TOBIN

Ballyfasy Wind Farm

Water Framework Directive Assessment Report

BUILT ON KNOWLEDGE

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1. INTRODUCTION

TOBIN were requested by Manogate Ltd, a development company supported by ART Generation and FuturEnergy Ireland, to complete a Water Framework Directive (WFD) Compliance Assessment for the proposed Ballyfasy Wind Farm project in County Kilkenny.

The proposed project comprises a 10 no. turbine windfarm, a 110 kV onsite substation, Grid Connection Options (GCO One and Two), proposed works areas on the Turbine Delivery Route (TDR) and all ancillary infrastructure and associated site development works.

GCO One proposes to install a 110 kV underground cable from the proposed onsite substation to the consented Castlebanny Wind Farm 110 kV substation 12 km to the north. GCO One crosses involves six watercourse crossings, which are tributaries of the Arrigle River and Smithstown_15. GCO Two lies entirely within the proposed wind farm site boundary and crosses one watercourse, an unmapped tributary to the Arrigle River. No flood-prone areas are identified along the GCO Two. The purpose of this WFD assessment is to determine if any specific components or activities associated with the proposed project will compromise WFD objectives or 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 will determine the water bodies with the potential to be impacted, describe the proposed mitigation measures, and determine if the project is in compliance with the objectives of the WFD.

1.1 BACKGROUND

The European Union (EU) Water Framework Directive (WFD) (2000/60/EC) was adopted in 2000 to establish a comprehensive framework for the protection and sustainable management of all water bodies, including rivers, lakes, transitional waters (estuaries), coastal waters, heavily modified water bodies (HMWBs), and groundwater.

In Ireland, the Directive was transposed into national law through the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003), as amended. The WFD is implemented via River Basin Management Plans (RBMPs), which operate in six-year planning cycles that involve assessment, implementation of measures, and review.

RBMPs include:

- Identifying River Basin Districts (RBDs) and individual water bodies
- Designating protected areas
- Assessing pressures and risks
- Monitoring water quality and ecological status
- Setting environmental objectives
- Developing and implementing programmes of measures

In Ireland:

- The first RBMP covered the period 2009–2015
- The second RBMP spanned 2018–2021
- The third RBMP, published as the Water Action Plan 2024, covers 2022–2027.

The Water Action Plan 2024 is Ireland's third River Basin Management Plan, developed in line with the EU Water Framework Directive (2000/60/EC). It sets out a national roadmap to protect and restore the ecological health of Ireland's water bodies—including rivers, lakes, estuaries, coastal waters, and groundwater—by 2027, in accordance with Sustainable Development Goal 6. Building on the work of previous cycles, this plan addresses past shortcomings by strengthening the integrated catchment management approach, enhancing governance, targeting evidence-based measures, and improving environmental compliance.

The plan identifies that just over half of Ireland's surface waters currently achieve good or high ecological status, with nutrient pollution, urban wastewater, and physical habitat changes being the key pressures. Specific actions include the development of 46 Catchment Management Work Plans and Sectoral Action Plans to ensure that the right measures are applied in the right places. The plan also emphasises public participation and accountability, with implementing bodies required to monitor and report progress. Despite some improvements, the overall trend shows little net progress, underscoring the need for more ambitious and coordinated action to meet WFD objectives by 2027.

This report presents a WFD assessment for the proposed project and forms an integral part of the Environmental Impact Assessment Report (EIAR). It should be read in conjunction with Chapter 9: Hydrology and Hydrogeology of the EIAR. Consideration of the WFD is a statutory requirement for any proposed development that may result in deterioration of the ecological or chemical status of a waterbody, or that may hinder improvements necessary to achieve WFD objectives.

To comply with the WFD, any new development must demonstrate that it satisfies the following four key objectives:

- Prevent deterioration of the ecological status of the affected waterbody and any hydraulically connected waterbodies within the same catchment;
- Avoid introducing impediments to the achievement of Good Ecological Status (GES) or Good Ecological Potential (GEP);
- Ensure that the WFD objectives for the affected waterbody are not compromised; and
- Safeguard the ability of other waterbodies within the catchment to meet their WFD objectives, ensuring these are not permanently excluded or undermined.

1.1.1 Assessment methods

This WFD Assessment evaluates the potential for the proposed wind farm development to result in non-temporary effects on WFD parameters associated with freshwater water bodies. Due to the inland location of the proposed development, transitional and coastal waters were considered but scoped out of further assessment.

Currently, there is no formal WFD assessment guidance specific to freshwater environments in Ireland. However, guidance published by the Northern Ireland Environment Agency (2012) for Environmental Impact Assessment (EIA) developments has been widely referenced. This guidance also forms the basis of the UK Planning Inspectorate's Advisory Note 18: 'Water Framework Directive' (PINS, 2017), which outlines a staged approach to WFD assessments. Although originating from different jurisdictions, the methodologies presented are broadly consistent and have informed the approach adopted in this assessment.

The WFD assessment follows four key stages:

1. Screening: Identification of relevant water bodies, their current status, future objectives, and any influencing activities in proximity to the proposed project.
2. Scoping: Determination of potential impacts on individual WFD quality elements during construction, operation, and decommissioning.
3. Assessment: Evaluation of the likely influence—positive or negative—on WFD elements, including assessment of effect permanence, data sufficiency, and confidence levels.
4. Mitigation: Identification of feasible and appropriate mitigation measures to address any adverse effects identified.

Where an activity is found to conflict with WFD objectives, but could achieve compliance through appropriate mitigation, such measures will be proposed.

In accordance with guidance, a 2 km buffer was applied when assessing potential effects on protected areas. For completeness and transparency, all identified protected sites within this buffer—including those relevant only to coastal waters—have been listed, even though not all are subject to further assessment in this context.

1.1.2 Assessment criteria

This assessment evaluates the potential for activities associated with the construction, operation, and decommissioning phases of the proposed project to influence nearby WFD-designated freshwater water bodies. The evaluation is based on the WFD quality elements that contribute to the classification of ecological status. For the freshwater water bodies intersecting or located near the proposed development, relevant details are presented in Table 1-1.

Ecological status is defined by the degree of deviation from natural or undisturbed conditions. The official WFD normative definitions used to determine ecological status are provided in Table 1-1.

Table 1-1: Description of Ecological Status classification

WFD element	*Description of elements for the classification of Ecological Status*
Biological Status	*Composition and abundance of aquatic flora (including macrophytes and phytobenthos)* *Composition and abundance of benthic invertebrate fauna* *Composition, abundance and age structure of fish fauna*
Chemical Status	*Elements that support the biological elements including:* • *Temperature* • *pH* • *Ammonia* • *Phosphate*
Hydrology Status	*Quantity of water flow* *Connection to groundwater bodies*
Morphology Status	*River depth and width variation* *Structure and substrate of the riverbed*

WFD element	*Description of elements for the classification of Ecological Status*
	Structure of the riparian zone

Source: WFD Directive 2000/60/EC

This assessment focuses on identifying non-temporary effects on water bodies, in accordance with Water Framework Directive (WFD) criteria. Under the WFD, effects are considered non-temporary if they persist beyond:

- Three years for impacts on biological quality elements, hydrology, or morphology;
- Twelve months for impacts on chemical status.

To inform the assessment, the following publicly available datasets from the Environmental Protection Agency (EPA) have been utilised:

- Catchment Data – River Water Bodies (GIS)
- Catchment Data – Lake Water Bodies (GIS)
- Surface Water Classification Status and Objectives (2016–2021)
- Groundwater Classification Status and Objectives (2016–2021)

These datasets provide the current status, objectives, and classification information necessary to evaluate potential impacts of the proposed wind farm on WFD-designated water bodies.

2. SCREENING AND SCOPING

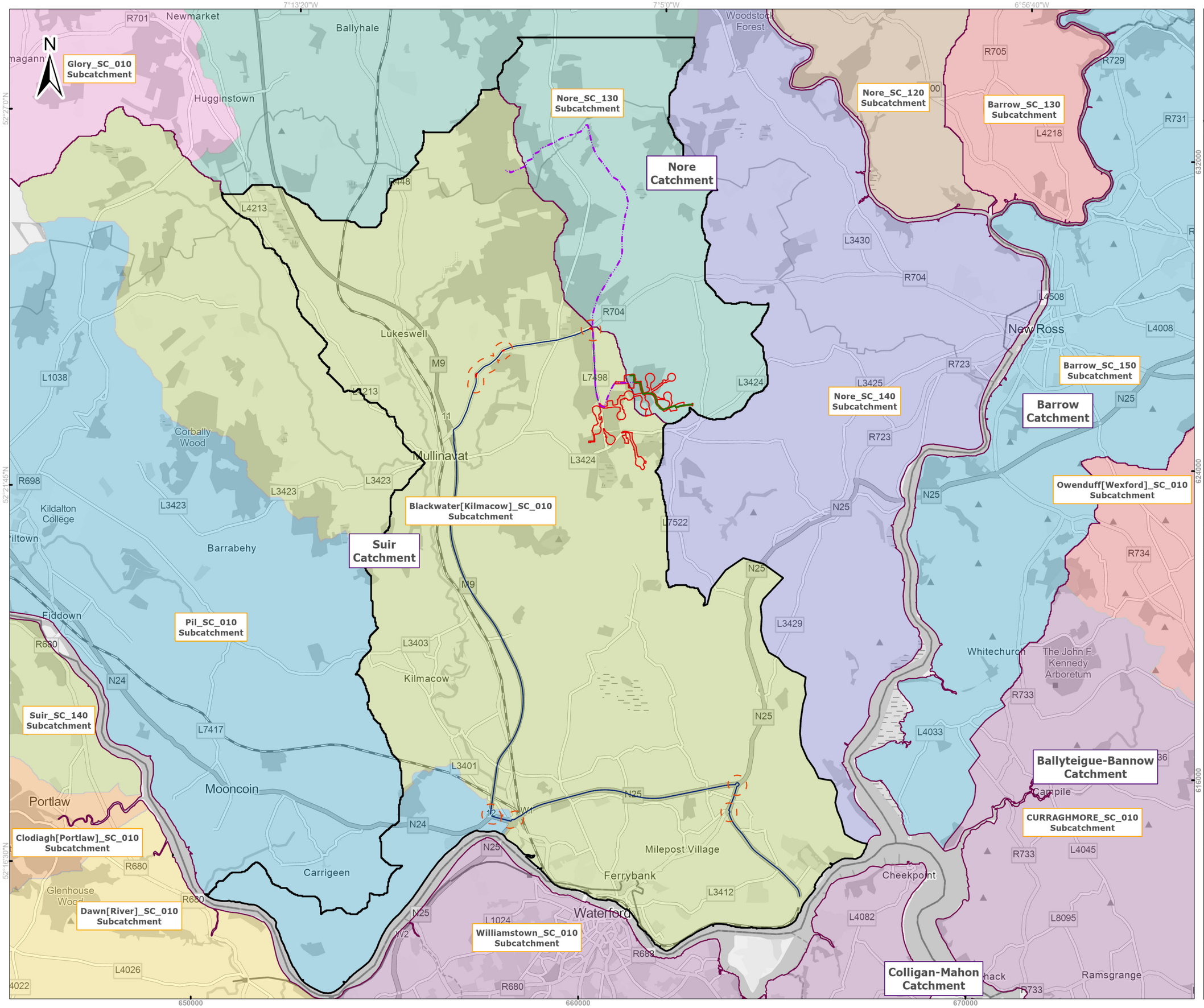
The EPA's "Water Quality in Ireland 2016–2021" is the most recent comprehensive national assessment of surface and groundwater status under the Water Framework Directive (WFD). It evaluates over 4,800 water bodies using data from a six-year monitoring cycle. Complementing this, the "Water Quality in 2024: An Indicators Report" provides an annual update, highlighting short-term changes and reinforcing ongoing trends.

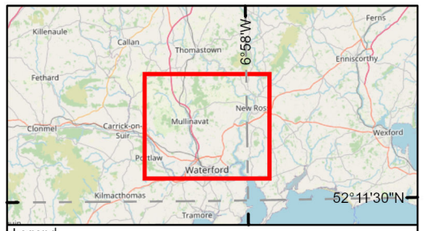
Nationally, the long-term analysis reveals that just 54% of surface waters (rivers, lakes, estuaries, and coastal waters) are in good or high ecological status, with groundwaters faring better, at 91% in good chemical and quantitative status. However, there has been no net improvement in surface water status since the previous cycle. Despite some localised gains, they were offset by a similar number of deteriorations.

The 2024 Indicators Report confirms continued stagnation in water quality, largely due to nutrient pollution—especially excess nitrogen and phosphorus from agriculture and wastewater. Notably, nitrogen levels remain too high in 40% of river sites and 20% of estuarine and coastal waters. The regional natural surface water drainage pattern, in the environs of the proposed project, is outlined in Figure 2-1.

In 2024, *"38% of river monitoring stations had concentrations higher than 8 mg/l NO_3 which is the level at which impacts to the ecological health of these rivers and associated downstream marine waters occurs. Phosphorus concentrations in rivers are stable, with no significant change in the last year. In 2024, 21% of river monitoring stations have phosphorus concentrations which are greater than the good status environmental quality standard (0.035 mg/l P)".* (EPA, 2025[1]).

[1] EPA (2025) Water quality monitoring report on nitrogen and phosphorus concentrations in Irish waters 2024





Legend

- Wind Farm Application Boundary
- Hydrology and Hydrogeology study area
- TDR works areas - 200m buffer

Grid Connection Options

- Option 1
- Option 2

Catchments

- WFD - Catchments

WFD - Subcatchments

- Barrow_SC_130
- Barrow_SC_150
- Blackwater[Kilmacow]_SC_010
- CURRAGHMORE_SC_010
- Clodiagh[Portlaw]_SC_010
- Dawn[River]_SC_010
- Glory_SC_010
- Nore_SC_120
- Nore_SC_130
- Nore_SC_140
- Owenduff[Wexford]_SC_010
- Pil_SC_010
- Suir_SC_140
- Williamstown_SC_010

0 2 4
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: Manogate Ltd.

Project: Ballyfasy Wind Farm

Title: Figure 2.1: Regional Catchment Delineation

Scale @ A3: 1:90,000

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2.1 SURFACE WATER BODIES

The proposed wind farm site is located in the River Suir and the River Nore catchment, both of which ultimately discharge into the Celtic Sea. Surface water and shallow groundwater flow across the proposed wind farm is dictated by local topography and geomorphology, creating a natural hydrological divide that channels drainage in multiple directions.

The proposed windfarm is located in three sub-catchments:

- Arrigle_010 – north and eastern areas of the wind farm
- Smartscastle stream_010 – Central and southern areas of the wind farm
- Nore (Kilmacow)_020 – Western areas of the wind farm.

Two streams are located within the proposed windfarm:

- Smithstown_15 Stream (IE_SE_15A020100), which flows north into the River Nore catchment via the Arrigle River.
- Smartscastle Stream (IE_SE_16S070500), which flows south into the Blackwater (Kilmacow) and finally into the River Suir catchment. It is joined by the Rathnasmolagh Stream, located to the south of the proposed wind farm.

To the west, the Ballyknockbeg Stream (IE_SE_16B020091) drains westward into the River Blackwater (Kilmacow). Watercourses within the proposed wind farm are small, moderate- to low-gradient streams, typically actively eroding with minimal fine sediment deposition. They are straightened/modified, and not subject to urbanisation or point source pollution. The Arrigle River, however, is partially channelised and straightened in some sections. Most streams, including the Arrigle, are heavily shaded by riparian vegetation, which provides ecological cover and helps regulate water temperature.

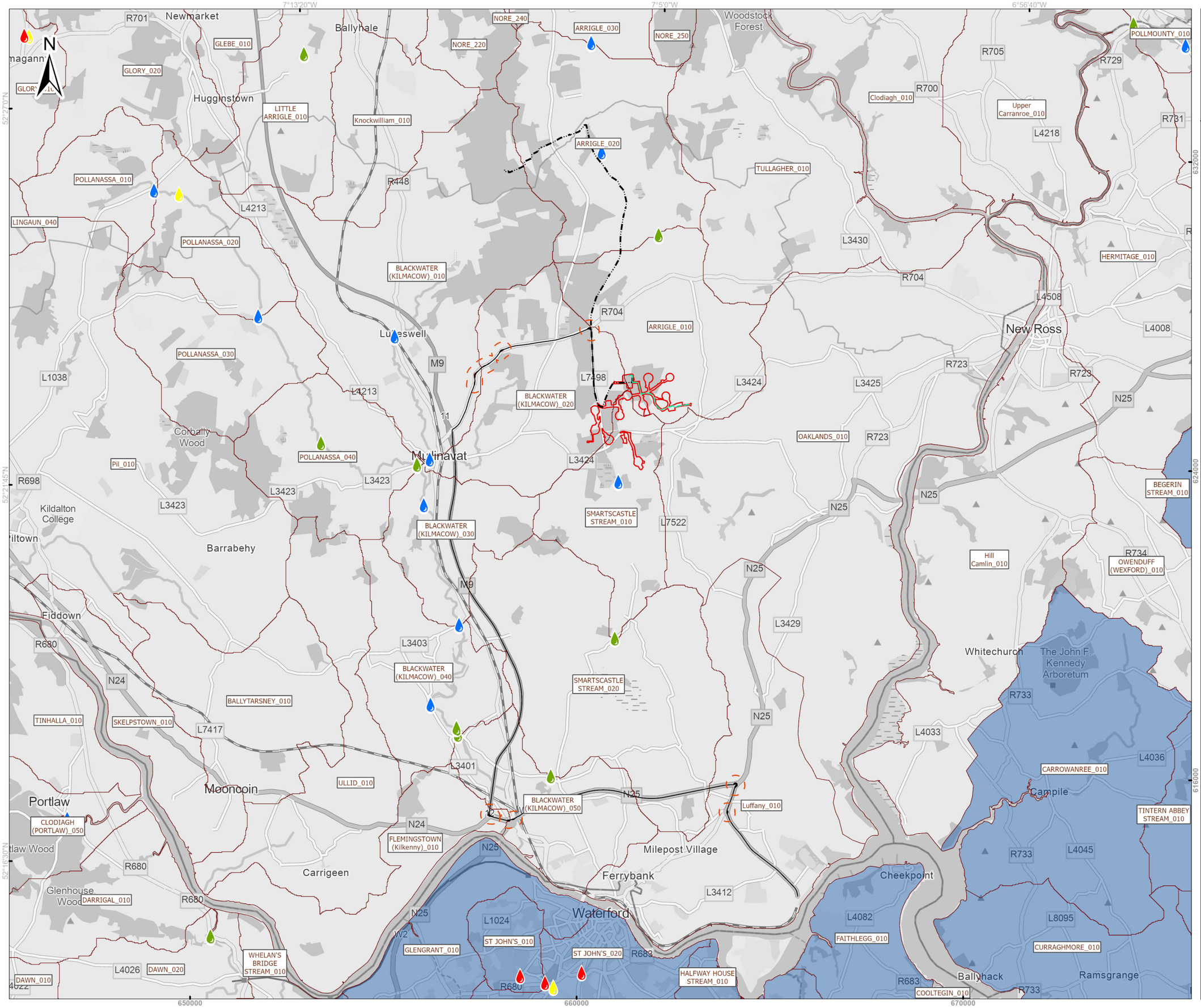
Overall, the hydrology reflects a relatively natural upland stream network, supporting sensitive aquatic habitats that may be vulnerable to hydromorphological and water quality changes. The proposed TDR works are located mainly in the Suir Catchment with the exception of the works at Three Friars Crossroads which is located in the Arrigle_010 sub-catchment.

A total of six watercourse crossings are required along the proposed GCO One, Arrigle_010 (crossed at two locations including unmapped tributaries) and Arrigle_020 (at four locations including unmapped tributaries). One watercourse crossing is proposed along GCO Two (an unmapped tributary of the Arrigle_010). As detailed above the Arrigle is part of the Nore Catchment.

Table 2-1: Water body status (https://catchment.ie) within 2 km of the development

Catchment	EPA Waterbody Code	EPA Subbasin Name	Current Status 2016-2021	Development within area	Infrastructure
River Nore					
	IE_SE_15A020100	Arrigle_010	Good	Yes	T4, T5, T6, T7, Construction Compound, Substation, GCO One, TDR works area
	IE_SE_15A020100	Arrigle_020	High	Yes	GCO One
	IE_SE_16B020080	Blackwater Kilmacow_020	Moderate	Yes	GCO One, TDR works area
River Suir	IE_SE_16S070500	Smartscastle Stream_010	Moderate	Yes	T2, T9, T3, T8
	IE_SE_16B020091	Ballyknockbeg Stream	Moderate	Yes	T1 to T10, GCO One, TDR works area
	IE_SE_15A020100	Flemingstown (Kilkenny)_010	Poor	Yes	TDR works area
	IE_SE_16B020500	Blackwater Kilmacow_050	Moderate	Yes	TDR works area
	IE_SE_16L680750	Luffany_010	Moderate	Yes	TDR works area

A summary of the catchments is included in Table 2-1 and shown on Figure 2-2. . The naming of the streams varies between the historical maps, OSi maps and the EPA catchment maps.



Legend

- Wind Farm Application Boundary
- Turbine Delivery Route
- TDR works areas - 200m buffer

Grid Connection Options

- Option 1
- Option 2
- WFD - Areas For Action
- WFD - River SubBasins

EPA surface water monitoring locations

- Q4 - Q5 Unpolluted
- Q3-4 Slightly Polluted
- Q2 - Q3 Moderately Polluted
- Q1 - Q2 Seriously Polluted

0 2 4
Kilometers

Spatial Reference
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Project: Ballyfasy Wind Farm

Title: Figure 2.2: River Subbasins and Q values

Scale @ A3: 1:90,000

Prepared by:	Checked by:	Date:
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Map Ref: 11474-055-SubB-EPA..SWML-TOB-A

Draft: A

1.1.3 Catchments

Two principal catchments are identified as hydrological receptors within the study area: the River Nore Catchment and the River Suir Catchment. Based on the Water Framework Directive (WFD) status and the presence or absence of ecological designations, surface water features in the vicinity of the proposed project are considered to have high sensitivity (e.g., River Arrigle) to medium sensitivity (e.g., Kilmacow River).

Nore Catchment

The Nore catchment includes the area drained by the River Nore and all streams entering tidal water between its confluence with the River Barrow at Ringwood, and the Barrow railway bridge at Drumdowney, Co. Kilkenny, draining a total area of 2,595km². The largest urban centre in the catchment is Kilkenny. The other main urban centres in this catchment are Abbeyleix, Callan and Thomastown. The total population of the catchment is approximately 94,700 with a population density of 37 people per km². The Nore rises on the north-eastern slopes of Borrisnoe Mountain, from where it runs northeast over an area underlain by a large gravel aquifer and past Borris-in-Ossory. The southern slopes of the Slieve Bloom Mountains are drained by the Tonet, Delour and Mountrath Rivers which join the Nore east and south of Mountrath. The Nore becomes tidal just upstream of Inistioge before continuing southeast to its confluence with the River Barrow at Ringwood. Flood relief works were completed during 2006. The River Arrigle flows north until it meets the River Nore to the north of Thomastown.

Suir Catchment

The Suir catchment includes the area drained by the River Suir and all streams entering tidal water between Drumdowney and Cheekpoint, Co. Waterford, draining a total area of 3,542km². The largest urban centre in the catchment is Waterford City. The other main urban centres in this catchment are Carrick-on-Suir, Clonmel, Caher, Thurles, Tipperary, Fethard and Templemore. The total population of the catchment is approximately 184,860 with a population density of 52 people per km². The headwaters of the Suir are located on the northern flanks of the Devil's Bit Mountain in Co. Tipperary. The river flows through a wide limestone plain, past Thurles, where the Suir is joined by the River Drish and the Tipperary Clodiagh. The Suir continues towards Cashel and onwards to Cahir and Carrick-on-Suir. The Suir becomes tidal just before reaching Carrick-on-Suir and is joined by several rivers between this point and Waterford city including the Lingaun, Portlaw Clodiagh, Pil, and Kilmacow Nore and then makes its way to the confluence with the Nore and Barrow Rivers east of Waterford City. The Suir estuary then turns south, flowing out to sea through Waterford Harbour between Dunmore East and Hook Head. Flood relief works were completed on the Suir at Carrick-on-Suir during 2003 and at Clonmel during 2014.

There are no WFD monitoring locations currently recording surface water chemistry within the boundary of the proposed wind farm site. However, 3.5 km further downstream of the proposed wind farm site along the River Arrigle at 'Bridge West of Ballyconnaught' there is an EPA monitoring point. Annual average ammonium and orthophosphate concentrations are below the threshold of 'Good status' . The *European Communities Environmental Objectives (Surface Waters), 2007 as amended*, which sets a limit of ≤ 0.065 mg/l NH_4 (mean) for ammonium and ≤ 0.035 mg/l MRP (mean) for phosphate. Water quality at this location is good as highlighted in Table 2-2.

Table 2-2: EPA WFD monitoring downgradient of the proposed wind farm site

Annual Average	Biochemical Oxygen Demand (BOD) (mg O_2/l)	Ammonium	Orthophosphate
Surface water regulations[2]	Good status ≤ 1.5 (mean) or ≤ 2.6 95%ile)	Good status ≤ 0.065(mean) and ≤ 0.140 (95%ile)	Good status (mean) and ≤ 0.045 (95%ile)
2007	0.9	0.017	0.020
2008	1.16	0.105	0.028
2009	0.78	0.014	0.018
2010	0.675	0.051	0.015
2011	0.925	0.026	0.019
2012	2.3	0.015	0.015
2013	0.6	0.014	0.014
2014	0.5	0.013	0.015
2015	1.025	0.058	0.045
2016	0.6	0.012	0.015
2017	1.48	0.036	0.034
2018	0.675	0.022	0.019
2019	0.86	0.032	0.025
2020	0.92	0.029	0.027
2021	1.04	0.021	0.038
2022	0.92	0.021	0.026
2023	1.125	0.014	0.020

Figure 2-1 depicts Surface Water Features/Local Catchment Delineation in relation to the proposed wind farm site area which includes a significant number of unnamed streams although EPA reference names have been applied for identification purposes.

[2] S.I. No. 77/2019 - European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019

1.1.4 Groundwater Bodies

The groundwater body (GWB) is the groundwater management unit under the WFD. Groundwater bodies are subdivisions of large geographical areas of aquifers so that they can be effectively managed in order to protect the groundwater and linked surface waters[3]. The GWB is defined as a distinct volume of groundwater, including recharge and discharge areas with little flow across the boundaries. The proposed windfarm site is underlain by the Knockmealdown groundwater body (GWB).

The proposed project is located in the following groundwater waterbodies (GWB), Mullinavat GWB (IE_SE_G_155) and Inistioge GWB (IE_SE_G_076). The Water Framework Directive report[4] for the period 2016-2021 describes the groundwater quality status as 'Good' for both GWB's. These classifications are based on an assessment of the point and diffuse sources in the area that may affect the groundwater quality. Anthropogenic pressures including agriculture are the main pressures on the Inistioge GWB.

The groundwater body descriptions are available from the GSI website[5] and the 'status' is obtained from the WFD website[6] and the EPA website[7]. The GWB underlying the proposed wind farm site are classified as being at 'Good' status as shown on Table 2-3.

Table 2-3: Summary of groundwater bodies

EU_CD Code	Name	Description	GWB status (2016-2021)
IE_SE_G_155	Mullinavat	Poorly productive bedrock	Good
IE_SE_G_076	Inistioge	Poorly productive bedrock	Good

The groundwater in the proposed wind farm is assessed as being of Good quantitative and chemical status. This is expected to continue.

1.1.5 Lake water Bodies

There are no Lake Water bodies within the vicinity of the proposed project.

1.1.6 Transitional and coastal waters

Transitional and coastal waters are not considered by this WFD assessment, having been assessed and scoped out from further assessment by the WFD assessment.

The screening exercise has identified those river waterbodies that are present within a 2 km buffer zone of the proposed wind farm.

[3] https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx

[4] https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/water-quality-in-ireland-2016--2021-.php

[5] www.gsi.ie

[7] www.epa.ie

2.2 SCOPING AND ASSESSMENT RESULTS

The WFD requires that activities are also in compliance with other relevant legislation, as considered below. The following are considered as part of the assessment (as mentioned above, in line with guidance, a 2 km buffer zone was applied in this assessment):

2.2.1 Protected areas

Nutrient sensitive areas comprise Nitrate Vulnerable Zones and polluted waters designated under the Nitrates Directive (91/676/EEC) and areas designated as sensitive areas under the Urban Wastewater Treatment Directive (UWWTD)(91/271/EEC).

There are no shellfish waters within 2 km of the proposed wind farm. There are no bathing water sites within 2 km of the proposed wind farm. There is one nutrient sensitive site, namely an Urban Wastewater Treatment Directive sensitive area (Site code: IE_SW_020_0500) located 2.7 km to the southwest of the proposed wind farm at the Nore Estuary Upper. SPAs and SACs within 2 km of the proposed wind farm as outlined in in Section 2.3.

2.3 NATURE DESIGNATIONS

These are areas previously designated for the protection of habitats or species where maintaining or improving the status of water is important for their protection. They comprise the aquatic part of Natura 2000 sites (i.e., European sites) – Special Protection Areas (SPAs) designated under the Birds Directive (79/409/EEC) and Special Areas of Conservation (SACs) designated under the Habitats Directive (92/43/EEC).

The proposed project does not overlap with any European site. It is, however, hydrologically connected downstream to two European sites; a hydrological connection from the Blackwater (Kilmacow)_020 River and Smartscastle Stream_010 to the Lower River Suir SAC (site code: 002137) and a hydrological connection from both the Arrigle_010 and Arrigle_020 River to the River Barrow and River Nore SAC (002162). Source-pathway-receptor (SPR) links via these hydrological pathways have been identified from the proposed project to these European sites. The River Arrigle and River Nore main channel downstream of the River Arrigle confluence, is not within the main known distribution of Freshwater Pearl Mussels in the River Nore – See EIAR Appendix 6-4 Freshwater pearl mussel report.

Additional NHA/SPAs – see Table 2-5- were considered based on an assessment of species core foraging and disturbance ranges of species of conservation interest (SCI).

Table 2-4: Designated Sites

Designated sites	Distance from proposed wind farm
River Barrow and River Nore SAC Site code: 002162 (NPWS, 2025b)	Hydrological connection via the Arrigle_010 River at a downstream distance of ca. 2.7 km.
Lower River Suir SAC Site code: 002137 (NPWS, 2017)	Hydrological connection via the Blackwater (Kilmacow)_020 River and Smartscastle Stream_010 at a downstream distance of ca. 18 km and 13 km respectively.
Lough Cullin pNHA Site code: 000406 (NPWS, 2009a)	Hydrological connection via the Smartscastle Stream_010 at a downstream distance of ca. 7.3 km.
Grannyferry pNHA Site code: 000833 (NPWS, 2009b)	Hydrological connection via the Smartscastle Stream_010 at a downstream distance of ca. 16.3 km and the Blackwater (Kilmacow)_020 River at a downstream distance of ca 18 km.

Only construction phase impacts have been identified as being possible in Chapter 9 (Hydrology and Hydrogeology) of this EIAR; these are mitigated through specific measures set out in Chapter 9 (Hydrology and Hydrogeology) of this EIAR, and in the Surface Water Management Plan (SWMP) (see EIAR Appendix 2-8), and contained within the Construction Environmental Management Plan (CEMP) in Appendix 2-6 of this EIAR.

Construction, operation and decommissioning activities have been considered in this assessment. The construction phase of the proposed wind farm has the greatest potential to affect WFD status. Operation of the wind farm should present no significant impacts of any kind on surface waterbodies. Maintenance and repair and decommissioning of the proposed wind farm are deemed to present similar types of impacts as construction activities but of a lower order magnitude. Therefore, the worst-case scenario is the construction activity on the waterbodies in the vicinity of the wind farm site. The assessment is informed by relevant literature, experience from wind farm construction and expert judgement. The confidence in the assessment is therefore medium-high (for definitions, see Glossary Section 6-1).

2.3.1 Hydromorphology

This section provides a summary of the known existing hydromorphology risk issues for the fluvial water bodies.

Table 2-5: Hydromorphological Assessment

Assessment Questions	Arrigle_010	Arrigle_020	Blackwater Kilmacow_040	Smartscastle Stream_010	Moneygorm_030
Consider if your activity could impact on hydromorphology (morphology or water flow of a water body at high status)?	No - RWB not a high status[8]	RWB at high status	No - RWB not a high status	No - RWB not a high status	No - RWB not a high status
Consider if your activity could significantly impact the hydromorphology of any water body?	No surface water drainage flow and volume will not significantly change	No surface water drainage flow and volume will not significantly change	No surface water drainage flow and volume will not significantly change	No surface water drainage flow and volume will not significantly change	No surface water drainage flow and volume will not significantly change
Consider if your activity is in a water body that is heavily modified for the same use as your activity?	No. Not a heavily modified water body.	No. Not a heavily modified water body.	No. Not a heavily modified water body.	No. Not a heavily modified water body.	No. Not a heavily modified water body.

[8] https://www.catchments.ie/water-map/

3. COMPLIANCE ASSESSMENT

The proposed project has been assessed for its potential to impact each of the WFD quality elements, and as a result has the potential to impact upon the status of the waterbodies or its ability to achieve its objectives.

WFD Compliance Assessment primarily considers the operation of a scheme. However, potential construction impacts are also considered if they have the potential for significant long-term change.

The WFD Compliance Assessment follows the structure of Chapter 9 (Hydrology and Hydrogeology) in so far as the three main phases of the proposed project are considered separately in the first instance. The potential for cumulative impacts on a water body as a result of multiple elements of the proposed wind farm potentially impacting upon them is considered in Step 3 of the assessment.

The principal activities that may contribute to effects are:

- Construction works - earthworks, and construction and upgrade of access roads (especially near streams).
- Operational Phase – maintenance works and accidental leaks and spills.
- Decommissioning – similar as during construction, but on a smaller scale.

3.1 CONSTRUCTION PHASE

Without mitigation actions, the proposed wind farm has the potential to affect the water quality and hydromorphology of streams at the proposed wind farm.

The factors that can affect water quality and associated aquatic habitats are associated with:

1. Nutrient release such as nitrogen and phosphorus;
2. Contamination events associated with accidental leaks and spills of fuel or other chemicals;
3. Physical modification to streams including increased flow; and
4. Sedimentation of streams.

A Construction Environmental Management Plan (CEMP) (see EIAR Appendix 2-6) and Surface Water Management Plan (SWMP) (see EIAR Appendix 2-8) will be implemented. Impacts in this section are thus the residual impacts identified in Chapter 6 (Biodiversity) and Chapter 9 (Hydrology and Hydrogeology) for each quality element of each WFD water body.

3.1.1 Biological Quality Elements

Potential impacts on biological quality elements are assessed in Chapter 6 (Biodiversity) of the EIAR. A summary is provided here and includes the likely residual effects following implementation of mitigation and control measures.

Site clearance, excavation activities and stockpiling of material have the potential to result in run off and nutrients and sediment entering water bodies during construction could stunt macrophyte growth, enhance filamentous algae growth, limit dissolved oxygen capacity and

reduce the ecological quality of watercourses ultimately causing increased mortality of fish and other aquatic organisms.

Through the implementation of specific mitigation, including clear-span bridge crossings, no long-term impacts on WFD biological quality elements are foreseen.

Impacts from the drainage are likely to be temporary and localised. Additional inputs of sediment may arise from runoff entry points which could lead to scouring of riverbanks and this, in turn, could alter natural flow dynamics within the channel, should mitigation not be in place. Furthermore, discharges from attenuation ponds could lead to scour of the beds and banks unless outfalls are appropriately designed. Any impacts from discharges will be minimised by managing suspended solid concentrations so they do not exceed 25mg/l (average) and ensuring discharges are controlled to limit scour and limit any impacts to species inhabiting the water bodies.

During periods of heavy and/or prolonged rainfall, sediment could enter the water bodies. Once in the receiving water body, channel bed habitats could be impacted due to smothering of bed materials reducing available foraging, nesting and refuge habitats used by fish and macroinvertebrates. In addition, the physiological functioning of fish may be affected due to gill damage caused by suspended solids.

Implementation of the mitigation as set out in Chapter 9 (Hydrology and Hydrogeology), and the use of location-specific measures, as detailed in EIAR Appendix 2.6 CEMP, will ensure that impacts will be minimised and will not result in deterioration of biological quality elements.

In-channel and riparian habitats could be temporarily impacted from disturbance during construction locally. As all wastewater from welfare facilities will be collected and removed off site, any risk of deteriorating water quality, which could impact on biological elements, will be minimised.

Potential impacts from the construction which may result in a loss of suitable habitat for fish, macroinvertebrates and macrophytes. Potential impacts from the removal of riparian vegetation include the localised loss of riparian habitat and localised bank destabilisation. This could result in the displacement of material which may settle on the channel beds, altering the composition and structure of the substrate used by inhabiting or foraging species. Additional impacts on habitats may arise from the accidental release of oil from machinery which could also alter bed and bank composition.

3.1.2 Chemical and Physico-chemical Quality Elements

Potential impacts on water quality are assessed in Chapter 9 (Hydrology and Hydrogeology) of the EIAR. A summary is provided here and includes the likely residual effects following implementation of mitigation and control measures.

Through implementation of the specific mitigation any impacts will be considered short-term and localised.

3.1.3 Hydromophological Quality elements

Potential impacts on hydromorphology are assessed in Chapter 9 (Hydrology and Hydrogeology) of the EIAR. A summary is provided here and includes the likely residual effects following implementation of mitigation and control measures.

The watercourse-crossing technique and use of clear-span bridges for the construction of the proposed wind farm will ensure that the proposed project will not have any direct impact on the hydromorphology of the water bodies. Through implementation of the mitigation, as set out in Chapter 9 (Hydrology and Hydrogeology), any indirect risk to the hydromorphology of the water bodies will be minimal.

3.1.4 Protected Areas

Potential impacts on Protected Areas are assessed in Chapter 6 (Biodiversity) of the EIAR. The permanent loss of habitat within the proposed wind farm site is evaluated. The construction works will result in significant habitat loss.

Following implementation of mitigation measures outlined in EIAR Appendix 2.6 (CEMP), it is not considered likely that there would be deleterious impacts on the qualifying features for the Protected Areas identified.

3.2 Operational Phase

3.2.1 Biological Quality Elements

Potential impacts on biological quality elements are assessed in Chapter 6 (Biodiversity) of the EIAR. A summary is provided here and includes the likely residual effects following implementation of mitigation and control measures.

The operation of the proposed wind farm would also result in an impact of negligible concern to the distribution and abundance of suitable foraging habitat. No indirect impacts on habitats or protected species are likely as a result of the proposed project.

3.2.2 Chemical and Physio-chemical Quality Elements

Potential impacts on water quality are assessed in Chapter 9 (Hydrology and Hydrogeology) of the EIAR. A summary is provided here and includes the likely residual effects following implementation of mitigation and control measures.

During the operational phase there would be no process water discharges. Surface water runoff from roads and other impermeable areas will be managed by sustainable drainage system (SuDS). Rainwater will be collected from roof areas and harvested before being re-circulated. Foul wastewater on site will be contained and transported by a permitted collector to a licenced Wastewater Treatment Plant (WwTP). No impacts on water bodies are considered likely.

The negligible impacts predicted in terms of levels and water quality mean that any impacts on inputting water bodies would also be negligible at most.

3.2.3 Hydromorphological Quality elements

Potential impacts on hydromorphology are assessed in Chapter 9 (Hydrology and Hydrogeology) of the EIAR. A summary is provided here and includes the likely residual effects following implementation of mitigation and control measures.

The operation of the proposed project is not considered likely to have any detrimental impact on hydromophological quality elements.

3.2.4 Protected Areas

Based on the proposed design and SuDS measures, the impacts on levels and flows would be indistinguishable from baseline conditions; and would meet the WFD requirements under existing and future climate conditions. As a result, it is not considered likely that the proposed wind farm would result in any deleterious impacts on the qualifying features of these protected areas.

3.3 COMPLIANCE ASSESSMENT SUMMARY

The site-specific impacts of the proposed wind farm on the biological, physico-chemical and hydromorphological quality elements of the water bodies are shown in the assessment above and are summarised in Table 3-1.

Table 3-1: WFD Assessment Summary

Receptor	Potential risk to receptor?	*Note the risk issue(s) for impact assessment*
Hydromorphology	No	*No instream works are proposed as part of the proposed wind farm. Surface water drainage flow and volume will be at greenfield runoff rates and will not significantly change as a result of the proposed wind farm.*
Biology:	Yes	*The Barrow and Nore River SAC and River Suir SAC are located downgradient* *The Arrigle River flows into the Nore River SAC, the Smartscastle and Blackwater flow into the Suir River SAC.* *There is also potential for such impacts to occur, including drill lubricant (e.g. bentonite) pollution, at the directional drilling site under the Arrigle River tributaries which flow into the Barrow and Nore SAC* *There are potential direct and indirect impacts on SACs/SPAs.*
Water quality	Yes	*Short term, the proposed project will not increase sediment and nutrients post-construction. Mitigation measures are detailed in the CEMP and SWMP.*
Protected areas	*Yes*	*The proposed wind farm is located within the Barrow and Nore River SAC and the River Suir SAC and is hydraulically linked to a number of SPAs. A CEMP and SWMP will be implemented as part of the proposed wind farm. The operation of the proposed wind farm will not significantly change the current level of surface water or groundwater volume or flow.*

3.4 ASSESSMENT OF PROPOSED PROJECT AGAINST PROGRAMME OF MEASURES

Within each RBMP, there is a list of measures, or environmental improvements, which have been identified by the RBMP, to meet the target date set by the Water Framework Directive. Part of the WFD compliance assessment is to consider measures and assess whether a proposed wind farm project can contribute to them or might obstruct any of them from being delivered. No turf cutting has occurred at the proposed wind farm site in recent decades. Forestry

measures as set out in the Water Action Plan 2024 will continue to be implemented on the afforested areas. There is minimal change in the impermeable area of the proposed project. Where there is a change, SuDS will be implemented and no significant effect is anticipated.

4. MITIGATION MEASURES

Construction works will be minimised where practical to reduce exposed ground that could generate silty water runoff, that once in water bodies could alter the natural composition and structure of the substrate especially during periods of prolonged and/or heavy rainfall. Implementation of the mitigation set out in EIAR Appendix 2-6 (CEMP) will ensure that such impacts are short-term and localised.

Exposed earth following topsoil stripping could act as a source of sediment following rainfall, which once in the watercourses, could lead to altered substrate composition temporarily. Through implementation of the mitigation set out in EIAR Appendix 2-6 (CEMP) and EIAR Appendix 2-8 (SWMP), any indirect risk to the hydromorphology of the water bodies will be minimal.

The exposure of soils associated with site preparation has the potential to be a source of fine sediment that could enter water bodies during periods of rainfall. Through implementation of the mitigation set out in EIAR Appendix 2.6 (CEMP), any indirect risk to the hydromorphology of the water bodies will be minimal.

Due to the location and nature of construction works and the implementation of the mitigation set out in EIAR Appendix 2.6 (CEMP), there will be no detrimental effects on hydromorphological quality elements associated with the construction compound and site preparation activities.

Through implementation of the mitigation set out in EIAR Appendix 2.6 (CEMP), any impacts to water bodies would be temporary and localised. Such discharges will discharge at greenfield runoff rates.

Any additional run-off or water from de-watering during construction will be treated (e.g., to remove sediment) within the limits of the proposed wind farm and discharged to local drains/swales.

Runoff from the construction of will be attenuated and treated as appropriate before being allowed to infiltrate or discharge from the proposed wind farm, ensuring that any sediment build-up or pollutants are captured on site rather than released into the wider environment.

Cumulative impacts may also occur between this proposed wind farm project and other proposed wind farms. Where waterbodies in the same catchments are crossed by multiple projects, any impacts may be additive, and the effects may accumulate downstream of the points where the waterbodies intersect.

Table 4-1: Mitigation Measures Matrix

	Turbines	Substation and compounds	Access tracks	Borrow Pits/Spoil deposition	Grid
Utilise existing bridges and access roads			++		++
>50m Buffer	++	++			
Interceptor drains	++	++	++	++	
Check Dams or similar	++	++	++	++	++
Swales			++	++	
Sediment traps		++		++	
Settlement Ponds	++	++		++	
Proprietary Settlement tanks	++	++		++	
Weather dependant	++	++	++	++	++
Silt Fences	+		++		
Clear Span Bridge			++		
Concrete washout and control measures	++	++		++	++
Chemical/fuel bunds	++	++		++	++

Taking into consideration the anticipated impacts of the proposed wind farm on the biological, physico-chemical and hydromorphological quality elements, following the implementation of design and mitigation measures, it is concluded that it will not compromise progress towards achieving good ecological status (GES) or cause a deterioration of the overall good ecological potential (GEP) of any of the water bodies that are in scope.

Table 4-2: Compliance of the proposed project with the environmental objectives of the WFD

Environmental Objective	Proposed wind farm	Compliance with the WFD Directive
No changes affecting high status sites.	There are no likely changes in relation to high status in the study area. (High confidence)	Yes
No changes that will cause failure to meet surface water good ecological status or potential or result in a	After consideration as part of the detailed compliance assessment, the proposed wind farm will not cause deterioration in the status of the	Yes

Environmental Objective	Proposed wind farm	Compliance with the WFD Directive
deterioration of surface water ecological status or potential.	water bodies during construction following the implementation of mitigation measures; during operation, no significant impacts are predicted. (High confidence)	
No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies.	The proposed wind farm will not cause a permanent exclusion or compromise achieving the WFD objectives in any other bodies of water within the River Basin District. (High confidence)	Yes
No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.	The proposed wind farm will not cause deterioration in the status of groundwater bodies. (High confidence)	Yes

The WFD also requires consideration of how a new scheme might impact on other water bodies and other EU legislation. This is covered in Articles 4.8 and 4.9 of the WFD.

Article 4.8 states: '*a Member State shall ensure that the application does not permanently exclude or compromise the achievement of the objectives of this Directive in other bodies of water within the same river basin district and is consistent with the implementation of other Community environmental legislation*'.

All water bodies within the study area have been assessed for direct impacts. The proposed project will not compromise the achievement of the objectives of the WFD for any water body in the study area. In addition, the proposed project has been assessed for the potential for cumulative impacts with other proposed wind farms within 1 km of the study area. Cumulative effects of this project with other developments in the region, relate to the effects on Hydrology. These developments include other existing or planned developments in the environs of Ballyfasy and/or developments with the potential to interface with the proposed project in terms of environmental effects.

With the implementation of the mitigation measures it is concluded that, in combination with other proposed wind farms, the proposed project will not compromise the achievement of the objectives of the WFD for any water body. Therefore, the proposed project complies with Article 4.8.

Article 4.9 of the WFD requires that "*Member States shall ensure that the application of the new provisions guarantees at least the same level of protection as the existing Community legislation*".

The Habitats Directive (1992) promotes the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats. European designated sites in the vicinity of the proposed wind farm have been assessed and are presented in the Natura Impact Statement (NIS). The NIS is a standalone document included in the planning application for the proposed project. It concludes that the proposed project will not lead to a deterioration

in the features of any designated site. The proposed project is not considered to be a risk to designated habitats and therefore is compliant with the Habitats Directive.

The Bathing Water Directive (BWD) (2006/7/EC) was adopted in 2006, and is the process used to measure/monitor water quality at identified bathing waters. There are no bathing waters within 2 km of the proposed project.

5. CONCLUSIONS

Taking into consideration the impacts of the proposed project on the biological, physico-chemical and hydromophological quality elements, it is concluded that, following the implementation of design and mitigation measures, it will not compromise progress towards achieving good ecological status (GES) or cause a deterioration of the overall status of the water bodies that are in scope; it will not compromise the qualifying features of protected areas and is compliant with other relevant Directives. It can therefore be concluded that the proposed project is fully compliant with the WFD and therefore does not require assessment under Article 4.7 of the WFD.

6. REFERENCES

EPA (2021) Water Quality in Ireland 2016-2021 ISBN 978-1-80009-073-6

Defra (2009) WFD Expert Assessment of Flood Management Impacts. Defra, London.

Northern Ireland Environment Agency (2012) Carrying out a Water Framework Directive (WFD) assessment on EIA Developments. NIEA.

UKTAG (2008) UK Environmental Standards and Conditions (Phase 1)

UKTAG (2013) Updated Recommendations on Environmental Standards River Basin Management (2015-21) Final Report. WFD UKTAG.

6.1 GLOSSARY

Term	Definition
Artificial waterbody	A body of surface water created by human activity.
Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.
Coastal waterbody	Surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters.
Confidence	Low - Non-expert opinion, unsubstantiated opinion with no supporting evidence. Medium - Expert view grounded in theory but based on limited information, e.g., anecdotal evidence, or historical data. High - Estimation of potential impacts or consequences, with strong theoretical basis, using accepted methods, reliable analysis and accepted within the sector as 'fit for purpose'. This typically includes analytical methods where the methods are strong and the science is reliable.
Groundwater	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.
Groundwater body	A distinct volume of groundwater within an aquifer or aquifers.
Lake waterbody	A body of standing inland surface water.
Non-Temporary/Temporary	The requirement is to assess if the activities will have an effect that is non-temporary on the status of the waterbody. The terms are not currently defined within the guidance, however, for the purposes of this assessment 'temporary' is assumed to mean recovery should occur within the period of time the element in question is measured. For example, macro-invertebrates should be measured every 3 years. Therefore, temporary means less than three years for this element.
River basin	The area of land from which all surface run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth, estuary or delta.
River Basin District	The area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, which is identified under Article 3(1) of the Water Framework Directive as the main unit for management of river basins.
River Basin Management Plan	River Basin Management Plans describe the river basin district, and the pressures that the water environment faces. It shows what this means for the current state of the water environment in the river basin district, and what actions will be taken to address the pressures. It sets out what improvements are possible by 2015 and how the actions will make a difference to the local environment - the catchments, estuaries, the coast and groundwater.
River waterbody	A body of inland water flowing on the surface of the land but which may flow underground for part of its course.
Surface water	Inland waters, except groundwater; transitional waters and coastal waters, except in respect of chemical status for which it shall also include territorial waters.
Transitional waterbody	Bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are influenced by freshwater flows.