APPENDIX 7-4

Water Framework Directive Compliance Assessment Report

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SUBSTITUTE CONSENT FOR DEVIATIONS AT MEENBOG WINDFARM, CO. DONEGAL

WATER FRAMEWORK DIRECTIVE ASSESSMENT

FINAL REPORT

Prepared for:

MKO

Prepared by:

HYDRO-ENVIRONMENTAL SERVICES

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1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) were requested by MKO, on behalf of Planree Ltd, to complete a Water Framework Directive (WFD) Compliance Assessment for the substitute consent for deviations at Meenbog Windfarm, Co. Donegal.

As described in Section 1.4.1 of the rEIAR, this FRA uses the following terminology: the 'Site', the 'Permitted Development', the 'Subject Development' and the 'Meenbog Windfarm'.

The purpose of this WFD assessment is to determine if any specific components or activities associated with the Subject Development. The assessment will also determine if the deviations have resulted in a deterioration of the status of any receiving waterbodies.

This assessment will determine the waterbodies which had the potential to be impacted by the Subject Development, will describe the mitigation measures which were implemented during the construction phase and will determine if the activities have been compliant with the objectives of the WFD.

This WFD Assessment is intended to supplement the rEIAR submitted as part of the substitute consent for the deviations at Meenbog Windfarm.

1.2 STATEMENT OF AUTHORITY

Hydro-Environmental Services (HES) are a specialist geological, hydrological, hydrogeological and environmental practice that delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford. We routinely complete impact assessments for hydrology and hydrogeology for a large variety of project types including wind farms.

This WFD assessment was prepared by Michael Gill, Conor McGettigan and John Twomey.

Michael Gill (P. Geo., B.A.I., MSc, Dip. Geol., MIEI) is an Environmental Engineer with over 22 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of wind farms in Ireland. He has also managed EIAR assessments for infrastructure projects and private residential and commercial developments. In addition, he has substantial experience in wastewater engineering and site suitability assessments, contaminated land investigation and assessment, wetland hydrology/hydrogeology, water resource assessments, surface water drainage design and SUDs design, and surface water/groundwater interactions. For example, Michael has worked on the EIS/EIARs for over 100 wind farm related projects across the country including the EIAR for Meenbog Windfarm.

Conor McGettigan (BSc, MSc) is an Environmental Scientist with 3 years' experience in environmental consultancy in Ireland. Conor holds an M.Sc. in Applied Environmental Science (2020) and a B.Sc. in Geology (2016) from University College Dublin. Conor has prepared the Land, Soils and Geology and Hydrology and Hydrogeology Chapters for numerous wind farm EIAR projects. Conor routinely completes WFD Assessments for a wide variety of projects including wind farms, quarries and proposed residential developments.

John Twomey (BSc) is a recent graduate of Earth and Ocean Science from UG and is in the process of training to become an Environmental Scientist. He has recently helped in the completion of hydrogeological and hydrological impact assessments on quarries, windfarms and industrial developments.

1.3 WATER FRAMEWORK DIRECTIVE

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

The WFD requires that all member states protect and improve water quality in all waters, with the aim of achieving good status by 2027 at the latest. Any new development must ensure that this fundamental requirement of the WFD is not compromised.

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.

The River Basin Management Plan objectives, which have been integrated into the design of the Meenbog Windfarm development, including the Subject Development, include:

- Ensure full compliance with relevant EU legislation;
- Prevent deterioration and maintain a 'high' status where it already exists;
- Protect, enhance and restore all waters with aim to achieve at least good status by 2027;
- Ensure waters in protected areas meet requirements; and,
- Implement targeted actions and pilot schemes in focused sub-catchments aimed at (1) targeting water bodies close to meeting their objectives and (2) addressing more complex issues that will build knowledge for the third cycle.

Ireland is currently in the latter stages of preparing the next River Basin Management Plan (RBMP) for Ireland. As of March 2024, the Draft River Basin Management Plan (2022-2027) has not been published while the draft plan is available to view at https://www.gov.ie/en/consultation/2bda0-public-consultation-on-the-draft-river-basin-management-plan-for-ireland-2022-2027/.

Our understanding of these objectives is that water bodies, regardless of whether they have 'Poor' or 'High' status, should be treated the same in terms of the level of protection and mitigation measures employed.

2. WATERBODY IDENTIFICATION & CLASSIFICATION

2.1 INTRODUCTION

This section identifies those Surface Waterbodies (SWBs) and Ground Waterbodies (GWBs) with potential have been affected by the Subject Development and reviews any available WFD information.

2.2 SURFACE WATERBODY IDENTIFICATION

The vast majority of the Site is located in the Foyle River surface water catchment within Hydrometric Area 1. This river basin district is an international river basin district with ~3% of this district located in Northern Ireland. Meanwhile, a small area in the northwest is mapped in the Donegal Bay North regional surface water catchment, with Hydrometric Area 37 of the North Western River Basin District.

Within the Foyle River catchment, the Site is located in the Mourne Beg River sub-catchment (MourneBeg_SC_010). The Mourne Beg River , a tributary of the Mourne River, flows to the southeast from Lough Mourne, situated ~2km northeast of the existing wind farm site entrance. The Mourne Beg River (Mourne Beg_010 SWB)flows to the east, ~150m north of the Site boundary before it crosses into Northern Ireland. Further downstream, the Mourne Beg River (Mourne Beg (Lisnacloone) SWB) discharges into the River Derg (River Derg (Millbrook) SWB), ~15km to the east. The River Derg continues to flow to the east. The Mourne River is formed at the meeting of the River Derg and the River Strule, ~27km east of the Site. The Mourne River then flows to the north, through the town of Strabane. Downstream of Strabane, it confluences with the Finn River to form the River Foyle.

In terms of WFD river sub-basins, the Site is located in a total of 5 no. WFD river sub-basins within the Mourne Beg River sub-catchment.

- The northwest and northeast of the Site are located in the Mourne Beg_010 river sub-basin. In total 2 no. deviations are mapped within this river sub-basin. The northwest of the Site is drained by Mary Breen's Burn Stream which flows to the northeast and discharges into the Mourne Beg River, ~1.8km to the northeast of the Site. A tributary of this watercourse is mapped to originate ~25m west of deviation 2. Meanwhile, the Mourne Beg River flows ~100m north of the northeastern section of the Site which includes deviation 21.

- The vast majority of the Site, including 17 no. deviations, is located in the Bunadaowen_010 river sub-basin. This area is drained by the Bunadaowen River and several of its tributaries. There is a high density of mapped watercourses in this area.

- A small area in the northeast of the Site, including 2 no. deviations (deviations 22 and 23), is mapped in the Mourne Beg River (Derrygoonan) river sub-basin. In this area the Shruangarve Stream flows to the northeast, ~130m northwest of deviation 22, before it discharges into the Mourne Beg River.

- The southeast of the Site, including 3 no. deviations (deviations 8, 9 and 10), is located in the Glendergan River sub-basin. A tributary of the Glendergan River flows to the south ~50m from deviation 9. The Glendergan River itself forms the southeastern boundary of the Site. This watercourse discharges into the River Derg ~3.7km to the southeast.

Within the Donegal Bay North surface water the Site, including deviation 1, is mapped in the Eske sub-catchment (Eske_SC_010). Within this area, a tributary of the Lowerymore River flows to the southwest ~200m west of deviation 1. The Lowerymore River flows to the southwest, through Barnesmore Gap, before discharging into Lough Eske ~8.7km to the southwest.

Figure A below presents a local hydrology map of the area and identifies the receiving waterbodies.

Table A presents the total upstream catchment area of each river waterbody downstream of the Site. The Bunadaowen_010 basin has the smallest upstream catchment area at 10.1km^2. The total upstream catchment area increases significantly downstream reaching 208.7km^2 within the Derg River (Millbrook) basin (upstream of the confluence between the Derg and the Mourne Beg Rivers).

Therefore, those waterbodies which are located in close proximity to the Site will have been more susceptible to water quality effects as a result of activities associated with the Subject Development. The potential for the Subject Development to impact the waterbodies decreased further downstream due to the increasing catchment area to the surface waterbody and resulting increase in flow volumes.

Table A: Downstream Catchment Size for River Waterbodies

WFD River Sub-Basin	Total Upstream Catchment Area (km^2)
Bunadaowen_010	10.6
Mournebeg_010	28.9
Mourne Beg River (Derrygoonan)	97.9
Mourne Beg River (Lisnacloone)	112.2
Derg River (Millbrook)	208.7
Lowerymore_020	22.84
Lowerymore_030	31.58
Eske_010	89.53
Glendergan River	37.1

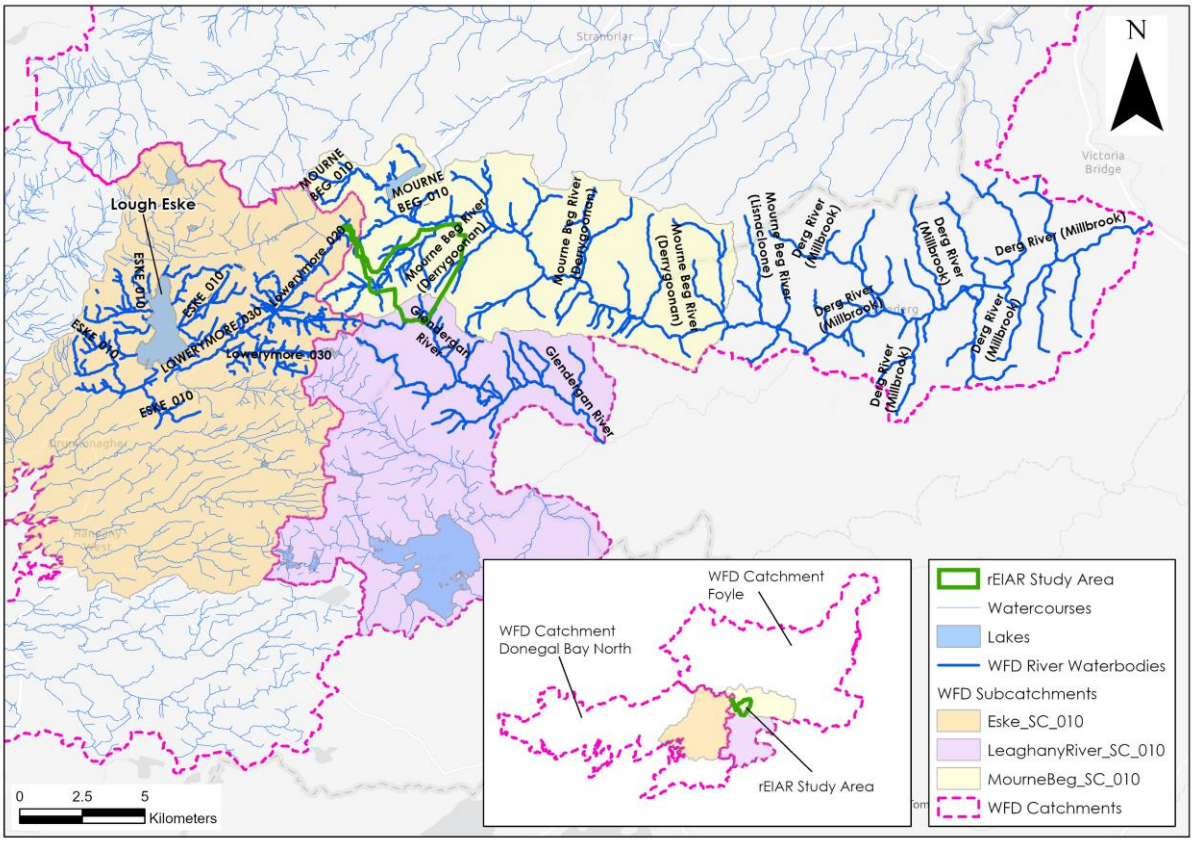

Figure A: Local Hydrology Map

2.3 SURFACE WATER BODY CLASSIFICATION

A summary of the WFD status and risk result for SWBs downstream of the Site are shown in **Table B**. The overall status of SWBs is based on the ecological, chemical and quantitative status of each SWB.

Local Groundwater Body (GWB) and Surface water Body (SWB) status information is available from (www.catchments.ie).

Within the Foyle surface water catchment, the Mourne Beg_010 SWB in the vicinity of the Site achieved 'Poor' status in all 3 no. WFD cycles (2010-2015, 2013-2018 and 2016-2021). Meanwhile, the status of the Bunadaowen_010 SWB improved from 'Poor' to 'Moderate' status in the latest WFD cycle (2016-2021). The east of the Site is drained by the Mourne Beg River (Derrygoonan) SWB which achieved 'Moderate' status in the last 2 no. WFD cycles. The status of the Glendergan River has deteriorated from 'Moderate' to 'Poor' in the latest WFD cycle. Downstream of the Site the Mourne Beg River (Lisnacloone) and the Derg River (Milbrook) SWBs are of 'Moderate' status.

The majority of the waterbodies in the vicinity and downstream of the Site within the Foyle catchment have been deemed to be 'at risk' of failing to meet their respective WFD objectives.

The 3rd Cycle Draft Foyle Catchment Report (EPA, 2021) states that the significant pressure affecting the greatest number of waterbodies in this catchment is agriculture. The significant pressures impacting the SWBs in the vicinity and downstream of the Site are as follows:

- Agriculture is only listed as a significant pressure on the Derg River (Milford).
- Forestry is a significant pressure on the Mourne Beg_010, Bunadaowen_010 and Mourne Beg River (Derrygoonan) SWBs in the vicinity of the Site. The catchment report states that the significant issues are arising primarily as a result from clear-felling and associated operations, which results in nutrient loads, acidification and sediment loads.
- Abstraction for the Lough Mourne Public Water Supply was identified as a significant pressure on the Mourne Beg_010 with habitat alternation due to hydrological changes identified as the issue.
- Peat drainage and peat extraction (i.e. extractive industry) have been identified as a significant pressure on the Mourne Beg River (Derrygoonan) and the Derg River (Milbrook).
- Unknown anthropogenic pressures are also listed to be impacted several SWBs including the Mourne Beg River (Derrygoonan) and Mourne Beg (Lisnacloone) SWBs.

Within the Donegal Bay North surface water catchment, the Lowerymore_020 and _030 SWBs in the vicinity and downstream of the Site achieved 'High' status in the latest 2 no. WFD cycles. Further downstream, the Eske_010 river waterbody and the Eske lake waterbody are of 'Good' status. With regard to risk status, the status of the Eske lake waterbody is currently under review while the Lowerymore River is 'not at risk'. No significant pressures have been identified on these SWBs.

The SWB status for the 2016-2021 WFD cycle are shown on **Figure B.**

Table B: Summary WFD Information for Surface Water Bodies

SWB	Overall Status (2010-2015)	Overall Status (2013-2018)	Overall Status (2016-2021)	Risk Status	Pressures
Bunadaowen_010	Poor	Poor	Moderate	At risk	Forestry
Mourne Beg River (Derrygoonan)	Unassigned	Moderate	Moderate	At risk	Forestry, Peat & Other
Glendergan River	Unassigned	Moderate	Poor	Review	None
Mourne Beg_010	Poor	Poor	Poor	At risk	Forestry & Other
Mourne Beg (Lisnacloone)	Unassigned	Moderate	Moderate	At risk	Other
Derg River (Millbrook)	Unassigned	Moderate	Moderate	At risk	Agriculture, Peat & Other
Lowerymore_020	High	High	High	Not at risk	None
Lowerymore_030	Good	High	High	Not at risk	None
Eske_010	Moderate	Good	Good	Not at risk	None
Lough Eske	Moderate	Good	Good	Review	None

2.4 GROUNDWATER BODY IDENTIFICATION

The Site is underlain by Precambrian Quartzites, Gneisses and Schists (PQGSs). The bedrock aquifer within these formations is deemed by the GSI to be a Poor Aquifer – Bedrock which is generally unproductive except in local zones (www.gsi.ie).

In terms of Groundwater Bodies (GWBs), the vast majority of the Site, including the Subject Development, is underlain by the Castlederg GWB. Meanwhile, a small area in the west of the Site, including deviation 1, is underlain by the Donegal south GWB. Both GWBs are characterised by poorly productive bedrock.

2.5 GROUNDWATER BODY CLASSIFICATION

The Castlederg and Donegal South GWBs, which underlie the Site, achieved 'Good' status in all 3 no. WFD cycles (2010-2015, 2013-2018 and 2016-2021) which is defined based on the quantitative status and chemical status of the GWB. These GWBs have been deemed to be 'not at risk' of failing to meet their respective WFD objectives. Furthermore, no significant pressures have been identified on these GWBs.

The GWB status for the 2016-2021 WFD cycles are shown on **Figure B**.

Table C: Summary WFD Information for Groundwater Bodies

GWB	Overall Status (2010-2015)	Overall Status (2013-2018)	Overall Status (2016-2021)	Risk Status	Pressures
Castlederg	Good	Good	Good	Not at risk	None
Donegal South	Good	Good	Good	Not at risk	None

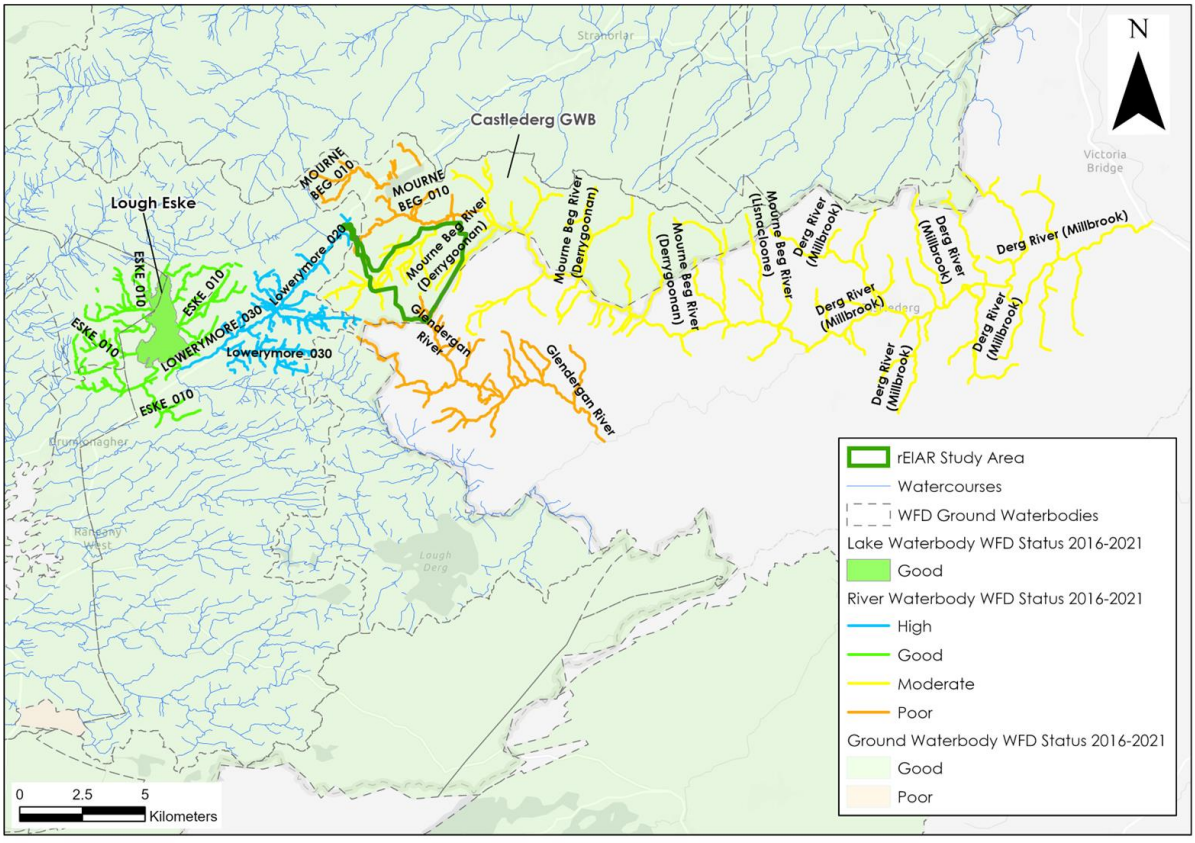

Figure B: WFD Groundwater and Surface Waterbody Status (2016-2021)

2.6 PROTECTED AREA IDENTIFICATION

The WFD requires that activities are also in compliance with other relevant legislation, as considered below. Nature conservation designations, bathing waters, Nutrient Sensitive Areas (NSA's), shellfish protected areas and Drinking Water Protected Area's (DWPA) within the vicinity of the Site are considered as part of the assessment.

2.6.1 Nature Conservation Designations

Within the Republic of Ireland designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPAs).

Ramsar sites are wetlands of international importance designated under the Ramsar Convention (adopted in 1971 and came into force in 1975), providing a framework for the conservation and wise use of wetlands and their resources.

The designated sites in close proximity and downstream of the Site are detailed below:

- Croaghonagh Bog SAC/pNHA (Site Code: 000129) is located immediately to the east of deviation 1. This area of the Site is located in the catchment of the Lowerymore River. The SAC/pNHA is located upstream of this deviation, therefore limiting the potential for effects to occur. However, the SAC/pNHA are predominantly located in the catchment of Mary Breen's Burn Stream and is therefore hydrologically connected to deviation 2 and the Subject Development.

- Cashelnavean Bog NHA (Site Code: 000122) is located ~200m west of deviation 1 and within the catchment of the Lowerymore River. However, no direct hydrological connections exist between the deviation area and this NHA. The Lowerymore River acts as a hydrological barrier between the designated site and the deviation area.

- Barnesmore Bog NHA (Site Code: 002375) is located ~400m west of the Site. This NHA is located upstream of the Subject Development. Therefore, there is no potential hydrological and hydrogeological connectivity.

- Lough Eske and Ardnamona Wood SAC/pNHA (Site Code: 000163) are located ~5km southwest of the Site. The Lowerymore River provides a direct hydrological connection between the Site and this SAC. Deviation 1 is located in the catchment of the Lowerymore River.

- The River Finn SAC (Site Code: 002301) is located downstream of the Subject Development along the Mourne Beg River. 24 of the 25 no. deviations are hydrologically connected with this SAC. Therefore, the Subject Development is hydrologically connected with this SAC.

2.6.2 Bathing Waters

Bathing waters are those designated under the Bathing Water Directive (76/160/EEC) or the later revised Bathing Water Directive (2006/7/EC).

There are no bathing waters immediately downstream of the Site.

2.6.3 Nutrient Sensitive Areas

Nutrient Sensitive Areas (NSA) 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). Sensitive areas under the UWWTD are water bodies affected by eutrophication associated with elevated

nitrate concentrations and act as an indication that action is required to prevent further pollution caused by nutrients.

There are no Nutrient Sensitive Areas in the vicinity or downstream of the Site.

2.6.4 Shellfish Waters

The Shellfish Waters Directive (2006/113/EC) aims to protect or improve shellfish waters in order to support shellfish life and growth.

There are no Shellfish Protected Waters within the vicinity of the Site. The closest designated shellfish area is in Donegal Bay.

2.6.5 Drinking Water

The closest mapped drinking water protected area (DWPA) to the Site is the Lough Mourne (Mourne DL) is an Article 7 Abstraction for Drinking Water. This lies upstream of the Site and is within the Mournebeg_010 basin. However, Uisce Éireann abstract water from the Bunadaowen River within the Site and pump it to Lough Mourne Reservoir, ~1.7km to the north. This abstraction is currently not mapped on the online WFD database (www.catchments.ie).

In the Donegal Bay North Catchment, the Eske_020 SWB upstream of Donegal Town and downstream of Lough Eske is listed as a DWPA.

3. WFD SCREENING

As discussed in **Section 2**, there several river water bodies that are located in the vicinity or downstream of the Site. There is also 1 no. lake body downstream of the Site. The Site is also underlain by 2 no. GWBs.

3.1 SURFACE WATER BODIES

As shown in **Figure A** above, there are 3 no. SWBs located in the vicinity and downstream of the Site downstream as far as and including Lough Eske in the Donegal Bay North Catchment. Meanwhile, there are a total of 7 no. SWBs located downstream of the Site in the Foyle Catchment as far as the Mourne River.

With consideration for the construction activities associated with the Subject Development, it is considered that the Mourne Beg_010, Bunadaowen_010, Mourne Beg River (Derrygoonan), Glendergan River and Lowerymore_020 SWBs are carried through into the WFD Assessment due to the location of Subject Development within these respective WFD river sub-basins. Furthermore, the Mourne Beg River (Lisnacloone) and the Lowerymore_030 SWBs will be included in the assessment due to their location directly downstream of the Mourne Beg River (Derrygoonan) and the Lowerymore_020 SWBs respectively. The Subject Development must not in any way have resulted in a deterioration in the status of these SWBS and/or prevented them from meeting the biological and chemical characteristics for good status in the future.

The Derg River (Milbrook) and Eske_010 SWBs have been screened out of the impact assessment due to the increasing flow volumes in these SWBs and their distant location from the Site. The Derg River (Milbrook) SWB is located downstream of the confluence between the Mourne Beg and Derg Rivers. This increase in flow volumes would provide a significant dilution effect. Similarly, the Eske_010 SWB is distant from the Site and encompasses all watercourse flowing into Lough Eske. The construction activities had no potential, and will have no potential, to cause a deterioration in the status of these screened out SWBs and/or jeopardise their attainment of good surface water status in the future.

Additionally, the Lough Eske lake waterbody has been screened out due to the large volumes of water within this waterbody and its distant location from the Site. The construction activities had no potential, and will have no potential, to cause a deterioration in the status of these screened out SWBs and/or jeopardise their attainment of good surface water status in the future.

3.2 GROUNDWATER BODIES

With respect to GWBs, the Castlederg and Donegal South GWBs have been screened in due to their location directly underlying the Site and the Subject Development. The Subject Development must not in any way have resulted in a deterioration in the status of these SWBS and/or prevented them from meeting the biological and chemical characteristics for good status in the future.

3.3 PROTECTED AREAS

The River Finn SAC (002031) is located along the Mourne Beg River and is hydrologically connected with the Site. With consideration for the construction activities associated with the Subject Development, it is considered that the River Finn SAC is carried through into the WFD Impact Assessment.

The Lough Eske and Ardnamona Wood SAC (000163) is located along the Lowerymore River and is hydrologically connected with the Site. With consideration for the construction

activities associated with the Subject Development, it is considered that the Lough Eske and Ardnamona SAC is carried through into the WFD Impact Assessment.

The Croaghonagh Bog SAC (000129) is located in the immediate vicinity of the Site and is hydrologically connected with deviation 2. With consideration for the construction activities associated with the Subject Development, it is considered that the Croaghonagh Bog SAC is carried through into the WFD Impact Assessment.

Cashelnavean Bog NHA (Site Code: 000122) is located ~200m west of deviation 1 and within the catchment of the Lowerymore River. However, no direct hydrological connections exist between the deviation area and this NHA. The Lowerymore River acts as a hydrological barrier between the designated site and the deviation area. Therefore, no hydrological or hydrogeological impacts will occur on this designated site as a result of the Subject Development.

Barnesmore Bog NHA (Site Code: 002375) is located ~400m west of the Site. This NHA is located upstream of the Subject Development and all deviation areas. Therefore, there is no potential hydrological and hydrogeological connectivity. Therefore, no hydrological or hydrogeological impacts will occur on this designated site as a result of the Subject Development.

Lough Mourne DWPA is an Article 7 Abstraction for Drinking Water and is partly sourced from the Bunadaowen River. With consideration for the construction activities associated with the Subject Development, it is considered that the Lough Mourne DWPA is carried through into the WFD Impact Assessment.

3.4 WFD SCREENING SUMMARY

A summary of WFD Screening discussed above is shown in **Table D**.

Table D: Screening of WFD water bodies located within the study area

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
Surface Water Body	River	Mourne Beg_010	**Yes**	A total of 2 no. deviations are located in the Mourne Beg_010 river sub-basin. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this SWB. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this SWB.
	River	Bunadaowen_010	**Yes**	A total of 17 no. deviations are located in the Bunadaowen_010 river sub-basin. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this SWB. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this SWB.
	River	Mourne Beg River (Derrygoonan)	**Yes**	A total of 2 no. deviations are located in the Mourne Beg (Derrygoonan) river sub-basin. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this SWB. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this SWB.
	River	Glendergan River	**Yes**	A total of 3 no. deviations are located in the Glendergan River sub-basin. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this SWB. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this SWB.
	River	Mourne Beg (Lisnacloone)	**Yes**	The Mourne Beg (Lisnacloone) is located directly downstream of the Mourne Beg River (Derrygoonan) SWB_010. Therefore, an assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this SWB. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this SWB.
	River	Derg River (Millbrook)	No	The Derg River (Millbrook) is located downstream of the confluence of the Mourne Beg and Derg Rivers. Due to the large flow volumes in this SWB, and its distant location from the Site, it will not be included into the WFD Impact Assessment as the potential for effects associated with the Subject Development are negligible.
	River	Lowerymore_020	**Yes**	1 no. deviation is located in the Lowerymore_020 river sub-basin. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this SWB. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this SWB.
	River	Lowerymore_030	**Yes**	The Lowerymore_030 SWB is located directly downstream of the Lowerymore_020 SWB and is hydrologically connected to the Site. Due to its proximal location to the Site, an assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this SWB. Similarly, an assessment is

				required to consider the potential effects of the operational and decommissioning phases on this SWB.
	River	Eske_010	No	The Eske_010 is located downstream of the Lowerymore_030 and is distant form the Site. The Eske_010 SWB includes all watercourse draining into Lough Eske. This SWB will not be included into the WFD Impact Assessment as the potential for effects associated with the Subject Development are negligible.
	Lake	Lough Eske	No	Lough Eske will not be brought through to the WFD Impact Assessment as there is no potential for SWB quality deterioration due to the large amount of water within this lake body which enables the dilution of possible contaminants.
Groundwater Body	Groundwater	Castlederg GWB	**Yes**	24 of the 25 no. deviations are underlain by the Castlederg GWB. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this GWB. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this GWB.
	Groundwater	Donegal South GWB	**Yes**	1 no. deviation is underlain by the Donegal South GWB. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this GWB. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this GWB.
Protected Areas	SAC	River Finn SAC	**Yes**	The River Finn SAC lies downstream of the Site along the Mourne Beg River within the Mourne Beg (Derrygoonan) sub-basin. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this SAC. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this SAC.
	SAC	Lough Eske and Ardnamona Wood SAC	**Yes**	The Lough Eske and Ardnamona Wood SAC is located downstream of the Site along the Lowerymore River within the Lowerymore_030 river sub-basin. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this SAC. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this SAC.
	SAC	Croaghonagh Bog SAC	**Yes**	A small section to the west within the Site is located within the Croaghonagh Bog SAC. This SAC is hydrologically connection to 1 no. deviation location. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this SAC. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this SAC.
	Drinking Water	Lough Mourne	**Yes**	While Lough Mourne Reservoir is located upstream of the Site, the reservoir is partly sourced from the Bunadaowen River. An assessment is required to consider the potential effects that the construction activities associated with the Subject Development have had on this DWPA. Similarly, an assessment is required to consider the potential effects of the operational and decommissioning phases on this DWPA.

4. WFD COMPLIANCE ASSESSMENT

4.1 SUBJECT DEVELOPEMNT DESCRIPTION

The Site comprises coniferous forestry, areas of open bog and the partially constructed Meenbog Windfarm.

The construction of Meenbog Windfarm began in November 2019. Currently ~90% of the groundworks for the construction of the Wind Farm have been completed. The works were suspended in November 2020 following the occurrence of a peat slide within the Site.

The Subject Development is described in full in Chapter 3 of the rEIAR.

The Subject Development comprises of 25 no. deviations from the windfarm permitted under ABP-300460-17 (amended by ABP-303729-19). The Subject Development relates to wind farm roads and hardstand areas, peat storage and containment measures, borrow pits, environmental and water quality mitigation measures, and ancillary works. The Subject Development is located in the townlands of Meenbog and Croaghnoagh, near the twin towns of Ballybofey and Stranolar, Co. Donegal. The Subject Development has a total development footprint of 8.8ha.

Due to the nature of Subject Development, comprising of near surface construction activities, combined with the local hydrogeological regime (low permeability peat soils overlying a Poor Bedrock Aquifer), effects on groundwater quality and quantity were generally negligible. The primary risks to groundwater would have been from hydrocarbon spillages and leakages. These risks are common potential effects at all construction sites (such as road works and industrial sites) and were assessed in the original EIAR. All potential contamination sources were carefully managed at the Site during the construction phase and mitigation measures were implemented to deal with these effects.

4.2 EFFECTS

4.2.1 Construction Phase

4.2.1.1 Surface Water Quality/Quantity Effects

The EIAR for the Permitted Development prescribed detailed mitigation measures relating to earthworks, and the release of suspended solids in surface waters, for the protection of surface water quality.

Whilst the location, alignment and size of components of the Subject Development differ from the Permitted Development plans , these infrastructure elements were constructed as per the methodology and guidelines prescribed in the EIAR for the Permitted Development and detailed in the CEMP.

Earthworks

Prior to the onset of construction works, drainage management systems were inserted in accordance with the EIAR and the CEMP. The on-site drainage system was designed to ensure that all surface water runoff is treated (water quality control) and attenuated (water quantity control) prior to release.

Construction of the site drainage system was only carried out during periods of low rainfall, therefore, minimising runoff rates. This reduced the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period also ensure that attenuation features associated

with the drainage system were in place and operational for all subsequent construction works.

The drainage system as summarised below ensured the protection of downstream surface water quality and quantity:

- Interceptor drains were installed up-gradient of all Subject Development work areas to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. This water is directed to areas where it can be re-distributed over the ground by means of a level spreader;

- Swales/road side drains are used to collect runoff from access roads and turbine hardstanding areas of the Site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling;

- On steep sections of access road transverse drains ('grips') were constructed where appropriate in the surface layer of the road to divert any runoff off the road into swales/road side drains;

- Check dams have been inserted along sections of access road drains to intercept silts at source;

- Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and,

- Settlement ponds will be designed in consideration of the greenfield runoff rate.

Detailed mitigation measures were also prescribed in the CEMP in relation to felling activities to ensure that there was no adverse effect on water quality. These mitigation measures are best practice measures, derived from the relevant guidance, and are reproduced below:

- Machine combinations were chosen which were most suitable for the ground conditions at the time of felling and to minimise soils disturbance;

- Use of buffer zones for aquatic zones as per the Forest service (2000) guidance;

- Roads and culverts were checked and maintained during felling operations;

- No tracking of vehicles through watercourses occurred;

- Where possible, existing drains were not disturbed during felling works;

- Ditches which drain from the felling area towards existing surface watercourses were blocked, and temporary silt traps were constructed. No direct discharge of such ditches to watercourses occurred during felling. Drains and sediment traps were installed during ground preparation works. Collector drains were excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains from collector drains included water drops and rock armour, as required, where there were steep gradients, and were not placed at right angles to the contour;

- Sediment traps were sited outside of buffer zones and had no direct outflow into the aquatic zone. Machine access was maintained to enable the accumulated sediment to be excavated. Sediment was carefully disposed of away from all aquatic zones. Where possible, all new silt traps were constructed on even ground and not on sloping ground;

- In areas, particularly sensitive to erosion, it was necessary to install double or triple sediment traps. This measure was reviewed on site during construction works;

- All drainage channels tapered out before entering the aquatic buffer zone. This ensured that discharged water gently fanned out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps were installed at the end of the drainage channels, to the outside of the buffer zone;

- Drains and silt traps were maintained throughout all felling works, ensuring that they were clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth ensured that erosion and sediment build-up were minimised and controlled;

- Brash mats were used to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding could occur. Brash mat renewal took place when they became heavily used and worn. Provision was made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there was a risk of severe erosion occurring, extraction was suspended during periods of high rainfall;

- Timber was stacked in dry areas, and outside a local 50m stream buffer zone. Straw bales and check dams were emplaced on the down gradient side of timber storage/processing sites;

- Works were carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water run-off;

- Refuelling or maintenance of machinery was not permitted within 50m of an aquatic zone. Dedicated refuelling areas were used during the felling works; and,

- Branches, logs or debris were not allowed to build up in aquatic zones. All such material was removed when harvesting operations were completed, but care was taken to avoid removing natural debris deflectors.

Monitoring

An inspection and maintenance plan for the on-site drainage system was prepared in advance of commencement of any works. Regular inspections of all installed drainage systems were undertaken, especially after heavy rainfall, to check for blockages, and ensure there was no build-up of standing water in parts of the systems where it is not intended. Inspections were also completed after tree felling. The inspections were completed by the ECoW and Project Hydrologist.

Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, was removed.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs was undertaken for each primary watercourse, and specifically following heavy rainfall events (i.e. weekly, monthly and event based).

The detailed surface water quality monitoring plan for the construction phase was set out in the CEMP.

Hydrocarbons

Furthermore, proven and effective measures in relation to the use and storage of hydrocarbons were implemented during the construction phase. These were the same as

those detailed in the EIAR and CEMP for the Permitted Development and are reproduced below:

- All plant was inspected and certified to ensured that they were leak free and in good working order prior to use.

- On site re-fuelling of machinery was carried out using a mobile double skinned fuel bowser: The fuel bowser, a double-axel custom-built refuelling trailer was re-filled off site and was towed around the site by a 4x4 jeep to where machinery was located. The 4x4 jeep carried fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser was parked on a level area in the construction compound when not in use and only designated trained and competent operatives were authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats were used during all refuelling operations;

- Onsite refuelling was carried out by trained personnel only;

- A permit to fuel system was put in place;

- Fuels stored on site were minimised. Fuel storage areas were bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;

- The plant used during construction was regularly inspected for leaks and fitness for purpose; and,

- An emergency plan for the construction phase to deal with accidental spillages was included within the Construction and Environmental Management Plan (Appendix 4-3). Spill kits were available to deal with and accidental spillage in and outside the re-fuelling area. However no spills were recorded during the construction of the Subject Development.

Wastewater

- The mitigation measures implemented to avoid release of wastewater at the Site were as follows:

- A self-contained port-a-loo with an integrated waste holding tank was used for welfare facilities, maintained by the providing contractor;

- Water supply for the site office and other sanitation was brought to site and removed after use from the site to be discharged at a suitable off-site treatment location ; and,

- No water was sourced on the site or discharged on the site.

Assessment of Effects on SWBs

Surface water quality monitoring has been completed throughout the construction phase in watercourses downstream of the Site. The results of this monitoring are detailed in Section 9.3.7 of the rEIAR and are summarised below:

- No pollution events were recorded during felling operations.

- Monthly water quality monitoring shows that there has been no deterioration in water quality in comparison to the baseline conditions.

- No significant increase in suspended solids were recorded in downstream SWBs.

- Biological Monitoring indicates that, based on biological indicators, there has been no deterioration in water quality during the construction phase in comparison to baseline conditions in most downstream locations. The exception is the Shruhanagarve Stream which forms part of the Mourne Beg River (Derrygoonan) SWB. This SWB achieved Bad ecological status in 2020. This was attributed to a peat slide which was caused by the construction of a permitted road. The ecological status of this SWB has since recovered and was recorded as having 'Good' ecological status in 2023.

- No spills of hydrocarbons were recorded during the construction of the Subject Development.

- No release of cement-based products were recorded during the construction of the Subject Development.

- No pollution incidents in relation to wastewater were recorded during the construction of the Subject Development.

Based on the above, we consider that the status of the SWBs post-construction was comparable to the baseline conditions. The implementation of the mitigation measures detailed in the EIAR and the CEMP ensured that the construction activities associated with the Subject Development have not negatively impacted water quality in downstream receptors.

A summary of the status change to SWBs arising from the construction activities associated with the Subject Development are detailed in **Table E**.

Table E: Surface Water Status Effects During the Construction Phase

SWB	Status 2013-2021	Current Status (2016-2021)	Assessed Potential Status Change
Mournebeg_010	Poor	Poor	Poor
Bunadaowen_010	Poor	Moderate	Moderate
Mourne Beg River (Derrygoonan)	Moderate	Moderate	Moderate
Mourne Beg River (Lisnacloone)	Moderate	Moderate	Moderate
Glendergan River	Moderate	Poor	Poor
Lowerymore_020	High	High	High
Lowerymore_030	High	High	High

4.2.1.2 Groundwater Quantity/Quality Effects

All construction phase activities associated with the Subject Development were completed in accordance with the mitigation measures for groundwater quality protection detailed in the EIAR and the CEMP.

Proven and effective measures in relation to the use and storage of hydrocarbons, the release of cement-based products and wastewater were implemented during the construction phase. These were the same as those detailed in the EIAR and CEMP for the Permitted Development.

Potential effects on groundwater quantity would not be anticipated due to the local hydrogeological regime (Poor Bedrock Aquifer) and the location of the borrow pit

excavations (excavation on the side of a hill at elevations between 200 and 300mOD). No significant groundwater dewatering occurred at the borrow pit locations. The main inflows were from direct rainfall and surface water runoff. Dewatering of the borrow pits was achieved through the intermittent use of a single, diesel pump which indicates very low levels of groundwater incursion.

Relevant environmental management guidelines from the EPA quarry 2006 guidance document – "Environmental Management in the Extractive Industry" in relation to groundwater issues were implemented during the construction phase.

Assessment of Effects on GWBs

The potential for the Subject Development to effect the overall status of the underlying GWBs is negligible given the scale of these GWBs in comparison to the footprint of the Subject Development. No change in quantitative status has occurred due to the lack of any significant dewatering associated with the Subject Development and the nature of the bedrock aquifer. No change in the qualitative status occurred as no spills of hydrocarbons, cement-based products or release of wastewater occurred at the Site.

Based on the above, we consider that the status of the GWBs post-construction is the same as the baseline conditions. The implementation of the mitigation measures detailed in the EIAR and the CEMP ensured that the construction activities associated with the Subject Development have not negatively impacted groundwater quality.

A summary of the status change to GWBs arising from the construction activities associated with the Subject Development are detailed in **Table F**.

Table F: Ground Water Status Effects During the Construction Phase

SWB	Status 2013-2021	Current Status (2016-2021)	Assessed Potential Status Change
Castlederg	Good	Good	Good
Donegal South	Good	Good	Good

4.2.1.3 Effects on Protected Areas

All construction phase activities associated with the Subject Development were completed in accordance with the mitigation measures for surface water quality protection detailed in the EIAR and the CEMP. Mitigation measures were implemented in relation to the entrainment of suspended solids, hydrocarbons, cement-based products and wastewater.

The implementation of these mitigation measures broke the pathway between the source and the downstream receptors (River Finn SAC, Lough Eske and Ardnamona Wood SAC, Croaghonagh Bog SAC and the Lough Mourne drinking water supplies).

Assessment of Effects:

No significant increase in suspended solids entrainment was recorded in downstream surface watercourses. No significant increase in suspended solids entrainment was recorded in local surface watercourses during the construction of the Subject Development. Monthly water quality sampling indicates that there has been no deterioration in water quality from the pre-construction condition. EPA monitoring data indicates that, based on biological factors, that there has been no deterioration in water quality.

Therefore, the Subject Development did not result in any deterioration in water quality within downstream designated sites.

4.3 POTENTIAL EFFECTS

4.3.1 Operational Phase

The effects of the operation phase of the Subject Development are significantly reduced in comparison with the construction phase.

The potential effects relate to:

- An increase in surface water runoff volumes associated with the Subject Development hardstand area in comparison with the pre-construction condition. However, the Subject Development footprint of 8.8ha equates to 1% of the total Site area. Calculations have shown that assuming a worst case scenario, where the Subject Development footprint has a runoff coefficient of 100%, the Subject Development results in an increase of 0.25% in the average daily/monthly runoff volume for the Site in comparison to the baseline runoff conditions. Furthermore, the drainage system associated with the Subject Development provides attenuation and has been designed to slow runoff from developed areas. Therefore, the Subject Development will not have had a significant effect on surface water quantity.

- Some minor maintenance works may be completed, such as maintenance of site entrances, internal roads and hardstand areas. These works would be of a very minor scale and would be very infrequent. Potential sources of sediment laden water would only arise from surface water runoff from small areas where new material is added during maintenance works.

Due to the nature of the operational phase, with no earthworks and only minor maintenance works, there will be no effects on local SWB or GWB status.

4.3.2 Decommissioning Phase

Given the nature of the Subject Development it will have no bearing on the decommissioning phase of the Meenbog Windfarm. The Subject Development will not alter the decommissioning plan for the Meenbog Windfarm and it is likely that the components of the Subject Development would remain in situ in the event of decommissioning of the Meenbog Windfarm.

An outline decommissioning plan is contained in the CEMP in Appendix 3.2. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will agree with the competent authority at that time.

As noted in the Scottish Natural Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the Proposed Wind Farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:

"best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm".

No significant effects on the hydrological and hydrogeological environment will occur during the decommissioning phase.

5. CONCLUSIONS

WFD status for SWBs (Surface Water Bodies) and GWBs (Groundwater Bodies) hydraulically linked to the Site are defined in **Section 2** above.

The construction activities associated with the Subject Development, in the absence of mitigation measures, would have had the potential to impact on the status of downstream SWBs and the underlying GWB. However, all construction activities were completed in accordance with the methodologies detailed in the EIAR and CEMP. Furthermore, the mitigation measures for the protection of surface and groundwater were implemented as per the EIAR and CEMP.

There has been no change in GWB or SWB status in the underlying GWB or downstream SWBs resulting from the construction phase of the Subject Development. The mitigation measures have ensured that there was no change in quantitative (volume) or qualitative (chemical) status, of the underlying GWBs, and downstream SWBs and downstream protected areas have been protected from any potential deterioration.

As such, the construction phase extraction activities:

- Have not caused a deterioration in the status of all surface and groundwater bodies assessed;
- Have not jeopardised the objectives to achieve 'Good' surface water/groundwater status;
- Have not jeopardised the attainment of 'Good' surface water/groundwater chemical status;
- Have not jeopardised the attainment of 'Good' surface water/groundwater quantity status;
- Have not permanently excluded or compromised the achievement of the objectives of the WFD in other waterbodies within the same river basin district;
- Have been compliant with the requirements of the Water Framework Directive (2000/60/EC); and,
- Have been consistent with other Community Environmental Legislation including the EIA Directive (2014/52/EU), the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC) (Note that a full list of legislation complied with in relation to hydrology and hydrogeology is included in Section 7.1.4 of the rEIAR Chapter 7).

Furthermore the operational and decommissioning phases of the Subject Development will be completed in accordance with EIAR and will not impact the status of any waterbody. In addition there will be no potential effects on any downstream protected areas as a result of the operational and decommissioning phases.

As such, the operational and decommissioning phases:

- will not cause a deterioration in the status of all surface and groundwater bodies assessed;
- will not jeopardise the objectives to achieve 'Good' surface water/groundwater status;
- does not jeopardise the attainment of 'Good' surface water/groundwater chemical status;
- does not jeopardise the attainment of 'Good' surface water/groundwater quantity status;
- does not permanently exclude or compromise the achievement of the objectives of the WFD in other waterbodies within the same river basin district;
- is compliant with the requirements of the Water Framework Directive (2000/60/EC); and,

- is consistent with other Community Environmental Legislation including the EIA Directive (2014/52/EU), the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC) (Note that a full list of legislation complied with in relation to hydrology and hydrogeology is included in Section 7.1.4 of rEIAR Chapter 7).

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