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Water Framework Directive Assessment

PRESENTED TO

Ballinla Windfarm Limited

DATE

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LIST OF ABBREVIATIONS

Abbreviation	Definition
AEP	Annual Exceedance Probability
AFA	Area for Further Assessment
A/HMWB	Artificial or Heavily Modified Water Body
CEMP	Construction and Environmental Management Plan
CIS	Common Implementation Strategy
DEHLG	Department of Environment, Heritage and Local Government
DWPA	Drinking Water Protected Areas
EGC	Enviroguide Consulting
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EQS	Environmental Quality Standards
GEP	Good Ecological Potential
GSI	Geological Survey Ireland
IES	Institute of Environmental Sciences
IGI	Institute of Geologists of Ireland
MWP	Malachy Walsh & Partners
OPW	Office of Public Works
PoM	Programme of Measurement
RBMP	River Basin Management Plan
SSFRA	Site Specific Flood Risk Assessment
SuDS	Sustainable Drainage Systems
TII	Transport Infrastructure Ireland
UE	Uisce Éireann
WAP	Water Action Plan
WFD	Water Framework Directive
WWTP	Wastewater Treatment Plant

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1 INTRODUCTION

Enviroguide Consulting (hereafter referred to as EGC) was appointed by Malachy Walsh and Partners (MWP) on behalf of Ballinla Wind Farm Ltd. (hereafter referred to as the Applicant) to complete a Water Framework Directive (WFD) Assessment for the proposed windfarm development at Ballinla Co. Offaly (hereafter referred to as the 'Proposed Development' and 'Site').

This report presents the findings of the WFD Assessment for the Site and Proposed Development.

1.1 Project Objective

The overall objective of this WFD assessment is to determine if any specific components or activities associated with the Proposed Development will compromise WFD Article 4 objectives, cause a deterioration in the status of any surface water or groundwater body and/or jeopardise the attainment of good surface water or groundwater status. This assessment also aims to identify any waterbodies with the potential to be impacted, describe the proposed mitigation measures, and define any residual potential impacts.

1.2 Project Scope of Work

The scope of this WFD assessment included the following tasks in line with WFD Common Implementation Strategy (CIS) Guidance:

- Screening for Potential Effects - Determine by a Source–Pathway–Receptor (SPR) model whether the Proposed Development could have any direct or indirect effect on the different quality elements relevant to the WFD.
- Scoping & Data Assessment - Identifies the receptors that are potentially at risk from proposed activity and assesses appropriateness of available data.
- WFD Assessment - Assess whether any effect could cause deterioration or compromise the status/potential status of a water body.

This assessment is reliant on the design information for the Proposed Development provided by the Applicant.

1.3 Professional Competency

The report was reviewed by Warren Vokes Ba MSc MCIWEM C.WEM a Senior Consultant of EGC. Warren is a Chartered Water and Environmental Manager with over 9 years' experience of preparing environmental and hydrological assessments. The report was approved by Gareth Carroll BA BEng MIEnvSc CEnv, a Principal Consultant of EGC. Gareth is a Chartered Environmentalist (CEnv) with the Institute of Environmental Sciences (IES) with over 12 years' experience of preparing environmental and hydrogeological assessments for a range of project types and geological and hydrogeological site settings and accredited to undertake WFD assessments.

2 METHODOLOGY

2.1 Legislative Context

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU, and 2014/101/EU ("WFD"), was established to ensure the protection of the water environment. The Directive was transposed in Ireland by the European Communities (EU) (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).

The WFD requires that all member states protect and improve water quality in all waters, with the aim of achieving good status by 2027 at the latest. It applies to all surface waters (defined as inland waters, both standing and flowing and includes rivers, lakes, reservoirs, streams and canals), groundwater, transitional (estuarine) and coastal waters. This includes both natural and "artificial and heavily modified bodies of water" ('artificial' is defined in Article 2(8) as 'a body of surface water created by human activity' and 'heavily modified' is defined in Article 2(9) as 'a body of surface water which as a result of physical alternations by human activity is substantially changed in character').

Any new development must ensure that this fundamental requirement of the WFD is not compromised. The Article 4 objectives, which have been considered as part of the design process of the Proposed Development, include the following:

- Protect, enhance, and restore all bodies of surface water and groundwater with the aim of achieving good surface water status by 2027.
- Prevent deterioration and maintain a 'high' status where it already exists.
- Implement the necessary measures with the aim of progressively reducing pollution in surface waters and groundwater.
- Ensure waters in protected areas meet requirements.

2.1.1 National Policy

The WFD is implemented through the River Basin Management Plans (RBMP) and which operate on a renewing six-year cycle of planning, action, and review. RBMPs set targets to address water quality issues including the identification of river basin districts, water bodies, protected areas, and any pressures or risks, monitoring, and setting environmental objectives. In Ireland, the first RBMP covered the period from 2009 to 2015, with the second cycle plan covering the period from 2018 to 2021.

The Water Action Plan 2024 (RBMP 3rd Cycle – 2022-2027) Programme of Measures outlines comprehensive measures to protect and improve water quality across various sectors. The Programme of Measures (PoM) for the RBMP is a comprehensive set of actions designed to achieve the environmental objectives set out in the WFD. The PoM includes both basic and supplementary measures:

Key elements of the PoM include:

- Integrated Catchment Management: The PoM uses an integrated catchment management approach, focusing on identifying the right measures for specific locations to maximise effectiveness.
- Collaboration: Implementation involves collaboration between various government departments, local authorities, the EPA, and other stakeholders, with the Programme Delivery Office overseeing and coordinating efforts.
- Monitoring and Reporting: An enhanced monitoring and reporting programme tracks the implementation progress and assesses the effectiveness of the measures.
- Targeted Actions: The PoM identifies specific actions under each pressure/issue affecting water quality, assigning lead organisations, timelines, and key performance indicators.
- Multiple Benefits: The PoM aims to deliver multiple benefits for water, biodiversity, and climate change mitigation and adaptation.
- Environmental Assessment: All measures and projects arising during the third-cycle RBMP are subject to further environmental assessments, including Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA), as required.

The Water Action Plan 2024 provides numerous specific examples of measures within the PoM, categorised by the sector driving the impact:

- Agriculture: Implementation of a stronger and more targeted Nitrates Action Programme, including tighter controls on nutrient applications, a livestock excretion banding system, a national fertiliser sales database, and enhanced inspection and enforcement programmes.
- Hydromorphology: Developing a new Controlled Activities for the Protection of Waters regime to address pressures on the physical condition of waters.
- Forestry: Increasing the area of forests with appropriate water setbacks, seeking improvements to the licence applications process for key forestry activities, and rolling out schemes that promote water protection.
- Urban Wastewater: Continued investment in urban wastewater infrastructure and a review of water bodies where urban wastewater is a significant pressure.
- Peatlands: Updating the National Peatlands Strategy and continuing the national programme of peatland restoration.

These measures are designed to ensure that all new developments comply with the WFD's fundamental requirements and contribute to the overall goal of achieving good water status by 2027.

This assessment takes into account and meets all the requirements and objectives outlined above, ensuring compliance with the WFD.

2.2 Water Framework Directive Classification

The information used in the classification of the status of our water bodies is collected in the national WFD monitoring programme.

2.2.1 Surface Water Assessment

Under the WFD, surface water bodies are defined as stated in section 2.1 above and below:

- Rivers.
- Lakes.
- Transitional waters.
- Coastal waters.
- Artificial surface water bodies.
- Heavily modified surface water bodies.

The overall status of surface waters is classified using information on the biological (aquatic flora and fauna), physio-chemical (temperature, oxygenation, nutrient conditions) and hydromorphological (waterflow, sediment composition and movement, river bank structure etc.) quality of the waterbody, with each category receiving a rating of, “High”, “Good”, “Moderate”, “Poor” or “Bad”. For example, for a waterbody to be assigned an overall 'good' status, its ecological and chemical status must be at least 'good'.

2.2.1.1 Ecological Status

The ecological status of a surface water body is assessed based on the following categories, with each category receiving a rating of, “High,” “Good,” “Moderate,” “Poor” and “Bad” (EPA, 2025). Refer to Figure 2-1 for a representation of the WFD classification of the waterbodies (Catchments.ie, 2025).

High status, which is considered to be the best status achievable or benchmark for a given water body, is the *‘reference condition’* defined as the biological, chemical, and morphological conditions associated with no or very low human pressure.

The ecological status of a surface water body is assessed according to:

- Biological quality (i.e., the condition of biological elements (aquatic flora and fauna)).
- Physico-chemical quality (temperature, oxygenation, nutrient conditions).
- Hydromorphological quality (waterflow (i.e., flow and tidal conditions), sediment composition and movement, riverbank structure, etc).

The overall ecological status of a surface water body is based on the lowest of the three individual categories, which means that the condition of a single quality element (i.e., biological, physico-chemical and hydromorphological) can cause a water body to fail to reach its WFD classification objectives.

In the case of artificial and heavily modified waters, ecological potential status is assessed similarly to ecological status above but is rated as “Maximum,” “Good,” “Moderate,” “Poor” or “Bad” ecological potential instead. In general terms, ‘maximum ecological potential’ means that the water body is as close as possible to a comparable surface water body, with the only differences being those directly attributed to artificial or modified nature of the water body.

2.2.1.2 Chemical Status

Chemical status (level of harmful chemicals in the water) is recorded by one of two ratings, ‘Good’ or ‘Fail.’ It is assessed by compliance with Environmental Quality Standards (EQS) for chemicals that are listed in the European Communities Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272/2009 (as amended). This involves making sure that no changes take place that would worsen the current condition of any water body and that a Proposed Development does not prevent the achievement of the future status objectives of any waterbody.

The chemical status classification for the waterbody is determined by the lowest scoring chemical reported in the waterbody.

For an Artificial or Heavily Modified Water Body (A/HMWB), hydromorphologically altered for anthropogenic purposes (i.e., water supply, flood protection or navigation), a Good Ecological Potential (GEP) applies in those waterbodies, which means that the ecology must be as close as possible to that of a similar natural water body, but without compromising its human use.

2.2.2 Groundwater Assessment

Groundwater is awarded either “Good” or “Poor” status. Groundwater is assessed based on its chemical and quantitative status.

2.2.2.1 Chemical Status

Good chemical status of a groundwater body requires the entry of hazardous substances and saline intrusion into the groundwater to be prevented, and the presence of other pollutants to be below the limits within S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended). Concentrations of pollutants must also not be of such a concentration as to effect the ecological or chemical status of associated surface waters or to damage linked terrestrial ecosystems.

2.2.2.2 Quantitative status

Quantitative status (i.e., the amount of water present) is assessed based on whether or not the available groundwater resource is being reduced by the long-term rate of annual abstraction.

A representation of the WFD classification of the waterbodies is presented Figure 2-1.

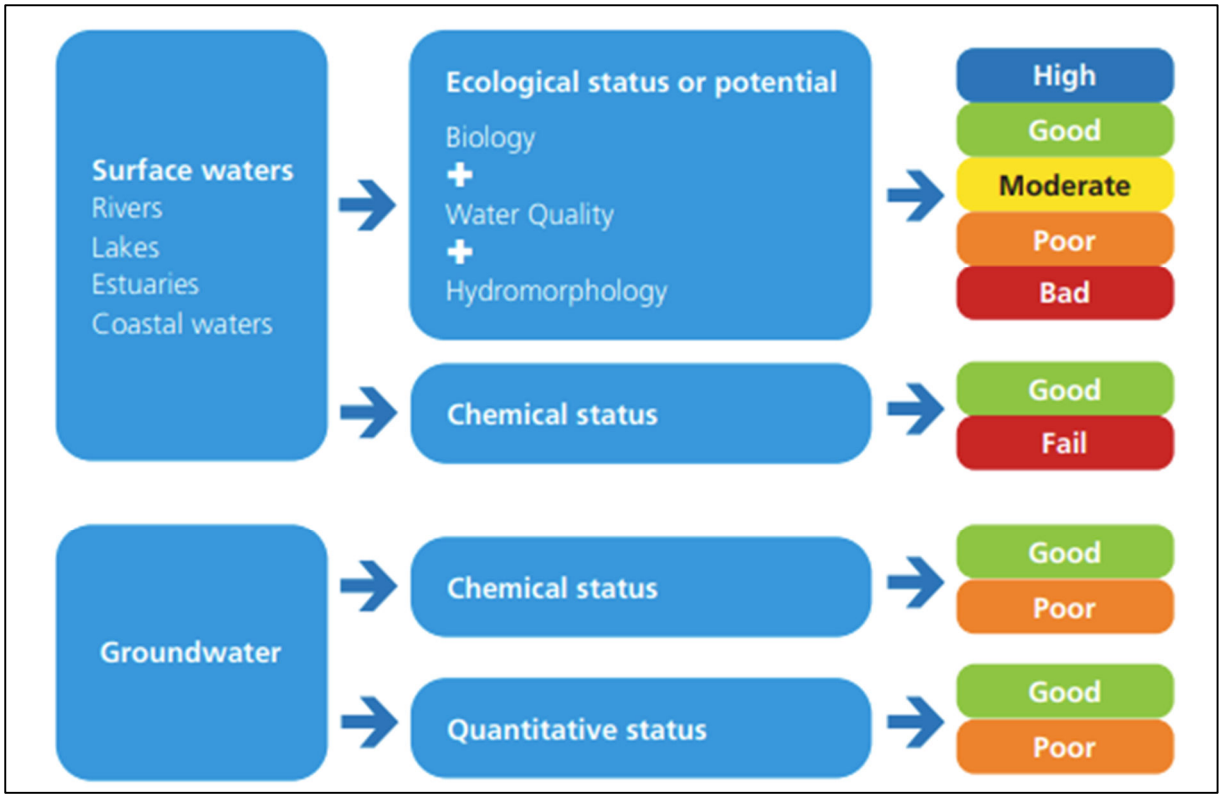

Figure 2-1: WFD Classification (source: EPA, 2025 – www.catchments.ie)

2.3 Approach to WFD Assessment

In order to assist in the implementation of the WFD, EU member states, alongside Norway and the European Commission, developed a Common Implementation Strategy (CIS) in May 2001. This CIS was designed to provide coherent and comprehensible guidelines aimed at achieving the aims of WFD.

The CIS provides an outline of an approach to WFD Assessments which breaks the assessment down into the following sequential steps.

- Screening for Potential Effects - Determine by a Source–Pathway–Receptor (SPR) model whether the Proposed Development could have any direct or indirect effect on the different quality elements relevant to the WFD.
- Scoping & Data Assessment - Identifies the receptors that are potentially at risk from proposed activity and assesses appropriateness of available data.
- WFD Assessment - Assess whether any effect could cause deterioration or compromise the status/potential status of a water body.

If the Proposed Development is determined to comprise or deteriorate the status/potential status of a waterbody then an “Article 4(7) Test” is required. The Proposed Development can only be authorised if the conditions as outlined under Article 4(7) a) to d) are fulfilled. If the conditions are not fulfilled the Proposed Development cannot be authorised according to the WFD.

If no impacts are identified, then no Article 4(7) assessment is required and authorisation may be permitted according to the WFD.

3 Description of the Proposed Development

The Proposed Development to be assessed comprises the construction of seven wind turbines, an onsite 110 kilovolt (kV) substation and all ancillary works in County Offaly (the Proposed Wind Farm),

in addition to works along the turbine delivery route (TDR) (the Proposed TDR). The Proposed Development comprises:

- Seven Wind Turbine Generators (WTGs)
- Seven WTG foundations and hardstand areas.
- One electrical substation (110kV) including independent power producer (IPP) substation and wind farm operations compound with associated ancillary buildings, security fencing and all associated works.
- One LiDAR station based on the ground.
- Two new site entrances from the L5010.
- New and upgraded internal site access tracks.
- All associated underground electrical and communications cabling connecting the proposed turbines to the proposed onsite substation.
- The TDR including temporary works on sections of the public road network and private lands along the turbine delivery route on the L-5006 and the junction of the R-402 and R-420.
- One temporary construction site compound and additional mobile welfare unit.
- One spoil deposition area.
- Landscaping.
- Associated surface water management systems.

The project considered in this report includes for an underground grid connection cabling, connecting the onsite substation to the national electricity grid via the Philipstown 110kV Substation located in the townland of Ballykilleen, Co. Offaly (the Proposed Grid Connection). The cabling will be located within the public road corridor or existing tracks for its entire length. The total length of the Proposed Grid Connection Route is approximately 8km, the full length of the Proposed Grid Connection Route is located within Co. Offaly. To ensure clarity, the Proposed Grid Connection Route will be the subject of a separate future planning application.

All elements of the Proposed Development listed above have been assessed in this report.

3.1 Proposed Development Construction Phase

The construction works for the Proposed Development will be carried out in a phased manner in order to minimise disruption to the local community, minimise environmental impact and ensure the safest working conditions possible. A comprehensive description of activities is outlined in **Chapter 3 Civil Engineering** of the **Environmental Impact Assessment Report (EIAR)**. The construction of the Proposed Development will principally comprise of the following works:

- Felling of any areas of coniferous forestry plantation necessary to facilitate construction works.
- Construction of site entrances and any sections of internal access tracks necessary to facilitate access to the temporary construction compound.
- Construction of the temporary construction compound including storage area for construction materials, temporary site cabins to provide welfare facilities for site personnel, office space, meeting rooms, canteen area, mobile sanitary facilities and parking.
- Establishment of the temporary storage of stockpiled excavated topsoil and subsoil within temporary material storage areas. Establishment of the spoil deposition area at T4.
- Earthworks and drainage infrastructure associated with construction of new and upgraded internal access tracks, crane hardstand, turbine foundations and substation compound.
- Construction of upgraded and new watercourse crossings for construction of internal access tracks and underground cables.
- Excavation of turbine bases and associated turbine hardstand areas.
- Installation of sections of underground cabling between turbines.
- Installation of sections of underground cabling to selected connection point option.
- Construction of the substation compound.
- Turbine delivery works, installation, and commissioning.
- Landscaping and biodiversity enhancement.

3.1.1 Construction Environmental Management Plan (CEMP)

A Construction and Environmental Management Plan (CEMP) has been prepared and submitted with the planning application under separate cover. The CEMP will be updated by the appointed contractor in advance of construction works commencing and will be maintained throughout the construction phase. The CEMP will be a key construction contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment, prior to construction, during construction and during operation of the Proposed Development, are implemented. The CEMP will collate and manage the proposed and agreed mitigation measures, monitoring and follow-up arrangements and management of environmental impacts. The environmental commitments of the project will be managed through the CEMP and will be secured in contract documentation and arrangements for construction and later development stages. The CEMP will mainly address the construction phase however, where monitoring is to continue into the operational phase these commitments will be communicated and transcribed into operational process documentation.

3.1.2 Surface Water Management

A site surface water management system will be constructed on the site to attenuate run-off, guard against soil erosion and safeguard downstream water quality. The drainage system will be implemented along all work areas including all internal site access tracks, storage areas, crane hardstand areas and temporary site construction compound. Details of the proposed site drainage system are described in **Chapter 3** of the EIAR.

The site drainage system for the Proposed Development is designed to maintain the existing flow regime and water quality. Clean water from upstream is diverted around work areas to prevent contamination, while dirty water is collected and treated separately. Flood attenuation measures include temporary storage within drainage channels using stone dams. Stream crossings will use bottomless culverts or pre-cast concrete culverts to avoid altering watercourse profiles and ensure fish passage. Environmental control measures will be implemented to minimize sedimentation and pollution during construction. There will be no direct outfalls to watercourses instead each clean water drain will be terminated in a discharge channel running parallel to the ground contours that will function as a weir to disperse the flow over a wider area of vegetation.

3.1.3 Water Course Crossings

<u>Watercourses Within the Proposed Wind Farm</u>

As part of the Proposed Development, four watercourse crossings will be required on EPA registered watercourse (EPA River Water Body Code: IE_SE_14E010200). The water crossings will consist of one clear span bridge and three culverts.

<u>Land Drains within the Proposed Wind Farm</u>

In the northern section of the Proposed Wind Farm, there are small field drains within the hedge lines of the agricultural fields. There will be approximately nine field drains to be crossed in this section of the Proposed Wind Farm. Bottomless culverts will be used in the northern section of the site.

In the southern section, there are numerous minor forestry drains all draining east to west within the forestry and the peatlands. Four land drains have been noted in site walkovers. They will be crossed using box culverts.

<u>Watercourses within the Proposed Grid Connection</u>

The Proposed Grid Connection route is 8km long on local roads. One EPA registered watercourse crossing is required along the Proposed Grid Connection, the Leitrim Stream (EPA River Water Body Code: IE_SE_14E010200). 18 land drains have been identified along the route. It is expected that horizontal directional drilling would be undertaken for the Proposed Grid Connection to cross under EPA mapped watercourses and under the Bord na Mona rail track adjacent to the Edenderry Power Station.

Refer to Chapter 3 Civil Engineering of the EIAR for the details on watercourse crossings. The potential methodologies that will be used include trench and ducting, culverts and horizontal directional drilling.

3.1.4 Water Course Crossings – Construction Methodology

No work will take place within the 20m buffer zones of EPA registered watercourses, except for drainage/stream crossings, associated track construction, forestry felling and minor works. Working near watercourses during or after intense or prolonged rainfall events will be avoided and work will cease entirely near watercourses when it is evident that there is a risk that pollution could occur. All construction method statements will be developed in consultation with Inland Fisheries Ireland and in accordance with the details in the CEMP accompanying this application.

The selection criteria for crossing natural/artificial drains and streams within the site were:

- Avoid crossing drains or streams at acute angles where possible.
- Avoid meanders at the crossing location.
- Cross where foundations could be constructed without excess excavation.
- Consider vertical alignment requirements.

All watercourse and drain crossings in the north section of the site will be made using bottomless culverts. No instream works will take place on the northern section of the site. In the southern section, there are numerous minor forestry drains all draining east to west within the forestry and the peatlands. Four land drains have been noted in site walkovers. They will be crossed using box culverts.

Clear span pre-cast concrete culverts are advantageous in several manners for this type of installation. As spans increase, the height can increase accordingly allowing significant light penetration under the culvert. The increase in height is complimentary to the vertical alignment requirements for access track design. Refer to **Planning Drawing 23882-MWP-00-00-DR-C-5415** for further details..

3.1.5 Conifer Tree Felling

Felling of commercial conifer and mixed broadleaf and conifer forestry will be required to accommodate the construction of some wind farm infrastructure, namely four turbine foundations, and associated hardstands, access tracks, turbine assembly, and spoil deposition area. It is proposed to fell around turbines both to facilitate construction and as a mitigation measure for bats as per best practice guidance and local specific biodiversity requirements. Overall felling of approximately 21ha of forestry will be required. The areas to be felled are outlined in **Planning Drawing 23882-MWP-00-00-DR-C-5034**.

All tree felling will be undertaken in accordance with a tree felling licence, using good working practices as outlined by the Department of Agriculture, Food, and the Marine Standards for Felling and Reforestation (2019) and will follow the specifications set out in Forest Service's 'Forestry and Water Quality Guidelines' (2000) and 'Forest Harvesting and Environmental Guidelines' (2000). These standards deal with sensitive areas, buffer zone guidelines for aquatic zones, ground preparation and drainage, chemicals, fuel, and machine oils. All conditions associated with the felling licence will be complied with. A felling licence application will only be submitted if planning permission is received for the Proposed Development.

3.1.6 Temporary Construction Compounds and Welfare Facilities

One temporary construction compound will be established upon commencement of the construction phase. See **Planning Drawing 23882-MWP-00-00-DR-C-5411** for details.

The compound will be used as a secure storage area for construction materials and will also contain temporary site cabins to provide welfare facilities for site personnel. Facilities will include office space, meeting rooms, canteen area, and mobile sanitary facilities. There will be areas designated for parking as well as construction waste within this compound. The Proposed Development will include an enclosed wastewater management system at the temporary compound capable of handling the wastewater demand during the construction phase. A holding tank is proposed at the compound for wastewater management. The holding tank will be emptied by a licensed permitted contractor only.

Upon completion of the project the compound will be decommissioned by backfilling the area with the material arising during excavation and landscaping with topsoil.

3.1.7 Water Supply

Water needs for construction activities will be limited to concrete truck chute washing, wheel wash, dust suppression and sanitary facilities. This water requirement will be sourced from onsite rainwater collection systems and settlement ponds.

It is estimated that up to approximately 3,000 litres per day of potable water will be required during peak construction for construction employees. It is proposed that this water requirement will be imported in bulk water tanks.

3.2 Operational Phase

The Operational Phase of the Proposed Development will comprise a wind farm (named Ballinla Wind Farm) comprising of seven wind turbines and all associated infrastructure. The proposed project is expected to have a lifespan of 35 years.

Surface water will be managed in accordance with the principles and objectives of Sustainable Drainage System (SuDS) to treat and attenuate water prior to discharging offsite. The Site surface water management system constructed during the construction phase of the Proposed Development will be implemented and maintained for the operational phase of the Proposed Development. Details of the proposed site drainage system are described in **Chapter 3 Engineering** of the **EIAR**. There will be no direct outfalls to watercourses instead each clean water drain will be terminated in a discharge channel running parallel to the ground contours that will function as a weir to disperse the flow over a wider area of vegetation.

During the operational phase, maintenance personnel will visit the substation building on a regular basis. The daily average wastewater production during the operational phase is estimated from the average number of workers on site, which is expected to be 2 workers, resulting in a typical wastewater production rate of 100 litres per day on days where substation maintenance and monitoring is undertaken. The wastewater generated during the operational phase will be managed by a holding tank which is of twin-hull design and fitted with an alarm to indicate levels and when it is due for empty. The holding tank will be emptied by a permitted contractor and treated at a licenced facility

Potable water for the operational and maintenance phase is estimated to be approximately 50 litres per day. This water will be supplied as bottled water. Waste water facilities at the substation compound will be serviced by a rainwater harvesting system.

The power generation aspect of the Proposed Development will not produce any waste emissions or pollutants. The general operation and maintenance of the Proposed Development is expected to produce a minimal amount of waste. Wastes arising during the operation phase of the Proposed Development include but are not limited to lubricating oils, cooling oils, and packaging from spare parts. The containment and disposal of such oils will be carried out by an approved contractor. Such operations will be carried out in accordance with the Waste Management (Hazardous Waste) Regulations, 1998. The remaining wastes will all be removed from site and reused, recycled, or disposed of in an authorised facility in accordance with best practice.

4 Site Setting and Receiving Environment

4.1 Site Location and Description

The Proposed Wind Farm is located in a rural area of east Co. Offaly and is approximately 4km west of the Edenderry town boundary and 24km east of Tullamore. Figure 2-2 outlines the location of the Proposed Wind Farm and Proposed Grid Connection Route, the area within this red line boundary is 42ha.

The Proposed Wind Farm is within the townland of Leitrim in the municipal district of Edenderry, Co. Offaly. The Proposed TDR will include development in the townlands of Leitrim, Ballyfore Big, Ballyleakin, and Ballina (Geashill By) Co. Offaly.

The Proposed Grid Connection will be a linear development within the townlands of Leitrim, Lumville, Ballinla, Clarkeville, Ballyfore Big, Ballyfore Little, Ballyeakin and Ballykilleen, in the local electoral area of Edenderry, Co. Offaly. The Proposed Grid Connection is 8km along the public roads from the proposed wind farm southeast to the existing Philipstown 110kV substation adjacent to the Edenderry Power Station.

Existing land cover at the site consists of agricultural land in the northern section and coniferous commercial forest in the southern section. The northern and southern sections of the Proposed Wind Farm are split by the L5010 local road which travels in an east west direction bisecting the Proposed Wind Farm. The Grand Canal is located to the north of the Proposed Wind Farm. The surrounding land includes agricultural fields, forestry and cutover peatlands.

Current land-use along the Proposed TDR and the Proposed Grid Connection comprises of public road corridor, public open space, pastures, mixed forestry and land principally used by agriculture with significant areas of natural vegetation.

The site location is presented in Figure 4-1 and the existing site layout is presented in Figure 4-2.

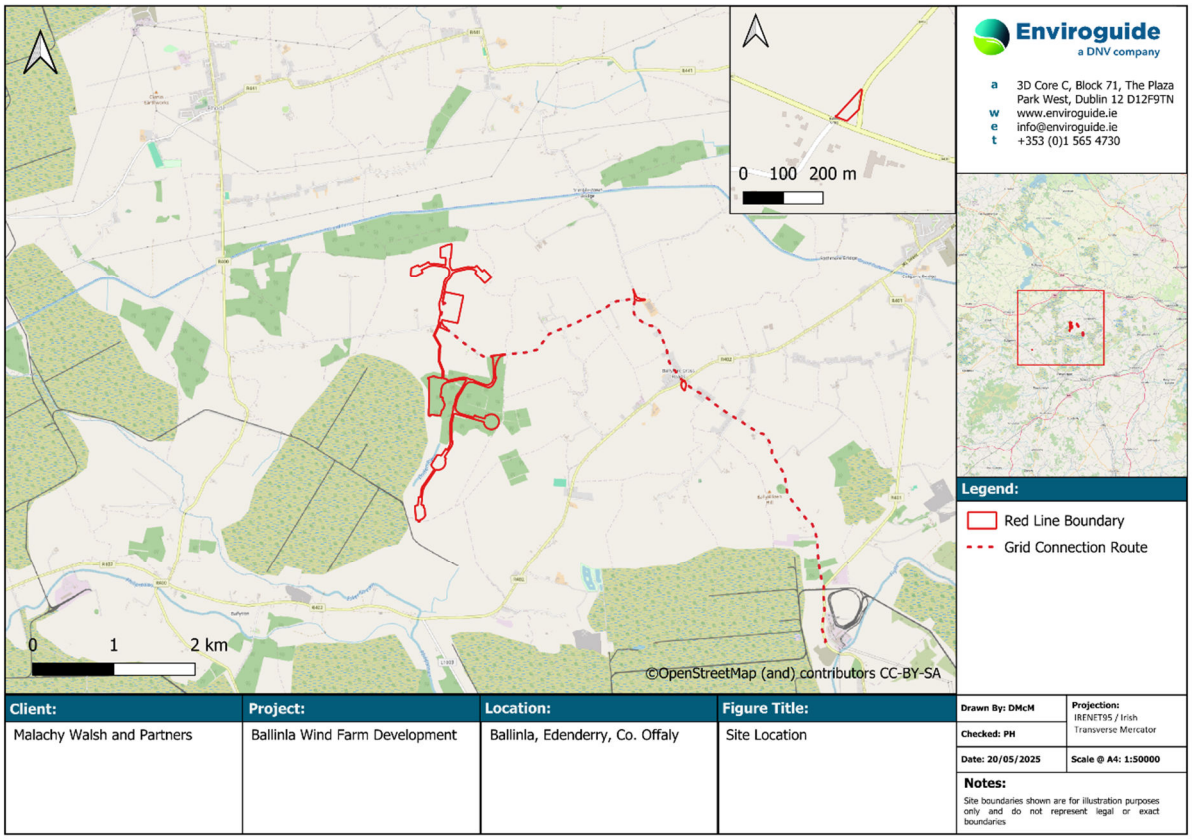

Figure 4-1: Site Location

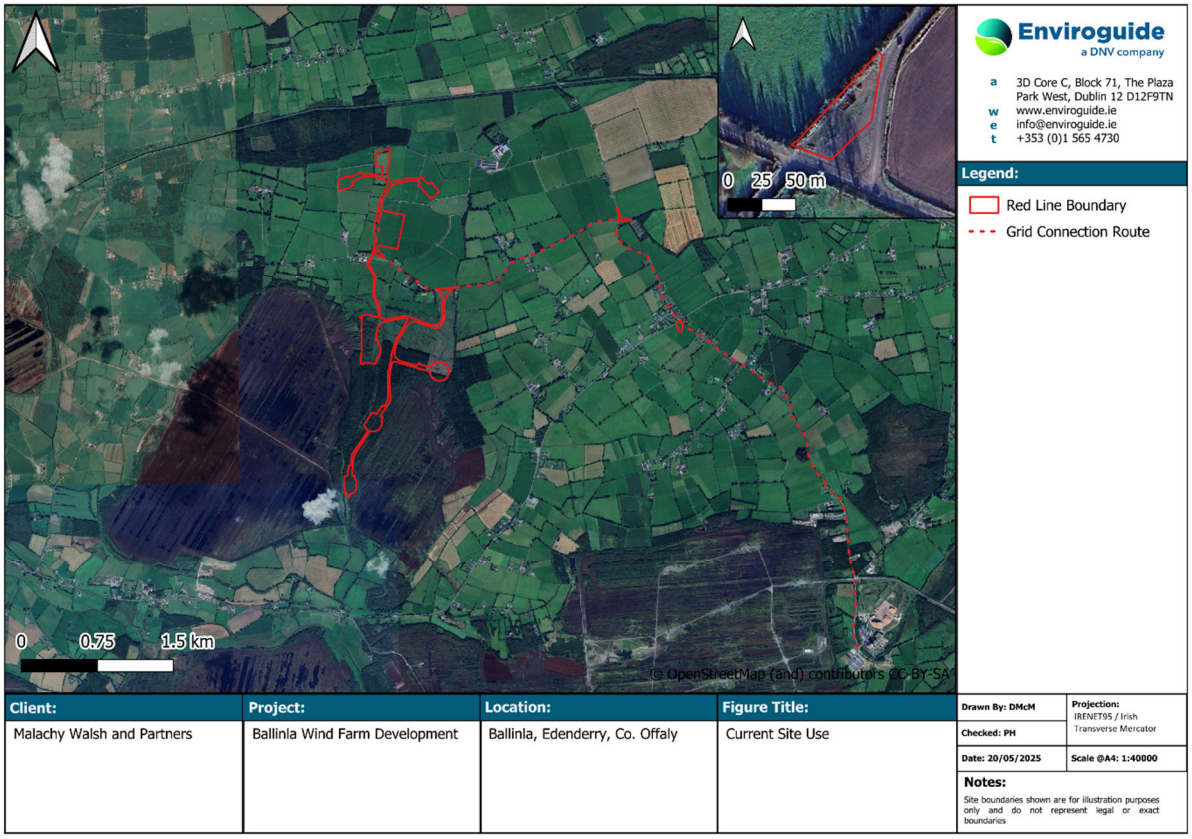

Figure 4-2: Current Site Use

4.2 Catchment and Surface Water Features

The Proposed Wind Farm is mapped by the EPA (EPA, 2025) to be within the Barrow WFD Catchment (I.D.: 14) with a small section of the northern portion of the site within the Boyne WFD Catchment (I.D.: 07). The majority of the Proposed Grid Connection is also mapped with the Barrow WFD catchment with the exception of a small section of the northern portion of the site within the Boyne WFD Catchment (I.D.: 07).

The Proposed Wind Farm is primarily mapped to be within the Figile_SC_020 WFD Sub-Catchment (Sub-Catchment I.D.: 14_14), with the exception of a small section in the northern portion of the site within Figile_SC_010 (Sub-Catchment I.D.: 14_03). The Proposed Grid Connection is mapped within Figile_SC_020, Boyne_SC_010 and Figile_SC_010 Sub-Catchment. The Proposed TDR works are located within the Lower Shannon WFD Catchment (I.D:25A) and the Tullamore_SC_010 sub-catchment (Sub-Catchment I.D.: 25A_4).

The Barrow catchment includes the area drained by the River Barrow upstream of the River Nore confluence and all streams entering tidal water between the Barrow railway bridge at Great Island and Ringwood, Co. Kilkenny, draining a total area of 3,025km². The largest urban centre in the catchment is Carlow.

The Boyne Catchment includes the area drained by the River Boyne and by all streams entering tidal water between The Haven and Mornington Point, Co. Meath, draining a total area of 2,694km². The largest urban centre in the catchment is Drogheda. The other main urban centres are Navan, Trim, Kells, Virginia, Bailieborough, Athboy, Kinnegad, Edenderry and Enfield.

The Lower Shannon catchment (25A) covers an area of 1,248km² and is characterised by relatively flat topography with much of the low-lying areas in the catchment covered in thick deposits of peat. The majority of the catchment is underlain by impure limestones with some purer karstified limestone located from Tyrrellspass to Kilcormac.

The majority of the site is mapped by the EPA (EPA, 2025) to be withing the Esker Stream_020 WFD Sub-basin (EU Code: IE_SE_14E010200) with a small section of the Proposed Grid Connection within Figile_030 (EU Code: IE_SE_14F010200). The remaining northern portion of the site is mapped within the BOYNE_020 WFD River Sub-basin (EU Code: IE_EA_07B040300).

Both the Boyne_020 (River Waterbody Code: IE_EA_07B040300) which is located within the northern portion of the wind farm area and the Esker Stream_020 (River Waterbody Code: IE_SE_14E010200) which is in the central and southern portions of the Proposed Wind Farm are indicated to drain the main development area as shown in EPA mapping. The drainage catchments observed on as part of site walk overs are shown in Figure 4-3. The Esker stream is also known as the Leitrim stream and may be referred as such within this Chapter. The Grand Canal Main Line (Boyne) (River Waterbody Code: IE_07_AWB_GCMLW) flows west - east to the north of the Proposed Development. The Boyne_020 river sub basin begins within the Proposed Development and drains in a northeasterly direction for approximately 9km before discharging into the Boyne_030 (River Waterbody Code: IE_EA_07B040400) with the Boyne eventually discharging to the Boyne Estuary (Transitional Waterbody Code: IE_EA_010_0100). A section of the Boyne_020 drains the northeast most section of the Proposed Grid Connection and is referred to by the EPA as the Kinnafad Stream. The Leitrim Stream begins within the site and flows in a southerly direction for 4.95km before discharging into the Figile_040 (River Waterbody Code: IE_SE_14F010300) further discharging into the Barrow_090 (River Waterbody Code: IE_SE_14B011000) approximately 26.2km downstream of the site with eventual discharge to the Barrow Suir Nore Estuary (Transitional Waterbody Code: IE_SE_100_0100).

The southern section of the Proposed Grid Connection is indicated to drain to the Figile_030 (River Waterbody Code: IE_SE_14F010200). The Figile_030 flows south and also confluences with the Figile_040.

The Ballinla (Geashill-by) TDR node is indicated to drain to the Tullamore_020 (River Waterbody Code: IE_SH_25T030100). The Tullamore_020 flows north and also confluences with the Tullamore_030 (River Waterbody Code: IE_SH_25T030300).

A number of open drainage ditches were identified during the site walkover undertaken by Enviroguide Consulting on the 10th of October 2024. These drainage ditches, which were observed to contain standing water at the time of inspection were connected to the Leitrim Stream. The channels in the northern portion of the site are deep, widened, straight and generally have no significant vegetation within the main channel. The lands drained by these ditches included areas within the Boyne Catchment as depicted in EPA mapping. As these ditches now discharge to the Leitrim Stream, the entirety of the Proposed Wind Farm is considered to drain to the Barrow Catchment. Only a small portion of the Proposed Grid Connection and the Proposed Ballyfore Big TDR works are likely to drain to the Kinnafad Stream and downstream Boyne catchment. The main channel of the Leitrim Stream in the southern portion of the Proposed Wind Farm is less modified though the channel is also deep, straight and no has significant vegetation within the main channel.

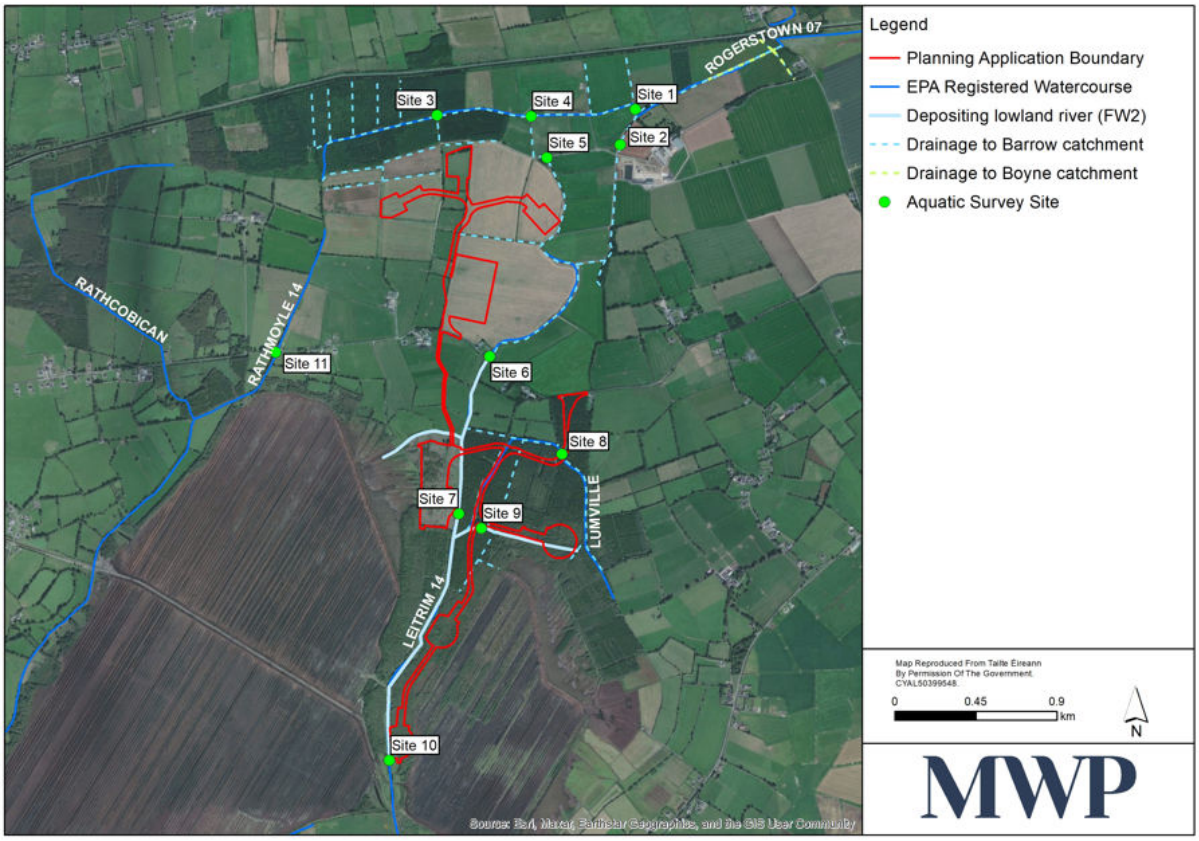

Figure 4-3: Drainage Catchments and Watercourses (Figure from Fish and Aquatic Survey Report)

There is no identified direct hydrological connection between the Proposed Development and the Grand Canal. The Rogerstown_07 river crosses the Grand Canal approximately 1km east of Trimblestown Bridge via an under-canal culvert that has been identified with no connection to the canal itself. The surface water features mapped by the EPA (EPA, 2025) within a 2km radius of the site are presented in Figure 4-4

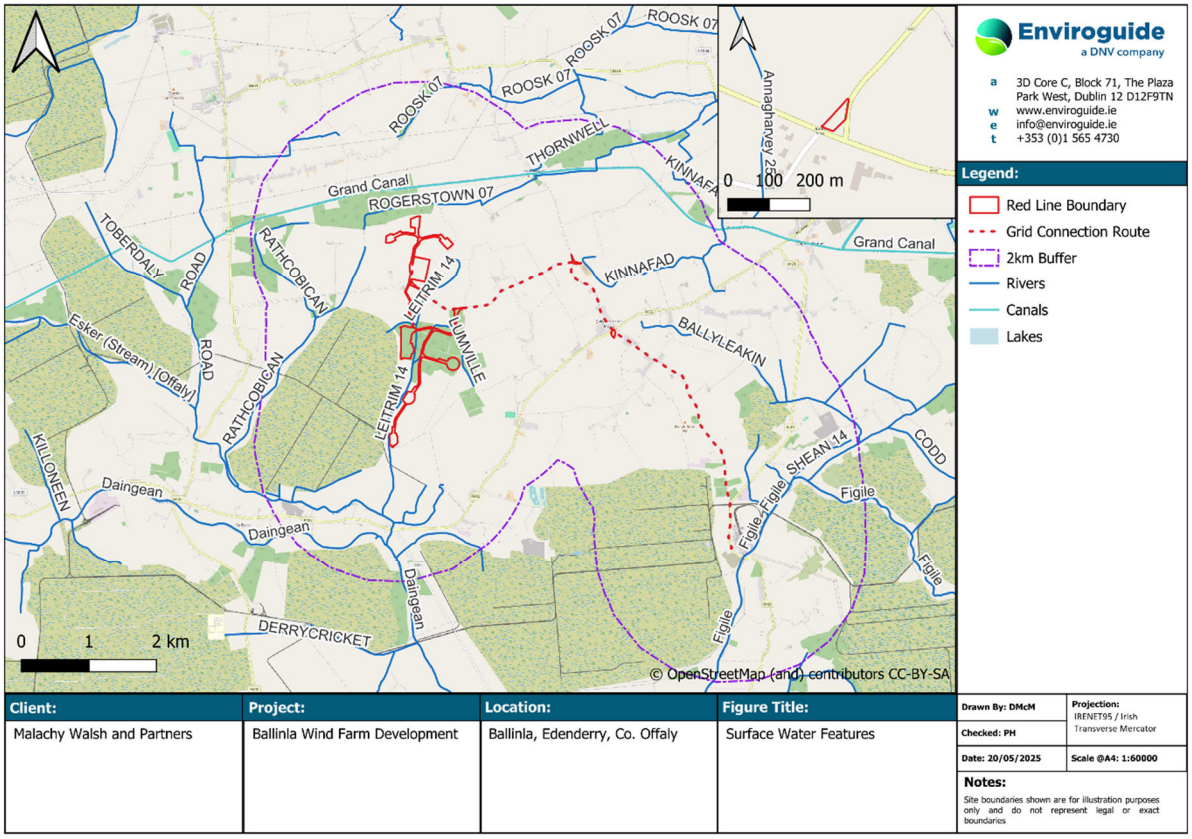

Figure 4-4: Local Surface Water Features

4.3 Groundwater Body and Flow Regimes

The bedrock aquifer beneath the Proposed Wind Farm is within the Rhode Groundwater Body (GWB) (EU Code: IE_SE_G_116). The Rhode GWB covers approximately 437km² and spans areas across Co. Offaly (GSI, 2025). The majority of the area is low-lying bog with a very flat surface. The highest elevations are to the north at Rhode (150m AOD). The surface drainage direction is to the southeast to the Philipstown River and also the tributaries of the Cushina River.

A small area of the northeastern portion of the Proposed Grid Connection and TDR works is within the Trim GWB (EU Code: IE_EA_002). The Trim GWB covers approximately 669km2 and spans areas across Co. Meath, Co. Louth, Co. Kildare and Co. Offaly (GSI, 2024). The area is mostly undulating lowlands with hillier areas at the GWB boundaries. The River Boyne is almost entirely enclosed within the Trim GWB with elevations falling to the river from southwest (Proposed Wind Farm location) to northeast.

The most southerly 1km of the Proposed Grid Connection and two nodes of the Proposed TDR is within the Cushina GWB (EU Code: IE_SE_G_048). The Cushina GWB covers approximately 170km2 and spans areas across Eastern Offaly, Laois and Kildare (GSI, 2024). The topography in the area is extremely low lying to the north with some small hills in the south. In general, the land surface slopes to the centre and south of the body towards the River Figile.

The Ballinla (Geashill-By) TDR node is underlain by the Geashill GWB (EU Code: IE_SH_G_103). The Ballina GWB covers approximately 280 km2. Land within this GWB is relatively flat with elevations ranging between 40m and 160m AOD and most ground is between 70m and 100m AOD.

The main recharge mechanisms within the underlying GWBs at the Proposed Development are summarised as follows:

- Recharge in the Rhode GWB is described as occurring in areas where subsoil thickness is lowest or where the permeability of the overlying subsoil is highest. This is most likely to occur in the vicinity of the Proposed Development, to the north of the GWB where higher elevations

and more permeable soils are located. In the area of the Toberdaly springs, permeable bedrock is of a thickness of approximately 30m. Bedrock in most areas is covered by subsoil greater than 5m in thickness, with clay/till dominating the uppermost 3m to 5m and the remaining 5m to 12m comprising of sand/gravel and clayey till units.

- For the north-eastern section of the Proposed Grid Connection and Proposed TDR within the Trim GWB, the primary recharge mechanisms are likely to be through diffuse and point recharge, with point recharge occurring over areas of more fractured limestone.
- In the Cushina GWB diffuse recharge will occur via rainfall percolating through the subsoil. Due to the generally low permeability of the aquifers within this GWB, a high proportion of the recharge will then discharge rapidly to surface watercourses via the upper layers of the aquifer, effectively reducing further the available groundwater resource in the aquifer.
- In the Ballina GWB Diffuse recharge will occur over the GWB via rainfall soaking through the subsoil only where subsoil is shallow or absent, or where subsoils are gravelly and high or moderate permeability. Thick, low permeability subsoils will cause rainfall to runoff, probably to another area within the GWB. In lowland areas where water tables are high, potential recharge may be rejected.
- The main discharge mechanisms within the underlying GWBs at the site of the Proposed Development are summarised as follows:
- The main groundwater discharge mechanism within the Rhode GWB is described as occurring to the rivers and streams to the south and southeast, while the discharge mechanisms at the Toberdaly springs are a composite of deep and shallow groundwater flows. The GSI (Rhode GWB Report) identifies that the majority of groundwater flow direction in the aquifer is from north and west to the south and east (GSI, 2024). Groundwater flow in the Rhode GWB generally occurs within enlarged fractures in the upper layers of bedrock. Regional groundwater system is unlikely across the width of the GWB due to it not being a regional karstic aquifer.
- Within the Trim GWB, discharge most likely occurs as baseflow along riverbeds and as point source at springs. The primary discharge being as baseflow to the River Boyne and its tributaries. Groundwater flow in the Trim GWB is determined by the degree of karstification and fracturing of the limestones. In highly karstified limestone areas (northeast of the GWB), groundwater flow will occur in conduits drawing water from very deep depths while in less karstified limestone areas groundwater flow will be at shallower depths.
- Within the Cushina GWB, discharge from this aquifer will be towards the overlying rivers where they are in hydraulic continuity with the aquifer. Drainage density in the south is quite low and this may indicate a higher permeability of the limestones here. Since there are an absence of streams in the area the aquifer discharges via springs, a number of karstic springs have been recorded in this southern area south east of Emo.
- Within the Ballina GWB, groundwater discharges to gaining streams and rivers where subsoil thickness permits, and to the springs within the GWB, also where subsoil is sufficiently thin to let groundwater discharge to surface (such as Kelly (2001) proposes at Killeigh and Meelaghans springs).

4.3.1 Aquifer Classification

The GSI provides a methodology for aquifer classification based on resource value (regionally important, locally important and poor) and vulnerability (extreme, high, moderate or low). Resource value refers to the scale and production potential of the aquifer whilst vulnerability refers to the ease with which groundwater may be contaminated by human activities (vulnerability classification primarily based on the permeability and thickness of subsoils).

The GSI (GSI, 2025) has classified the bedrock aquifer beneath the Proposed Development as follows:

- The Edenderry Oolite Member bedrock aquifer beneath the wind farm site is mapped as a Locally Important Aquifer (Lm) which is generally moderately productive.
- The majority of the Proposed Grid Connection is primarily mapped as a Locally Important Aquifer (Lm) which is generally moderately productive. The southern 1.4km of the Proposed Grid Connection is mapped as a Locally Important Aquifer (LI) which is moderately productive only in local zones.

- The identified nodes along the Proposed TDR are underlain by a Locally Important Aquifer (LI) which is generally moderately productive.

It is noted that there is no gravel aquifers mapped within a 2km radius of the site and Proposed Development (GSI, 2025).

4.3.2 Aquatic Ecology and Fish Report

The Aquatic Ecology and Fish Report (**EIAR Volume III, Appendix 6-2**), prepared by MWP for the Proposed Development (MWP, 2023), outlines the findings of the freshwater aquatic ecology and fish surveys. Aquatic field work was carried out on the 14th and 15th June (biological sampling) and 2nd and 3rd August (electric fishing) during 2023. A survey was also undertaken on 26th January when water levels were higher to determine if any waterbodies within the Proposed Development drained to the north. The report details the methodology, including desktop studies and field surveys, and presents results on aquatic habitats, macroinvertebrate diversity, water quality, and fish populations.

Key findings of the Aquatic Ecology and Fish Report are that the watercourses at the Proposed Development are highly modified and degraded, consisting mainly of drainage ditches, small streams, and deepened rivers. These water features now drain into the Leitrim Stream in the River Barrow catchment. The aquatic macroinvertebrate communities are common but show reduced diversity due to poor water quality, which is rated as moderate or poor. The main water quality issues stem from agriculture, forestry, and past peat harvesting. Fish species present include three-spined stickleback, brown trout, and others, but salmonids are largely absent due to unsuitable conditions. High sediment loads negatively impact water quality and aquatic life. Amphibians use the drainage ditches in the northern part of the site.

4.4 Flood Risk

A site-specific flood risk assessment (SSFRA), developed by MWP (MWP, 2025), refer to **EIAR Volume III, Appendix 8-2**, assessed the potential flood risk associated with fluvial, groundwater, coastal and pluvial flooding for the site and Proposed Development. A summary of the main findings of this FRA is as follows.

- The report was prepared in the context of *The Planning System and Flood Risk Management – Guidelines for Planning Authorities, November 2009 (PSFRM)*, published by the Office of Public Works and the Department of Environment, Heritage and Local Government.
- The Proposed Development includes for the construction of no.7 turbines, hardstands, foundations, access tracks, internal underground connector cable, substation, LiDAR station, felling areas and soil deposition areas.
- The Stage 1 and 2 flood risk assessments indicated that there is potential for flooding at this site. The potential source of flooding was identified as fluvial flooding from the Leitrim watercourse and the Lumville watercourse.
- In particular, the NIFM published flood extents which indicate that this site may be vulnerable to flooding.
- A Stage 3 Detailed Flood Risk Assessment (FRA) was carried out to assess flood risk issues in sufficient detail to provide a quantitative appraisal of potential flood risk to the site.
- There are no flow records available for the Leitrim watercourse and the Lumville watercourse. The IH124 flood estimation method was selected as the most appropriate flood estimation method to calculate the flood flows for catchments.
- In order to predict the flood extents and flood levels at the site, a combined 1D-2D hydraulic model was created using HEC-RAS river modelling software.

- The model was used to create a flood zone map of the existing site which indicates the extent of Flood Zones A and B. Areas of the site outside of these Flood Zones are in Flood Zone C.
- Flood mapping indicates that the proposed substation is located within Flood Zone B. Turbine 1 is located in Flood Zone B which has a moderate probability of flooding (0.1% to 1% probability (between 1 in 100 and 1 in 1,000) for river flooding. The remainder of the 6 no. turbines are located in Flood Zone C which has a low probability of flooding (less than 0.1% annual exceedance probability or 1 in 1000).
- To ensure that there is no unacceptable flood risk, the following mitigation measures are recommended:
    - The design flood level for the proposed substation is the 0.1%AEP MRFS flood level plus 500mm freeboard.
    - The design flood level for the proposed 7 no. turbines is the 1%AEP MRFS flood level plus 500mm freeboard
    - It was concluded that, once the proposed mitigation measures are implemented, the Proposed Development will not have an adverse impact on flooding elsewhere.

4.5 Nature Conservation

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of SACs and the Birds Directive (2009/147/EC) seeks to protect birds of special importance by the designation of SPAs. SACs and SPAs are collectively known as Natura 2000 or European sites (referred to hereafter as Natura 2000 site).

NHAs are designations under the Wildlife Acts to protect habitats, species, or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with SAC and/or SPA Sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the meantime under planning policy which normally requires that planning authorities give recognition to their ecological value.

While hydrological connectivity can extend over considerable distances, the likelihood of any measurable impact is considered negligible due to the substantial separation distance, combined with the natural dilution, attenuation, and dispersion processes that occur within intervening watercourses. As a result, sites beyond 30km are not considered to fall within the ZoI of the Proposed Development.

There are nine further Natura 2000 sites that are identified within the potential hydrological ZoI of the Proposed Development. There are also five NHAs and seven further pNHAs identified with a potential hydrological connection to the Proposed Development. The Natura 2000 sites and other protected and designated sites or areas with a potential hydrological connection to the site are summarised in Appendix A and presented in Figure 4-5.

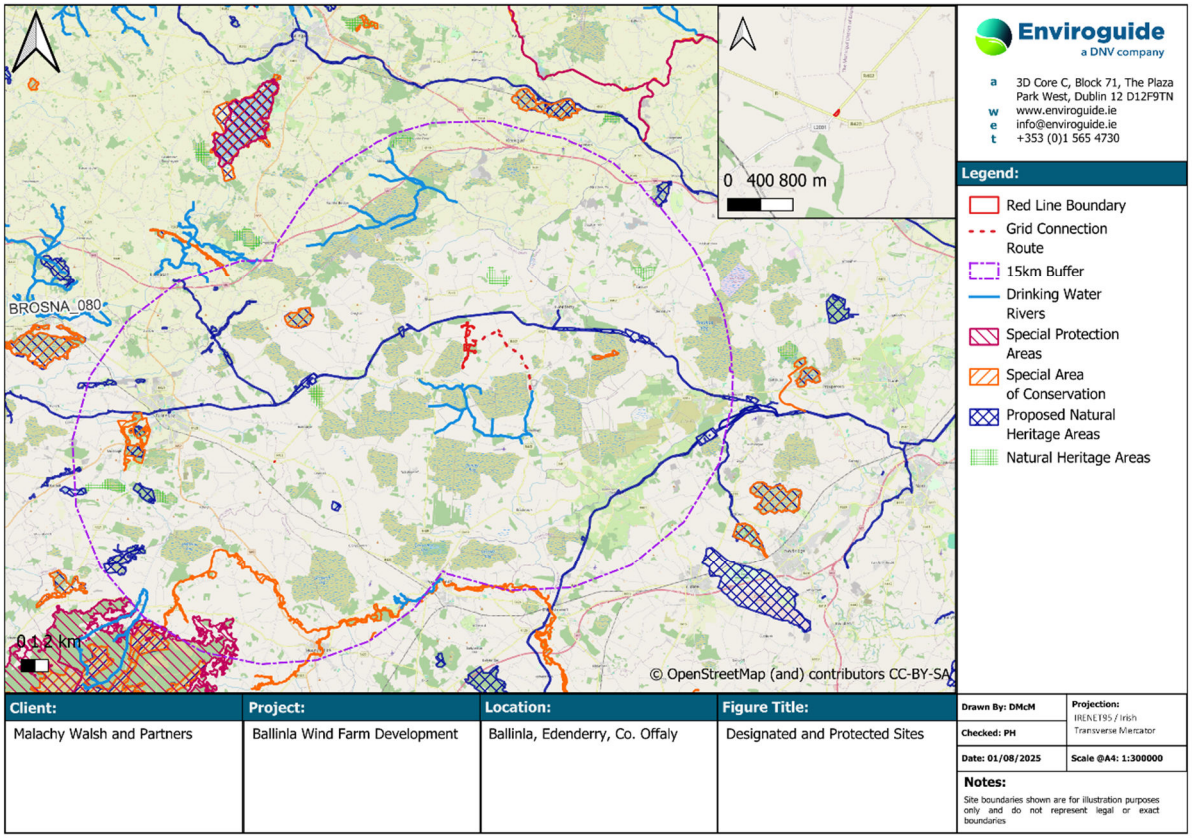

Figure 4-5: Designated and Protected Sites

4.6 Drinking Water

The river drinking water protected areas (DWPA) are represented by the full extent of the WFD river waterbodies from which there is a known qualifying abstraction of water for human consumption as defined under Article 7 of the WFD.

The Figile_040 waterbody is identified (EPA, 2024) as a drinking water river supplying the Clonbulloge PWS, under Article 7 of the WFD. The Figile_040 is located approximately 1.4km downstream of the Proposed Wind Farm and 0.25km from the Proposed Grid Connection. It is noted that the watercourse draining the Proposed Wind Farm (Leitrim Stream) confluences with the Figile River approximately 50m downstream of the Clonbulloge WTP.

4.7 Shellfish Areas

Although the Shellfish Waters Directive (SWD) has been repealed, areas used for the production of shellfish that were designated under the SWD, are protected under the WFD as ‘areas designated for the protection of economically significant aquatic species’.

The requirement from a WFD perspective is to ensure that water quality does not impact on the quality of shellfish produced for human consumption. In Ireland, 64 areas have been designated as shellfish waters (S.I. No. 268 of 2006, S.I. No. 55 of 2009, S.I. 464 of 2009).

The closest designated Shellfish Area location is at Balbriggan/Skerries approximately 72km east of the Site within the Irish Sea.

4.8 Nutrient Sensitive Areas

EU member states are required under the Urban Wastewater Treatment Directive (91/271/EEC) to identify nutrient-sensitive areas. These have been defined as “natural freshwater lakes, other

freshwater bodies, estuaries and coastal waters which are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken".

Sections of the Boyne River, the Barrow River, the Boyne Estuary and the Barrow Estuary are all designated as nutrient sensitive. The closest designated Nutrient Sensitive fish Area location is the Barrow_90 waterbody approximately 25km downstream of the Site.

4.9 Bathing Waters

Bathing waters are designated under Regulation 5 of Directive 2006/7/EC. Designated Bathing Waters exist under S.I. No. 79/2008 and S.I. No. 351/2011 Bathing Water Quality (Amendment) Regulations 2011. EC Bathing Water Profiles - Best Practice and Guidance 2009.

The closest designated bathing water location is Laytown/Bettystown located approximately 72km east of the Site.

5 SCREENING

This stage aims to determine if the Proposed Development impacts WFD waterbodies. It involves gathering relevant design information of the Proposed Development and the baseline environment of potentially impacted waterbodies. Where no potential impact pathways are identified, Stage 2 and 3 of the assessment are not undertaken.

The screening stage includes the following:

- Initial screening to identify relevant water bodies using criteria such as direct impact, connectivity, and underlying groundwater bodies.
- Reviewing the RBMP to decide which water bodies to include.
- Collecting baseline data and relevant design information of the Proposed Development.

The screening assesses the potential risk to WFD objectives based on design, implementation, and baseline data. Activities associated with the Proposed Development are divided into construction and operational phases, as detailed in Section 3. The assessment uses expert knowledge for a qualitative evaluation of potential risks to WFD objectives.

5.1 Surface Waterbodies

The methodology for screening surface waterbodies is based on proximity to the proposed works and scale and nature of the works likely to affect the waterbody in question. The initial study area extends beyond the site boundaries and includes a 2km radius of the site (i.e., Proposed Development) and potential receptors outside of this radius that are potentially hydrologically connected with the Site which is based on the Institute of Geologists of Ireland (IGI) Guidelines (IGI, 2013). This broader study area is necessary to identify and evaluate all potential receptors that could be affected by the Proposed Development, either directly or indirectly. The distinction between the site and the study area is crucial. The site of the Proposed Development is the focal point of the assessment, while the study area includes any potential hydrogeological/hydrological connections to sensitive receptors including habitats that might experience secondary effects.

The WFD status for river, lake, transitional and/or coastal water bodies that have a potential hydrological connection to the site as recorded by the EPA (EPA, 2025) in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003) are provided in Table 5-1 and Figure 5-1. Table 5-1 also presents the screening exercise undertaken for identified surface waterbodies within the study area.

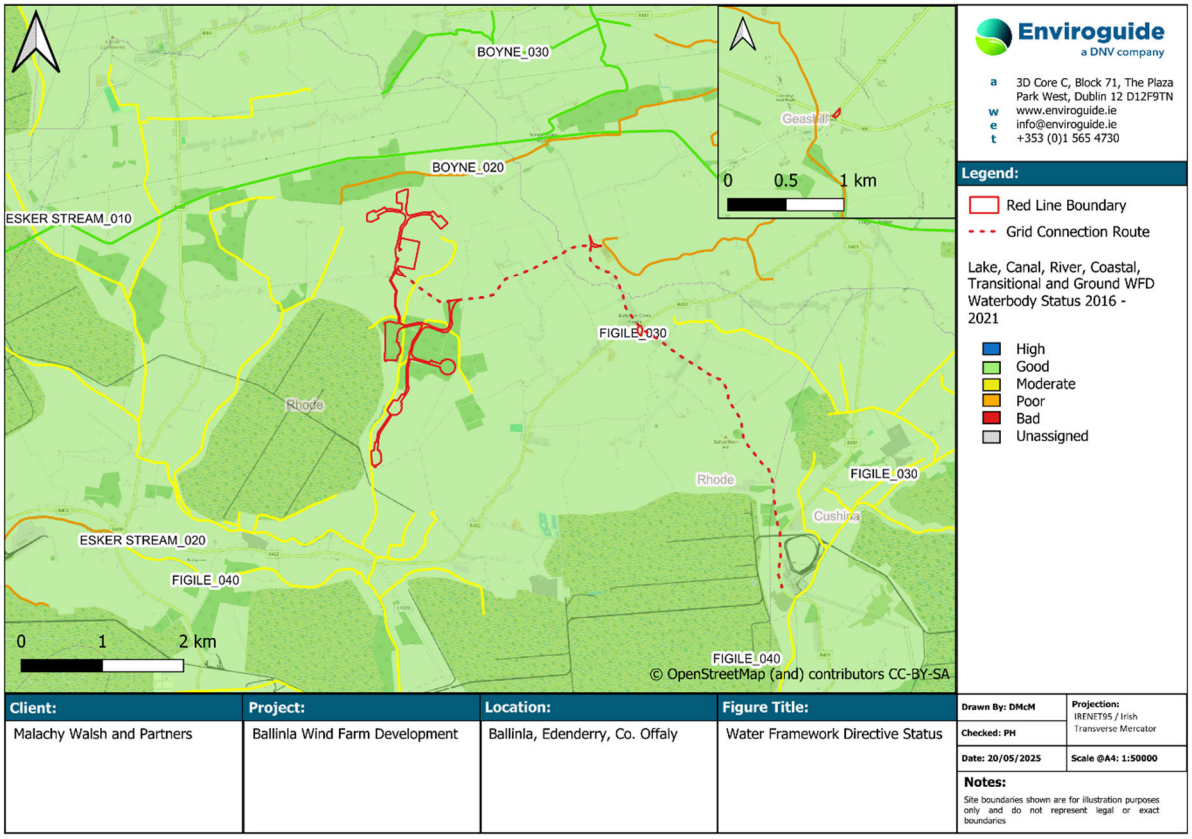

Figure 5-1: Water Framework Directive Status

Table 5-1 Surface Waterbodies Screening Assessment

Waterbody Name	Waterbody EU Code	WFD Status (2016-2021)	WFD Risk	Screening Assessment	Justification
Esker Stream_010	IE_SE_14E010100	Moderate	Review	Screened Out	Upstream tributary of the Leitrim Stream that is spatially near to the western portion of the Proposed Development though is in a separate watershed to the proposed works. No works are to be undertaken within catchment of waterbody. The scale and nature of the works mean that migrate of impacts upstream are unlikely.
Esker Stream_020	IE_SE_14E010200	Moderate	At Risk	Screened In	Waterbody drains the proposed wind farm area of the site and includes tributary streams of the Leitrim Stream that will be the receiving watercourses for runoff from the site. Several new watercourse crossings are to be constructed over watercourses within this waterbody. Works within the catchment have the potential to adversely affect water quality status.
Figile_030	IE_SE_14F010200	Moderate	At Risk	Screened In	Waterbody drains a section of the Proposed Grid Connection and Proposed TDR works. Works to facilitate the Proposed Grid Connection have the potential to adversely affect water quality status during construction as a result of contaminated runoff.
Figile_040	IE_SE_14F010300	Moderate	At Risk	Screened In	Upstream waterbody drains a section of the Proposed Wind Farm, Proposed Grid Connection and Proposed TDR works which have the potential to adversely affect water quality status during construction as a result of contaminated runoff.
Figile_050	IE_SE_14F010400	Poor	At Risk	Screened In	Upstream waterbody drains a section of the Proposed Wind Farm, Proposed Grid Connection and Proposed TDR works which have the potential to adversely affect water quality status during construction as a result of contaminated runoff.

Waterbody Name	Waterbody EU Code	WFD Status (2016-2021)	WFD Risk	Screening Assessment	Justification
Figile_060	IE_SE_14F010500	Good	Not at Risk	Screened In	Upstream waterbody drains a section of the Proposed Wind Farm, Proposed Grid Connection and Proposed TDR works which have the potential to adversely affect water quality status during construction as a result of contaminated runoff.
Figile_070	IE_SE_14F010510	Good	Review	Screened Out	Although upstream waterbody drains a section of the Proposed Development, due to the distances involved and dilution within the waterbodies, it is unlikely for potential pollutants to migrate to the surface waterbody in concentrations sufficient to cause adverse effects on status.
Figile_080	IE_SE_14F010600	Good	Review	Screened Out	
Barrow_090	IE_SE_14B011000	Poor	At Risk	Screened Out	
Barrow_100	IE_SE_14B011130	Moderate	At Risk	Screened Out	
Barrow_110	IE_SE_14B011300	Good	Not at Risk	Screened Out	
Barrow_120	IE_SE_14B011500	Good	Not at Risk	Screened Out	
Barrow_130	IE_SE_14B011600	Poor	Review	Screened Out	
Barrow_140	IE_SE_14B011900	Poor	At Risk	Screened Out	
Barrow_150	IE_SE_14B012000	Moderate	Review	Screened Out	
Barrow_160	IE_SE_14B012460	Moderate	At Risk	Screened Out	
Barrow_170	IE_SE_14B012600	Moderate	At Risk	Screened Out	
Barrow_180	IE_SE_14B012700	Moderate	At Risk	Screened Out	

Waterbody Name	Waterbody EU Code	WFD Status (2016-2021)	WFD Risk	Screening Assessment	Justification
Barrow_190	IE_SE_14B012820	Moderate	Review	Screened Out	
Barrow_200	IE_SE_14B012920	Moderate	At Risk	Screened Out	
Barrow_210	IE_SE_14B013100	Poor	At Risk	Screened Out	
Barrow_220	IE_SE_14B013300	Moderate	At Risk	Screened Out	
Barrow_230	IE_SE_14B013514	Poor	At Risk	Screened Out	
Barrow_240	IE_SE_14B013600	Moderate	Review	Screened Out	
Grand Canal Main Line (Boyne)	IE_07_AWB_GCMLW	Good	Not at Risk	Screened Out	The Grand Canal is directly north of the Proposed Wind Farm. EPA mapping indicates that two headwater streams, the Rogerstown Stream and Kinnafad Stream drain portions of the site and flow north east where they are culverted under the Grand Canal. Site walkovers have confirmed that due to previous drainage works the site no longer drains to the Rogerstown Stream. A small portion of the Proposed Grid Connection and Proposed TDR are within the catchment of the Kinnafad Stream. There is no indication that this stream acts as a feeder to the Grand Canal and as such there is no direct hydrological connection to the Proposed Development.
Boyne_020	IE_EA_07B040300	Poor	At Risk	Screened In	Waterbody drains a section of the Proposed Grid Connection and Proposed TDR works. Works to facilitate grid connection have the potential to adversely affect water quality status during construction as a result of contaminated runoff.
Boyne_030	IE_EA_07B040400	Good	Not at Risk	Screened In	Upstream waterbody drains a section of the Proposed Grid Connection and works to facilitate grid connection have the potential to adversely affect water quality status during construction as a result of contaminated runoff.

Waterbody Name	Waterbody EU Code	WFD Status (2016-2021)	WFD Risk	Screening Assessment	Justification
Boyne_040	IE_EA_07B040600	Moderate	At Risk	Screened Out	Although an upstream waterbody drains a section of the Proposed Development, due to the distances involved and dilution within the waterbodies, it is unlikely for potential pollutants to migrate to the surface waterbody in concentrations sufficient to cause adverse effects on status.
Boyne_050	IE_EA_07B040800	Good	Not at Risk	Screened Out	
Royal Canal Main Line (Boyne)	IE_07_AWB_RCMLE	Good	Not at Risk	Screened Out	
Boyne_060	IE_EA_07B040900	Good	Not at Risk	Screened Out	
Boyne_070	IE_EA_07B041000	Moderate	At Risk	Screened Out	
Boyne_080	IE_EA_07B041200	Moderate	At Risk	Screened Out	
Boyne_090	IE_EA_07B041400	Moderate	At Risk	Screened Out	
Boyne_100	IE_EA_07B041500	Moderate	At Risk	Screened Out	
Boyne_110	IE_EA_07B041600	Moderate	Review	Screened Out	
Boyne_120	IE_EA_07B041700	Moderate	At Risk	Screened Out	
Boyne_130	IE_EA_07B041810	Moderate	Review	Screened Out	
Boyne_140	IE_EA_07B041900	Moderate	Review	Screened Out	
Boyne_150	IE_EA_07B042010	Moderate	At Risk	Screened Out	
Boyne_160	IE_EA_07B042100	Moderate	At Risk	Screened Out	

Waterbody Name	Waterbody EU Code	WFD Status (2016-2021)	WFD Risk	Screening Assessment	Justification
Boyne_170	IE_EA_07B042150	Good	Review	Screened Out	
Boyne_180	IE_EA_07B042200	Good	Not at Risk	Screened Out	
Tullamore_020	IE_SH_25T030100	Poor	At Risk	Screened In	The Proposed TDR works within the townland of Balina is required to facilitate the turbine delivery. It should be noted that works were previously undertaken at this location to facilitate the TDR of a previous scheme. Waterbody drains a section of the Proposed TDR works. Works have the potential (limited) to adversely affect water quality status as a result of contaminated runoff.
Tullamore_030	IE_SH_25T030300	Poor	At Risk	Screened In	Upstream waterbody drains a section of the Proposed TDR works. Works to have the potential (limited) to adversely affect water quality status as a result of contaminated runoff.
Tullamore_040	IE_SH_25T030400	Moderate	At Risk	Screened Out	Although an upstream waterbody drains a section of the Proposed Development, due to the distances involved and dilution within the waterbodies, it is unlikely for potential pollutants to migrate to the surface waterbody in concentrations sufficient to cause adverse effects on status.
Clodiagh (Tullamore)_050	IE_SH_25C060500	Moderate	At Risk	Screened Out	
Brosna_100	IE_SH_25B090761	Moderate	At Risk	Screened Out	
Brosna_110	IE_SH_25B090800	Moderate	At Risk	Screened Out	
Brosna_120	IE_SH_25B090950	Moderate	At Risk	Screened Out	
Brosna_130	IE_SH_25B091000	Moderate	At Risk	Screened Out	
Brosna_140	IE_SH_25B091200	Moderate	At Risk	Screened Out	

Waterbody Name	Waterbody EU Code	WFD Status (2016-2021)	WFD Risk	Screening Assessment	Justification
Shannon (Lower)_010	IE_SH_25S012000	Moderate	Review	Screened Out	
Shannon (Lower)_020	IE_SH_25S012060	Moderate	At Risk	Screened Out	
Shannon (Lower)_030	IE_SH_25S012350	Moderate	Review	Screened Out	
Shannon (Lower)_050	IE_SH_25S012500	Poor	At Risk	Screened Out	
Shannon (Lower)_060	IE_SH_25S012600	Moderate	Review	Screened Out	
Derg TN	IE_SH_25_191a	Moderate	At Risk	Screened Out	
Derg HMWB	IE_SH_25_191b	Good	Not at Risk	Screened Out	
Upper Barrow Estuary	IE_SE_100_0300	Moderate	At Risk	Screened Out	
Barrow Nore Estuary Upper	IE_SE_100_0250	Moderate	At Risk	Screened Out	
New Ross Port	IE_SE_100_0200	Moderate	At Risk	Screened Out	

Waterbody Name	Waterbody EU Code	WFD Status (2016-2021)	WFD Risk	Screening Assessment	Justification
Lower Suir Estuary (Little Island – Cheekpoint)	IE_SE_100_0500	Moderate	At Risk	Screened Out	
Barrow Suir Nore Estuary	IE_SE_100_0100	Moderate	At Risk	Screened Out	
Boyne Estuary	IE_EA_010_0100	Moderate	At Risk	Screened Out	
Limerick Dock	IE_SH_060_0900	Poor	At Risk	Screened Out	
Upper Shannon Estuary	IE_SH_060_0800	Poor	At Risk	Screened Out	
Lower Shannon Estuary	IE_SH_060_0300	Good	Not at Risk	Screened Out	
Waterford Harbour	IE_SE_100_0000	Moderate	At Risk	Screened Out	
Boyne Estuary Plume Zone	IE_EA_010_0000	Moderate	At Risk	Screened Out	
Mouth of the Shannon (Has 23.27)	IE_SH_060_0000	Good	Not at Risk	Screened Out	

5.2 Groundwater

Similar to surface waterbodies (refer to Section 5.1), the methodology for screening ground waterbodies is based on proximity to the site of the Proposed Development and the scale and nature of the works likely to effect the waterbody in question.

The WFD status for groundwater bodies that have a potential hydrological connection to the site as recorded by the EPA (EPA, 2025) in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003) are provided in Table 5-2 and Figure 5-1. Table 5-2 also presents the screening exercise undertaken for identified groundwater bodies within the study area.

Table 5-2 Groundwater Bodies Screening Assessment

Waterbody Name	Waterbody EU Code	WFD Status (2016-2021)	WFD Risk	Screening Assessment	Justification
Rhode GWB	IE_SE_G_116	Good	Not at Risk	Screened In	Works required to facilitate the turbine foundations and HDD for the Proposed Grid Connection have the potential to adversely affect the status of the underlying GWB if unmitigated. Construction will temporarily increase groundwater vulnerability.
Trim GWB	IE_EA_G_002	Good	At Risk	Screened In	Works required to facilitate the HDD the Proposed Grid Connection and Proposed TDR works have the potential to adversely affect the status of the underlying GWB if unmitigated.
Cushina GWB	IE_SE_G_048	Good	Not at Risk	Screened In	Works required to facilitate the HDD for the Proposed Grid Connection and Proposed TDR works have the potential to adversely affect the status of the underlying GWB if unmitigated.
Geashill GWB	IE_SH_G_103	Good	Not at Risk	Screened In	The TDR works within the townland of Balina are required to facilitate the turbine delivery. It should be noted that works were previously undertaken at this location to facilitate the TDR of a previous scheme. Although the works required to provide the proposed TDR are likely minimal, there is potential to adversely affect the status of the underlying GWB if unmitigated.

5.3 Register of Protected Areas

The WFD Register of Protected Areas is a comprehensive list of areas designated under the WFD that require special protection due to their environmental significance. These areas include:

- Drinking Water Protected Areas: Areas designated for the abstraction of water intended for human consumption.
- Areas for the Protection of Economically Significant Aquatic Species: Such as shellfish waters.
- Recreational Waters: Including bathing waters.
- Nutrient-Sensitive Areas: Such as nitrate vulnerable zones.
- Areas for the Protection of Habitats and Species: Including those designated under the Habitats Directive and Birds Directive.

The register helps ensure that these areas are managed and their integrity protected to meet the Article No.4 objectives set out in the WFD.

The WFD and its associated directives provide a robust framework for the protection of water bodies, including protected areas. Guidance documents, such as the CIS guidance (European Commission, 2021. CIS) on the delineation of water bodies and groundwater monitoring, clarify the requirements for protected areas and their integration into the overall water management strategy.

Given this integrated approach, a separate screening/risk evaluation for protected areas is not required. The existing assessment process already encompasses the necessary considerations and measures to protect these areas. The assessment ensures compliance with the WFD objectives including protected areas.

Potential impacts of the Proposed Development on protected areas are discussed further in Chapter 6 Biodiversity and Chapter 8 Hydrology and Hydrogeology of the EIAR submitted with the planning application for the Proposed Development.

Although the Proposed Development does not directly overlap with any designated protected areas, the potential for indirect effects via surface water or groundwater pathways cannot be ruled out at this stage. Therefore, the screening process has taken into account the potential for the Proposed Development to influence the status or objectives of these protected areas. This includes consideration of the relevant River Basin Management Plans (RBMPs), the Water Action Plan 2024, and associated Programme of Measures (PoM), to ensure that the development does not conflict with national water protection objectives.

5.4 Water Action Plan (WAP) 2024 Programme of Measures

The Water Action Plan (WAP) provides information on the status and planned actions for surface waterbodies in Ireland. These entries offer insights into the specific measures being considered or implemented to improve the ecological status of the surface waterbodies.

The WAP identifies several key pressures impacting water quality in surface waterbodies across the country:

- Nutrient Pollution: Excessive levels of phosphorus and nitrogen from agricultural runoff are a significant concern. These nutrients can lead to eutrophication, which depletes oxygen in the water and harms aquatic life
- Urban Pollution: Inadequately treated wastewater and stormwater runoff from urban areas contribute to the degradation of water quality. This includes pollutants such as heavy metals, oils, and other contaminants
- Physical Modifications: Changes to the river's natural flow and structure, such as barriers and drainage works, disrupt the ecosystem and affect water quality
- Climate Change: Altered weather patterns and increased frequency of extreme weather events exacerbate existing pressures on water quality.

The WAP identifies several suggested actions to protect and restore water quality in surface waterbodies ensuring a sustainable and healthy aquatic environment. The actions include:

- Nutrient Management: Implementing stricter controls on agricultural practices to reduce nutrient runoff. This includes promoting the use of buffer strips, cover crops, and precision farming techniques
- Improving Wastewater Treatment: Upgrading wastewater treatment facilities to ensure that effluents meet higher standards before being discharged into waterbodies
- Restoring Natural Ecosystems: Removing or modifying barriers to restore natural river flow and habitat connectivity. This also involves re-naturalizing riverbanks and floodplains
- Integrated Catchment Management: Developing and implementing catchment-specific management plans that address local pressures and involve stakeholders in decision-making processes
- Climate Adaptation Measures: Enhancing resilience to climate change by incorporating adaptive management strategies and investing in green infrastructure.

As part of the screening process, the WAP 2024 has been reviewed to identify any relevant pressures or planned measures that may intersect with the Proposed Development. The WAP outlines key pressures on water quality in Ireland, including nutrient pollution from agriculture, urban wastewater discharges, physical modifications to watercourses, and the effects of climate change. These pressures are particularly relevant given the rural and hydrologically setting of the Proposed Development.

The screening has also considered the WAP's proposed actions, such as improved nutrient management, restoration of natural hydromorphology, and enhanced wastewater treatment, all of which aim to support the achievement of WFD objectives. The presence of these pressures and the alignment of the Proposed Development with the WAP's objectives are important considerations in determining whether the Proposed Development could contribute to cumulative impacts or conflict with existing Programme of Measures (PoM).

5.5 Drinking Water Protected Areas and Natura 2000 Sites

In addition to the direct potential impacts of the Proposed Development, the presence of protected areas—including Drinking Water Protected Areas and Natura 2000 sites—within the wider hydrological catchment necessitates consideration of indirect effects. While these sites may not be located immediately adjacent to the development footprint, potential hydrological connectivity through surface or groundwater pathways could result in downstream impacts. As part of the screening process, the Water Action Plan 2024 and the relevant River Basin Management Plans (RBMPs) have been reviewed to ensure that the Proposed Development does not conflict with national water quality objectives or compromise the implementation of any Programme of Measures (PoM) established to protect or improve water body status.

5.6 Screening Summary

The screening stage of the WFD assessment has been undertaken to determine whether the Proposed Development has the potential to impact the status or objectives of any surface water or groundwater bodies within or hydrologically connected to the site. The assessment considered the location, scale, and nature of the proposed works, including turbine foundations, access roads, watercourse crossings, substation construction, and associated infrastructure.

Using a Source–Pathway–Receptor (S–P–R) model, the screening identified multiple credible pathways through which the Proposed Development could interact with WFD water bodies. These include potential sedimentation and pollution risks during construction, hydromorphological alterations from watercourse crossings, and possible impacts on groundwater quality and flow regimes due to excavation and drainage works

Given the presence of hydrological connectivity, the sensitivity of the receiving environment, and the nature of the proposed activities, the screening has concluded that the Proposed Development screens in for further WFD assessment. A detailed scoping and impact assessment are therefore required to evaluate the potential effects on relevant WFD quality elements and to ensure compliance with Article 4 objectives of the Directive.

6 SCOPING AND DATA ASSESSMENT

The scoping process aims to identify the WFD quality elements that may be affected by the Proposed Development. This process is informed by the nature of the proposed works, the hydrological and hydrogeological context, and the sensitivity of the receiving environment.

The scoping process has identified the following WFD quality elements as requiring detailed assessment:

- Hydromorphological elements, due to potential alterations from watercourse crossings and drainage modifications.
- Physico-chemical elements, particularly nutrient and sediment loading during construction.
- Biological elements, where aquatic habitats may be affected by changes in water quality and flow.
- Groundwater chemical and quantitative status, due to potential impacts from excavation, spoil deposition, and directional drilling.

6.1 Hydromorphological Elements

The construction of watercourse crossings, including bottomless culverts in the northern section and a clear-span bridge in the southern section of the site, has the potential to alter the hydromorphological characteristics of the Leitrim Stream (Esker Stream_020) and its tributaries. While the use of bottomless culverts and clear-span structures is intended to minimise instream disturbance, temporary works may still affect flow patterns, bank stability, and sediment transport.

Instream works required for culvert installation in the southern section may disturb the streambed and banks, potentially leading to short-term changes in channel morphology. These alterations could affect the hydromorphological status of the receiving waterbodies, particularly if sediment deposition or flow constriction occurs. Although these impacts are expected to be localised and temporary, they could contribute to a deterioration in WFD status if not properly mitigated.

6.2 Physico-Chemical Elements

Construction activities pose several risks to the physico-chemical quality of surface waters. These include:

- Sediment mobilisation from earthworks, access roads, and stockpiles, which may increase turbidity and reduce oxygen levels in the Leitrim Stream, Kinnafad Stream, and Figile River.
- Runoff containing contaminants, such as hydrocarbons, concrete washout, or other construction-related pollutants, may enter watercourses via overland flow or existing drainage infrastructure.
- Horizontal Directional drilling (HDD) for the grid connection introduces a risk of bentonite or lubricant release, which could affect water quality if a breakout occurs near a watercourse.

In the absence of mitigation, these activities could result in moderate, medium-term impacts on water quality, potentially affecting the WFD status of water bodies already classified as “at risk” or “moderate.” Effective sediment control, spill prevention, and drainage management are essential to prevent deterioration.

6.3 Biological Elements

The biological status of surface waters may be indirectly affected by changes in water quality and flow conditions. Increased sedimentation can smother benthic habitats, reduce macroinvertebrate diversity, and impair fish spawning grounds. In particular:

- Instream works may disturb aquatic habitats, especially during sensitive periods for fish and macroinvertebrates.
- Suspended solids and nutrient enrichment from runoff may degrade habitat quality and reduce ecological integrity.

These impacts, while generally short-term and reversible, could contribute to a decline in biological status if they coincide with critical ecological periods or occur in already stressed water bodies. The Leitrim Stream and its tributaries are particularly sensitive due to their existing WFD classification and ecological function.

6.4 Data Assessment

Based on availability of existing baseline information it was considered that there is sufficient information available regarding the Proposed Development and the hydrological and hydrogeological conditions in the vicinity of the site to inform the assessment and no further investigations are required.

7 WFD ASSESSMENT

Potential effects of the Proposed Development on the WFD waterbody status (i.e., river waterbodies, ground waterbodies, etc.) both during construction and operation have been considered. Refer to Sections 7.2 and 7.3 below for further detailed assessment. The potential impacts described below regarding the Construction Phase, Operational Phase and Cumulative Impacts have been conservatively assessed in the absence of standard avoidance, remedial and mitigation measures as described in Section 8.

7.1 Construction Phase

7.1.1 Hydromorphological Effects

7.1.1.1 Hydrogeology

During the construction phase, no direct discharges to or abstractions from groundwater are proposed, aside from the infiltration of rainfall over limited areas of the site. Water required for construction activities—such as concrete chute washing, wheel wash, dust suppression, and sanitary facilities—will be imported and stored in temporary compounds, thereby avoiding reliance on local groundwater resources.

However, excavation activities, particularly for turbine foundations, may necessitate localised dewatering. This has the potential to temporarily lower groundwater levels in the immediate vicinity, which could affect nearby wells or groundwater-dependent ecosystems. If not properly managed, such changes could influence the quantitative status of the underlying groundwater bodies, including the Rhode GWB and Trim GWB.

Ground investigations have identified shallow groundwater at approximately 2m below ground level. Where encountered, shallow recharge wells will be used to reinfiltrate water and maintain the natural hydrogeological regime. This approach is intended to prevent any significant alteration to groundwater flow paths or recharge dynamics.

The use of HDD for the grid connection introduces a potential risk of inadvertent returns (frac-outs) of drilling fluids into shallow aquifers, particularly in areas of fractured bedrock or high permeability. While HDD crossings are designed to occur at a minimum depth of 1.5m below the base of watercourses, any uncontrolled release of drilling fluids could affect groundwater quality. Such contamination, if it were to occur, could compromise the chemical status of the groundwater body. However, with appropriate controls in place, the risk is considered unlikely and the potential impact is significantly diminished.

The Proposed TDR works are not anticipated to result in significant changes to the hydrogeological regime, as they are confined to shallow, surface-level works along existing roadways.

7.1.1.2 Hydrology

Although no direct discharges to surface water are proposed, construction activities may alter local surface water flow regimes. Land re-profiling, drainage modifications, and the installation of infrastructure may change runoff patterns and flow paths. These changes could affect the

hydromorphological quality elements of nearby water bodies, particularly the Leitrim Stream (Esker Stream_020), Kinnafad Stream, and Figile River.

Several minor watercourse crossings are required. In the northern section of the site, bottomless culverts will be used to preserve natural flow conditions, while in the southern section, a clear-span bridge will be installed over the Leitrim Stream. In-stream works may be required for culvert installation, which could temporarily disrupt flow and sediment transport. These interventions, if not carefully managed, could contribute to a deterioration in hydromorphological status under the WFD.

The Proposed Grid Connection will primarily be installed via shallow trenching within public roads and verges. However, two sections will be installed using HDD, which may alter subsurface hydrology and affect connectivity between water bodies. Additionally, the interception of land drains during construction may temporarily influence surface water runoff, potentially resulting in localised ponding or altered flow timing. Culverts will be installed to maintain existing flow paths and minimise disruption.

The Proposed TDR works are not expected to significantly alter surface water flow regimes, as they are confined to existing road corridors and disturbed areas.

7.1.2 Physico-Chemical Effects

7.1.2.1 In-Stream Works and Sedimentation

In-stream works required for culvert installation in the southern portion of the site present a direct risk to the physico-chemical and biological status of the Leitrim Stream (Esker Stream_020) and its tributaries. These works, although scheduled for low-flow summer periods, may disturb the streambed and release suspended solids into the water column. Elevated turbidity can reduce light penetration, smother benthic habitats, and impair macroinvertebrate and fish populations—key biological indicators under the WFD.

Similarly, the construction of a clear-span bridge over the Leitrim Stream may cause localised disturbance to stream banks and adjacent soils. While less intrusive than in-stream works, there remains a risk of sediment mobilisation with potential implications for the hydromorphological and biological quality elements of the affected water bodies.

7.1.2.2 Surface Runoff and Overland Flow

Construction activities across the site, including internal access routes, groundworks, and stockpiling of soils, pose a risk of sediment-laden runoff entering nearby watercourses. Without appropriate containment and treatment, overland flow could transport suspended solids and other contaminants into the Leitrim Stream, Kinnafad Stream, and Figile River. These inputs could degrade water quality, particularly in water bodies already classified as “at risk” or “moderate” under the WFD. In the absence of mitigation, this scenario represents a potential negative impacts the physico-chemical status of the receiving waters.

Along the Proposed Grid Connection route, runoff may also enter existing roadside drainage systems, potentially transporting contaminants offsite. Although considered unlikely, such events could still result in localised degradation of water quality, with implications for downstream WFD status.

7.1.2.3 Accidental Spills and Leaks

During construction, the vulnerability of the underlying aquifer will be temporarily increased due to excavation and exposure of granular subsoils or fractured bedrock. This creates a direct pathway for contaminants—such as fuels, lubricants, or other hazardous materials—to enter the groundwater system in the event of a spill or containment failure. In productive fissured bedrock areas like the Rhode GWB, there is a high degree of interconnection between groundwater and surface water. A worst-case scenario could result in contaminants migrating rapidly through the aquifer and discharging into connected surface waters, thereby affecting both the chemical status of the groundwater body and the ecological status of downstream surface water bodies.

7.1.2.4 HDD

The use of HDD for the grid connection introduces additional risks to groundwater quality. Although HDD is a trenchless technique designed to minimise surface disturbance, it involves the use of pressurised drilling fluids (typically bentonite-based), which can pose a contamination risk if an inadvertent return (frac-out) occurs. This is particularly relevant in areas of shallow, fractured bedrock or high-permeability subsoils. If drilling fluids were to enter the groundwater system, they could alter its chemical composition and potentially affect the WFD chemical status of the Rhode or Trim GWBs.

7.1.2.5 Cementitious Materials

The use of cement-based products during construction, particularly for turbine foundations and structural installations, presents a risk to both surface and groundwater quality. These materials are highly alkaline and can significantly alter pH levels if released into the environment. A pH shift outside the acceptable range (typically 6–9 for salmonid waters) can harm aquatic life, particularly fish and macroinvertebrates, and may result in a breach of environmental quality standards under the WFD. Although any release would likely be accidental, localised, and of limited volume, the potential for short-term, reversible impacts on the chemical and physico-chemical status of receiving water bodies remains.

7.1.2.6 Wastewater

During the construction phase of the Proposed Development, there is a potential risk of contamination to both surface water and groundwater bodies arising from accidental discharges associated with welfare facilities, machinery maintenance, and general site operations. In particular, leaks or spills from foul water holding tanks, if not properly managed, could introduce pollutants such as nutrients, pathogens, or hydrocarbons into the environment.

From a WFD perspective, such contaminants pose a risk to the chemical and physico-chemical quality elements of water bodies. In groundwater, the introduction of organic matter or hydrocarbons could degrade chemical status, particularly in vulnerable aquifers such as the Rhode GWB, where fractured bedrock may facilitate rapid contaminant migration. In surface waters, nutrient enrichment or pathogen loading could impair ecological status by promoting eutrophication or affecting aquatic biota.

However, the Proposed Development incorporates embedded controls to mitigate these risks. All temporary welfare facilities will be self-contained, with wastewater collected in sealed storage tanks. These tanks will be regularly emptied by a licensed waste contractor and transported offsite to an authorised treatment facility, in accordance with relevant waste management legislation and best practice guidelines.

Given these measures, the risk of uncontrolled discharges is considered to be low. The implementation of these controls ensures that the development remains compliant with Article 4 objectives of the WFD, protecting both the chemical integrity of groundwater and the ecological health of connected surface waters.

7.1.2.7 Flooding

During the construction phase, there is a potential risk that flood events—particularly those associated with intense or prolonged rainfall—could mobilise pollutants present on site. These pollutants may include suspended sediments, hydrocarbons, cementitious materials, and other deleterious substances associated with construction activities. From a WFD perspective, such events could result in the temporary deterioration of water quality in nearby surface water bodies, thereby affecting their physico-chemical and biological status.

Floodwaters can act as a transport mechanism, carrying contaminants offsite and into adjacent watercourses such as the Leitrim Stream, Kinnafad Stream, and Figile River. The mobilisation of fine sediments and pollutants during flood events may lead to increased turbidity, oxygen depletion, and chemical imbalances in the receiving waters. These effects, even if short-term, could impair aquatic habitats and reduce the ecological integrity of water bodies already classified as “at risk” or “moderate” under the WFD.

Although parts of the Proposed Development are located within Flood Zone B—where the annual probability of flooding is between 0.1% and 1%—the overall risk of flood-related impacts during the construction phase is considered low. This is due to the temporary nature of construction activities, which limits the window of exposure to potential flood events, and the embedded design measures intended to manage surface water on site.

Nonetheless, in the absence of appropriate mitigation, flood events could result in unlikely but potentially negative impacts on the WFD status of hydrological receptors. These impacts would primarily affect the physico-chemical quality elements of surface waters, with secondary implications for biological status if aquatic habitats are degraded.

7.1.3 Biological Effects

7.1.3.1 Impacts from In-Stream Works and Sediment Disturbance

In-stream works associated with culvert installation in the southern portion of the site pose a direct risk to aquatic habitats. These works may disturb the streambed and banks, releasing suspended solids into the water column. Elevated turbidity can reduce light penetration, smother benthic habitats, and impair macroinvertebrate communities—key indicators of ecological status under the WFD. If sedimentation occurs during sensitive periods (e.g. spawning or larval development), it may also affect fish populations. In the absence of mitigation, these impacts could result deterioration in biological status, particularly in the Leitrim Stream (Esker Stream_020), which is already classified as “at risk.”

7.1.3.2 Habitat Modification and Flow Alteration

Hydromorphological changes resulting from watercourse crossings, drainage modifications, and land re-profiling may alter habitat availability and diversity. Even minor changes in flow velocity, channel structure, or substrate composition can affect the distribution and abundance of aquatic species. For example, the replacement of natural streambeds with artificial culverts may reduce habitat complexity and connectivity, limiting the movement of fish and macroinvertebrates. These changes, if not properly mitigated, could contribute to a decline in ecological status by disrupting the biological integrity of the affected water bodies.

7.1.3.3 Water Quality Degradation

Biological communities are also vulnerable to changes in water chemistry. Runoff containing sediment, nutrients, hydrocarbons, or alkaline substances (e.g. from concrete works) can degrade water quality and stress aquatic organisms. Even short-term exposure to elevated pH or fine particulates can impair gill function in fish, reduce reproductive success, and alter community composition. In productive systems with limited assimilative capacity, such as the Leitrim Stream and Figile River, these pressures may exacerbate existing water quality issues and hinder recovery efforts under the WFD.

7.2 Operational Phase

7.2.1 Hydromorphological Effect

7.2.1.1 Hydrogeological Flow Regime

During the operational phase of the Proposed Develpooment, the potential for impacts on the underlying groundwater bodies—primarily the Rhode GWB and Trim GWB—is considered minimal. The Proposed Grid Connection, which is routed through existing road surfaces and verges, will continue to interact with the surrounding hydrogeological environment. While largely passive, subsurface infrastructure such as HDD-installed ducts and culverts may influence shallow groundwater movement. If not fully sealed or if intersecting permeable strata, these features could act as preferential pathways, potentially altering local flow directions or infiltration rates.

However, given the limited scale and depth of these installations, and the absence of any abstraction or discharge to groundwater, the effect on the quantitative status of the aquifers is expected to be negligible. Similarly, the risk to chemical status is low, provided that the infrastructure remains sealed and no contaminants are introduced during operation.

The Proposed TDR works, having been reinstated following construction, are not expected to result in any long-term alteration to groundwater flow regimes or recharge dynamics. Any minor, indirect effects—such as changes in infiltration due to subsoil compaction—are expected to be temporary and negligible.

7.2.1.2 Hydrological Flow Regime

There will be no direct outfalls to watercourses during the operational phase. Surface water runoff from the Proposed Wind Farm will be managed in accordance with SuDS principles, ensuring that runoff is attenuated and treated prior to discharge via overland flow to the Leitrim Stream, Kinnafad Stream, Figile River, and downstream water bodies. The removal of a shallow forestry land drain, which currently serves a limited catchment, will not significantly alter the hydrological regime. Post-development flow paths will be maintained, and greenfield runoff rates will be restored to pre-drainage conditions.

Watercourse crossings associated with the Grid Connection will be achieved using HDD and culverts. While these interventions may cause minor, localised alterations to flow velocity or sediment transport, they are designed to replicate natural flow conditions and minimise disruption. The predicted impact on surface water hydrology is therefore considered to be negligible.

The Proposed TDR works, once reinstated, are not expected to result in any long-term changes to land use, drainage patterns, or surface water flow regimes. However, temporary road widening may give rise to subtle, indirect effects such as altered surface water flow paths or minor disruptions to existing drainage connectivity. These effects are expected to be negligible and temporary.

Overall, the operational phase of the development is not anticipated to result in any deterioration in the hydromorphological or physico-chemical status of surface water bodies, nor will it prevent the achievement of WFD objectives.

7.2.2 Physico-Chemical Effects

7.2.2.1 Surface Runoff

There will be no direct outfalls to watercourses during operation. Surface water runoff from the site will be managed in accordance with SuDS principles, ensuring that runoff is attenuated and treated prior to discharge via overland flow to the Leitrim Stream and its tributaries. This approach is designed to protect the physico-chemical quality elements of surface waters by reducing the risk of sediment-laden or pollutant-rich discharges.

Given the limited potential for contaminated runoff during the operational phase and the design of the drainage system, the effect on surface water quality is predicted to be negligible. These conditions are not expected to compromise the WFD status of the receiving water bodies, provided that SuDS features are maintained and function as intended.

7.2.2.2 Accidental Spills and Leaks

Lubricating and cooling oils required for turbine operation and maintenance will be stored and handled in accordance with the site's operating plan. While underground cables are not expected to require maintenance, there remains a residual risk of accidental release of hazardous substances—such as through failure of secondary containment or a materials handling incident.

If such a release were to occur, deleterious substances could infiltrate the underlying aquifer or migrate offsite via surface water drainage. This could result in a localised deterioration in the chemical status of the Rhode GWB or Trim GWB and potentially affect the ecological status of connected surface water bodies such as the Leitrim Stream, Kinnafad Stream, and Figile River.

7.2.2.3 Wastewater

Wastewater generated during the operational phase will be minimal (typically <2,000 litres/month) and managed via a twin-hull holding tank fitted with an alarm system. All wastewater will be removed offsite by a licensed contractor and treated at an authorised facility. This system is designed to prevent any discharge to ground or surface water.

From a WFD perspective, the containment and offsite treatment of wastewater ensures that there is no risk of deterioration in water quality or interference with the achievement of WFD objectives.

7.2.2.4 Flooding

Flood events during the operational phase have the potential to mobilise contaminants from site infrastructure, including hydrocarbons, sediment, and other construction-related residues. If these substances are transported into adjacent watercourses, they could temporarily degrade water quality, affecting the physico-chemical status of receiving water bodies such as the Leitrim Stream, Kinnafad Stream, and Figile River.

However, the risk of such contamination is considered low due to the sealed nature of key infrastructure, the limited presence of hazardous materials, and the implementation of standard pollution prevention measures. Furthermore, the development will not increase flood risk elsewhere, and downstream water bodies (e.g. Barrow and Boyne Rivers) are expected to have sufficient dilution capacity to absorb any residual inputs without measurable impact.

In the absence of mitigation, the potential impact on water quality during a flood event is predicted to be negligible. These effects are not expected to compromise the WFD status of the receiving water bodies, provided that embedded controls and maintenance protocols are adhered to throughout the operational phase.

7.2.2.5 Biological Effects

The primary biological receptors of concern include aquatic macroinvertebrates, fish populations, and aquatic flora, all of which are sensitive to changes in water quality, flow regime, and habitat structure. During operation, the site will not generate process effluents or involve activities that directly disturb aquatic habitats. However, there remains a limited potential for indirect effects through surface water runoff, particularly during storm events.

Surface water runoff from hardstanding areas (e.g. turbine bases, access tracks) will be managed through SuDS, which are designed to attenuate and treat runoff before it reaches nearby watercourses. Provided these systems are maintained and function as intended, the risk of sediment or pollutant transport to aquatic habitats is minimal. As such, the potential for adverse effects on biological quality elements is considered negligible.

In the unlikely event of a hazardous material release (e.g. lubricants or oils), there is a residual risk of contamination reaching surface waters. If such an incident were to occur, it could temporarily degrade water quality and affect aquatic organisms. However, the sealed nature of infrastructure, low volumes of hazardous materials, and embedded pollution prevention measures significantly reduce this risk.

Overall, the operational phase of the development is not expected to result in any deterioration in the biological status of receiving water bodies or prevent the achievement of WFD ecological objectives.

7.3 Surface Waterbodies

7.3.1 Hydromorphology Quality

Table 7-1 Surface Waterbodies Hydromorphological Quality

Waterbody Name	Potential Impact (Construction)	Potential Impact (Operation)	Potential Impact of Proposed Development	Standard Design Mitigation Incorporated?
Esker Stream_020	Yes	Yes	Excavations required for turbine foundations and in stream works required to install culverts have potential to mobilise sediment in significant volumes and adversely affect hydromorphological quality of receiving waterbodies. Several new crossings of the Esker Stream_020 are required for internal site access including a crossing of the main channel of the Leitrim Stream itself. Construction within the floodplain may adversely affect the existing flood regime.	Yes
Figile_030	Yes	No	Works required as part of proposed grid connection and TDR works have potential to mobilise sediment in significant volumes and adversely affect hydromorphological quality of receiving waterbodies.	Yes
Figile_040	Yes	No	Excavations required in upstream catchment for turbine foundations and in stream works required to install culverts have potential to mobilise sediment in significant volumes and adversely affect hydromorphological quality of Figile_040.	Yes
Figile_050	Yes	No	Excavations required in upstream catchment for turbine foundations and in stream works required to install culverts have potential to mobilise sediment in significant volumes and adversely affect hydromorphological quality of Figile_050. Risk is partially mitigated due to distance from source of potential pollution and dilution.	Yes
Figile_060	Yes	No	Excavations required in upstream catchment for turbine foundations and in stream works required to install culverts have potential to mobilise sediment in significant volumes and	Yes

Waterbody Name	Potential Impact (Construction)	Potential Impact (Operation)	Potential Impact of Proposed Development	Standard Design Mitigation Incorporated?
			adversely affect hydromorphological quality of Figile_060. Risk is partially mitigated due to distance from source of potential pollution and dilution.	
Boyne_020	Yes	No	Works required as part of proposed grid connection and TDR works have potential to mobilise sediment in significant volumes and adversely affect hydromorphological quality of receiving waterbodies.	Yes
Boyne_030	Yes	No	Excavations required in upstream catchment for proposed grid connection and temporary access have potential to mobilise sediment in significant volumes and adversely affect hydromorphological quality of Boyne_030. Risk is partially mitigated due to distance from source of potential pollution and dilution.	Yes
Tullamore_020	Yes	No	Works required as part of proposed TDR works have potential to mobilise sediment and adversely affect hydromorphological quality of receiving waterbodies though effects are likely highly limited due to scale and nature of works in catchment.	Yes
Tullamore_030	Yes	No	Works required in upstream catchment have potential to mobilise sediment and adversely affect hydromorphological quality of receiving waterbodies, though effects are likely highly limited due to scale and nature of works in catchment.	Yes

7.3.2 Chemical Quality

Table 7-2 Surface Waterbodies Chemical Quality

Waterbody Name	Potential Impact (Construction)	Potential Impact (Operation)	Potential Impact of Proposed Development	Standard Design Mitigation Incorporated?
Esker Stream_020	Yes	Yes	Excavations required for turbine foundations and in stream works required to install culverts have potential to mobilise sediment/contaminants and adversely affect chemical quality of receiving waterbody. Several new crossings of the Esker Stream_020 are required for internal site access including a crossing of the main channel of the Leitrim itself. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction and operational phase.	Yes
Figile_030	Yes	No	Excavations required as part of proposed grid connection and TDR works have potential to mobilise sediment/contaminants and adversely affect chemical quality of receiving waterbodies. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction phase. Risk is partially mitigated due to limited nature of the works within catchment of this waterbody.	Yes
Figile_040	Yes	Yes	Excavations required as part of proposed grid connection have potential to mobilise sediment/contaminants and adversely affect chemical quality of receiving waterbodies. Filgile_040 is downstream of works location though risk remains due to proximity and limited dilution potential upstream. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction and operational phase.	Yes
Figile_050	Yes	No	Excavations required as part of proposed grid connection have potential to mobilise sediment/contaminants and adversely affect chemical quality of receiving waterbodies. Filgile_050 downstream of works location though risk remains due to proximity and limited dilution potential upstream. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction phase.	Yes

Waterbody Name	Potential Impact (Construction)	Potential Impact (Operation)	Potential Impact of Proposed Development	Standard Design Mitigation Incorporated?
Figile_060	Yes	No	Excavations required as part of proposed grid connection have potential to mobilise sediment/contaminants and adversely affect chemical quality of receiving waterbodies. Filgile_060 downstream of works location though limited risk remains due to proximity and dilution potential upstream. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction phase.	Yes
Boyne_020	Yes	No	Excavations required as part of proposed grid connection and TDR works have potential to mobilise sediment/contaminants and adversely affect chemical quality of receiving waterbodies. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction phase. Risk is partially mitigated due to limited nature of the works within catchment of this waterbody.	Yes
Boyne_030	Yes	No	Excavations required as part of proposed grid connection and TDR works have potential to mobilise sediment/contaminants and adversely affect chemical quality of receiving waterbodies. Boyne_030 downstream of works location though limited risk remains due to proximity and dilution potential upstream. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction phase. Risk is partially mitigated due to limited nature of the works within catchment of this waterbody.	Yes
Tullamore_020	Yes	No	Works required as part of proposed TDR works have potential to mobilise sediment/contaminants and adversely affect chemical quality of receiving waterbodies though effects are likely highly limited due to scale and nature of works in catchment.	Yes
Tullamore_030	Yes	No	Works required in upstream catchment have potential to mobilise sediment/contaminants and adversely affect chemical quality of receiving waterbodies, though effects are likely highly limited due to scale and nature of works in catchment.	Yes

7.3.3 Biological Quality

Table 7-3 Surface Waterbodies Biological Quality

Waterbody Name	Potential Impact (Construction)	Potential Impact (Operation)	Potential Impact of Proposed Development	Standard Design Mitigation Incorporated?
Esker Stream_020	Yes	Yes	Excavations required for turbine foundations and in stream works required to install culverts have potential to mobilise sediment/contaminants and adversely affect biological quality of receiving waterbody. Several new crossings of the Esker Stream_020 are required for internal site access including a crossing of the main channel of the Leitrim itself. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction and operational phase.	Yes
Figile_030	Yes	No	Excavations required as part of proposed grid connection and TDR works have potential to mobilise sediment/contaminants and adversely affect biological quality of receiving waterbodies. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction phase. Risk is partially mitigated due to limited nature of the works within catchment of this waterbody.	Yes
Figile_040	Yes	Yes	Excavations required as part of proposed grid connection have potential to mobilise sediment/contaminants and adversely affect biological quality of receiving waterbodies. Filgile_040 is downstream of works location though risk remains due to proximity and limited dilution potential upstream. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction and operational phase.	Yes
Figile_050	Yes	No	Excavations required as part of proposed grid connection have potential to mobilise sediment/contaminants and adversely affect biological quality of receiving waterbodies. Filgile_050 downstream of works location though risk remains due to proximity and limited dilution potential upstream. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction phase.	Yes
Figile_060	Yes	No	Excavations required as part of proposed grid connection have potential to mobilise sediment/contaminants and adversely affect biological quality of receiving waterbodies. Filgile_060 downstream of works location though limited risk remains due to proximity and	Yes

Waterbody Name	Potential Impact (Construction)	Potential Impact (Operation)	Potential Impact of Proposed Development	Standard Design Mitigation Incorporated?
			dilution potential upstream. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction phase.	
Boyne_020	Yes	No	Excavations required as part of proposed grid connection and TDR works have potential to mobilise sediment/contaminants and adversely affect biological quality of receiving waterbodies. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction phase. Risk is partially mitigated due to limited nature of the works within catchment of this waterbody.	Yes
Boyne_030	Yes	No	Excavations required as part of proposed grid connection and TDR works have potential to mobilise sediment/contaminants and adversely affect biological quality of receiving waterbodies. Boyne_030 downstream of works location though limited risk remains due to proximity and dilution potential upstream. The use of deleterious materials such as fuels, oils and cementitious materials will be required to be used on site through the construction phase. Risk is partially mitigated due to limited nature of the works within catchment of this waterbody.	Yes
Tullamore_020	Yes	No	Works required as part of proposed TDR works have potential to mobilise sediment/contaminants and adversely affect biological quality of receiving waterbodies though effects are likely highly limited due to scale and nature of works in catchment.	Yes
Tullamore_030	Yes	No	Works required in upstream catchment have potential to mobilise sediment/contaminants and adversely affect biological quality of receiving waterbodies, though effects are likely highly limited due to scale and nature of works in catchment.	Yes

Groundwater Bodies

7.3.4 Chemical Quality

Table 7-4 Groundwater Bodies Chemical Quality

Receptor	Potential Impact (Construction)	Potential Impact (Operation)	Potential Impact of Proposed Development	Standard Design Mitigation Incorporated?
Rhode GWB	Yes	No	During excavation and directional drilling activities, the groundwater vulnerability will temporarily be increased and there will be an increased risk to the underlying bedrock aquifer due to any accidental release of deleterious materials (e.g., fuels or other hazardous materials being used onsite), through the failure of secondary containment or a materials handling accident at the Site, to exposed granular subsoils or bedrock creating a direct pathway to the underlying bedrock aquifer. Use of Cementitious Materials - There is a potential risk associated with the cementitious materials used during construction works including construction of foundations and other structures impacting on the underlying groundwater at the site.	Yes
Trim GWB	Yes	No		Yes
Cushina GWB	Yes	No		Yes
Geashill GWB	Yes	No		Yes

7.3.5 Quantitative Quality

Table 7-5 Groundwater Bodies Quantitative Quality

Receptor	Potential Impact (Construction)	Potential Impact (Operation)	Potential Impact of Proposed Development	Standard Design Mitigation Incorporated?
Rhode GWB	Yes	No	Diversions of water courses are not required for the construction phase of the Proposed Development, however based on the findings of the Ground Investigation (GII, 2024), there may be a requirement for management of surface water (rainwater) and shallow groundwater (recorded at levels 2.00mbgl), where encountered during groundworks. Where required, shallow recharge wells will be utilised to ensure the existing hydrogeological regime is maintained by allowing water to infiltrate back into the ground, ensuring that groundwater levels remain stable. There will be no unauthorised discharge of water (groundwater or surface water runoff) to ground, drains or water courses during the construction phase. During the operational phase there will be no direct discharges to groundwater at the Proposed Development. There will be a minor increase in hardstanding in the immediate vicinity of the proposed wind turbines. This will result in a highly localised reduction of groundwater infiltration and recharge. Therefore, it is considered that here will be little to no change to the overall recharge potential to the aquifer at the main development site. The proposed grid connection route is located in existing areas of hardstanding or in the verge of the existing road network. The grid connection will require (HDD) horizontal directional drilling under one or more minor watercourses or field drains. The directionally drilled conduit will have a negligible displacement of groundwater, will be deep enough as to not effect flow in the hyporheic zone and will not limit groundwater flows in general.	Yes
Trim GWB	Yes	No		Yes
Cushina GWB	Yes	No		Yes
Geashill GWB	Yes	No		Yes

8 DESIGN AVOIDANCE AND MITIGATION

The standard measures outlined in this section of the report will ensure that there will be no significant impact on the receiving waterbodies. These measures are considered to be industry standard and an intrinsic part of contemporary construction methodologies. The effective implementation of these measures will ensure that the Proposed Development will not have any impact on compliance with the EU Water Framework Directive, European Communities (Environmental Objectives) Surface Water Regulations (S.I. 272 of 2009 and as amended) and the European Communities Environmental Objectives (Groundwater) Regulations (S.I. No. 9 of 2010 and as amended) individually or in combination.

8.1 Construction Phase

8.1.1 Good Practice Measures

Implementation of good practice measures as a matter of course during the construction of the Proposed Development are not considered to be mitigation measures but form an integral part of the design/construction process.

During the Construction Phase, all works will be undertaken in accordance with the CEMP (MWP, 2025). Following appointment, the contractor will be required to further develop the CEMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground and surface water with regard to the relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001). The CEMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development. These measures will address the main activities of potential impact which include:

- Control and Management of surface water runoff.
- Control and management of shallow groundwater during excavation and dewatering.
- Management and control of soil and materials.
- Appropriate fuel and chemical handling, transport and storage.
- Management of accidental release of contaminants at the site.
- Control and handling of cementitious materials.
- The appointed contractor will produce a Pollution Prevention Plan (or similar document). This will include procedures and diagrams for:
- Dewatering of excavations.
- Temporary soil storage.
- Fuel storage/refuelling.
- Concrete wash-out area.
- Controlling surface water entering Site.
- Preventing existing drainage features becoming pathways for construction runoff.
- Reducing soil exposure and reinstating as rapidly as possible.
- Contingency measures.

Emergency procedures will be developed by the main contractor in advance of works commencing and spillage kits will be available onsite including in vehicles operating onsite. Construction staff will be familiar with emergency procedures in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with best practice standards and legislative requirements including but not limited to the Environmental Protection Agency Act, 1992 (as amended), Waste Management Act, 1996 (as amended) and the Safety, Health and Welfare at Work Act, 2005 (as amended).

- Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the site.
- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.

- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.
- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Proposed Development site and compliantly disposed of offsite. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.
- All construction works staff will be familiar with emergency procedures in the event of accidental fuel spillages.
- All construction works staff onsite will be fully trained on the use of equipment.

8.1.2 In-Stream Works

Where instream works are required for the construction of watercourse crossings and culverts, the following mitigation measures will be implemented to protect water quality and maintain the integrity of the receiving waterbodies:

- All instream and near-stream works will be carried out in accordance with:
- Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (2016).
- Transport Infrastructure Ireland (TII) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (2008).
- CIRIA C648 – Control of Water Pollution from Linear Construction Projects (2006).
- No instream works will be carried out outside the permitted IFI window of July 1st to September 30th, to protect aquatic habitats and fish spawning periods.
- A qualified Environmental Clerk of Works (ECoW) will be present onsite during all instream works (e.g., bridge and culvert installations) to oversee environmental protection measures and ensure compliance with best practice.
- The ECoW will conduct regular water quality monitoring upstream and downstream of the works area to detect any changes and initiate corrective actions if necessary.
- Silt fences and sediment control measures will be installed as required to prevent sediment from entering watercourses.
- Prior to construction, defined works areas will be fenced off at each crossing location. Silt fences will be attached to these fences to create a barrier between the works and adjacent watercourses (e.g., the Leitrim stream and its tributaries).
- Silt fences will be constructed using geotextile membranes that allow water to pass through while retaining sediment.
- Heras fencing will be installed in front of the silt fences to prevent “site creep” — the gradual encroachment of construction activities toward sensitive areas.
- Precast concrete culverts will be used to minimise in-stream construction time and reduce the risk of pollution.
- Existing vegetation will be preserved where possible, and disturbed areas will be promptly replanted to stabilise soils and reduce erosion.
- All river protection measures (e.g., silt fences, settlement ponds) will be maintained in effective condition throughout the works and inspected regularly.
- Daily monitoring of silt fences and settlement ponds will be carried out by the contractor or ECoW, particularly during sensitive phases such as site clearance, concrete pours, and after heavy rainfall events.
- Maintenance of sediment control infrastructure will be undertaken as needed to ensure continued effectiveness.
- Monitoring frequency will be adjusted based on the stage of works and environmental conditions, with increased checks during high-risk activities or adverse weather.
- Hydrological and Hydrogeological Flow Regime
- Excavation, dewatering, and construction activities may disrupt natural surface and subsurface water flow paths, potentially altering the hydrological and hydrogeological regime. Mitigation and monitoring measures to limit potential impacts are as follows:

- Implement a site-specific surface water management system based on SuDS principles incorporating features such as:
- Swales, filter drains, and attenuation basins to manage runoff volumes and rates.
- Check dams and level spreaders to reduce flow velocity and promote infiltration.
- Settlement ponds or silt traps to capture suspended solids before discharge.
- All watercourse crossings (e.g. for access tracks or cable routes) will be designed in accordance with OPW Section 50 requirements, ensuring that culverts or bridges are appropriately sized to accommodate the 1-in-100-year flood event plus climate change allowance.
- Crossings will be constructed using methods that maintain flow continuity and minimise in-stream works.
- Drainage infrastructure will be designed to replicate pre-development greenfield runoff rates and avoid increasing flood risk downstream.
- Maintain existing drainage patterns where possible; reinstate any disturbed field drains or watercourses post-construction.
- Use shallow recharge wells where dewatering is required to maintain local groundwater levels.
- All dewatering will be managed in accordance with best practice standards (i.e., CIRIA C750).
- The dewatering methodology to be implemented by the appointed contractor will ensure that any dewatering is confined to the localised zone and does not extend towards the site boundaries.
- Seal and backfill cable trenches to prevent preferential flow paths.
- Monitor groundwater levels during construction and adjust dewatering practices accordingly.

8.1.3 Sedimentation

The following mitigation measures would be implemented to reduce the potential for sedimentation during the construction phase:

- No work will take place within the 20m buffer zones of EPA mapped watercourses, except for drainage/stream crossings, associated track construction and minor works.
- Site traffic will only be permitted within this buffer to access watercourse crossings or to facilitate instream and near-stream works (near-stream works on EPA watercourses will include some forestry felling carried out to forestry felling 10m buffer standards).
- There will be no storage of material/equipment or overnight parking of machinery inside the 15m buffer zone to the watercourse.
- Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channel along the buffer zone boundary.
- Where works are necessary inside the 20m buffer double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase.
- Drainage channels and streams will be clearly identified onsite and shown on method statements and site plans.
- During the construction activities there will be a requirement for diverting rainwater away from the construction areas, into nearby drainage channels and streams.
- Visual inspections of roads and wheel washing at site entry/exit points will be undertaken to prevent the accumulation of dirt.
- Excavations will only remain open for limited time periods to reduce groundwater and surface water ingress and water containing silt will be passed through a settlement pond prior to discharge.
- Dewatering, where required, will incorporate the use of filter media. There will be no direct discharges into the watercourses.
- Spoil and temporary stockpiles including stone stockpile areas will be positioned in locations which are distant from drainage systems and retained drainage channels, away from areas subject to flooding.
- To help shed rainwater and prevent ponding and infiltration, the sides and top of the stockpiles will be regraded to form a smooth gradient with compacted sides reducing infiltration and silt runoff.
- Where required, silt fences will be erected at the toe of stockpiles to prevent runoff. The silt fences will be monitored daily by the appointed contractor and silt will be removed as required.

- Runoff from spoil heaps will be prevented from entering watercourses by diverting it through onsite settlement ponds and removing material as soon as possible to designated storage areas.
- Silt traps will be placed across the works boundary in any areas adjacent to watercourses to avoid siltation of watercourses. These will be maintained and cleaned regularly throughout the construction phase.
- Use biodegradable erosion control matting on exposed slopes.
- Phase vegetation clearance and re-seed disturbed areas promptly.
- Monitor and maintain sediment control measures daily, especially after rainfall events.

8.1.4 Accidental Spills and Leaks

The following mitigation measures would be implemented to reduce the potential for accidental spills and leaks during the construction phase:

- The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the main contractor in advance of any works commencing.
- The main contractor will prepare method statements for weather and flood forecasting and continuous monitoring of water levels in the Leitrim stream and its tributaries. These will be made available to the local authority where requested. The main contractor will also provide method statements for the removal of site materials, fuels, tools, vehicles, and persons from flood zones in order to minimise the risk to persons working on the site as well as potential input of sediment or construction materials into the waterbodies during flood events.
- No work will take place within the 20m buffer zones of EPA mapped watercourses, except for drainage/stream crossings, associated track construction and minor works.
- Site traffic will only be permitted within this buffer to access watercourse crossings or to facilitate instream and near-stream works (near-stream works on EPA watercourses will include some forestry felling carried out to forestry felling 10m buffer standards).
- Wastewater from the construction welfare facilities will be managed by means of a sealed storage tank. All wastewaters will be removed from site by permitted waste collector to wastewater treatment plants.
- There will be no tracking of machinery within watercourses.
- There will be no storage of material/equipment or overnight parking of machinery inside the 15m buffer zone to the watercourse.
- Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channel along the 15m buffer zone boundary.
- Designate a bunded storage area at the contractor's compound(s) and away from surface water gullies or drains for oils, solvents and paints used during construction. The fuel storage tanks shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area or 25% of the total capacity of all the tanks within the bund, whichever is the greater.
- Chemicals will be stored within a storage container with an accompanying Control of Substances Hazardous to Health ("COSHH") Datasheet in accordance with health and safety regulations. All chemicals will be stored in designated bunded areas at least 15m away from watercourses.
- Drainage from the bunded area shall be diverted for collection and safe disposal. All containers within the storage area will be clearly labelled, so that appropriate remedial action can be taken in the event of a spillage. When moving drums from the bunded storage area to locations within the site plot, a suitably sized spill pallet will be used for containing any spillages during transit.
- All plant and equipment utilised onsite will be maintained is in good working condition. Any equipment not meeting the required standard will not be permitted for use within the Proposed Development. Only emergency breakdown maintenance will be carried out onsite.
- Drip trays and spill kits will be available onsite to ensure that any spills from vehicles are contained and removed offsite.
- Drip trays will be located under all static plant.
- Hoses and valves will be checked regularly for signs of wear and will be turned off and securely locked when not in use.

- Diesel pumps and similar equipment will be checked regularly, and any accumulated oil removed for appropriate disposal.
- Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in designated impermeable refuelling areas isolated from surface water drains.
- There will be no refuelling allowed within 15m of the watercourses.
- Where mobile fuel bowsers are used on the site, in the event of a machine requiring refuelling outside of the designated impermeable area, fuel will be transported in a mobile double skinned tank.
- Adequate stocks of hydrocarbon absorbent materials (e.g., spill-kits and/or booms) shall be held onsite to facilitate response to accidental spills. Spill response materials shall also be stored on all construction vehicles.
- In the event of an accidental spillage, or water pollution incident, the site manager or designate shall notify the Local Authority as soon as possible.

8.1.5 Use of Cementitious Materials

Mitigation and monitoring measures to limit potential impacts associated with the use of natural resources throughout the course of the Proposed Development are as follows:

- No work will take place within the 20m buffer zones of EPA mapped watercourses, except for drainage/stream crossings, associated track construction and minor works.
- Site traffic will only be permitted within this buffer to access watercourse crossings or to facilitate instream and near-stream works (near-stream works on EPA watercourses will include some forestry felling carried out to forestry felling 10m buffer standards).
- Ready-mixed concrete will be brought to the site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated water (for example storm water) to the underlying subsoil and groundwater.
- The pouring of concrete will take place within a designated area protected (for example by a geosynthetic material) to prevent concrete runoff into the soil/groundwater media.
- Any use of concrete in proximity to watercourses will be carefully controlled to avoid spillage. No onsite batching should occur. Washout from mixing will be carried out only in a designated contained impermeable area.
- Wash down and washout of concrete transporting vehicles will take place at an appropriate designated area and direct discharge of wash water to ground or surface waters will be strictly prohibited. Alternatively, where washout takes place onsite, it will be carried out in a designated, carefully managed onsite washout area.
- Wastewater from washing of concrete lorry chutes will be directed into a concrete washout container, lined with an impermeable membrane. The container should be of good condition, should not overflow or leak and should be easily accessible to vehicles. The containers must be checked and emptied at a frequency equivalent to the volume of concrete being used and no runoff should leave the washout location. The area much be clearly marked and must be located away from storm drain inlets, open drainage facilities, water courses and ditches.

8.1.6 Flood Risk

Construction activities undertaken in or near flood-prone areas can significantly increase the risk of flooding and associated impacts on the water environment. Improper site drainage, obstruction of natural flow paths, or the alteration of existing hydrological regimes may exacerbate flood risk both on-site and downstream. These effects can lead to the mobilisation of sediments, pollutants, or construction materials into nearby watercourses, potentially degrading water quality and affecting the Water Framework Directive (WFD) status of receiving waterbodies. To mitigate these risks and ensure the protection of the water environment during flood events, the following mitigation measures are required:

- Develop and implement a Flood Risk Management Plan tailored to the site.
- Avoid storing materials, fuels, or machinery in flood-prone areas.
- Install temporary bunds, berms, or barriers to divert floodwaters from sensitive zones.
- Store hazardous substances above predicted flood levels and in secure, weather-resistant containers.

- Use permeable surfaces to reduce surface water flow.
- Regularly inspect and maintain site drainage systems.
- Monitor water levels during high-risk periods.
- Conduct pre and post flood inspections and adapt mitigation measures based on weather forecasts and site conditions.

8.1.7 Wastewater Management

Improper handling or unauthorised discharge of foul water or construction-related wastewater (e.g., from equipment washing or dewatering) could lead to contamination of surface water or groundwater, potentially affecting the WFD status of receiving waterbodies. The following mitigation measures are required:

- All foul water from temporary welfare facilities will be collected in sealed holding tanks and regularly removed offsite by a licensed contractor to a permitted wastewater treatment facility.
- No unauthorised discharge of water to ground or surface water will occur during the construction phase. All discharges will be subject to the appropriate consents under Section 16 of the Local Government (Water Pollution) Acts and Regulations for any water discharges to sewer or from OCC under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990 for discharges to surface water.
- Where water must be pumped from excavations, it will be treated (e.g., via settlement or hydrocarbon interceptors) before discharge and only in accordance with the relevant discharge licence.
- All existing drainage channels and public sewers will be clearly identified, protected, and shown on site plans and method statements to prevent accidental discharge of untreated water.
- Under no circumstances will untreated wastewater from equipment washing, road sweeping, or other construction activities be released offsite.

8.2 Operational Phase

It is anticipated that fuel (lubricating oil, hydraulic fluid) will be required. For the vehicles and equipment that will be brought to the Proposed Development during construction, refuelling will be carried out using 110% capacity double bunded mobile bowsers.

Chemicals will be brought to the Proposed Development for construction works, some of which could be consider hazardous. Care will be taken with the usage and disposal of any fuel, oils and chemicals at the Proposed Development. Any hazardous waste generated at the Proposed Development will be disposed of to the licenced waste facility.

Surface water will be managed in accordance with the principles and objectives of SuDS to treat and attenuate water prior to discharging offsite. Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be incorporated into the overall management strategy for the Proposed Development. This will ensure that there are no impacts on water quality and quantity (flow regime) during the operational phase of the Proposed Development.

Foul water during the operational phase of the Proposed Development will ultimately discharge via a licenced facility under the appropriate consents from UE. A Foul water from the site will only be discharged to the UE network under the appropriate consents from UE, and therefore, the Proposed Development will not cause a potential impact on water quality and the WFD status of receiving waterbodies and any Natura 2000 sites associated with discharges from the site.

8.3 Residual Risk to Waterbody Status

The effect of the standard design avoidance and mitigation measures have been assessed and summarised in Table 8-1, which provides a summary of the predicted/potential status changes associated with the Proposed Development, with and without mitigation. In all cases, the proposed measures are sufficient to meet WFD objectives.

Table 8-1 Summary of WFD Status for Unmitigated and Mitigated Scenarios

WFD Waterbody I.D. & EPA Code	Current WFD Status (2016-2021)	Current WFD Risk	Unmitigated Status Change	Mitigated Status Change
Construction Phase				
Esker Stream_020	Moderate	At Risk	Poor	Moderate
Figile_030	Moderate	At Risk	Moderate	Moderate
Figile_040	Moderate	At Risk	Poor	Moderate
Figile_050	Poor	At Risk	Poor	Poor
Figile_060	Good	Not at Risk	Good	Good
Boyne_020	Poor	At Risk	Moderate	Moderate
Boyne_030	Good	Not At Risk	Good	Good
Tullamore_020	Poor	At Risk	Poor	Poor
Tullamore_030	Poor	At Risk	Poor	Poor
Rhode GWB	Good	Not at Risk	Good	Good
Trim GWB	Good	At Risk	Poor	Good
Cushina GWB	Good	Not at Risk	Good	Good
Geashill GWB	Good	Not at Risk	Good	Good
Operational Phase				
Esker Stream_020	Moderate	At Risk	Poor	Moderate

8.4 Potential Impact on Water Action Plan Programme of Measures

Based on the findings of this assessment, it is considered that in applying the precautionary principle and assessing a worst-case scenario the Proposed Development will have no adverse impacts on the implementation of the WAP Programme of Measures. Adverse impacts associated with historic urbanisation will be negated through the implementation of SuDS and appropriate treatment of foul effluent from the site.

9 CONCLUSIONS

The findings of the risk-based assessment identified that in the absence of any mitigation and avoidance measures there could be a potential impact on the waterbody status within receiving water bodies associated with the Proposed Development.

The standard mitigation measures as outline above will prevent any impact on the receiving groundwater and surface water environment. Hence, the Proposed Development will not have any impact on compliance with the EU Water Framework Directive, European Communities (Environmental Objectives) Surface Water Regulations, 2009 (SI 272 of 2009, as amended 2012 (SI No 327 of 2012), and the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), as amended 2012 (SI 149 of 2012) and 2016 (S.I. No. 366 of 2016).

The Proposed Development will not cause a deterioration in the status of waterbodies hydrologically connected with the Proposed Development, taking account of design avoidance and mitigation measures that will be implemented. The Proposed Development will not jeopardise the objective to achieve 'good' surface water status or good ecological potential.

There will be no impact to the existing WFD status of waterbodies associated with the Proposed Development as a result of the Proposed Development taking account of embedded design avoidance and mitigation measures.

9.1 WFD Article 4 Objectives Compliance Statement

The assessment contained within this report has comprehensively demonstrated that the Proposed Development adheres to the Article 4 objectives of the Water Framework Directive (WFD). Applying the precautionary principle and evaluating a worst-case scenario, it is evident that there are no adverse impacts to the Status of waterbodies, thus aligning with the objective to protect, enhance, and restore all bodies of surface water and groundwater, with the aim of achieving good surface water status by 2027.

Furthermore, the Proposed Development incorporates measures, such as Sustainable Drainage Systems (SuDS) and the appropriate management of construction stage runoff, which will prevent any deterioration in waterbody status and maintain high status where it already exists. Moreover, the necessary measures are being implemented with the aim of progressively reducing pollution in surface waters and groundwater, thereby fulfilling the objective of reducing pollution incrementally.

Consequently, the Proposed Development in full compliance with the overarching goal of achieving good surface water status by 2027 and maintaining the integrity of the water environment.

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Appendix A - Designated and Protected Sites

Designated Site	Site Code	Distance from Site (km)	Direction	Potential Hydrological Connection to the Site
Special Area of Conservation (SAC)				
River Boyne and River Blackwater SAC	2299	17.22	Northeast	Yes, downstream of the Site within potential Zone of Influence.
River Barrow and River Nore SAC	2162	16.18	Southeast	
Charleville Wood SAC	571	9.52	West	
River Shannon Callows SAC	216	47.33	Southwest	Yes, though connection is extremely tenuous due to distance, watercourse dilution and nature of the proposed works. Not considered to be within Zone of Influence.
Lough Derg SAC	11	55.2	Southwest	
Lower River Shannon SAC	2165	86.32	Southwest	
Boyne Coast and Estuary SAC	1957	69.13	Northeast	
The Long Derries, Edenderry SAC	925	8.34	East	No, hydrologically upstream of the Site
Raheenmore Bog SAC	582	9.94	West	
Special Protection Area (SPA)				
River Boyne and River Blackwater SPA	4232	17.22	Northeast	Yes, downstream of the Site within potential Zone of Influence.
Boyne Estuary SPA	4080	67.93	Northeast	Yes, though connection is extremely tenuous due to distance, watercourse dilution and nature of the proposed works. Not considered to be within Zone of Influence.
Seas off Wexford SPA	4237	132.59	South	
Middle Shannon Callows SPA	4096	39.09	Southwest	
Lough Derg (Shannon) SPA	4058	58.17	Southwest	
River Shannon and River Fergus Estuaries SPA	4077	106.81	Southwest	

Designated Site	Site Code	Distance from Site (km)	Direction	Potential Hydrological Connection to the Site
Lough Ernell SPA	4044	19.18	Northwest	No, hydrologically upstream of the Site
Slieve Bloom Mountains SPA	4160	25.4	Southwest	No, hydrologically upstream of the Site
Proposed Natural Heritage Area (pNHA)				
Grand Canal	2104	0.4	North	No direct hydrological connection
Royal Canal	2103	17.24	Northeast	No direct hydrological connection. However, the Boyne has a pumped feeder contribution to the Roal Canal. Connection is extremely tenuous due to distance, watercourse dilution and nature of the proposed works. Not considered to be within Zone of Influence.
Trim	1357	34.92	Northeast	Yes, though connection is extremely tenuous due to distance, watercourse dilution and nature of the proposed works. Not considered to be within Zone of Influence.
Boyne Woods	1592	50.01	Northeast	
Slane Riverbank	1591	56.29	Northeast	
Crewbane Marsh	553	56.94	Northeast	
Rossnaree Riverbank	1589	57.41	Northeast	
Dowth Wetland	1861	61.71	Northeast	
King Willima's Glen	1804	63.01	Northeast	

Designated Site	Site Code	Distance from Site (km)	Direction	Potential Hydrological Connection to the Site
Boyne River Islands	1862	64.01	Northeast	
Boyne Coast and Estuary	1957	69.05	Northeast	
Barrow Valley at Tankardstown Bridge	858	41.26	South	
Cloghristick Wood	806	59.62	South	
Clohastia	830	86.4	South	
Barrow River Estuary	698	94.89	South	
Ballyhack	695	118.46	South	
Waterford Harbour	787	119.13	South	
Duncannon Sandhills	1738	121.38	South	
Dunmore East Cliffs	664	128.62	South	
Hook Head	764	127.79	South	
River Shannon Callows	216	47.33	Southwest	
Lough Derg	11	58.17	Southwest	
Inner Shannon Estuary -South Shore	435	106.81	Southwest	
Fergus Estuary and Inner Shannon, North Shore	2048	108.45	Southwest	
The Long Derries, Edenderry	925	8.34	East	No, hydrologically upstream of the Site
Raheenmore Bog	582	9.94	West	
Natural Heritage Areas (NHA)				
Carbury Bog NHA	1388	11.2	Northeast	
Black Castle Bog NHA	570	2.13	North	No, hydrologically upstream of the Site
Daingean Bog NHA	2033	9.76	Southwest	
Note:				

Designated Site	Site Code	Distance from Site (km)	Direction	Potential Hydrological Connection to the Site
'*' = Distance is measured as closest point to the Site				

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