Oweninny Wind Farm Phase 3

Environmental Impact Assessment Report

Appendix 11.3 Water Framework Directive Assessment Report

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Bord na Móna

Oweninny Wind Farm Phase 3

Water Framework Directive Assessment Report

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1.0 INTRODUCTION

TOBIN Consulting Engineers were requested by Bord na Móna to complete a Water Framework Directive (WFD) Compliance Assessment for a planning application for a proposed wind farm and grid connection development at Oweninny Phase 3, Bellacorick, Co. Mayo. The proposed wind farm comprises a 18 no. turbine windfarm, underground grid connection and associated site development works.

The purpose of this WFD assessment is to determine if any specific components or activities associated with the proposed wind farm development 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 established in 2000 in order to provide a framework for the protection of surface waterbodies (including rivers, lakes, coasts, estuaries and heavily modified waterbodies) and groundwater.

The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003). The WFD is implemented through the River Basin Management Plans (RBMP) which comprises a six-yearly cycle of planning, action and review. RBMPs include identifying 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 2010 to 2015 with the second cycle plan covering the period from 2018 to 2021. River Basin Management Plan 2022-2027 is currently at draft status.

The WFD requires that the ecological status of all surface waterbodies is assessed, that pressures are identified and that programmes of measures are put in place in order to maintain or achieve Good Ecological Status (GES) or Good Ecological Potential (GEP) in heavily modified and artificial waterbodies. Ecological status is assessed by considering a range of biological, hydromorphological, chemical and physico-chemical quality elements as well as specific pollutants.

Ecological status and the status of the quality elements is assessed and classified as one of the following:

- High;
- Good;
- Moderate;
- Poor; and
- Bad.

Member states must provide information on anthropogenic pressures. The magnitude of pressure and associated impact affects the status classification.

This report provides a WFD assessment for the Oweninny phase 3 Wind Farm development. This report forms part of the Environmental Impact Assessment and should be read in conjunction with Chapter 11 Hydrology and Water Quality . Consideration of the WFD is required for any Development application which has the potential to cause deterioration in the

ecological and chemical status of a waterbody or to compromise improvements which might otherwise lead to a waterbody meeting its WFD objectives.

Any new development must therefore ensure that four objectives are satisfied:

- Objective 1: Deterioration in the ecological status of the waterbody or connected waterbodies (within the same catchment) is prevented;
- Objective 2: Impediments to the attainment of GES status for the waterbody are not introduced;
- Objective 3: Attainment of the WFD objectives for the waterbody is not compromised;
- Objective 4: Achievement of the WFD objectives in other waterbodies within the same catchment are not permanently excluded or compromised.

1.1.1 Assessment methods

This WFD Assessment evaluates the potential for the proposed wind farm to have non-temporary effects on WFD parameters of freshwater waterbodies. Transitional and coastal waterbodies were considered and scoped out from further assessment due to the inland location.

There is no formal guidance for carrying out WFD assessments for the freshwater environment. The Northern Ireland Environment Agency provides guidance for EIA developments on carrying out a WFD assessment (Northern Ireland Environment Agency, 2012). No specific guidance exists for freshwater waterbodies; however this guidance was used as the basis of the UK's Planning Inspectorate (PINS) Advisory Note 18 'Water Framework Directive' June 2017 (PINS 2017) in which it sets out the stages of an assessment. In principle, the approaches outlined in each of these guidelines are similar. These documents have been used to inform the approach taken for this WFD assessment, which is as follows:

- Screening: Identify and record the current status, future objectives and any relevant activities that may influence the waterbodies in the locality of the proposed wind farm .
- Scoping: For each WFD element, record where the construction, operation and/or decommissioning could affect the status.
- Assessment: Evaluate the extent to which activities influence (positively or negatively) the WFD elements; the likelihood of non-temporary effects; the data available and confidence in the assessment; and any next steps for data collection and evaluation as required.
- Mitigation: Identify where actions may be possible and appropriate to mitigate any negative effects of the development.

Where the assessment identifies a component or activity which is not compliant with WFD objectives but which may become compliant with appropriate mitigation.

In line with this guidance a 2km buffer zone was applied for assessing protected areas. For clarity and brevity purposes, the 2km buffer and the full list of identified protected sites (including those which are considered coastal water specific) are maintained for all assessments.

1.1.2 Assessment criteria

This assessment needs to evaluate where activities during the construction, operation and decommissioning may influence WFD waterbodies. Evaluation will be made against those quality elements that make up the classification of ecological status. For the freshwater waterbodies that intersect the proposed wind farm , these are shown in Table 1-1 Ecological

Status is defined as alteration from 'natural' conditions; see the official WFD normative definitions in the box below.

Table 1-1: Description of elements for the classification of Ecological Status that are recorded for those waterbodies intersected by the proposed wind farm .

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 river bed* *Structure of the riparian zone*

Source: WFD Directive 2000/60/EC

This assessment is reliant of identifying those effects that are non-temporary i.e., 3years for Biological status, Hydrology and Morphology and 12 months for Chemical status.

To inform this assessment the following datasets owned by the EPA and available online have been used:

- Catchment Data - River Waterbodies GIS
- Catchment Data - Lake Waterbodies GIS
- Surface Water Classification Status and Objectives results for 2016-2021
- Groundwater Classification Status and Objectives results 2016-2021.

2.0 STAGE 2 SCREENING AND SCOPING

On a national stage, the Environmental Protection Agency (EPA, 2022) has published the Water Quality in Ireland Report 2016-2021 which provides the latest assessment of the quality of Ireland's rivers, lakes, estuaries, coastal and groundwaters. Water quality nationally has declined. Water quality at the proposed site has shown an improvement in the last 10 years with the Owenmore 010 and 020 currently at high status.

The proposed wind farm for Oweninny Wind Farm Phase 3 lies on the border of two Water Framework Directive (WFD) catchments. The western side of the windfarm belongs to the Blacksod-Broadhaven Catchment (ID 33) and the eastern side lies within the Moy and Killala Bay Catchment (ID 34).

For this assessment to inform Cycle 3, there are eight waterbodies achieving High Status, 37 achieving Good Status, seven achieving Moderate Status and one achieving Poor Status in the Blacksod-Broadhaven Catchment (ID 33). There are 16 waterbodies achieving High status, 91 achieving Good Status, 23 achieving Moderate Status, 12 achieving Poor Status and there are no Bad Status waterbodies within the Moy and Killala Bay Catchment (ID 34).

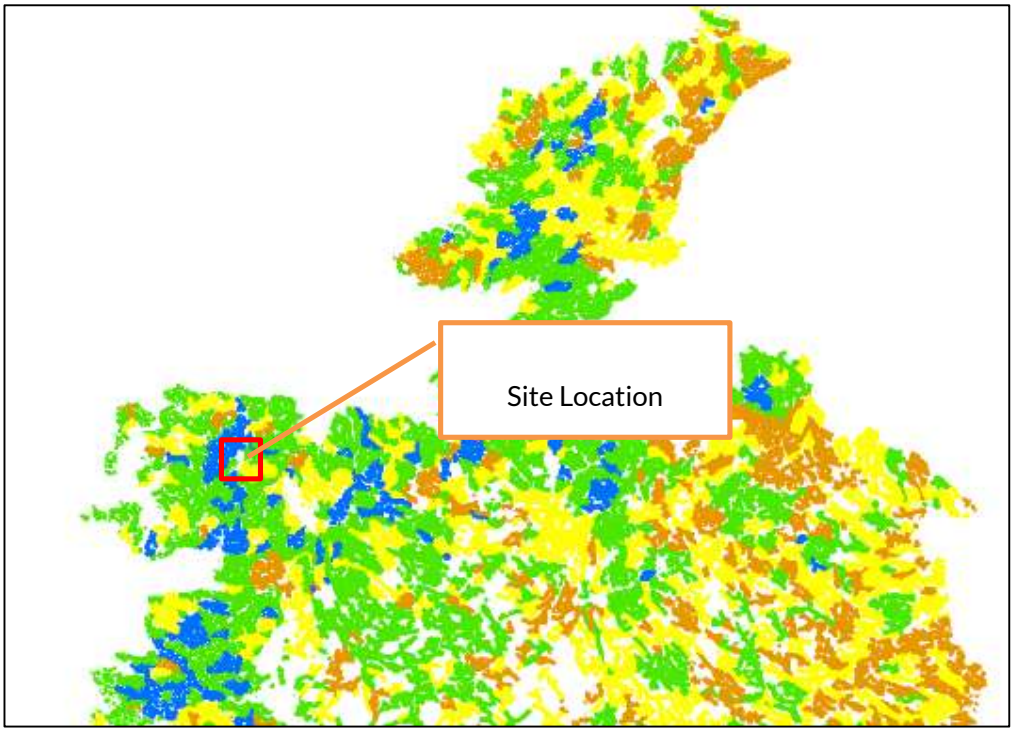

Figure 2-1: National WFD status – 2016 -2021

2.1.1 Surface Water Bodies

The river waterbody types located where the development is proposed are primarily small, sometimes medium sized, and low lying streams which flow to either the Owenmore river, Cloonaghmore or River Deel. There is one lake waterbody (L. Dahybaun) in the vicinity of the proposed wind farm .

More locally, five sub basins are present at the proposed wind farm site. The west of the site lies within the Muing_100, Owenmore_010 and Owenmore_020 and is located in the Blacksod-Broadhaven catchment. The majority of the site lies within the catchment of the

Oweninny/Owenmore River. These are the Cloonaghmore_020 located to the northeast of the site. This SWB is part of the Moy and Killala Bay catchment. The southeast of the site is within the Shanvolahan_010 sub catchment which is a part of the Moy and Killala Bay hydrometric area.

Table 2-1: Water Body Status (https://www.catchment.ie) within 2km of development

Waterbody Code	Name	Current Status 2016-2021	Development within area
IE_WE_33M010100	Muing_100	Good	Yes
IE_WE_33O040050	Owenmore_010	High	Yes
IE_WE_33O040200	Owenmore_020	High	Yes
IE_WE_34C030100	Cloonaghmore_100	Good	Yes
IE_WE_34S010400	Shanvolahan_100	Moderate	Yes
IE_WE_34D010010	DEEL (CROSSMOLINA)_020	High	No
IE_WE_34D010025	DEEL (CROSSMOLINA)_030	Good	No
IE_WE_34C030030	CLOONAGHMORE_010	High	No
IE_WE_33A020100	ALTNABROCKY_010	Good	No

A summary of the catchment is included in Table 2-1. The regional natural surface water drainage pattern, in the environs of the proposed Oweninny Wind Farm Phase 3 development site, is outlined in Figure 2-1. The proposed wind farm site is located mostly within the Oweninny/Owenmore River catchment, located on the eastern part of Oweninny Bog. The naming of the streams varies between the historical maps, OSi maps and the EPA catchment maps.

Table 2-2: WFD Catchment and Subbasin Summary

Bog	Catchment	Hydrometric Area	Sub catchment	River Subbasin	Relevant Rivers /streams	Turbines/Substation/compound in each catchment	WFD status 2016-2021
Oweninny Wind Farm Phase 3	Blacksod and Broadhaven	**HA33**	Owenmore_SC_010	**Owenmore_010**	Oweninny, Sheskin, Fiddaunnamuingeery	T6, cable route, BP1, C1	High
				Owenmore_020	Owenmore	Grid Connection	High
			Owenmore_SC_020	**Muing010**	Owenmore, Muing, Lough Dahybaun	T1-T5, T7, Substation, C2, cable route, BP1	Good
	Moy -Killala	**HA34**	Deel Crossmolina_SC_020	**Shavolahan_010**	Fiddaunagosty, Shanvolahan and Fiddauntooghaun	T12, T13, C3, C4, BP2, PDA2, PDA3, PDA4	Moderate – Area for Action
			Cloonaghmore SC_010	**Cloonaghmore_010**	Shanvodinnaun, Fiddaunfura, Cloonaghmore	T8 to T11, T13 to T18,	Good

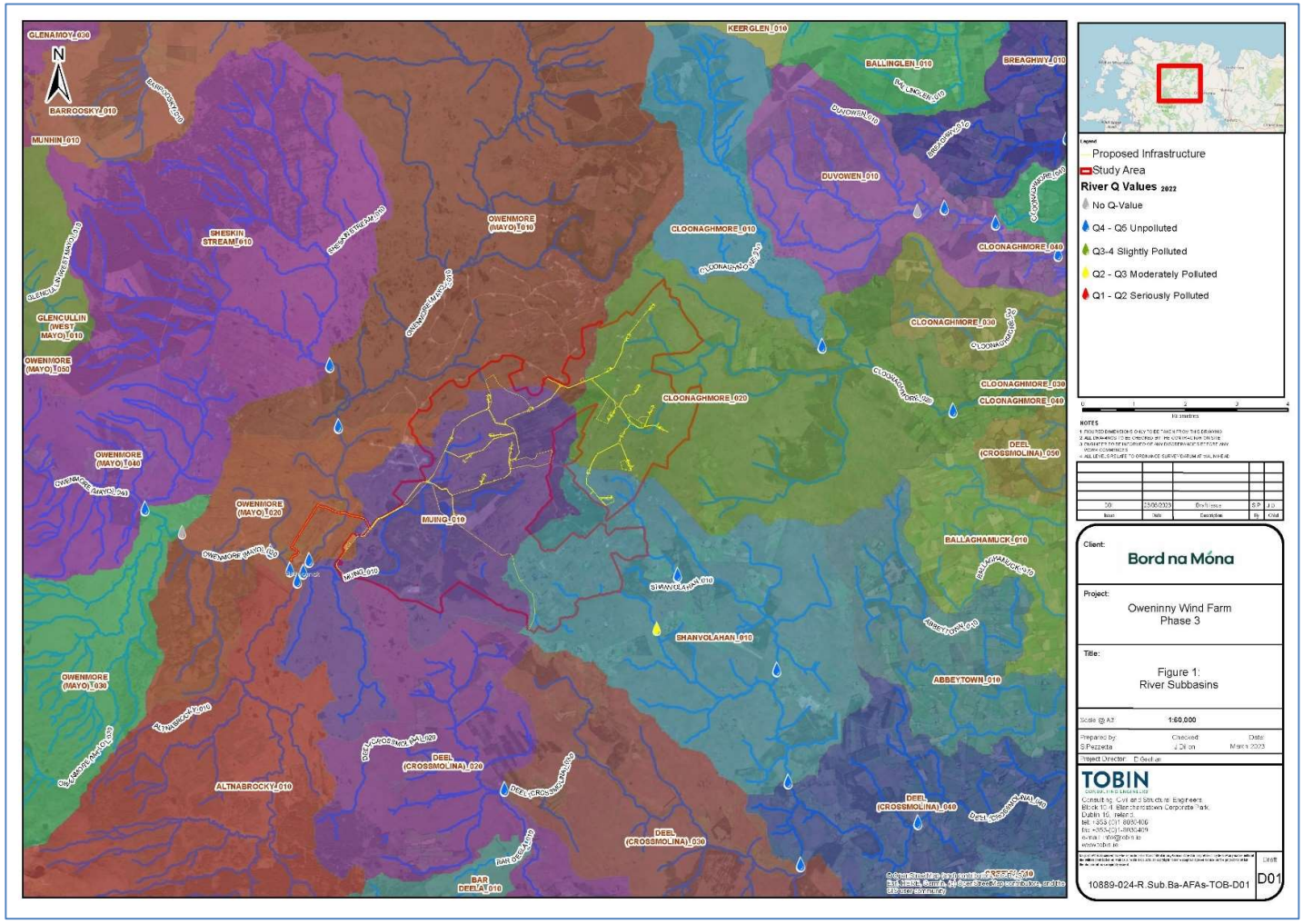

Figure 2-2: WFD Subbasins

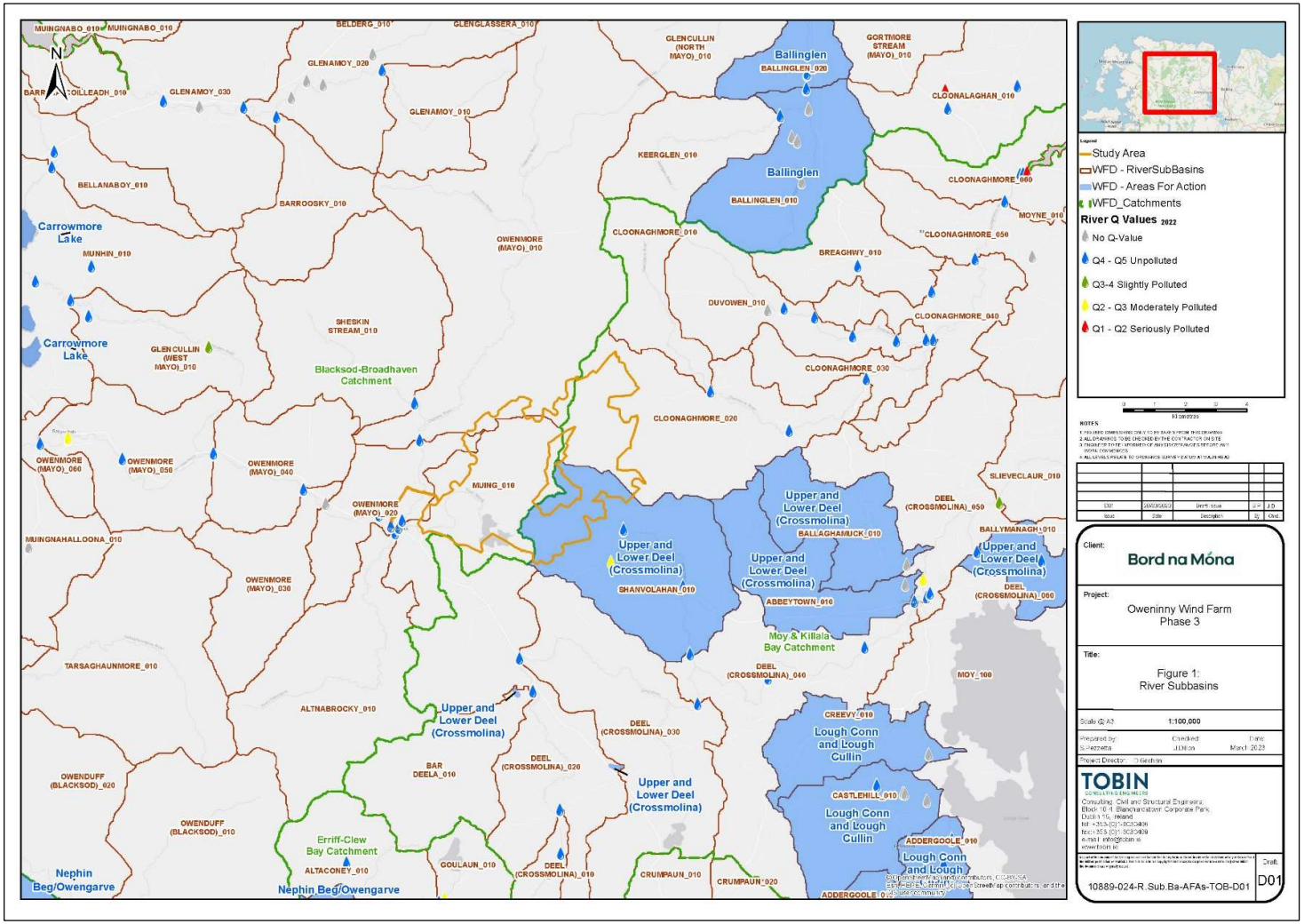

Figure 2-3: WFD catchments and AFAs

The bog then consists of five river basins, which are the Muing010, Owenmore 010 and Owenmore 020 to the northwest and west, the Cloonaghmore to the north east and the Shanvolahan to the southwest. The regional natural surface water drainage pattern, in the environs of Oweninny Bog is shown in Figure 2.1.

2.1.1.1.1 Blacksod and Broadhaven Catchment

The Blacksod-Broadhaven catchment includes the area drained by all streams entering tidal water in Blacksod and Broadhaven Bays draining a total area of 1,302km² (EPA, 2022[1]). Rivers within the catchment includes the Owenmore, Oweninny and Owenduff Rivers. The Owenmore River flows west until it reaches Tullaghan Bay and drains a catchment of approximately 332 km^2. Numerous small rivers and tributary streams (Oweninny, Sheskin, Muing, Fiddaungal, Fiddaunnaglogh, Fiddaunnameenabane, Fiddauncam and the Fiddaunnamuinggeery) flow into the Owenmore River. The Oweninny is joined by the Sheskin Steam which drains the forested upper catchment slopes of Slieve Fyagh before entering the Oweninny River. There are no Nutrient Sensitive Areas in the catchment.

Owenmore_010 Subcatchment

The Owenmore_010 includes the upper reaches of the Owenmore river and includes the Oweninny, Fiddaunnamuinggeery, Sheskin and Sruffaunnamuingabatia Rivers. Oweninny Phase 1 and 2 are located primarily in Owenmore_010. Part of the cable route and Borrow Pit 1 are located in the Oweninny_010 RWB. There are no proposed turbines in Owenmore_010. The Sruffaunnamuingabatia, which drains the Bellacorick Iron Flush SAC is located to the west of the phase 3 wind farm , flows westwards and joins the Oweninny river, 1 km further west.

Owenmore_020 Subcatchment

The Owenmore_020 subcatchment is located downgradient of Owenmore_010 and comprises the main Owenmore river and 1st order streams which discharge to the River. Muing 010 includes the Muing River, Croaghaun West and stream which discharge to Lough Dahybaun.

Downgradient of the Oweninny and Sheskin river confluence, the Owenmore flows southwards, externally to the site and joins the Muing and Altanabrocky River, turning westwards after Bellacorick Bridge and runs paralleling the N59.

The Muing River and the Muingamolt (EPA name - Croaghaun East) tributary rise within the site and flows to Oweninny river at Bellacorick bridge.

Lough Dahybaun, a small lake is located to the upper reaches of the Muing river. Due to the rehabilitation works on the peat extraction site, a large number of additional ponds were created in topographical lows. Water quality in Owenmore 010 and 020 is good as highlighted in Figure 2-4.

[1] www.catchment.ie (assessed Sept 2022)

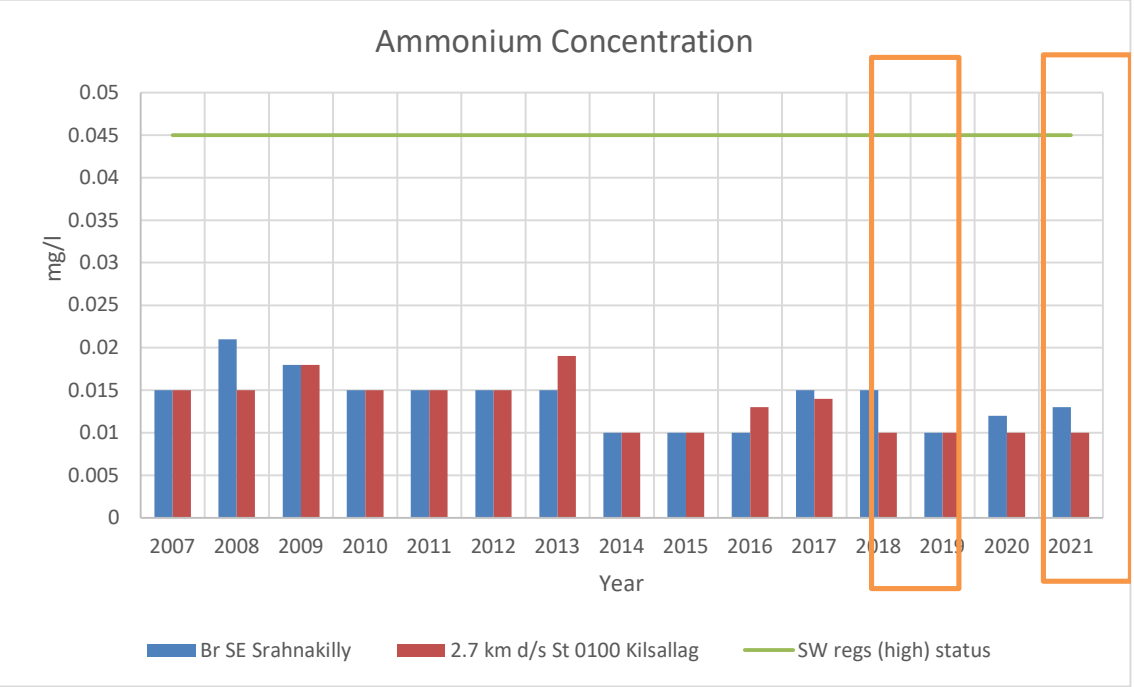

Figure 2-4 WFD monitoring upgradient and downgradient of Oweninny WF

Note Oweninny Phase 1 and 2 construction period highlighted in orange.

2.1.1.1.2 Moy – Killala catchment (HA34)

The Moy-Killala catchment includes the area drained by the River Moy and all streams entering tidal water in Killala Bay between Benwee Head and Lenadoon Point, Co. Sligo, draining a total area of 2,345km². The proposed wind farm is located in the upper reaches of the Cloonaghmore 020 and Shanvolahan010.

Cloonaghmore 020

To the north eastern part of the proposed wind farm the Cloonaghmore River drains a catchment of 132 km^2 before entering the sea at Rathfran Bay to the north of Killala village. The Cloonaghmore subcatchment comprises the Fiddaunfura (EPA name Kilfian South ED), Doobehy River and Shanvodinnaun tributaries flow north eastwards to the Owenmore East (HA34) and Cloonaghmore River. The Cloonaghmore River is also known as the Palmerstown River.

An afforested hill (Furnought Hill) forms the topographical high (and catchment boundary) within the site and represent discrete glacial/post glacial geomorphological features. Turbines T8 to T11, T14 to T18 are located in the catchment of the Cloonaghmore River.

Shanvolahan 010

The south-eastern part of the site drains to Shanvolahan River and its tributaries (Fiddaunagosty and Fiddauntooghaun) before entering the Deel River, 8km to the southeast. The River Deel flows to Lough Conn and eventually discharges the River Moy before entering the sea at Killala Bay. The Moy catchment drains an area of 1,966 km^2;

The south-eastern part of the proposed wind farm drains to tributaries of the Shanvolahan River. T12 and T13 lies within the Shanvolahan010.

The River Deel as a prioritised area for action (AFA) in the Draft River Basin Management Plan (3rd Cycle) and is part of the Moy-Deel Margaritifera Sensitive Area. The Shanvolahan is a tributary of the Deel river which supports an important population of *Margaritifera margaritifera* the Freshwater Pearl Mussel. The population of this protected species was mapped in 2009 by Moorkens and Killeen for the Department of Environment Heritage and Local Government[11] The nearest recorded freshwater pearl mussel population is located some 8 km downstream of the proposed wind farm. Pearl Mussel was absent on the River Shanvolahan in 2009, 2013 and 2021 aquatic surveys. In 2021, all the rivers including the Shanvolahan tributaries draining from the bog have populations of trout and salmon. Crayfish were found on two of the Shanvolahan tributaries indicting the overall good water quality.

Figure 2-2 depicts Surface Water Features/Local Catchment Delineation in relation to site area which includes a significant number of unnamed streams although EPA reference names have been applied for identification purposes. The proposed wind farm is not located in a delineated area for action as set out in the 2018-2021 National River Basin Management Plan.

Each of the streams flowing through or adjacent to the site has its own sub-catchment area. The delineation of these catchment boundaries, see Figure 2-2 and Figure 2-3.

2.1.2 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 waters2. The GWB is defined as a distinct volume of groundwater, including recharge and discharge areas with little flow across the boundaries. The proposed wind farm is underlain by the Belmullet GWB and the Bellacorrick-Killala GWB. The groundwater body descriptions are available from the GSI website3 and the 'status' is obtained from the WFD website4 and the EPA website5. The GWBs underlying the site are classified as being at 'Good' status as shown on **Error! Reference source not found.**. The Belmullet and Bellacorrick-Killala GWB is comprised of low transmissivity and storativity rocks, described as Poorly Productive bedrock as detailed in Table 2-3.

Table 2-3: Summary of groundwater bodies

EU_CD Code	Name	Description	GWB status (2016-2021)
IE_WE_G_0057	Belmullet	Poorly productive bedrock	Good
IE_WE_G_0041	Bellacorick-Killala	Poorly productive bedrock	Good

The groundwater is used for agriculture and is not a significant pressure (across the basin) from diffuse pollution. The groundwater in the proposed wind farm is assessed as being of Good quantitative and chemical status. This is expected to continue. The bedrock aquifer is at least 10 m below the surface along the proposed wind farm .

2.1.3 Lake water Bodies

Lough Dahybaun, a small lake is located to the upper reaches of the Muing river. There are no RPA nutrient sensitive lakes and estuaries in hydrological/hydrogeological connection with the proposed wind farm and there are no RPA shellfish/pearl mussel areas within the proposed wind farm.

Table 2-4: Summary of Lake Status (https://www.catchment.ie)

Waterbody Code	Name	Current Status 2016-2021
IE_WE_33_1912	Dahybaun	High

2.1.4 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 of the Scoping Report (RWE, 2014).

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

[2] https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx
[3] www.gsi.ie
[4] www.wfdireland.ie
[5] 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 looked at as part of the assessment (as mentioned above, in line with guidance a 2km 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 2km of the proposed wind farm;
- There are no bathing water sites within 2km of the proposed wind farm ;
- There are no nutrient sensitive sites within 2km of the proposed wind farm; and
- There are a number of SPAs or SACs within 2km of the proposed wind farm.

2.2.2 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 Natura2000 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).

Designated sites	Distance from proposed wind farm
Lough Dahybaun SAC [002177]	0km (the European site overlaps the proposed wind farm site , however only proposed infrastructure is the amenity track
Bellacorick Bog Complex SAC [001922]	0km (the European site runs alongside the north-eastern boundary of the proposed wind farm. However, the nearest proposed infrastructure will be located 225m south of the European site).
Bellacorick Iron Flush SAC [000466]	Ca. 400m north of the proposed wind farm site
River Moy SAC [002298]	Ca. 2.5km south of the proposed wind farm site
Owenduff/Nephin Complex SAC [000534]	Ca. 3.8km south west of the proposed wind farm site
Carrowmore Lake Complex SAC [000476]	Ca. 4.5km west of the proposed wind farm site
Bellacorick Bog Complex pNHA [001922]	0km (the designated site runs alongside the proposed site However, the nearest proposed infrastructure will be located 225m south of the European site)
Knockmoyle, Sheskin Nature Reserve	Ca. 700m northwest of the proposed wind farm site
Owenboy, Nature Reserve	Ca. 2km south of the proposed wind farm site
Knockmoyle/Sheskin RAMSAR Site (Code: 372)	Ca. 700m north of the proposed wind farm site
Owenboy RAMSAR Site (Code: 371)	Ca. 2km south of the proposed wind farm site

There is no pathway to the Bellacorrick Bog SAC. Only construction phase impacts have been identified as being possible in Chapter 11 (Water) in Volume 2 of this EIAR; these are mitigated through specific measures set out in Chapter 11 (Water) in Volume 2 of this EIAR, and in the

Surface Water Management Plan (SWMP), contained within the Construction Environmental Management Plan (CEMP) in Appendix 3.1 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 identified 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 its vicinity. The assessment is informed by relevant literature, experience from Oweninny Phase 1 and 2 and made using expert judgement. The confidence in the assessment is therefore medium-high (for definitions, see Glossary).

2.2.3 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	Lake Water Body	Muing_100	Owenmore_010 and 020	Cloonaghmore_100	Shanvolahan_100
Consider if your activity could impact on the hydromorphology (morphology or water flow of a water body at high status?	No. No changes to lake	No. RWB is not at High Status	RWB at high status – no alteration to river, cable in bridge	RWB at high status – no alteration to river, cable in bridge	No. RWB is not at 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.

3.0 STAGE 3: COMPLIANCE ASSESSMENT

The proposed wind farm has been assessed for its potential to impact each of the WFD quality elements, and as a result have the potential to impact upon the status of the water body or its ability to achieve its objectives in relation to those elements or impact upon Protected Areas.

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 11 (Water) in so far as the three main phases of the proposed wind farm 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 Development has the potential to affect the water quality and hydromorphology of streams at the Proposed Development

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) (Chapter 3 Appendix 3.1) and Surface Water Management Plan (SWMP) (Chapter 11, Appendix 11.3) will be implemented. Impacts in this section are thus the residual impacts identified in Chapter 8 (Biodiversity) and Chapter 11 (Water) for each quality element of each WFD water body. The measures incorporated into the CEMP and SWMP are embedded mitigation.

3.1.1 Biological Quality Elements

Potential impacts on biological quality elements are assessed in Chapter 8 (Biodiversity) of the EIAR. A summary is provided here and includes the likely residual effects following implementation of mitigation and control measures.

The clear span watercourse crossing techniques to be used for the construction of the Proposed development are not anticipated to have any significant direct impact on habitats within the affected WFD water bodies.

In addition, sediment entering water bodies during construction could impair visibility making it difficult for fish to forage or risk physiological damage to their gills, although this would be short-

term until dilution or flushing has taken place. Through the implementation of specific mitigation for clear span 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 if this leads to scouring of river banks which could also 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 and ensuring discharge rates 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 is set out in Chapter 11, and the use of location specific measures as detailed in Appendix 3.1 CEMP, 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 quality 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 may cause 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.

Chemical and Physico-chemical Quality Elements

Potential impacts on water quality are assessed in Chapter 11 (Water) 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.

3.1.2 Hydromophological Quality elements

Potential impacts on hydromorphology are assessed in Chapter 11 (Water) 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 clean span bridges are used for the construction of the proposed wind farm are not anticipated to have any direct impact on hydromorphology of the water bodies. Through implementation of the mitigation set out in any indirect risk to the hydromorphology of the water bodies will be minimal.

3.1.3 Protected Areas

Potential impacts on Protected Areas are assessed in Chapter 8 (Biodiversity) of the EIAR.

None of the habitats on site are Annex I habitats. As there are no rare or legally protected plant species present on the proposed wind farm no mitigation measures are required and no residual impacts are predicted. Thus, the proposed wind farm would not result in likely significant negative residual effects, at the local geographic scale.

Following implementation of mitigation measures outlined in Appendix 3.1 (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 8 (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 wind farm .

3.2.2 Chemical and Physico-chemical Quality Elements

Potential impacts on water quality are assessed in Chapter 11 (Water) 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 to a licenced Wastewater Treatment Plant (WwTP). No impacts on water bodies are considered likely.

The impact has been classed as imperceptible differences in water quality concentrations and within the normal bounds of variation of laboratory analysis results from coincident physical samples. No material changes were identified during the construction of Phase 1 and Phase 2 Oweninny developments and the operation of Phase 1 since 2019.

The negligible impacts predicted for 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 11 (Water) 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 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.

3.2.5 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 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: habitats	No	The footprint of the proposed wind farm is contained primarily within the cutover bog. There are no significant direct or indirect impacts on SACs/SPAs or Annex Habitats. There are no designated sites altered by the proposed wind farm .
Biology: fish	No	The risks to the receptor during construction and operation, is from increased sediment to adjacent streams. No instream works are proposed as part of the proposed wind farm. Surface water drainage flow and volume will not increase as a result of the proposed wind farm. In addition, a CEMP will be implemented. The construction of Phase 1 and Phase 2 has not altered the good fish status of the surrounding streams.
Water quality	Yes	Short term, the proposed wind farm will not increase sediment and nutrients. Mitigation measures are detailed in the CEMP and SWMP.
Protected areas	*No*	The proposed wind farm is adjacent to the SACs and SPAs. No other protected areas are within the study area of this assessment. A CEMP and SWMP will be implemented as part of the proposed wind farm. No construction works will occur in SACs/SPAs. The operation of the proposed wind farm will not significantly change the current level of surface water or groundwater volume or flow.

3.3 Assessment of Proposed Wind Farm 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 can contribute to them or might obstruct any of them from being delivered. One water body Shanavolahan_010 was identified within the RBMP Areas for Action. No peat harvesting has occurred at the proposed development since 2003. No peat harvesting will occur on the rehabilitated site.

4.0 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 Appendix 3.1 (CEMP) will ensure 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 Appendix 3.1 (CEMP), Annex B (SWMP), any indirect risk to the hydromorphology of the water bodies will be minimal.

The exposure of peat/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 Appendix 3.1 (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 Appendix 3.1 (CEMP), there will be no detrimental effects on hydromorphological quality elements associated with the construction of the site compound and site preparation activities.

Through implementation of the mitigation set out in Appendix 3.1 (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 site, 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 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 are intersected. There are three previous phases of windfarm development on the site and the experience gained indicates the proposed development will not prevent the achievement of good status at the site or the maintenance of high status in the Owenmore.

Table 4-1: Mitigation Measures matrix

	Turbines	Substation and compounds	PDAs	Access tracks	Amenity track	Borrow Pits	Grid
Utilise existing bridges and access roads				✓	✓		✓
>50m Buffer	✓	✓	✓		✓		
Interceptor drains	✓	✓	✓	✓	✓	✓	
Check Dams or similar	✓	✓	✓	✓	✓	✓	✓
Swales				✓	✓	✓	
Sediment traps			✓				
Level spreaders			✓	✓			
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 GES or cause a deterioration of the overall GEP of any of the water bodies that are in scope.

Table 4-2: Compliance of the proposed wind farm 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 deterioration of surface water ecological status or potential.	After consideration as part of the detailed compliance assessment, the proposed wind farm will not cause deterioration in the status of the water bodies during construction following the implementation of mitigation measures; during operation, no significant impacts are predicted. (high confidence)	Yes
No changes which will permanently prevent or compromise the Environmental	The proposed wind farm will not cause a permanent exclusion or compromise achieving the WFD objectives in any other bodies of	Yes

Environmental Objective	Proposed wind farm	Compliance with the WFD Directive
Objectives being met in other water bodies.	water within the River Basin District. (high confidence)	
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 the 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 wind farm will not compromise the achievement of the objectives of the WFD for any water body in the study area. In addition, the proposed wind farm has been assessed for the potential for cumulative impacts with other proposed wind farms within 1km 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 Oweninny Bog and/or developments with the potential to interface with the bog in terms of environmental effects. Key developments in the area include:

- Sheskin Wind Farm – Phase 1 and Phase 2;
- Doonleg Wind Turbine;
- Oweninny Wind Farm; and
- Green Hydrogen Plant (Planning Phase).

With the implementation of the mitigation measures it is concluded that in combination with other proposed wind farms the proposed wind farm will not compromise the achievement of the objectives of the WFD for any water body. Therefore, the proposed wind farm 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 wind farm. It concludes that the proposed wind farm will not lead to a deterioration in the features of any designated site. The proposed wind farm 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 2km of the proposed wind farm .

5.0 CONCLUSIONS

Taking into consideration the impacts of the proposed wind farm 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 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 wind farm is fully compliant with WFD and therefore does not require assessment under Article 4.7 of the WFD.

6.0 REFERENCES

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.

7.0 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.

Appendix A

WFD normative definitions

The WFD provides normative definitions of ecological quality for the purposes of classification of overall ecological status. In surface waterbodies, these are as follows:

High status

There are no, or only very minor, anthropogenic alterations to the values of the physico-chemical and hydromorphological quality elements for the surface waterbody type from those normally associated with that type under undisturbed conditions.

The values of the biological quality elements for the surface waterbody reflect those normally associated with that type under undisturbed conditions, and show no, or only very minor, evidence of distortion.

These are type-specific conditions and communities.

Good status

The values of the biological quality elements for the surface waterbody show low levels of distortion resulting from human activity but deviate only slightly from those normally associated with the surface waterbody type under undisturbed conditions.

Moderate status

The values of the biological quality elements for the surface waterbody type deviate moderately from those normally associated with the surface waterbody type under undisturbed conditions. The values show moderate signs of distortion resulting from human activity and are significantly more disturbed than under conditions of good status.

Poor status

Waters show evidence of major alterations to the values of the biological quality elements for the surface waterbody type and the relevant biological communities deviate from those normally associated with the surface waterbody type under undisturbed conditions.

Bad status

Waters show evidence of severe alterations to the values of the biological quality elements for the surface waterbody type and large portions of the relevant biological communities normally associated with the surface waterbody type under undisturbed conditions are absent.