g. site tracks within runoff attenuation and treatment features.

The waterbodies along the Candidate Gathabawn Grid Connection are be assessed in this report also as they have a direct hydrological link to the connection works. The Ballyconra stream crossing and the Kilkenny-Ballynakill Gravels GWB have been scoped out of this assessment as they will not have any impacts due to shallow trenching (c. 1.3 m deep). The Gorteenamuck crossing will consist of trenching over/under a culvert, the Gorteenahilla crossing will use Horizontal Directional Drilling under the bridge and watercourse, and the Lismaine stream crossing and the Lisdowney stream crossing will use trenching across the watercourse with appropriate dam and overpump construction methods. The groundwater bodies that are within the proposed Gathabawn Windfarm study area and are directly beneath the Candidate Gathabawn Grid Connection will also be assessed, they are the Lisdowney GWB and Durrow GWB.

The closest Environmental Protection Agency (EPA) WFD monitoring station to the Ballylehaun section is on the River Goul (GOUL_050), which is within 2.7 km of T2 (EPA Station Ref no. RS15G020300). The closest station to the Ballyring section is on the Nuenna River (NUENNA_020), which is within 1.4 km of T12. It is also the closest station to the two facilitating works FW8 and FW9, which is within 3 km of both.

Details of the identified surface and groundwater bodies and the potential risks of deterioration on each waterbody are outlined below.

Table 3: GORTEENAHILLA_010 WFD Status and Description of Potential Impacts

Water Body Name / WFD ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: GORTEENAHILLA_010 WFD ID: IE_SE_15G080300	Moderate	At risk	Oxygenation and nutrient pollution	Agriculture and forestry
Description of potential impact of scheme element on watercourse:				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection, if left unmitigated, are outlined here:				
Construction Phase:				
There is potential for an indirect hydrological link to the waterbody from groundwater seepage and surface runoff during the construction of the proposed Gathabawn Windfarm. This could increase the risk of suspended sediments and accidental fuel spillages entering the waterbody.				



It could also increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody due to the introduction of wind farm infrastructure. - The Ballylehaun-Ballyring Underground Cable will cross the Gorteenamuck stream by trenching over/under and existing culvert, while the Gorteenahilla River will be crossed by Horizontal Directional Drilling (HDD). This could increase the risk of suspended sediments and accidental fuel spillages entering the waterbody. Operational Phase: - There is potential for an indirect hydrological link to the waterbody from groundwater seepage and surface runoff during the operational phase of the proposed Gathabawn Windfarm. As a result of introduced infrastructure and continued maintenance of the windfarm, this could increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody. - The Ballylehaun-Ballyring UGC will also need to be maintained, and so there could be potential oil and fuel spillages and suspended solids entering the waterbody from maintenance works during the operational phase.
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Table 4: GORTEENAHILLA_010 Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration	
Surface water body EPA Name and WFD ID: GORTEENAHILLA_010, IE_SE_15G080300			
Biological quality	Fish	No published EPA WFD data available.	There is a risk of deterioration if no mitigation measures are put in place due to accidental oil and fuel spillages and suspended solids entering the waterbody as the waterbody flows in close proximity to the site boundaries (same sub-basin), especially Facilitating Works FW8 and FW9 (within c. 23 m and 5 m from the river, respectively). Existing agricultural drainage networks within the Ballyring site boundary also provides a partial hydrological pathway towards the river, increasing its chances of receiving surface runoff from the site. The pollutants could decrease the water quality of the river, and therefore its WFD status. There are also two Candidate Gathabawn Grid Connection Route crossings on the waterbody at the Gorteenamuck stream and Gorteenahilla stream, where accidental fuel and oil spillages and suspended solids entering the waterbody.
	Invertebrates	The EPA WFD Ecological Status or Potential is determined as Moderate - The latest Q-Value result from the nearest monitoring station (Ref. No. RS15G080300) in 2019 is Q3-4. Q-Value surveys carried out by Triturus Environmental Ltd. in July 2025 concluded that the waterbody had a Q-Value status of Q3 (Poor status) at sample site C2 on the Gorteenahilla stream and C3 on the Ballyring Upper stream, and Q3-4 (Moderate status) at B4 on the Gorteenahilla stream. There was no Q-Value survey result for C1 on the Gorteenamuck stream which was dry at the time.	
Physio-chemical quality	Temperature	No published EPA WFD data available.	Considering the above, with the implementation of the
	Oxygenation	No published EPA WFD data available. Surface water monitoring carried out by Ecopower Ltd. showed that the EQS AA threshold at 0.065 mg/L for	



WFD Elements		Risk of Deterioration	
		Biochemical Oxygen Demand was exceeded by sampling site C2 at 2 mg/L. Biochemical Oxygen Demand was below the EQS (AA) threshold of 1.5 mg/L for all other sample sites taken in this waterbody.	embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, the overall Risk of Deterioration is Medium.
	Acidification	No published EPA WFD data available.	
	Nutrients	No published EPA WFD data available. Surface water monitoring carried out by Ecopower Ltd. showed that C3 exceeded the EQS AA threshold (0.065 mg/L) of Ammonia as N at 0.081 mg/L in May 2025. C3 also exceeded the Orthophosphate as PO ₄ threshold set out by the EPA (>0.035 mg/L) and by the Drinking Water Regs (S.I. No. 122 of 2014) (0.03 mg/L) at 0.113 mg/L in May 2025, and C3 exceeded the thresholds at 0.05 mg/L in December 2025. B4 also exceeded the Drinking Water Regs threshold for Orthophosphate as PO ₄ at 0.031 mg/L in December 2025. Total Phosphorus as P EQS threshold of >0.035 mg/L was exceeded by C3 at 0.08 mg/L in May 2025 and B4, C2 and C3 at 0.05 mg/L, 0.04 mg/L and 0.05 mg/L respectively, in December 2025. B4, C2 and C3 exceeded the EPA threshold (8 mg/L) for Nitrate as NO ₃ at 17.07 mg/L, 11.44 mg/L and 10.56 mg/L, respectively, in December 2025, and B4 also exceeded the threshold in May 2025 at 9.08 mg/L.	
	Suspended Solids (SS)	No published EPA WFD data available. Surface water monitoring carried out by Ecopower Ltd. showed that suspended solid levels were below the	



WFD Elements		Risk of Deterioration	
		threshold of 25 mg/L Salmonid Water Quality Regulations (S.I. 293 OF 1998) at <2 to 8 at sample sites C2, C3 and B4 in May 2025, and between <5 to 7 at sample sites C1, C2, C3, and B4 in December 2025.	
Hydromorphology	Arterial Drainage Modification	No published EPA WFD data available.	There will be no modification of natural watercourses for the proposed Gathabawn Windfarm and the Candidate Gathabawn Grid Connection. However, the proposed Gathabawn Windfarm works is in close proximity to the waterbody, which could lead to deterioration of the hydromorphology, and therefore its WFD status. Considering the above, with the implementation of the embedded mitigation, industry good practice mitigation measures for construction and operation, and the fact that there will be no direct discharge into any waterbody. it is considered that the overall Risk of Deterioration is Medium.



Table 5: GOUL_040 WFD Status and Description of Potential Impacts

Water Body Name / WFD ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: GOUL_040 WFD ID: IE_SE_15G020300	Poor	At risk	Morphological and Nutrient Pollution	Forestry and Agriculture
Description of potential impact of scheme element on watercourse:				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm, if left unmitigated, are outlined here:				
Construction Phase:				
There is potential, albeit low, for an indirect hydrological link to the waterbody from groundwater seepage during the construction of the proposed Gathabawn Windfarm. This could increase the risk of suspended sediments and accidental fuel, oil and cement spillages entering the waterbody. It could also increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody due to the introduction of wind farm infrastructure.				
Operational Phase:				
There is potential, albeit low, for an indirect hydrological link to the waterbody from groundwater seepage during the operational phase of the proposed Gathabawn Windfarm. As a result of introduced infrastructure and continued maintenance of the windfarm, this could increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody.				

Table 6: GOUL_040 Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration	
Surface water body EPA Name and WFD ID: GOUL_040, IE_SE_15G020300			
Biological quality	Fish	No published EPA WFD data available.	There is a low risk of deterioration from suspended sediments and accidental fuel, oil and cement spillages entering the waterbody from groundwater seepage if no mitigation measures are put in place as the waterbody is in a different sub-basin to the proposed Gathabawn Windfarm.
	Invertebrates	The EPA WFD Ecological Status or Potential is determined as Poor - The latest Q-Value result from the nearest monitoring stations (Ref. No. RS15G020300; Ref No. RS15G020250) in 2025 is Q3.	
Physio-chemical quality	Temperature	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum temperature of 13.5 Å°C in July 2024.	With the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, the overall Risk of Deterioration is Low to Negligible.
	Oxygenation	Between 2024 and 2026, monitoring by the EPA WFD detected an average of 9.37 mg/L dissolved oxygen – Currently at a Pass Status.	
	Acidification	Between 2024 and 2026, monitoring by the EPA WFD	



WFD Elements		Risk of Deterioration	
		detected a maximum pH of 8.1 in March 2026, November 2025, May 2025, July 2024, and May 2024 – Currently at a Pass Status.	
	Nutrients	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum Ammonia (Total as N) level of 0.059 mg/L in April 2024, ortho-Phosphate (as P) at 0.075 mg/L in March 2025, and Total Oxidised Nitrogen (as N) at 7.3 mg/L in November 2025 – Currently at a Pass Status for Nutrient conditions, Moderate status at Nitrogen conditions and Nitrate, and High status for Ammonium and Orthophosphate.	
	Suspended Solids (SS)	No published EPA WFD data available.	
Hydromorphology	Arterial Drainage Modification: District Drainage Scheme on western side of M8 only	OPW District Drainage Scheme	There will be no modification of natural watercourses and with the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, it is considered that the overall Risk of Deterioration is Low to Negligible.



Table 7: GOUL_050 WFD Status and Description of Potential Impacts

Water Body Name / WFD ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: GOUL_050 WFD ID: IE_SE_15G020360	Moderate	At risk	Nutrient pollution	Agriculture
Description of potential impact of scheme element on watercourse:				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm, if left unmitigated, are outlined here: Construction Phase: - There is potential for an indirect hydrological link to the waterbody from groundwater seepage and surface runoff during the construction of the proposed Gathabawn Windfarm. This could increase the risk of suspended sediments and accidental fuel, oil and cement spillages entering the waterbody. It could also increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody due to the introduction of wind farm infrastructure. Operational Phase: - There is potential for an indirect hydrological link to the waterbody from groundwater seepage and surface runoff during the operational phase of the proposed Gathabawn Windfarm. As a result of introduced infrastructure and continued maintenance of the windfarm, this could increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody.				

Table 8: GOUL_050 Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration	
Surface water body EPA Name and WFD ID: GOUL_050, IE_SE_15G020360			
Biological quality	Fish	No published EPA WFD data available.	There is a risk of deterioration if no mitigation measures are put in place as it is within the same sub-basin as the proposed Gathabawn Windfarm. This could increase suspended sediments and accidental oil, fuel and cement spillages entering the waterbody from indirect surface runoff and groundwater seepage from the site. There are existing agricultural drainage networks within the Ballylehaun site boundary which have the potential to act as hydrological pathway towards the river this increasing its chances of receiving surface runoff from the site. Pollutants could increase the risk of the water decreasing in
	Invertebrates	The EPA WFD Ecological Status or Potential is determined as Poor - The latest Q-Value result from the nearest monitoring station (Ref. No. RS15G020360) in 2025 is Q3. Q-Value surveys carried out by Triturus Environmental Ltd. in July 2025 concluded that the waterbody had a Q-Value status of Q2-3 (Poor status) at sample site A1 on the Coolnacrutta stream, and Q3 (Poor status) at A2 on the Coolnacrutta stream and A3 on the Goul stream.	
Physio-chemical quality	Temperature	No published EPA WFD data available.	



WFD Elements		Risk of Deterioration	
	Oxygenation	No published EPA WFD data available. Biochemical Oxygen Demand was below the EQS (AA) threshold of 1.5 mg/L for all sample sites taken in this waterbody by Ecopower Ltd. during monitoring in 2025.	quality which could deteriorate the WFD status the however the identified agricultural drains are more than 50m from any proposed construction works at the site. With the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, the overall Risk of Deterioration is Low.
	Acidification	No published EPA WFD data available.	
	Nutrients	No published EPA WFD data available. In May 2025. Sample sites A1, A2 and A3 exceeded the EPA threshold (8 mg/L) for Nitrate at NO3 at 13.73 mg/L, 14.66 mg/L and 13.99 mg/L, respectively. In December 2026, they also exceeded the threshold at 21.12 mg/L, 19.8 mg/L and 26.8 mg/L, respectively. A1, A2 and A3 also exceeded the Drinking Water Regs threshold of 0.03 mg/L at <0.031 mg/L for all samples. A3 also exceeded the Total Phosphorus as P EQS MAC threshold of >0.035 mg/L at 0.05 mg/L.	
	Suspended Solids	No published EPA WFD data available. Surface water monitoring carried out by Ecopower Ltd. showed that suspended solids levels were below the threshold of 25 mg/L Salmonid Water Quality Regulations (S.I. 293 OF 1998) at <2 to 4 at sample sites A1, A2 and A3.	
Hydromorphology	Arterial Drainage Modification: District Drainage Scheme on western side of M8 only	OPW District Drainage Scheme	There will be no modification of natural watercourses and with the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, it is considered that the



WFD Elements		Risk of Deterioration	
			overall Risk of Deterioration is Low to Negligible.

Table 9: GOUL_060 WFD Status and Description of Potential Impacts

Water Body Name / WFD ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: GOUL_060 WFD ID: IE_SE_15G020500	Poor	At risk	Sediment, Morphological and Nutrient Pollution	Hydromorphology and Agriculture
Description of potential impact of scheme element on watercourse:				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm, if left unmitigated, are outlined here:				
Construction Phase:				
There is potential, albeit low, for an indirect hydrological link to the waterbody from groundwater seepage and surface runoff during the construction of the proposed Gathabawn Windfarm. This could increase the risk of suspended sediments and accidental fuel, oil and cement spillages entering the waterbody. It could also increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody due to the introduction of wind farm infrastructure.				
Operational Phase:				
There is potential, albeit low, for an indirect hydrological link to the waterbody from groundwater seepage and surface runoff during the operational phase of the proposed Gathabawn Windfarm. As a result of introduced infrastructure and continued maintenance of the windfarm, this could increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody.				

Table 10: GOUL_060 Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration	
Surface water body EPA Name and WFD ID: GOUL_060, IE_SE_15G020500			
Biological quality	Fish	No published EPA WFD data available.	There is a risk of deterioration if no mitigation measures are put in place as the waterbody is within the same sub-basin as the proposed Gathabawn Windfarm. This could increase the chance of receiving suspended sediments and accidental fuel, oil and cement spillages from indirect surface runoff and groundwater seepage. This could affect the water quality of the waterbody which could lead to a deterioration in WFD status.
	Invertebrates	The EPA WFD Ecological Status or Potential is determined as Poor - The latest Q-Value result from the nearest monitoring stations (Ref. No. RS15G020500) in 2025 is Q3.	
Physio-chemical quality	Temperature	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum temperature of 13.9 Å°C in June 2024.	
	Oxygenation	Between 2024 and 2026, monitoring by the EPA WFD	



WFD Elements		Risk of Deterioration	
		detected an average of 10.62 mg/L dissolved oxygen – Currently at a Pass Status.	With the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, it is considered that the overall Risk of Deterioration is Low.
	Acidification	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum pH of 8.3 in March 2026, September 2024 and May 2024 – Currently at a Pass Status.	
	Nutrients	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum Ammonia (Total as N) level of 0.045 mg/L in November 2025, ortho-Phosphate (as P) at 0.056 mg/L in June 2024, and Total Oxidised Nitrogen (as N) at 6.4 mg/L in March 2026 – Currently at a Pass Status for Nutrient conditions, Moderate status at Nitrogen conditions and Nitrate, and High status for Ammonium and Orthophosphate.	
	Suspended Solids (SS)	No published EPA WFD data available.	
Hydromorphology	Arterial Drainage Modification: District Drainage Scheme (Goul River) located on western side of M8 only	OPW District Drainage Scheme	There will be no modification of natural watercourses and with the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, it is considered that the overall Risk of Deterioration is Low to Negligible.



Table 11: River Nore and River Barrow and Nore SAC (NORE_120) WFD Status and Description of Potential Impacts

Water Body Name / WFD ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: NORE_120 WFD ID: IE_SE_15N011400	Moderate	At Risk	Nutrients	Agriculture
Description of potential impact of scheme element on watercourse:				
The potential causes of WFD status deterioration that could result from the Candidate Gathabawn Grid Connection, if left unmitigated, are outlined here: Construction Phase: The Parksgrove-Moatpark Underground Cabling (UGC) will cross the River Nore by Horizontal Directional Drilling (HDD). This could increase the risk, albeit low, of suspended sediments and accidental fuel and oil spillages entering the waterbody from surface runoff and groundwater seepage. Operational Phase: Maintenance of the UGC could increase the risk, albeit low, of suspended sediments and accidental fuel and oil spillages entering the waterbody from surface runoff and groundwater seepage.				

Table 12: River Nore and River Barrow and Nore SAC (NORE_120) Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration	
Surface water body EPA Name and WFD ID: NORE_120, IE_SE_15N011400			
Biological quality	Fish	No published EPA WFD data available.	There is a low risk of deterioration if no mitigation measures are put in place due to an increase in suspended solids and accidental oil spillages from surface runoff or groundwater seepage in the construction and operational phase of the Parksgrove-Moatpark Underground Cabling (UGC) that crosses the waterbody. This could decrease the water quality in the waterbody, and subsequently negatively affect the WFD status.
	Invertebrates	No published EPA WFD data available.	
Physio-chemical quality	Temperature	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum temperature of 17. 2 Â°C in August 2025.	By utilising the Horizontal Directional Drilling (HDD) method for the crossing, combined with the implementation of the embedded mitigation, industry good practice mitigation measures for construction,
	Oxygenation	Between 2024 and 2026, monitoring by the EPA WFD detected an average of 10.06 mg/L dissolved oxygen – Currently at a Pass Status.	
	Acidification	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum pH of 8.2 in April 2026 – Currently at a Pass Status.	
	Nutrients	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum	



WFD Elements		Risk of Deterioration	
		Ammonia (Total as N) level of 0.039 mg/L in February 2024, ortho-Phosphate (as P) at 0.031 mg/L in February 2024, and Total Oxidised Nitrogen (as N) at 4.3 mg/L in April 2026 – Currently at a Pass Status for Nutrient conditions, Moderate status at Nitrogen conditions and Nitrate, and High status for Ammonium and Orthophosphate.	and the fact that there will be no direct discharge into any waterbody, the overall Risk of Deterioration is Low to Negligible .
	Suspended Solids (SS)	No published EPA WFD data available.	
Hydromorphology	Arterial Drainage Modification	No published EPA WFD data available.	By utilising the HDD method for the crossing, combined with the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, the overall Risk of Deterioration is Low to Negligible .



Table 13: NORE_150 WFD Status and Description of Potential Impacts

Water Body Name / WFD ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: NORE_150 WFD ID: IE_SE_15N011700	Good	Not At Risk	N/A	N/A
Description of potential impact of scheme element on watercourse:				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection, if left unmitigated, are outlined here: Construction Phase: - There is potential for an indirect hydrological link to the waterbody from groundwater seepage and surface runoff during the construction of the proposed Gathabawn Windfarm, especially as the majority of groundwater baseflow from the site is to the River Nore. This could increase the risk of suspended sediments and accidental fuel, oil and cement spillages entering the waterbody. It could also increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody due to the introduction of wind farm infrastructure. - The Ballyring-Parksgrove Underground Cabling (UGC) will cross the Lismaine by dam and overpump method. This could increase the risk of suspended sediments and accidental fuel and oil spillages entering the waterbody. Operational Phase: - There is potential for an indirect hydrological link to the waterbody from groundwater seepage and surface runoff during the operational phase of the proposed Gathabawn Windfarm. As a result of introduced infrastructure and continued maintenance of the windfarm, this could increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody. - Maintenance for the UGC could result in potential oil and fuel spillages and suspended solids entering the waterbody during the operational phase.				

Table 14: NORE_150 Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration	
Surface water body EPA Name and WFD ID: NORE_150, IE_SE_15N011700			
Biological quality	Fish	No published EPA WFD data available.	There is a risk of deterioration if no mitigation measures are put in place due to an increase in suspended sediments, and accidental oil, fuel and cement spillages entering the water body through indirect surface runoff and groundwater seepage from the proposed Gathabawn Windfarm and the Candidate Gathabawn Grid Connection Route. This could decrease the water quality of the waterbody, and therefore its WFD status. The waterbody is within the same sub-basin as the proposed
	Invertebrates	The EPA WFD Ecological Status or Potential is determined as Moderate - The latest Q-Value result from the nearest monitoring station (Ref. No. RS15N011700) in 2025 is Q3-4. Q-Value surveys carried out by Triturus Environmental Ltd. in July 2025 concluded that the waterbody had a Q-Value status of Q3 (Poor status) at sample site B1 on the Lismaine.	



WFD Elements		Risk of Deterioration	
Physio-chemical quality	Temperature	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum temperature of 17.7 Å°C in August 2025.	Gathabawn Windfarm and Candidate Gathabawn Grid Connection, increase the chances of receiving these pollutants. The existing farm drainage networks within the Ballyring site boundary also provide a direct hydrological pathway towards the river, increasing the risk of these pollutants entering the waterbody from the site. The Candidate Gathabawn Grid Connection directly crosses this waterbody which again increases the chances of pollutants entering the waterbody.
	Oxygenation	Between 2024 and 2026, monitoring by the EPA WFD detected an average of 10.16 mg/L dissolved oxygen – Currently at a Pass Status. Biochemical Oxygen Demand was below the EQS (AA) threshold of 1.5 mg/L for all sample sites taken in this waterbody by Ecopower Ltd. during monitoring in 2025.	
	Acidification	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum pH of 8.3 in April 2026 – Currently at a Pass Status.	With the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, the overall Risk of Deterioration is Low .
	Nutrients	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum Ammonia (Total as N) level of <0.02 (throughout 2024-26), ortho-Phosphate (as P) at 0.028 mg/L in October 2025, and Total Oxidised Nitrogen (as N) at 4.7 mg/L in April 2026 – Currently at a Pass Status for Nutrient conditions, Moderate status at Nitrogen conditions and Nitrate, and High status for Ammonium and Orthophosphate. Surface water monitoring carried out by Ecopower Ltd. showed that Orthophosphate as PO ₄ exceeded the Drinking Water Regulations (S.I. No 122 of 2014) threshold of 0.03 mg/L and the EPA indicator of risk to ecological health of rivers threshold of >0.035 at 0.093 mg/L (Sample Site B1) in May 2025, and at 0.061 mg/L in December 2025. Nitrate as NO ₃ exceeded the	



WFD Elements		Risk of Deterioration	
		EQS MAC threshold of 8 mg/L at 25.52 mg/L in December 2025. Total phosphorus as P exceeded the EQS MAC threshold of >0.035 mg/L at 0.05 mg/L.	
	Suspended Solids (SS)	No published EPA WFD data available. Surface water monitoring carried out by Ecopower Ltd. showed that suspended solid levels were below the threshold of 25 mg/L Salmonid Water Quality Regulations (S.I. 293 OF 1998) at <2 at sample site B1 in May 2025 and 6 mg/L in December 2025.	
Hydromorphology	Arterial Drainage Modification	No published EPA WFD data available.	There will be no modification of natural watercourses for the proposed Gathabawn Windfarm. There will be temporary modifications of the waterbody for the construction of the Candidate Gathabawn Grid Connection by using a dam and overpump method to install the crossing underground. With the dam and pumping only being temporary, and the implementation of the embedded mitigation, industry good practice mitigation measures during construction, and the fact that there will be no direct discharge into any waterbody, it is considered that the overall Risk of Deterioration is Low.



Table 15: NUENNA_010 WFD Status and Description of Potential Impacts

Water Body Name / WFD ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: NUENNA_010 WFD ID: IE_SE_15N020100	Moderate	At Risk	Nutrient Pollution	Agriculture
Description of potential impact of scheme element on watercourse:				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm, if left unmitigated, are outlined here:				
Construction Phase:				
There is potential for an indirect hydrological link to the waterbody from groundwater seepage and during the construction of the proposed Gathabawn Windfarm. This could increase the risk of suspended sediments and accidental fuel, oil and cement spillages entering the waterbody. It could also increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody due to the introduction of wind farm infrastructure.				
Operational Phase:				
There is potential for an indirect hydrological link to the waterbody from groundwater seepage and during the operational phase of the proposed Gathabawn Windfarm. As a result of introduced infrastructure and continued maintenance of the windfarm, this could increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody.				

Table 16: NUENNA_010 Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration	
Surface water body EPA Name and WFD ID: NUENNA_010, IE_SE_15N020100			
Biological quality	Fish	The EPA WFD determined that the Fish Status or Potential is Moderate for this waterbody.	There is a low risk of deterioration if no mitigation measures are put in place due suspended sediments and accidental fuel, oil and cement spillages entering the waterbody through groundwater seepage as the waterbody is in a different sub-basin to the proposed Gathabawn Windfarm.
	Invertebrates	The EPA WFD Ecological Status or Potential is determined as Moderate - The latest Q-Value result from the nearest monitoring station (Ref. No. RS15N020100) in 2019 is Q3-4.	
Physio-chemical quality	Temperature	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum temperature of 12.5 Å°C in August 2025.	With the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, the overall Risk of Deterioration is Low to Negligible.
	Oxygenation	Between 2024 and 2026, monitoring by the EPA WFD detected an average of 10.57 mg/L dissolved oxygen – Currently at a Pass Status.	



WFD Elements		Risk of Deterioration	
	Acidification	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum pH of 8.1 in July 2024 – Currently at a Pass Status.	
	Nutrients	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum Ammonia (Total as N) level of 0.026 in January 2025, ortho-Phosphate (as P) at 0.018 mg/L in November 2025, and Total Oxidised Nitrogen (as N) at 10 mg/L in January 2026 – Currently at a Pass Status for Nutrient conditions, Moderate status at Nitrogen conditions and Nitrate, and High status for Ammonium and Orthophosphate.	
	Suspended Solids (SS)	No published EPA WFD data available.	
Hydromorphology	Arterial Drainage Modification	No published EPA WFD data available.	There will be no modification of natural watercourses and with the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, it is considered that the overall Risk of Deterioration is Low to Negligible.



Table 17: NUENNA_020 WFD Status and Description of Potential Impacts

Water Body Name / WFD ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: NUENNA_020 WFD ID: IE_SE_15N020400	Poor	At Risk	Nutrients and Organic Pollution	Agriculture, Urban Wastewater
Description of potential impact of scheme element on watercourse:				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm, if left unmitigated, are outlined here:				
Construction Phase:				
There is potential for an indirect hydrological link to the waterbody from groundwater seepage and surface runoff during the construction of the proposed Gathabawn Windfarm. This could increase the risk of suspended sediments and accidental fuel, oil and cement spillages entering the waterbody. It could also increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody due to the introduction of wind farm infrastructure.				
Operational Phase:				
There is potential for an indirect hydrological link to the waterbody from groundwater seepage and surface runoff during the operational phase of the proposed Gathabawn Windfarm. As a result of introduced infrastructure and continued maintenance of the windfarm, this could increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody.				

Table 18: NUENNA_020 Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration	
Surface water body EPA Name and WFD ID: NUENNA_020, IE_SE_15N020400			
Biological quality	Fish	No published EPA WFD data available.	There is a risk of deterioration if no mitigation measures are put in place due to suspended sediments and accidental fuel, oil and cement spillages entering the waterbody from indirect surface runoff and groundwater seepage, especially from the temporary facilitating works FW8 and FW9 that are upstream from the river, and from the Ballyring area (same sub-basin).
	Invertebrates	The EPA WFD Ecological Status or Potential is determined as Poor - The latest Q-Value result from the nearest monitoring station (Ref. No. RS15N020300) in 2025 is Q3.	
Physio-chemical quality	Temperature	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum temperature of 14.1 Â°C in July 2026.	As the facilitating works are within a different sub-basin, and with the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody,
	Oxygenation	Between 2024 and 2026, monitoring by the EPA WFD detected an average of 10.36 mg/L dissolved oxygen – Currently at a Pass Status.	
	Acidification	Between 2024 and 2026, monitoring by the EPA WFD	



WFD Elements		Risk of Deterioration	
		detected a maximum pH of 8.2 in April 2026 and April 2025 – Currently at a Pass Status.	the overall Risk of Deterioration is Low.
	Nutrients	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum Ammonia (Total as N) level of <0.02 (throughout 2024-26), ortho-Phosphate (as P) at 0.026 mg/L in February 2026, and Total Oxidised Nitrogen (as N) at 6.7 mg/L in April 2026 – Currently at a Pass Status for Nutrient conditions, Moderate status at Nitrogen conditions and Nitrate, and High status for Ammonium and Orthophosphate.	
	Suspended Solids (SS)	No published EPA WFD data available.	
Hydromorphology	Arterial Drainage Modification	No published EPA WFD data available.	There will be no modification of natural watercourses and with the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, it is considered that the overall Risk of Deterioration is Low to Negligible.



Table 19: ERKINA_050 WFD Status and Description of Potential Impacts

Water Body Name / WFD ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: ERKINA_050 WFD ID: IE_SE_15E010550	Moderate	At risk	Nutrient pollution	Agriculture
Description of potential impact of scheme element on watercourse:				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm, if left unmitigated, are outlined here:				
Construction Phase:				
There is potential for an indirect hydrological link to the waterbody from groundwater seepage and during the construction of the proposed Gathabawn Windfarm. This could increase the risk of suspended sediments and accidental fuel, oil and cement spillages entering the waterbody. It could also increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody due to the introduction of wind farm infrastructure.				
Operational Phase:				
There is potential for an indirect hydrological link to the waterbody from groundwater seepage and during the operational phase of the proposed Gathabawn Windfarm. As a result of introduced infrastructure and continued maintenance of the windfarm, this could increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody.				

Table 20: ERKINA_050 Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration	
Surface water body EPA Name and WFD ID: NUENNA_020, IE_SE_15N020400			
Biological quality	Fish	No published EPA WFD data available.	There is low risk of deterioration if no mitigation measures are put in place due to suspended sediments and accidental fuel, oil and cement spillages entering the waterbody from groundwater seepage.
	Invertebrates	The EPA WFD Ecological Status or Potential is determined as Moderate - The latest Q-Value result from the nearest monitoring station (Ref. No. RS15E010550) is Q3-4.	
Physio-chemical quality	Temperature	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum temperature of 19.5 Â°C in July 2026.	With the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, the overall Risk of Deterioration is Low to Negligible .
	Oxygenation	Between 2024 and 2026, monitoring by the EPA WFD detected an average of 9.69 mg/L dissolved oxygen – Currently at a Pass Status.	
	Acidification	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum pH of	



WFD Elements		Risk of Deterioration	
		8.1 in March 2025 and April 2025 – Currently at a Pass Status.	
	Nutrients	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum Ammonia (Total as N) level of 0.036 mg/L in September and December 2024, ortho-Phosphate (as P) at 0.042 mg/L in December 2024, and Total Oxidised Nitrogen (as N) at 5.3 mg/L in December 2025 – Currently at a Pass Status for Nutrient conditions, Moderate status at Nitrogen conditions and Nitrate, and High status for Ammonium and Orthophosphate.	
	Suspended Solids (SS)	No published EPA WFD data available.	
Hydromorphology	Arterial Drainage Modification	No published EPA WFD data available.	There will be no modification of natural watercourses and with the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, it is considered that the overall Risk of Deterioration is Low to Negligible.



Table 21: LISDOWNEY_010 WFD Status and Description of Potential Impacts

Water Body Name / WFD ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: LISDOWNEY_010 WFD ID: IE_SE_15L020100	Moderate	At risk	Nutrient pollution	Agriculture
Description of potential impact of scheme element on watercourse:				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm, if left unmitigated, are outlined here:				
Construction Phase:				
There is potential, albeit low, for an indirect hydrological link to the waterbody from groundwater seepage during the construction of the proposed Gathabawn Windfarm. This could increase the risk of suspended sediments and accidental fuel, oil and cement spillages entering the waterbody. It could also increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody due to the introduction of wind farm infrastructure.				
Operational Phase:				
There is potential, albeit low, for an indirect hydrological link to the waterbody from groundwater seepage during the operational phase of the proposed Gathabawn Windfarm. As a result of introduced infrastructure and continued maintenance of the windfarm, this could increase the runoff volumes, peak flow rates and pollutant loading entering the waterbody.				

Table 22: LISDOWNEY_010 Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration	
Surface water body EPA Name and WFD ID: LISDOWNEY_010, IE_SE_15L020100			
Biological quality	Fish	No published EPA WFD data available.	There is low risk of deterioration if no mitigation measures are put in place due to suspended sediments and accidental fuel, oil and cement spillages entering the waterbody from indirect groundwater seepage it is in a different sub-basin to the proposed Gathabawn Windfarm.
	Invertebrates	The EPA WFD Ecological Status or Potential is determined as Poor - The latest Q-Value result from the nearest monitoring station (Ref. No. RS15L020100) in 2025 is Q3.	
Physio-chemical quality	Temperature	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum temperature of 16.4 Â°C in July 2026.	With the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, the overall Risk of Deterioration is Low to Negligible.
	Oxygenation	Between 2024 and 2026, monitoring by the EPA WFD detected an average of 10.875 mg/L dissolved oxygen – Currently at a Pass Status.	



WFD Elements		Risk of Deterioration	
	Acidification	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum pH of 8.4 in April 2026 and April 2025 – Currently at a Pass Status.	
	Nutrients	Between 2024 and 2026, monitoring by the EPA WFD detected a maximum Ammonia (Total as N) level of 0.041 mg/L in April 2024, ortho-Phosphate (as P) at 0.037 mg/L in July 2025, and Total Oxidised Nitrogen (as N) at 4.9 mg/L in July 2026 – Currently at a Pass Status for Nutrient conditions, Moderate status at Nitrogen conditions and Nitrate, and High status for Ammonium and Orthophosphate.	
	Suspended Solids (SS)	No published EPA WFD data available.	
Hydromorphology	Arterial Drainage Modification	No published EPA WFD data available.	There will be no modification of natural watercourses and with the implementation of the embedded mitigation, industry good practice mitigation measures, and the fact that there will be no direct discharge into any waterbody, it is considered that the overall Risk of Deterioration is Low to Negligible.



Table 23: Lisdowney Groundwater WFD Status and Description of Potential Impacts

Water Body Name, ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: Lisdowney WFD ID: IE_SE_G_088	Good	Not at risk	N/A	N/A
Description of potential impact of scheme element on watercourse				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection, if left unmitigated, are outlined here: Construction Phase: • Increase of suspended solids and sediment directly impacting groundwater from soil stripping, infrastructure excavation, cable trench and drainage channel construction. • Accidental fuel, oil or cement spills or chemical leakages from on-site machinery, site vehicles or because of the construction of the hardstanding areas directly impacting groundwater quality. • Potential for groundwater levels to be temporarily impacted if groundwater seepage into excavation areas occurs. • Increase in direct pollutant loading entering the waterbody due to windfarm infrastructure. Operational Phase: • Accidental oil and fuel spills from on-site maintenance machinery impacting groundwater quality.				

Table 24: Lisdowney Groundwater Body Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration
Groundwater body EPA Name and WFD ID: Lisdowney, IE_SE_G_088		
Physio-chemical quality	Oxygenation	The Lisdowney GWB is classified as being of good status for general chemical assessments and it is not at risk of achieving its 2027 WFD targets. Without mitigation measures in place, there is a medium risk of deterioration to oxygenation as a result of the proposed Gathabawn Windfarm due to potential accidental fuel and oil spillages (during the construction and operational phase), and an increase in suspended solids and sediment (during the construction phase) coming from the site. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table, the overall Risk of Deterioration is Low.
	Nutrients	Without mitigation measures in place, there is a medium risk of deterioration to nutrient levels as a result of the proposed Gathabawn Windfarm due to potential accidental fuel and oil spillages (during the construction and operational phase), and an increase in suspended solids and sediment (during the construction phase) coming from the site. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require



WFD Elements		Risk of Deterioration
		excavation below the water table, the overall Risk of Deterioration is Low.
Quantitative	Quantity - Recharge and Abstraction	Without mitigation measures in place, there is a medium risk of deterioration to the quantity of water in the Lisdowney GWB due to the construction of drainage channels in the area during the construction phase. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table nor abstraction of water, the overall Risk of Deterioration is Low.



Table 25: Durrow Groundwater WFD Status and Description of Potential Impacts

Water Body Name, ID	WFD Current Status	WFD 3 rd Cycle Risk Status	Significant Issues Identified from 3 rd Cycle WFD	Significant Pressures Identified from 3 rd Cycle WFD
EPA Name: Durrow WFD ID: IE_SE_G_156	Good	At risk	Nutrient pollution	Agriculture
Description of potential impact of scheme element on watercourse				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection, if left unmitigated, are outlined here: Construction Phase: • Increase of suspended solids and sediment directly impacting groundwater from soil stripping, infrastructure excavation, cable trench and drainage channel construction. • Accidental fuel, oil or cement spills or chemical leakages from on-site machinery, site vehicles or because of the construction of the hardstanding areas directly impacting groundwater quality. • Potential for groundwater levels to be temporarily impacted if groundwater seepage into excavation areas occurs. • Increase in direct pollutant loading entering the waterbody due to windfarm infrastructure. Operational Phase: • Accidental fuel and oil spills from on-site maintenance machinery impacting groundwater quality.				

Table 26: Durrow Groundwater Body Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration
Groundwater body EPA Name and WFD ID: Durrow, IE_SE_G_156		
Physio-chemical quality	Oxygenation	The Durrow GWB was classified as being At risk of not achieving its 2027 WFD targets during the 3rd WFD cycle (2016-2021) as a result of agricultural pressures. However, during the 4th cycle of the WFD (2019-2024), the GWB received a Good status for general chemical assessments. Without mitigation measures in place, there is a high risk of deterioration to oxygenation as a result of the proposed Gathabawn Windfarm due to potential accidental fuel and oil spillages, and an increase in suspended solids and sediment coming from the site and infiltrating into the karstified aquifer during construction, and potential oil spillages from site machinery and pollutants from the windfarm infrastructure during the constructional and operational phase. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table, the overall Risk of Deterioration is Low.
	Nutrients	Without mitigation measures in place, there is a high risk of deterioration to nutrient levels as a result of the proposed Gathabawn Windfarm due to potential accidental fuel and oil spillages during the



WFD Elements		Risk of Deterioration
		construction and operational phase, and an increase in suspended solids and sediment coming from the site and infiltrating in the karstified aquifer during the construction phase. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table, the overall Risk of Deterioration is Low.
Quantitative	Quantity - Recharge and Abstraction	Without mitigation measures in place, there is a high risk of deterioration to the quantity of water in the Durrow GWB due to the construction of drainage channels in the area during the construction phase. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table nor abstraction of water, the overall Risk of Deterioration is Low.



Table 27: Rathdowney Groundwater WFD Status and Description of Potential Impacts

Water Body Name, ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: Rathdowney WFD ID: IE_SE_G_114	Good	Not at risk	N/A	N/A
Description of potential impact of scheme element on watercourse				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm, if left unmitigated, are outlined here: Construction Phase: - Indirect increase of suspended solids and sediment impacting groundwater from soil stripping, infrastructure excavation, cable trench and drainage channel construction from the Durrow GWB. - Accidental fuel, oil or cement spills or chemical leakages from on-site machinery, site vehicles or because of the construction of the hardstanding areas indirectly impacting groundwater quality from the Durrow GWB. - Potential for groundwater levels to be temporarily impacted if groundwater seepage into excavation areas occurs in the Durrow GWB. - Increase in pollutant loading entering the waterbody due to windfarm infrastructure in the Durrow GWB. Operational Phase: - Increase in direct pollutant loading entering the waterbody due to windfarm infrastructure in the Durrow GWB. - Accidental fuel spills from on-site maintenance machinery impacting groundwater quality.				

Table 28: Rathdowney Groundwater Body Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration
Groundwater body EPA Name and WFD ID: Rathdowney, IE_SE_G_114		
Physio-chemical quality	Oxygenation	The Rathdowney GWB is classified as being of good status for general chemical assessments and it is not at risk of achieving its 2027 WFD targets. Without mitigation measures in place, there is a medium risk of deterioration to oxygenation as a result of the proposed Gathabawn Windfarm due to potential accidental fuel and oil spillages (during the construction and operational phase), and an increase in suspended solids and sediment coming from the Durrow GWB (during the operational phase). Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table, the overall Risk of Deterioration is Low.
	Nutrients	Without mitigation measures in place, there is a medium risk of deterioration to nutrient levels as a result of the proposed Gathabawn Windfarm due to potential accidental fuel and oil spillages (during the construction and operational phase), and an



WFD Elements		Risk of Deterioration
		increase in suspended solids and sediment coming from the site (during the operational phase). Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table, the overall Risk of Deterioration is Low.
Quantitative	Quantity - Recharge and Abstraction	Without mitigation measures in place, there is a medium risk of deterioration to the quantity of water in the Rathdowney GWB due to the construction of drainage channels in the area during the construction phase. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table nor abstraction of water, the overall Risk of Deterioration is Low.



Table 29: Shanahoe Groundwater WFD Status and Description of Potential Impacts

Water Body Name, ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: Shanahoe WFD ID: IE_SE_G_119	Good	Not at risk	N/A	N/A
Description of potential impact of scheme element on watercourse				
The potential causes of WFD status deterioration that could result from the proposed Gathabawn Windfarm, if left unmitigated, are outlined here: Construction Phase: - Indirect increase of suspended solids and sediment impacting groundwater from soil stripping, infrastructure excavation, cable trench and drainage channel construction from the Durrow GWB. - Accidental fuel, oil or cement spills or chemical leakages from on-site machinery, site vehicles or because of the construction of the hardstanding areas indirectly impacting groundwater quality from the Durrow GWB. - Potential for groundwater levels to be temporarily impacted if groundwater seepage into excavation areas occurs in the Durrow GWB. - Increase in pollutant loading entering the waterbody due to windfarm infrastructure in the Durrow GWB. Operational Phase: - Increase in direct pollutant loading entering the waterbody due to windfarm infrastructure in the Durrow GWB. - Accidental fuel spills from on-site maintenance machinery impacting groundwater quality.				

Table 30: Shanahoe Groundwater Body Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration
Groundwater body EPA Name and WFD ID: Shanahoe, IE_SE_G_119		
Physio-chemical quality	Oxygenation	The Shanahoe GWB is classified as being of good status for general chemical assessments and it is not at risk of achieving its 2027 WFD targets. Without mitigation measures in place, there is a medium risk of deterioration to oxygenation as a result of the proposed Gathabawn Windfarm due to potential accidental fuel and oil spillages (during the construction and the operational phase), and an increase in suspended solids and sediment (during the construction phase) coming from the site at the Durrow GWB. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table at any GWB in the study area, the overall Risk of Deterioration is Low.
	Nutrients	Without mitigation measures in place, there is a medium risk of deterioration to nutrient levels as a result of the proposed Gathabawn Windfarm due to potential accidental fuel and oil spillages (during the



WFD Elements		Risk of Deterioration
		construction and operational phase), and an increase in suspended solids and sediment (during the construction phase) coming from the site and infiltrating in the karstified aquifer. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table, the overall Risk of Deterioration is Low.
Quantitative	Quantity - Recharge and Abstraction	Without mitigation measures in place, there is a medium risk of deterioration to the quantity of water in the Shanahoe GWB due to the construction of drainage channels in the area during the construction phase. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table nor abstraction of water, the overall Risk of Deterioration is Low.



Table 31: GWDTE-The Loughlans Turlough (SAC000407) Groundwater WFD Status and Description of Potential Impacts

Water Body Name, ID	WFD Current Status	WFD Risk Status	Significant Issues Identified from 3rd Cycle WFD	Significant Pressures Identified from 3rd Cycle WFD
EPA Name: GWDTE-The Loughlans Turlough (SAC000407) WFD ID: IE_SE_G_134	Good	Not at risk	N/A	N/A
Description of potential impact of scheme element on watercourse				
The potential causes of WFD status deterioration that could result from the proposed development, if left unmitigated, are outlined here. Construction Phase: - Indirect increase of suspended solids and sediment impacting groundwater from soil stripping, infrastructure excavation, cable trench and drainage channel construction from the Durrow GWB. - Accidental fuel, oil or cement spills or chemical leakages from on-site machinery, site vehicles or because of the construction of the hardstanding areas indirectly impacting groundwater quality from the Durrow GWB. - Potential for groundwater levels to be temporarily impacted if groundwater seepage into excavation areas occurs in the Durrow GWB. - Increase in pollutant loading entering the waterbody due to windfarm infrastructure in the Durrow GWB. Operational Phase: - Increase in direct pollutant loading entering the waterbody due to windfarm infrastructure in the Durrow GWB. - Accidental fuel spills from on-site maintenance machinery impacting groundwater quality.				

Table 32: GWDTE-The Loughlans Turlough (SAC000407) Groundwater Body Risk of Deterioration of Status Elements

WFD Elements		Risk of Deterioration
Groundwater body EPA Name and WFD ID: GWDTE-The Loughlans Turlough (SAC000407), IE_SE_G_134		
Physio-chemical quality	Oxygenation	The GWDTE-The Loughlans Turlough (SAC000407) GWB is classified as being of good status for general chemical assessments and it is not at risk of achieving its 2027 WFD targets. Without mitigation measures in place, there is a medium risk of deterioration to oxygenation as a result of the proposed Gathabawn Windfarm due to potential accidental fuel and oil spillages, and an increase in suspended solids and sediment coming from the site at the Durrow GWB. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table at any GWB in the study area, the overall Risk of Deterioration is Low.



WFD Elements		Risk of Deterioration
	Nutrients	Without mitigation measures in place, there is a medium risk of deterioration to nutrient levels as a result of the proposed Gathabawn Windfarm due to potential accidental fuel and oil spillages, and an increase in suspended solids and sediment coming from the site and infiltrating in the karstified aquifer. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table, the overall Risk of Deterioration is Low.
Quantitative	Quantity - Recharge and Abstraction	Without mitigation measures in place, there is a medium risk of deterioration to the quantity of water in the GWDTE-The Loughlans Turlough (SAC000407) GWB due to the construction of drainage channels in the area. Considering the embedded mitigation measures, the application of industry good practice, and the fact that the proposed development will not require excavation below the water table nor abstraction of water, the overall Risk of Deterioration is Low.



4.2 Mitigation Measures planned to achieve environmental objectives of the WFD

General mitigation measures have been included in the EIAR to protect surface and groundwater quality, and these are set out below for the construction and operational phases of the proposed Gathabawn Windfarm and the Candidate Gathabawn Grid Connection.

The development will adhere to the site Environmental Management Plan (EMP) to ensure that the development is managed in an appropriate manner and there is no risk to any surface water or groundwater bodies.

Mitigation measures are:

- Surface water quality monitoring of watercourses downstream of the works will be carried out monthly for the first six months post construction, and thereafter annually during the Operational Years 1, 2, 3, 4 and 5, and then every 5 years thereafter, to record any change to baseline trends. Samples will be analysed by an appropriately certified laboratory and the resulting report submitted to Kilkenny County Council;
- The Asset Manager will inspect the windfarm site drainage system during quarterly site inspections, and any necessary repairs or maintenance works carried out promptly;
- During any reopening/re-widening of site entrances or facilitating works locations, any topsoil removed to reveal the hardcore underneath will be stored in an adjacent temporary deposition area, sealed to prevent erosion, and a silt curtain will be erected downslope of this deposition area. Following the completion of the transportation, the hardcore area will be covered over once again using the soil in the deposition area. The area will be reseeded/replanted as appropriate to the location. The area will be fenced from livestock until revegetation has occurred;
- On site re-fuelling of machinery (if required) will be carried out using a mobile double skinned fuel bowser;
- Spill response apparatus including spill-kits and fuel absorbent mats will be stored in each turbine and stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment and in the implementation of the Emergency Response Plan, as contained in the Environmental Management Plan;
- All fuels or oils, required during operation, will be stored in a designated, bunded, locked COSSH storage area at the control buildings. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment will also be contained within the bunded area;
- Fuel, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage. Safety data sheets for all chemicals will be kept on-site;
- Overnight parking of plant and machinery will only be permitted at the turbine locations. There will be no refuelling of vehicles or plant permitted within 100m of a watercourse or drainage feature or within 100m of the Cullahill Mountain SAC or the Gales Hill Nature Reserve. Drip trays and fuel traps will be used to contain any potential leaks;
- No concrete batching will take place on site and all concrete will be ready-mixed and delivered;



- The pouring of concrete will be scheduled for dry days. If a sudden rainfall event should occur, then suitable covers will be ready and available at the pour site to cover the concrete. The pour site will be kept free of standing water;
- All operators involved in pouring concrete will be trained and experienced in working with concrete;
- Run-off from wind turbine foundation concrete pours will not be permitted to flow over adjacent lands or enter drainage channels. The run-off will be contained within the foundation area and pumped into a skip to settle out; settled solids will be appropriately disposed of off-site;
- The Contractor will not permit the discharge of cement contaminated waters to the construction phase drainage system, onto adjacent lands or directly to any artificial drain or watercourse;
- Concrete trucks will be washed out at the supplier's facilities and not on site. The only concrete washing that will occur on site is the hand washing of the chutes at the rear of the trucks. Washing of chutes will only take place at the designated area and into a Roadside Concrete Washout unit;
- Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain or directly onto adjacent habitats. Rather, all pumped water will be discharged to local vegetation via a silt bag or infiltration trench or settlement pond, as appropriate, to surrounding vegetation;
- Works in wet drainage channels will not be undertaken without isolation of flow within the drain. The water will be isolated from the works by over pumping, flume (pipe) or channel diversion methods;
- Surface water quality monitoring of watercourses upstream, at, and downstream of the works will be carried out at regular intervals by the Environmental Management team during the construction phase. Laboratory analysis of water samples will also be undertaken as part of the monitoring programme by an independent and appropriately certified laboratory
- Additional mitigation measures will be deployed within 50 m of watercourses or wet drainage features, including the placement of silt trapping arrangements along preferential surface water flow paths, and temporary drain blocking in existing drains. Works will not take place within this 50 m zone during prolonged heavy or exceptional rainfall events;
- At Parksgrove Substation, a permanent surface water drainage network will be installed at the substation compound and along the associated access road, and will ensure that all surface water runoff from the access road and new the hardstand areas will be captured and treated prior to discharge/release. The drainage infrastructure will not be installed during heavy or prolonged rainfall events or when the soil is waterlogged. The site drainage network will include check dams and settlement ponds which will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas. Water will be released to surrounding vegetation via buffered outfall weirs;
- In-stream works at W3, W4 and W5 will not be undertaken without isolation of flow within the watercourse by over-pumping through a flume (pipe). The Project Ecologist will supervise all watercourse crossing works at W1 to W6 inclusive. A pre-works survey will be carried out by the Project Ecologist to identify any electrofishing requirements at the watercourses, and if required electrofishing of the isolated



section will be carried out under licence prior to the commencement of excavation works. Instream works at W3, W4 and W5 will be followed by site-specific reinstatement measures to ensure the restoration of flow character and morphology within the affected reach. Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margin to stabilise banks, add flood protection and provide riparian buffer;

- The horizontal directional drilling works will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized watertight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures
 - In the event of break-out occurring in the stream/river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures
 - In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point

And in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the Whole Gathabawn Windfarm Project Environmental Management Plan;

- Prior to works commencing along the Parksgrove-Moatpark UGC, a silt curtain will be installed immediately inside the road boundary fence for the entire length of the UGC within the verge, and where the UGC enters agricultural land, a double silt curtain will be installed on the outside of the construction works area up to and around the drilling pit on the western side of the river. On the eastern side of the River Nore, prior to works commencing, a silt curtain will be installed along the entire length of the access road from the R432, with a double silt fence installed beyond the construction works area boundary up to and around the drilling pit on the eastern side of the river; and
- Only precast concrete or double skinned HDPE pipes will be used for new drain crossing structures, if required, along the Ballylehaun-Ballyring UGC. Only precast concrete chambers will be used at Joint Bays.



5.0 RBMP Programme of Measures

The River Basin Management Plan (RBMP) for Ireland for the period 2022-2027, sets out a programme of mitigation measures to meet the environmental objectives of the WFD to 2027⁵. These mitigation measures cover the following areas:

- Agriculture;
- Hydromorphology;
- Forestry;
- Urban Wastewater discharges;
- Urban Runoff Pressures;
- Domestic Wastewater (Septic Tanks) Discharges;
- Unknown Pressures;
- Other Pressures;
- Peatlands;
- Industry, Mines and Quarries;
- Drinking Water Source Protection;
- Invasive Species;
- Hazardous Chemicals in the Aquatic Environment;
- Aquaculture; and
- Land Use Planning.

A list of mitigation measures to address the identified environmental measures are outlined in the RBMP⁶. The proposed Gathabawn Windfarm or the Candidate Gathabawn Grid Connection do not fall directly into one of the above categories and therefore is assessed here against the list of measures for Unknown Pressures, see Table 31 below.

Table 33: Proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection assessed against WFD measures for Unknown Pressures

RBMP Measure	RBMP Delivery Method	Impact from Proposed Project
Measure: Unknown 1 - Steps necessary for delivery		
The Local Authority Waters Programme (LAWPRO) will conduct assessments of water bodies in Priority Areas for Action where the pressures are unknown to identify the specific issues and actions that are required to protect or restore water quality as necessary.	Assess unassigned waterbodies (WBs) as part of Programme of Assessment and Actions (PAA) work and make referrals for implementation of measures	No impact – Site is not in area of priority action
Measure: Unknown 2 - Steps necessary for delivery		
Each local authority supported by LAWPRO will conduct assessments of other water bodies where the pressures are unknown (which are not	Assess unassigned WBs	No impact – Site is not in area of priority action

⁵ Department of Housing, Local Government and Heritage (2024). Water Action Plan 2024. A River Basin Management Plan for Ireland. Appendix 1: Programme of Measures: Further information on the environmental measures to 2027.

⁶ Department of Housing, Local Government and Heritage (2024). Water Action Plan 2024. A River Basin Management Plan for Ireland. Appendix 2: Programme of Measures - List of Measures.



RBMP Measure	RBMP Delivery Method	Impact from Proposed Project
within priority areas for action) to identify the specific issues and actions that are required to protect or restore water quality as necessary.		
Measure: Unknown 3 - Steps necessary for delivery		
The Local Authority Services National Training Group (LASNTG) will provide appropriate training programmes including on Catchment assessment, Integrated Catchment Management, and farm inspections for the staff of local authorities and all implementing bodies.	- Review training programme necessary for the LA natural water sector - Coordination of development of training materials - Roll out of training programme	No impact – Site is not in area of priority action



6.0 WFD Assessment Findings

This WFD Assessment has been undertaken to support the planning application for the proposed Gathabawn Windfarm.

This report and assessment identify the relevant WFD waterbodies which have the potential to be impacted by the Gathabawn Windfarm and the Candidate Gathabawn Grid Connection, identifies if the requirements of the WFD are being met and assesses whether their activities will:

- Cause a deterioration in WFD status of a waterbody; and/or
- Hinder a programme of measures (PoM) designed to bring about Good Status for a waterbody.

Based on the findings from the assessment undertaken here, it is considered that the proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection, with the above mitigation measures in place:

- i) Will not result in a deterioration in the WFD status of the identified surface water and groundwater bodies; and
- ii) Will not hinder any PoM designed to bring about the Good Status of a waterbody.



Figures

Figure WFDA-01: Site Location and EPA WFD Surface Waterbodies

Figure WFDA-02: EPA WFD River Sub-basin Boundaries

Figure WFDA-03: EPA WFD Groundwater Bodies

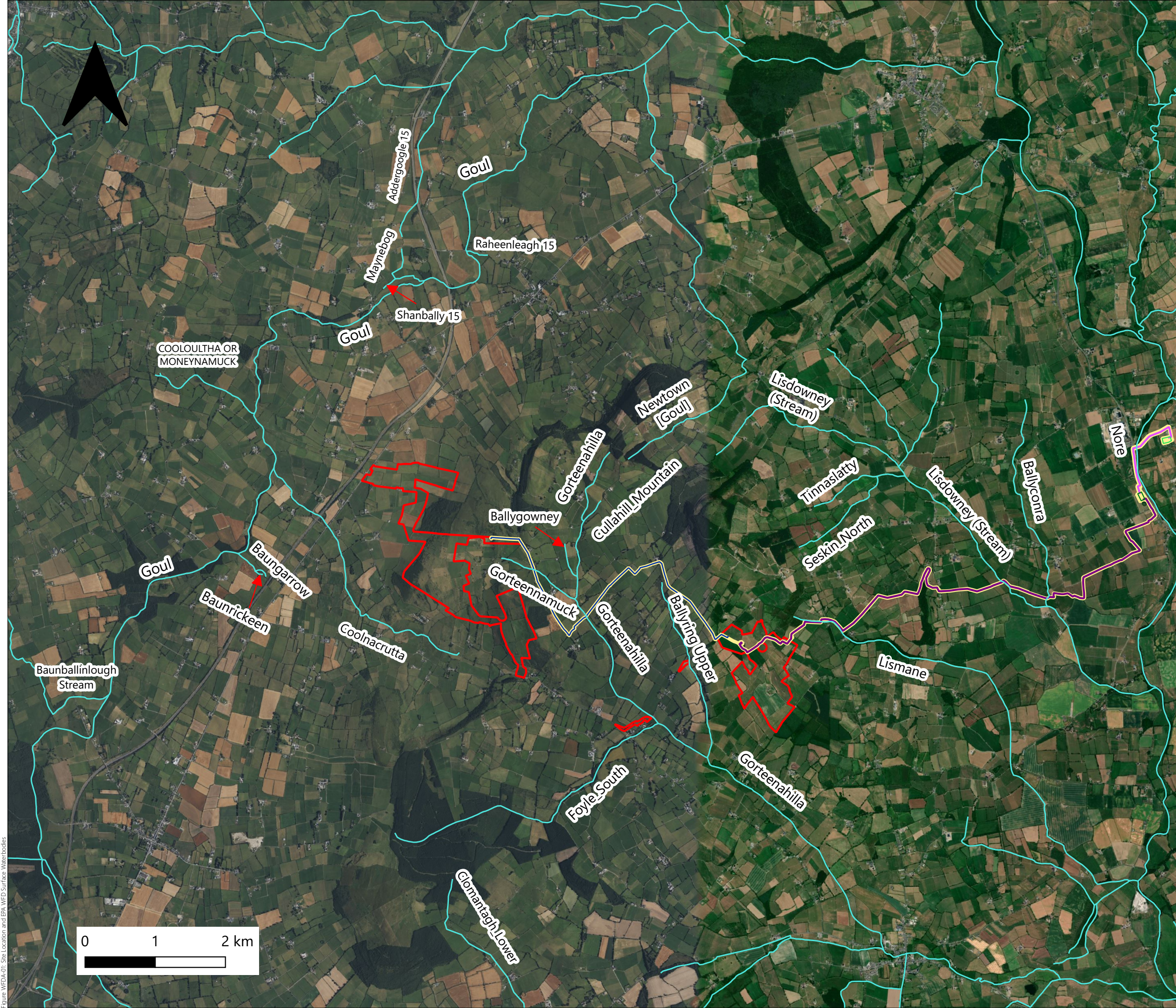




Making Sustainability Happen



Making Sustainability Happen



Notes:
1. Basemap: ESRI Satellite
2. Surface Water River Layer Source: Environemntal Protection Agency
3. Infrastructure: Supplied By Ecopower Ltd.

- LEGEND:
- Red Line Boundary
 - EPA WFD River Waterbodies
 - EirGrid Ballyragget Substation
 - Parksgrove Substation
 - Ballylehaun - Ballyring Cable Link
 - Ballyring - Parksgrove Underground Cabling
 - Parksgrove - Moatpark Underground Cabling
 - Construction Works Boundary - Candidate Grid Connection

Bing Satellite



Zetec House,
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R95 PX5X, Ireland

1		09/26	AH	KW	PG
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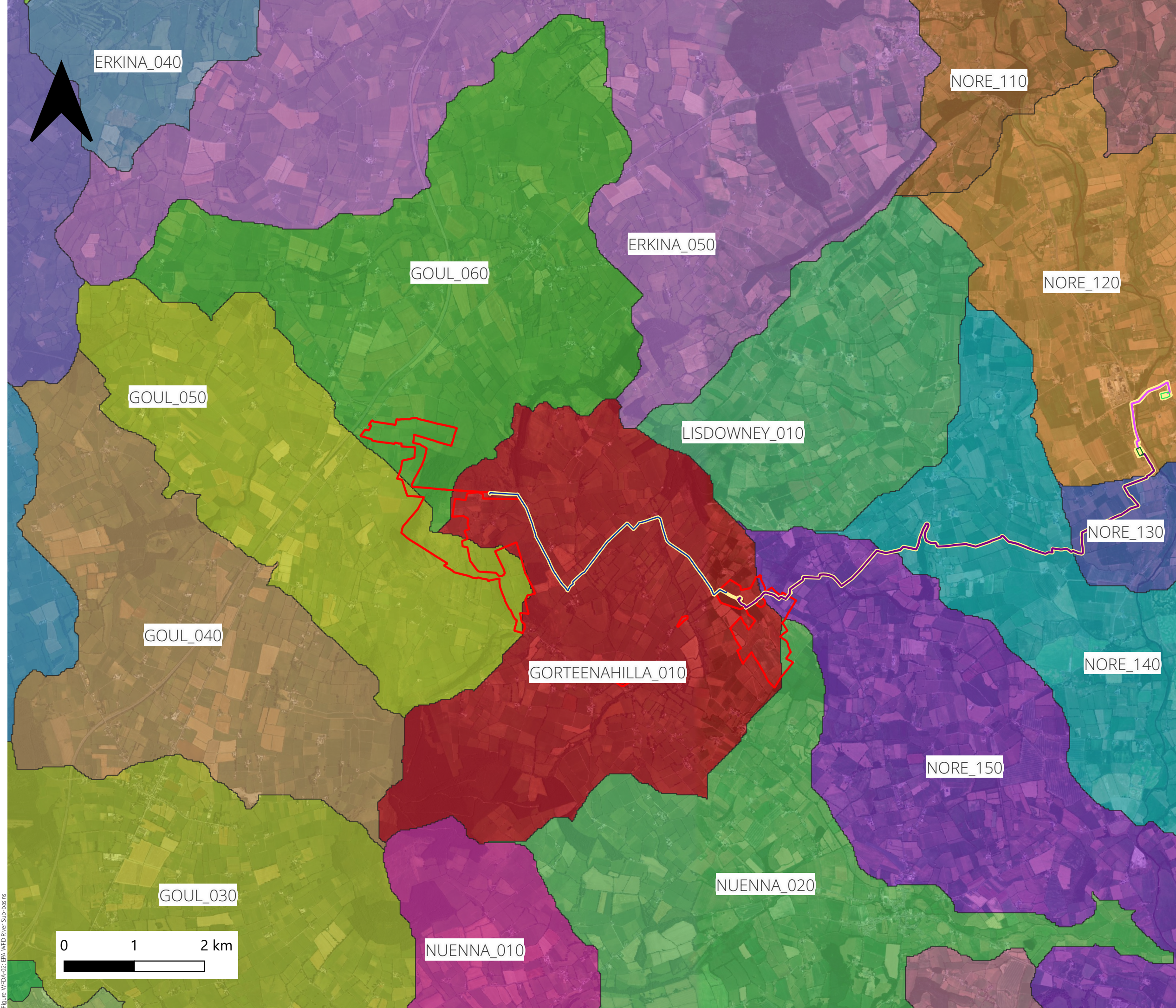
Project
Proposed Gathabawn Windfarm

Drawing Title
Figure WFDA-01: Site Location and EPA WFD Surface Waterbodies

Scale 1:50,000 @ A3		SLR Project No. 501.065883.00001	
Designed AH	Drawn AH	Checked KW	Authorised PG
Date 09/2026	Date 09/2026	Date 09/2026	Date 09/2026
Drawing Number Figure WFDA-01: Site Location and EPA WFD Surface Waterbodies			Rev. 01

Figure WFDA-01: Site Location and EPA WFD Surface Waterbodies

Figure WFDA-02: EPA WFD River Sub-basins



Notes:
1. Basemap: ESRI Satellite
2. Surface Water River Layer Source: Environemntal Protection Agency
3. Infrastructure: Supplied By Ecopower Ltd.

- LEGEND:
- Red Line Boundary
 - EirGrid Ballyragget Substation
 - Parksgrove Substation
 - Ballylehaun - Ballyring Cable Link
 - Ballyring - Parksgrove Underground Cabling
 - Parksgrove - Moatpark Underground Cabling
 - Construction Works Boundary - Candidate Grid Connection

- EPA WFD River Sub Basins
- ARDREAGH_010
 - ARIGNA (KILKENNY)_010
 - BAUNBALLINLOUGH STREAM_010
 - ERKINA_040
 - ERKINA_050
 - GORTEENAHILLA_010
 - GOUL_020
 - GOUL_030
 - GOUL_040
 - GOUL_050
 - GOUL_060
 - LISDOWNEY_010
 - NORE_110
 - NORE_120
 - NORE_130
 - NORE_140
 - NORE_150
 - NUENNA_010
 - NUENNA_020
 - OWVEG (NORE)_050
 - RATHDOWNEY STREAM_010

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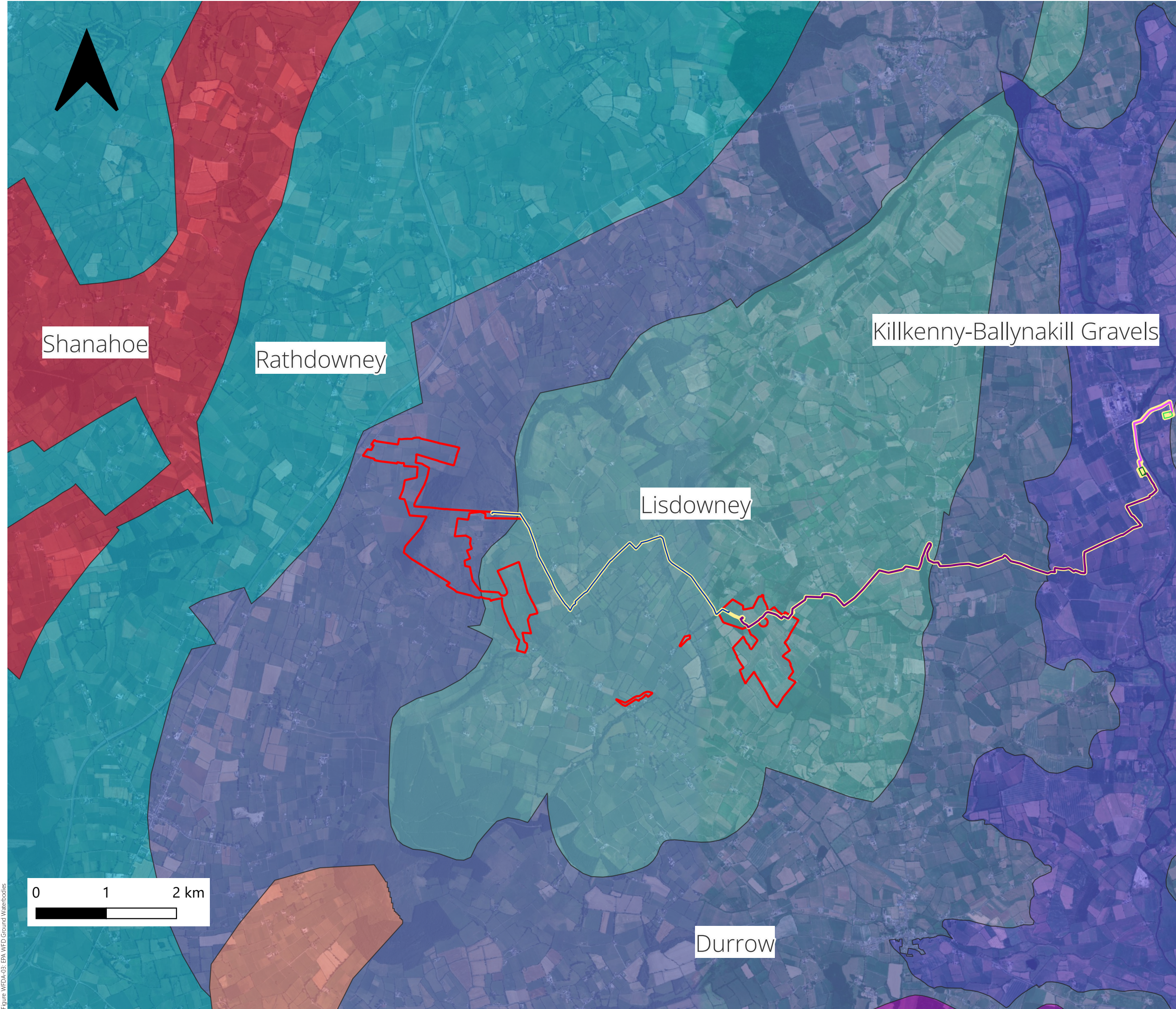
Client
Ecopower Ltd.

Project
Proposed Gathabawn Windfarm

Drawing Title
Figure WFDA-02: EPA WFD River Sub-basin Boundaries

Scale 1:50,000 @ A3		SLR Project No. 501.065883.00001	
Designed AH	Drawn AH	Checked KW	Authorised PG
Date 09/2026	Date 09/2026	Date 09/2026	Date 09/2026

Drawing Number Figure WFDA-02: EPA WFD River Sub-basin Boundaries	Rev. 01
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Notes:
1. Basemap: ESRI Satellite
2. Ground Waterbody Layer Source: Geological Survey Ireland
3. Infrastructure: Supplied By Ecopower Ltd.

LEGEND:

- Red Line Boundary
- EirGrid Ballyragget Substation
- Parks Grove Substation
- Ballylehaun - Ballyring Cable Link
- Ballyring - Parks Grove Underground Cabling
- Parks Grove - Moatpark Underground Cabling
- Construction Works Boundary - Candidate Grid Connection

EPA WFD Groundwater Bodies

- Durrow
- Killkenny-Ballynakill Gravels
- Lisdowney
- Rathdowney
- Shanahoe

Bing Satellite



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Drawing Title
Figure WFDA-03: EPA WFD Ground Waterbodies

Scale	1:50,000	@ A3	SLR Project No.	501.065883.00001
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Designed	AH	Drawn	AH	Checked	KW	Authorised	PG
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Date	09/2026	Date	09/2026	Date	09/2026	Date	09/2026
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Drawing Number	Figure WFDA-03: EPA WFD Ground Waterbodies	Rev.	01
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Flood Risk Assessment Report

Gathabawn Windfarm Project

Ecopower Developments Limited

Zetec House,
Purcellsinch IDA Business Park,
Dublin Road
Kilkenny
R95 PX5X

Prepared by:

SLR Environmental Consulting (Ireland) Ltd

7 Dundrum Business Park, Windy Arbour, Dublin, D14
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SLR Project No.: 501.065883.00001

Client Reference No: Gathabawn Wind Farm

25 September 2026

Revision: 1

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
0 Draft	14 September 2026	MCOB/OB		
0	21 September 2026	MCOB/OB	OB	PG
1	24 September 2026	KVS	PG	PG

Basis of Report

This document has been prepared by SLR Environmental Consulting (Ireland) Ltd (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with Ecopower Developments Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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Acronyms and Abbreviations

AFA	Areas for Further Assessment
C&D	Construction & Demolition
CFRAM	Catchment Flood Risk Assessment and Management
DoEHLG	Department of Environment, Heritage and Local Government
DS	Drainage Strategy
EPA	Environmental Protection Agency
FRA	Flood Risk Assessment
GSI	Geological Survey Ireland
Ha.	Hectares
ITM	Irish Transverse Mercator
NIFM	National Indicative Fluvial Mapping
OPW	Office of Public Works
PFRA	Preliminary Flood Risk Assessment
SID	Strategic Infrastructure Development
SPR	Source-Pathway-Receptor
SSFRA	Site-Specific Flood Risk Assessment



1.0 Introduction

SLR Environmental Consulting (Ireland) Limited (SLR) has been appointed by Ecopower Developments Limited (the Client) to prepare a Site-Specific Flood Risk Assessment (SSFRA) as part of a Strategic Infrastructure Development (SID) planning application for a 12-turbine wind farm (referred to as 'Gathabawn Windfarm') in the north of County Kilkenny, Ireland.

The Proposed Gathabawn Windfarm comprises 12 wind turbines covering approximate area of c. 260 ha. split between two Sites – The Ballylehaun Site (7 turbines, T1–T7) and the Ballyring Site (5 turbines, T8–T12). The Ballylehaun Site is to the west and the Ballyring Site is to the east with their boundaries c. 2.5 km apart. Site location is detailed further within Section 1.1. Refer to **Figure FRA-1** for the Site location and application area that is assessed within this SSFRA.

The Candidate Gathabawn Grid Connection, while not included as part of this planning application, consists of the construction of a new substation at Parksgrove townland, called the Parksgrove Substation, and comprises underground cabling between the Ballylehaun Area and Ballyring Area (Ballylehaun-Ballyring UGC), Ballyring Area and Parksgrove Substation (Ballyring-Parksgrove UGC), and Parksgrove Substation and the EirGrid Ballyragget Substation (Parksgrove-Moatpark UGC). This Stage 1 SSFRA has been carried out in accordance with *The Planning System and Flood Risk Management*¹, and should be read in conjunction with drawings and documents submitted as part of the SID planning application.

1.1 Site Location

The Ballylehaun Site is situated across the townlands of Coolnacrutta, Glashare, Ballylehaun, Rathloghan and Gorteenamuck and accessible via the R639 Regional Road. The Ballylehaun Site is approximately centred at Irish Transverse Mercator (ITM) grid reference, E634196, N670356.

The Ballyring site is situated across the townlands of Ballyring Upper, Ballyring Lower and Tentore, and is accessible via the Ballyring Upper Road. The Ballyring Site is approximately centred at ITM grid reference, E638753, N668978.

The closest village to the proposed Gathabawn Windfarm is Gathabawn village, c. 1 km southeast from the closest Ballylehaun turbine and c. 3 km from the nearest Ballyring turbine.

The surrounding land use around the two Sites comprises Complex cultivation patterns (turbines T1 and T2), land principally occupied by agriculture with significant areas of natural vegetation (turbines T3, T4, T5 and T7) and pastureland (turbines T6, T8, T9, T10, T11, T12). See **Figure FRA-1** for site location.

1.2 Existing Site Drainage

Artificial drainage ditches are located around the perimeter of existing grassland fields, predominantly around the Ballyring Site. The existing farm drains typically run dry during periods of low rainfall, except for a wet drainage channel at the southeasterly area of the Ballyring Site. There are two existing drainage channels within the Ballyring Area which will be intercepted during the construction phase D01 and D02.

Surface water runoff will be captured by a mixture of the artificial and natural drainage ditches which ultimately convey water into one of three nearby watercourses, the Coolnacrutta

¹ *Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009)



Stream, the Gorteennamuck Stream and the Lismaine Stream. See **Figure FRA-1** for the local surface water features.

Given the greenfield nature of the Site, it is assumed that any formal drainage systems will be present alongside the Sites' road design (8km in total, comprising 6.7km of new road and 1.3 km of upgraded farm track).

However, it is expected that the majority of incident rainfall will drain via a combination of infiltration to underlying strata and surface water runoff with local topography.

1.3 Nominated Hydrologists

This SSFRA report has been prepared by:

- Milo Cruise O'Brien BSc (Geography & Geology) MSc (Environmental Risk, Resilience & Sustainability) GradCIWEM, IAH – SLR Project Hydrogeologist.
- Olivia Bond BSc (Geography) – SLR Project Hydrologist;
- Dr. Peter Glanville P.Geo. EurGeol. MCIWEM PhD (Geomorphology) MSc. (GIS) - SLR Technical Director Hydrology.

Milo is a project hydrologist/hydrogeologist at SLR and has experience preparing Flood Risk Assessment reports, Environmental Impact Assessment Reports, GIS analysis and baseline reports for renewable energy projects. Milo also has experience preparing Flood Risk Assessments for wind and solar projects.

Olivia is a project hydrologist at SLR who regularly completes Flood Risk Assessments, Scoping Reports, Environmental Impact Assessment Chapters, Surface Water Drainage Strategies and GIS analysis for renewable projects in Ireland and the UK.

Peter is a Technical Director (Hydrology) with SLR and has over 25 years' experience in the area of hydrology and flood risk assessments. Peter has undertaken and prepared flood risk assessments for a wide range of projects and has also prepared Section 4 Discharge Licences for a variety of developments. He has also been involved as a hydrologist in a range of environmental monitoring projects for Environmental Baseline Studies, exploration operations, quarry site operations and infrastructure projects.

2.0 Flood Planning Guidelines

In November 2009 the Office of Public Works (OPW) and Department of the Environment, Heritage and Local Government (DoEHLG) issued guidelines for planning authorities addressing the management of flood risk in the planning system², hereinafter referred to as the 'Flood Guidelines'.

The Flood Guidelines introduced comprehensive mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. Implementation of the guidelines will be achieved through actions at national, regional, local authority and site-specific levels, depending on the plan or development project being considered.

2.1 Planning Objectives

The consultation guidelines for planning authorities relating to the flood guidelines require the planning system at national, regional and local level to:

² 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (2009): Office of Public Works and the Department of the Environment, Heritage and Local Government.



- Avoid development in areas at risk of flooding by not permitting development in flood risk areas, particularly floodplains, unless where it can be fully justified, there are wider sustainability grounds for appropriate development and unless the flood risk can be managed to an acceptable level, without increasing flood risk elsewhere and, where possible, reducing flood risk overall;
- Adopt a sequential approach to flood risk management based on avoidance, reduction and then mitigation of flood risk as the overall framework for assessing the location of new development in the development planning processes; and
- Incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals.

A sequential approach is adopted in the flood guidelines in order to guide development away from areas at risk of flooding, this entails the following actions:

- **Avoid:** Locate new development in lower risk flood zones;
- **Substitute:** Ensure that the type of development is not particularly vulnerable to the adverse impacts of flooding;
- **Justify:** Ensure that the development is considered for strategic reasons;
- **Mitigate:** Ensure that flood risk is reduced to acceptable levels; and
- **Proceed:** Development to proceed only where Justification Test passed and emergency planning measures are in place.

2.2 Sequential Approach and Flood Zones

The sequential approach identifies and defines three different flood zones (designated Zones A, B and C) in order to guide development at a particular site.

The flood zones are:

- **Zone A:** High probability of flooding. This zone defines areas with the highest risk of flooding from rivers (i.e. more than 1% probability or more than 1 in 100) and the coast (i.e. more than 0.5% probability or more than 1 in 200).
- **Zone B:** Moderate probability of flooding. This zone defines areas with a Moderate risk of flooding from rivers (i.e. 0.1% to 1% probability or between 1 in 100 and 1 in 1000) and the coast (i.e. 0.1% to 0.5% probability or between 1 in 200 and 1 in 1000).
- **Zone C:** Low probability of flooding. This zone defines areas with a low risk of flooding from rivers and the coast (i.e. less than 0.1% probability or less than 1 in 1000) and covers all areas not within Zones A or B.

2.3 Development Vulnerabilities and Appropriateness

The flood guideline defines three types of development based on their vulnerability. These are:

- **Highly Vulnerable Development:** Garda, ambulance, hospitals, schools, dwelling houses, students halls, essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations;
- **Less Vulnerable Development:** Buildings used for retail, leisure, warehousing, commercial industrial and non-residential institutions, land and buildings used for agricultural and forestry, waste treatment, mineral working and processing, local transport infrastructure; and



- **Water Compatible Development:** Flood control infrastructure, docks, marines, navigation facilities, ship building, water-based recreation and tourism, amenity opens spaces, outdoor sports and recreation and essential facilities such as changing rooms.

Uses not listed in the flood guideline should be considered on their own merits.

Inappropriate development that does not meet the criteria of the Justification Test should not be considered at the plan-making stage or approved within the development management process **Table 1** illustrate those types of development that would be appropriate to each flood zone and those that would be required to meet the Justification Test.

Table 1: Matrix of Vulnerability versus Flood Zones

Development	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

2.4 Flood Risk Stages

A methodology for the identification and assessment of flood risk is outlined in Technical Appendix A of the flood guidelines. The aim of the Flood risk Assessment (FRA) is to identify and quantify the risk of flooding to land, property and people and also to provide sufficient information to assess whether a proposed project is appropriate at a specific site.

The FRA is undertaken over a number of stages with each progressing to a more detailed assessment, dependant on the outcome of each stage, until the level of detail in the FRA is appropriate to support the planning application or it has been demonstrated that flooding is not a relevant issue for the site.

The stages in the assessment are typically;

- **Stage 1:** Flood Risk Identification;
- **Stage 2:** Initial Flood Risk Assessment; and
- **Stage 3:** Detailed Flood Risk Assessment (including quantitative model).

In practice, Stage 1 and Stage 2 are generally undertaken for sites unless no flood risk to the site is identified at the end of Stage 1 and there is no requirement to move to Stage 2. At the end of Stage 2 a decision is taken as to whether it is necessary to proceed to Stage 3 in the assessment process, in relation to flood risk at a site.

Stage 3 often includes detailed hydraulic modelling to adequately assess the site-specific flood risk and to assist in providing adequate flood mitigation measures, if required, for a development.

2.5 Proposed Project Classification

In accordance with The Planning System and Flood Risk Management Guidelines land uses are categorised according to their vulnerability to flooding; highly vulnerable, less vulnerable or water compatible.

The aim is to determine the appropriateness of a development within areas at risk of flooding. The classification depends on the risk to people within the development, the potential effects to infrastructure caused by a flood and the potential environmental damage caused arising from pollution caused by the development in the event of a flood.



Elements of the proposed Gathabawn Windfarm infrastructure such as the substation and key electrical equipment would be classified as 'Highly Vulnerable' development, in accordance with the Flood Guidelines' electricity generating power stations classification. However, other elements such as the turbines and site road infrastructure would be classified as 'Less Vulnerable' development as the vulnerability to people and infrastructure in an event of a flood is considered to be low. In addition, based on the site topography, the probability of flooding to the proposed development itself is low, which is discussed further in Section 3 of this report.

For these reasons, the Parksgrove Substation is considered to be 'Highly Vulnerable' development while the remainder of the development would be classified as 'Less Vulnerable' development category and is appropriate for Flood Zone C (Low Risk), see Table 1 above.

2.6 Flood Risk Assessment Conceptual Model

In order to assess the flood risk for a particular site it is essential to understand what the risk is. This is undertaken using a conceptual Source-Pathway-Receptor (SPR) model.

A SPR model is a representation of the components of flood risk. The three components are a **source** of floodwater(s) (for example prolonged or intense rainfall), the **receptors** (such as land, buildings and people) that are affected by flooding and the **pathway** (such as rivers, floodplain, artificial drainage systems, overland flow etc.) through which the flood water reaches those receptors.

For a risk to arise, all three components of the SPR model must be present.

3.0 Stage 1: Flood Risk Identification

The Stage 1 Flood Risk Identification uses existing and recorded information to identify whether there may be any flooding or surface water management issues related to the application Site. The potential sources of flooding to any site can be varied and can include one or more of the following:

- Flooding from rivers (fluvial);
- Flooding from land (pluvial);
- Flooding from groundwater and karst;
- Flooding from the sea or tidal (coastal);
- Flooding from sewers; and
- Flooding from manmade impoundments (reservoirs, canals and other artificial sources).

3.1 Local Surface Water Features

According to the Environmental Protection Agency (EPA) online map viewer (accessed September 2026), there are six surface watercourses within proximity of the windfarm Site. **Figure FRA-1** highlights the location of the watercourses in relation to the Site.

Coolnacrutta watercourse, at its closest point, lies c. 0.45 km south of the Ballylehaun Area boundary and flows north-westerly direction before discharge into the River Goul c. 1.27 km west of the Ballylehaun Site.

The Gorteennamuck stream is, at its closest point, 0.18 km east of the Ballylehaun Site boundary and flows southeasterly before discharging into the Gorteenahilla c. 0.75 km southeast.

The Gorteenahilla watercourse is, at its closest point, 0.75 km east of the Ballylehaun Site and 2 km west of the Ballyring Site and flows south to south-easterly. Facilitating Works FW8 on



the turbine delivery route are c.23m from this watercourse at the closest point. The Gorteenahilla discharges into the Nuenna River, in the village of Freshford, c. 3.4 km south of the Ballyring Site.

The Ballyring Upper stream is, at its closest point, c. 0.48 km west of the Ballyring Site and c.5m from facilitating works FW9 which flows southerly before discharging into the Gorteenahilla, c. 0.87 km to the south.

The Lismaine watercourse is, at its closest point, c. 0.33 km northeast of the Ballyring Site and flows easterly to south-easterly before discharging into the River Nore approximately 5.5 km southeast of the Site.

The Foyle South is, at its closet point, c.90m from facilitating works FW8, and flows north-easterly before discharging into the Gorteenahilla.

The entire Gathabawn Windfarm Development is situated within the Nore catchment (Catchment ID: 15). Turbines T1-T7 of the Ballylehaun Site are situated within the Goul sub catchment (sub catchment ID: Goul_SC_010) and turbines T8-T12 are situated within the Nore sub catchment (sub catchment ID: Nore_SC_070).

EPA mapping indicates that there are no lakes within the Site boundary.

There are no artificial water courses (canals, reservoirs etc) in the vicinity of the Site.

3.2 Fluvial Flooding

The OPW Catchment Flood Risk Assessment and Management (CFRAM) flood study commenced in June 2011 and ran until the end of 2016. The study involved detailed hydraulic modelling of rivers, their tributaries and tidal flooding to develop and implement Flood Risk Management Plans for the areas identified as being at significant risk of flooding during Ireland's Preliminary Flood Risk Assessment (PFRA). These identified areas are referred to as Areas for Further Assessment (AFA) for flood risk.

The OPW National Indicative Fluvial Mapping (NIFM) maps are available for areas of the country not included as part of the CFRAM Programme and include the modelling of watercourses within catchments greater than 5 km². While useful for national-scale mapping, the NIFM does not provide an accurate representation of projected flood extents and depths at the site-specific scale. Like CFRAM, the NIFM maps are only indicative of the predicted flood extent and probability at the site level.

The Site is not located within an AFA and therefore detailed CFRAM hydraulic modelling is not available.

The NIFM dataset shows the Facilitating Works FW8 are partially within an area of low and medium probability of fluvial flooding, near the confluence of the Gorteenahilla and Foyle South. The works are temporary, the aggregate will not create an impermeable surface, and the affected land and road boundary will be reinstated to its original condition following completion of the turbine transportation. Given the short duration of the works and their temporary nature, no permanent loss of floodplain storage or permanent alteration to flood flow paths is anticipated as a result of FW8. All other parts of the application area are not at risk of fluvial flooding from any of the identified watercourses mentioned in section 3.1. It is therefore considered that the risk of fluvial flooding is low and not significant.

The available NIFM flood extent mapping is illustrated in **Figure FRA-2**.

3.3 Pluvial Flooding

Pluvial flooding occurs when the volume or intensity of rainfall exceeds the infiltration capacity of natural ground or drainage system.

No publicly available surface water flood maps were identified for the Site.



The Site is underlain by permeable loamy subsoils which facilitate natural infiltration of rainfall. It is also expected that certain quantities of rainfall will transpire as surface water runoff which will either naturally percolate into underlying strata or ultimately enter one of the three watercourses within proximity of the Site.

A Surface Water Management Plan (SWMP), has been developed for the Site to retain, treat and manage any additional surface water created by areas of hardstanding associated with the turbines, See Tab 5 in the Environmental Management Plan for the Gathabawn Windfarm Project. The SWMP will ensure that surface water flood risk at the Site and surrounding local area is not exacerbated by increased impermeable area introduced by the Proposed Development.

Given the permeable nature of the underlying subsoils at the Site, it is considered that the risk of pluvial flooding is low and not significant.

3.4 Groundwater Flooding

The Geological Survey of Ireland (GSI) publish groundwater flood maps for Ireland. The Site is not located within a known area at risk of groundwater flooding. The nearest recorded groundwater flooding event is c. 6.1 km to the south of the Ballylehaun Site.

The GSI Synthetic Aperture Radar (SAR) Seasonal Flood Maps shows observed peak flood extents which took place between Autumn 2015 and Summer 2021. The GSI mapping indicates a small number of modelled flood extents from pluvial flooding within and around the redline boundary at the Ballylehaun Site. These are considered likely to represent localised topographic depressions where groundwater water ponded during very wet periods when groundwater levels were above the ground level. The modelled extents are small scale and isolated in nature; given their limited extent of these modelled events they are not considered to present a constraint to the proposed infrastructure.

Therefore, it is considered that the risk of groundwater is low and not significant

3.5 Coastal Flooding

The Proposed Development is located over 85 km from the nearest coastline / tidal area.

Therefore, it is considered that the risk of coastal flooding is low and not significant.

3.6 Historical Flooding

According to the OPW historical flooding database, there are no recorded historical flooding events at the Site or within 2 km.

The closest recorded historical flooding event is 3.53 km southeast of the Ballyring Site. This flooding event was recorded in March 2018 and was associated with fluvial overtopping of the Nuenna River.

3.7 Flooding from Sewers

There are no storm drains on the Site or within proximity of the Site.

Therefore, it is considered that the risk of flooding from sewers is low and not significant.

3.8 Flooding from Reservoirs and Canals

There are no reservoirs or artificial canals within the Site or within proximity of the Site.

Therefore, it is considered that the risk of flooding from reservoirs and canals is low and not significant.



3.9 Flood Screening – Summary

With reference to the potential sources of flooding discussed, the Site is not located within any mapped flood zones, nor does it show physical evidence of historical flooding.

The flood risk from each potential source is summarised in **Table 2**.

Table 2: Flood Screening Summary

Potential Sources of Flooding	Potential to Flood at the Site	Flood Risk
Flooding from rivers (fluvial)	Facilitating Works FW8 are partially within an area of low and medium probability of fluvial flooding. Given the short duration of the works and their temporary nature, no permanent loss of floodplain storage or permanent alteration to flood flow paths is anticipated as a result of FW8. All other parts of the site are not located within the OPW Flood Zones A or B and NIFM mapping indicates that there is no risk of flooding from local surface water features.	Low
Flooding from land (rainfall / pluvial)	The Site comprises permeable subsoils and currently storm water infiltrates into the ground. GSI Historical flood extents in and around the redline boundary at Ballylehaun are limited in size and extent and are not considered to present a constraint to the Proposed Development.	Low
Flooding from groundwater	The Site is not located within a known area at risk of groundwater flooding. The GSI groundwater flooding database records one recorded groundwater flooding event which is located over 6 km from the Site. The GSI SAR modelled flood events indicate the potential for some very localised groundwater flooding, probably associated with topographic low points in the landscape.	Low
Flooding from the sea (Coastal / Tidal)	The Site is located c. 85 km away from the nearest coastline / tidal area.	Low
Flooding from reservoirs and artificial sources	There are no artificial surface water bodies in the vicinity of the Site.	Low

3.10 Requirement for Stage 2 Flood Risk Assessment

The flood guidelines state that if any source of flood risk at a Site is identified at Stage 1, it is necessary to progress to the Stage 2 Initial Flood Risk Assessment.

Each of the potential flooding sources has been analysed based on the findings of a desktop study and the potential flood risk at the Site is considered to be low and not significant.

It is concluded therefore, that a Stage 2 assessment is not necessary as no potential flood risk to the Site has been identified.



4.0 Conclusion

The Site is generally classified as a 'Less Vulnerable' development under the Flood Guidelines because, except for the substation and key electrical infrastructure which is classified as 'Highly Vulnerable' development. Notwithstanding this the site is located in Flood Zone C which is at a Low Risk of flooding.

Based on the Stage 1 Flood risk screening undertaken as part of this assessment, it is considered that flood risk to the Site is low.

The Flood Guidelines require that development must not increase flood risk elsewhere. Precipitation onto the Site naturally percolates through the permeable subsoils, there is no discharge of storm water to external drainage networks or watercourses, and the development does not involve any modification to a watercourse. Any surface water created by the increased impermeable area introduced as part of the Proposed Development will be retained and discharged in an appropriate manner, as outlined within the SWMP produced for the Site. Therefore, it is considered that the Proposed Development will not increase flood risk in the surrounding catchment.

Based on the FRA undertaken here, the following conclusions are made:

- i. **the Site is not considered to be at risk to flooding; and**
- ii. **the Proposed Development will not increase flood risk elsewhere in the catchment.**

Based on the screening and assessment undertaken here it is considered that the Proposed Development and Site is compliant with the requirements of the flood guidelines.



FIGURES

Figure FRA-1 Proposed Gathabawn Windfarm: Site Location & Surface Water Features

Figure FRA-2 Proposed Gathabawn Windfarm: NIFM River Flood Extent Map

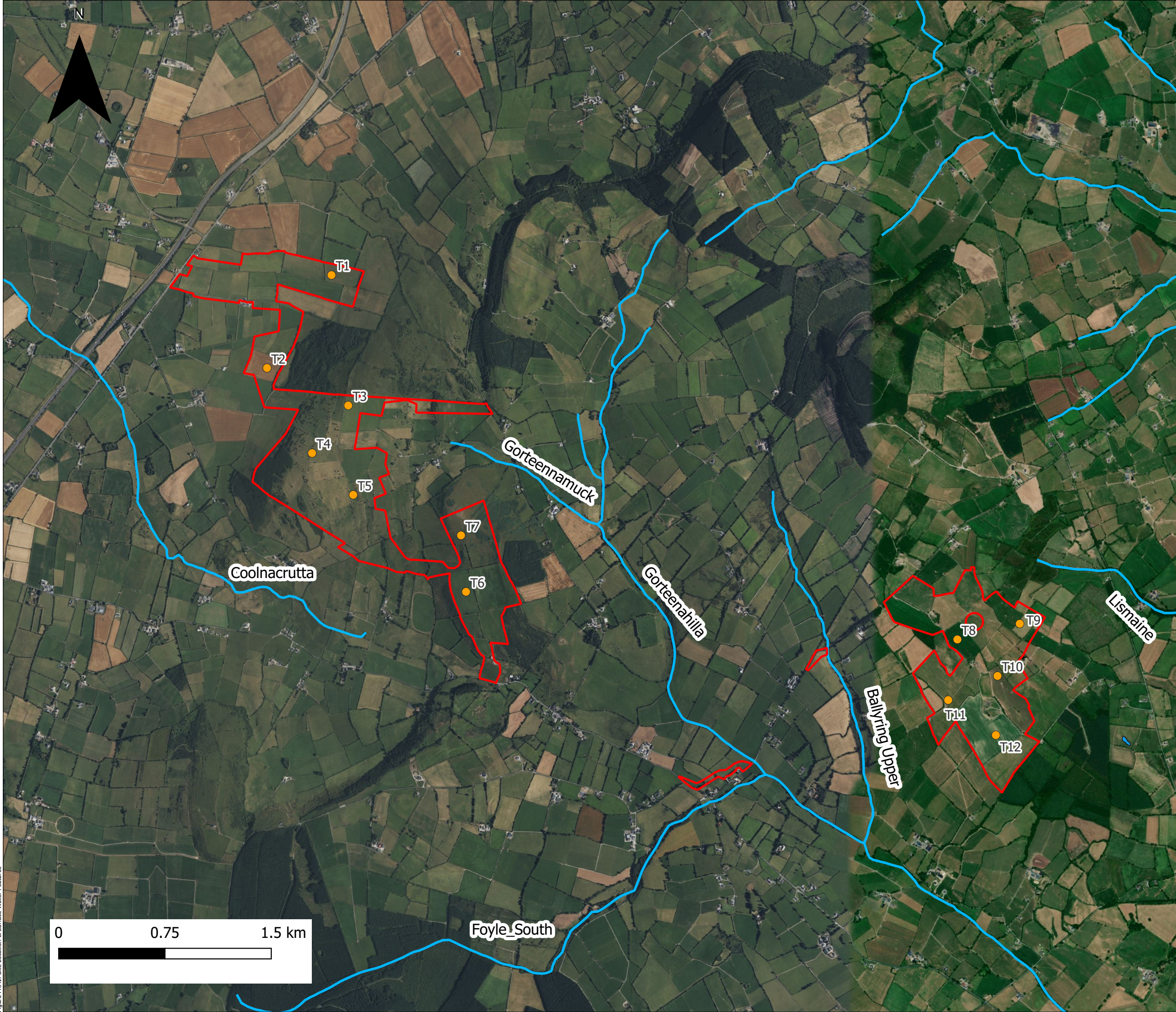




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Notes:
1. Basemap: Bing Satellite
2. Surface Water River Layer Source: Environemntal Protection Agency
3. Infrastructure: Supplied By Ecopower Ltd.

- LEGEND:
- Proposed Gathabawn Turbines
 - ▭ Red Line Boundary
 - EPA Surface River Waterbodies
 - ▭ Lakes



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Project
Gathabawn Wind Farm

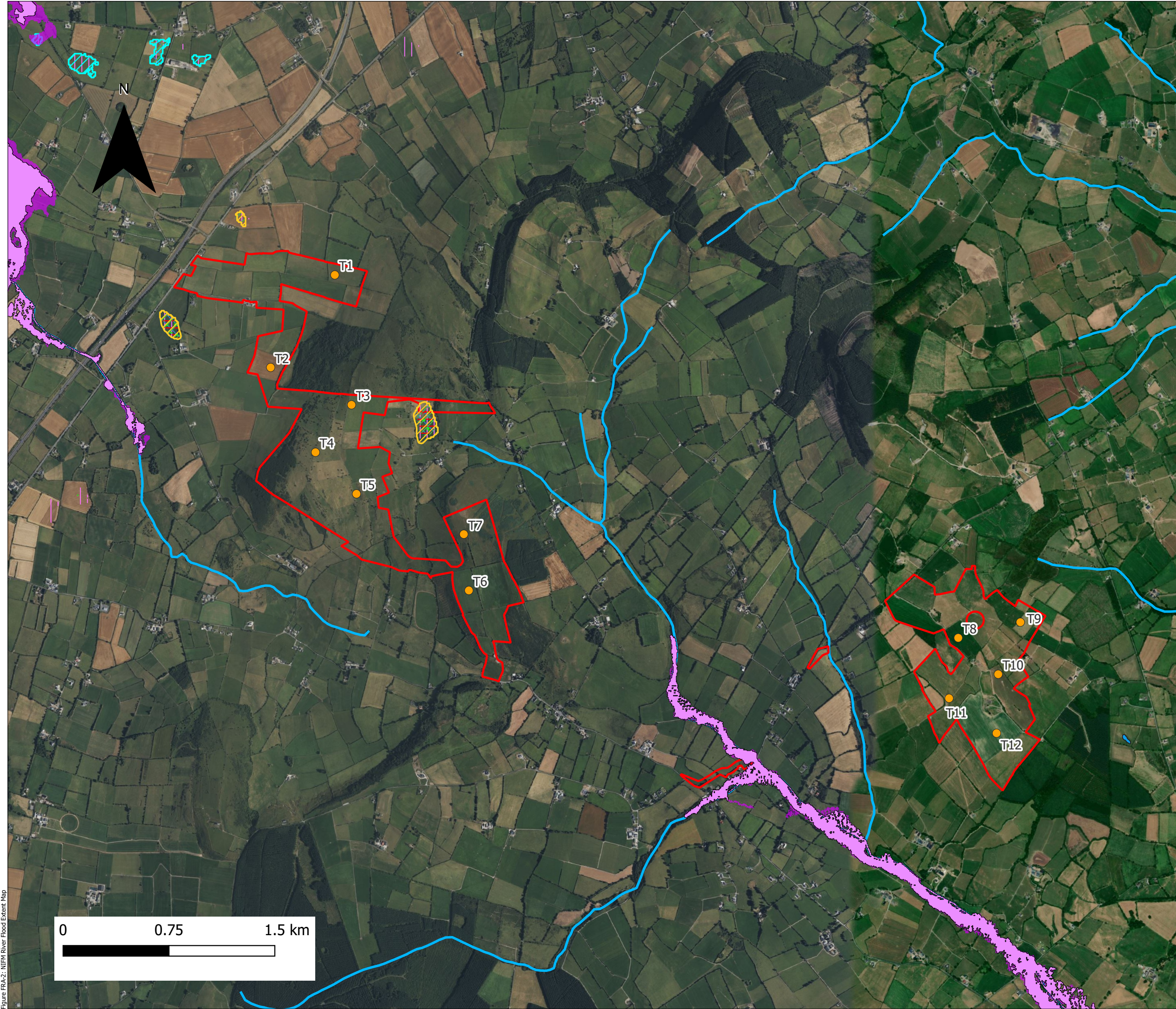
Drawing Title
Proposed Gathabawn Windfarm: Site Location & Surface Water Features

Scale 1:25,000 @ A3		SLR Project No. 501.065883.00001	
Designed MCOB	Drawn MCOB	Checked KW	Authorised PG
Date 09/2026	Date 09/2026	Date 09/2026	Date 09/2026

Drawing Number
Figure FRA-1

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01

Figure FRA1: Site Location & Surface Water Features



Notes:
1. Basemap: Bing Satellite
2. Surface Water River Layer Source: Environemntal Protection Agency
3. Infrastructure: Supplied By Ecopower Ltd.

- LEGEND:
- Proposed Gathabawn Turbines
 - Red Line Boundary
 - EPA Surface River Waterbodies
 - Lake
 - NIFM River Current Scenario Flood Zone A
 - NIFM River Current Scenario Flood Zone B
 - GSI Historic Groundwater Flood Map
 - GSI Surface Water Flood Map (2015-2016)
 - GSI Seasonal Flood Map (2015-2016)
 - GSI Seasonal Flood Map (2017-2018)
 - GSI Seasonal Flood Map (2018-2019)
 - GSI Seasonal Flood Map (2019-2020)
 - GSI Seasonal Flood Map (2020-2021)



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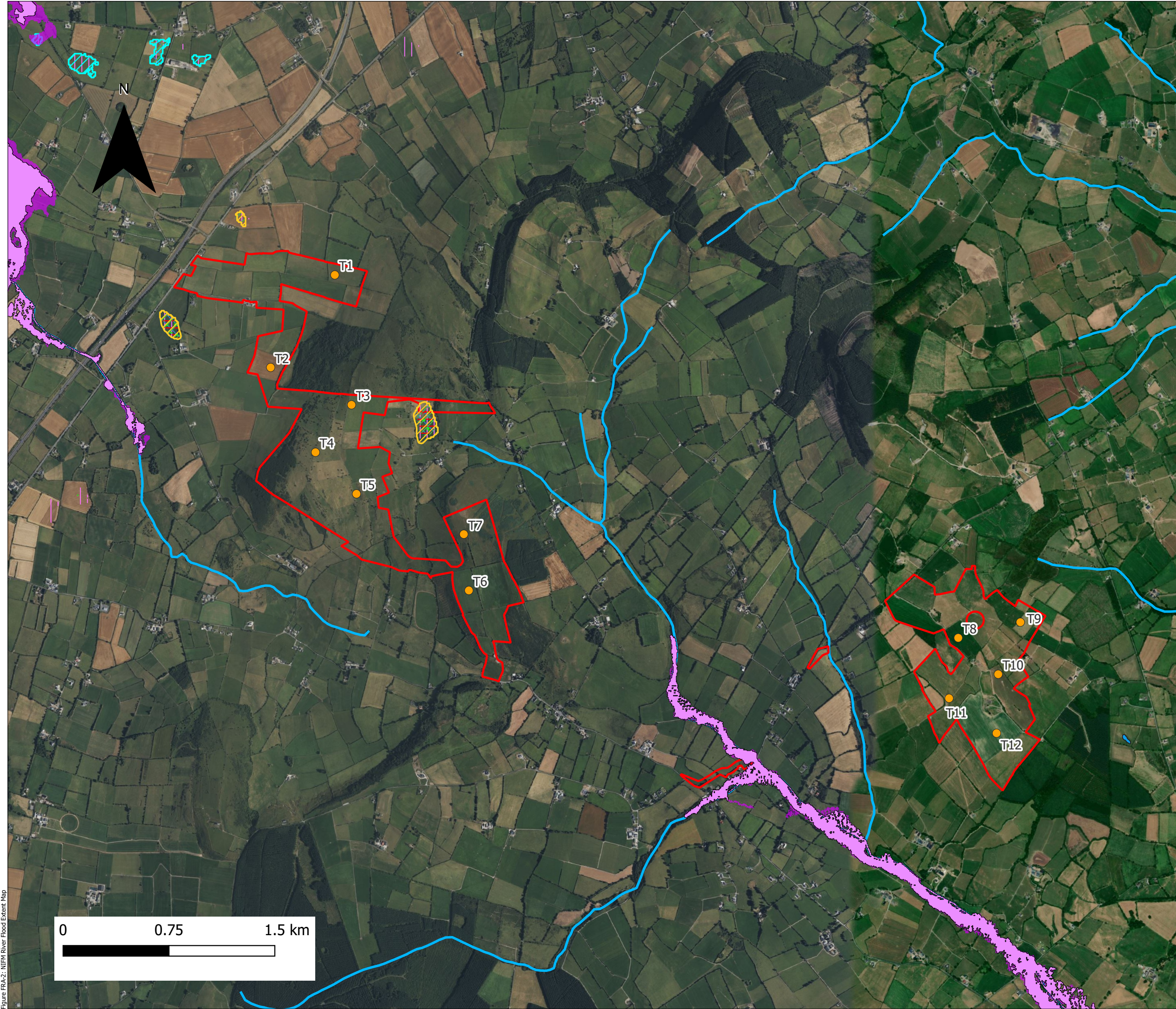
Drawing Title
Proposed Gathabawn Windfarm: NIFM River Flood Extent Map

Scale 1:25,000 @ A3		SLR Project No. 501.065883.00001	
Designed MCOB	Drawn MCOB	Checked KW	Authorised PG
Date 09/2026	Date 09/2026	Date 09/2026	Date 09/2026

Drawing Number
Figure FRA-2

Rev.
01

Figure FRA-2: NIFM River Flood Extent Map



Notes:
1. Basemap: Bing Satellite
2. Surface Water River Layer Source: Environemntal Protection Agency
3. Infrastructure: Supplied By Ecopower Ltd.

- LEGEND:
- Proposed Gathabawn Turbines
 - Red Line Boundary
 - EPA Surface River Waterbodies
 - Lake
 - NIFM River Current Scenario Flood Zone A
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 - GSI Seasonal Flood Map (2020-2021)



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Drawing Title
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Designed MCOB	Drawn MCOB	Checked KW	Authorised PG
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Drawing Number
Figure FRA-2

Rev.
01

Figure FRA-2: NIFM River Flood Extent Map