White Hill Wind Farm Electricity Substation & Electricity Line

Environmental Impact Assessment Report

Annex 7.3: Water Framework Directive Assessment

White Hill Wind Limited

Galetech Energy Services
Clondargan, Stradone, Co. Cavan Ireland
Telephone +353 (0)49 555 5050
www.galetechenergyservices.com

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co.Waterford
Ireland

tel: +353 (0)58 44122
fax: +353 (0)58 44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

WATER FRAMEWORK DIRECTIVE COMPLIANCE ASSESSMENT

WHITE HILL WIND FARM ELECTRICITY SUBSTATION AND ELECTRICITY LINE

FINAL REPORT

Prepared for:

WHITE HILL WIND LTD

Prepared by:

HYDRO-ENVIRONMENTAL SERVICES

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Author:	**MICHAEL GILL DAVID BRODERICK NITESH DALAL**
Signed:	 **Michael Gill B.A., B.A.I., M.Sc., MIEI Managing Director – Hydro-Environmental Services**

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1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) was requested by Galetech Energy Services (GES), on behalf of White Hill Wind Limited to complete a Water Framework Directive (WFD) Compliance Assessment for the White Hill Wind Farm Electricity Substation & Electricity Line ('the project').

The purpose of this WFD assessment is to determine if any specific components or activities associated with the project will compromise WFD objectives or cause a deterioration in the status of any surface water or groundwater body and/or jeopardise the attainment of good surface water or groundwater status.

This assessment will determine the water bodies with the potential to be impacted, describe the proposed mitigation measures and determine if the project is in compliance with the objectives of the WFD.

This WFD Assessment is intended to supplement the Water chapter of the EIAR for the project.

1.2 STATEMENT OF AUTHORITY

Hydro-Environmental Services (HES) are a specialist 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 and grid connections.

This WFD assessment was prepared by Michael Gill, David Broderick and Nitesh Dalal.

Michael Gill (P. Geo., B.A.I., MSc, Dip. Geol., MIEI) is an Environmental Engineer with over 18 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 project s 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 Slievecallan WF, Cahermurphy (Phase I & II) WF, Carrownagowan WF, and Croagh WF and over 100 other wind farm related project s across the country.

David Broderick P.Geo (BSc, H.Dip Env Eng, MSc) is a hydrogeologist with over 17 years' experience in both the public and private sectors. David has a strong background in groundwater resource assessment and hydrogeological/hydrological investigations in relation to developments such as quarries and wind farms. David has completed numerous geology and water sections for input into Environmental Impact Assessment Reports/Environmental Impact Statements (EIAR/EIS) for a range of commercial developments. For example, David has worked on the EIS/EIAR for Oweninny WF, Cloncreen WF, Pinewoods WF, Arderroo WF and Yellow River WF, and over 80 other wind farm related project s across the country.

Nitesh Dalal (B.Tech, PG Dip., MSc) is an Environmental Scientist Intern with over 7 years' experience in environmental consultancy and environmental management in India. Nitesh is pursuing an M.Sc. in Environmental Science (2024) and holds a PG Diploma in Health, Safety and Environment from Annamalai University, India (2021) and B.Tech. in Environmental Engineering (2016) from Guru Gobind Singh Indraprastha University, India (2016).

Ciara Rodahan is a Junior Environmental Scientist. Ciara holds a BSc in Environmental Science from UCC. Ciara is currently in the process of completing an MSc in Applied Environmental Geoscience.

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 WFDs 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 (2022 - 2027)/Water Action Plan 2024 objectives, which have been integrated into the design of the project, 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.

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 Groundwater Bodies (GWBs) with potential to be affected by the project and reviews any available WFD information.

2.2 SURFACE WATERBODY IDENTIFICATION

On a regional scale, the electricity substation, electrical control unit and electricity line are located entirely within the River Barrow surface water catchment within Hydrometric Area 14. The River Barrow flows approximately 3.5km to the east of the electricity substation site.

On a more local scale, the substation is located in the Barrow_SC_120 sub-catchment and within the Moanmore_010 river waterbody sub-basin (Moanmore Stream catchment).

The electrical control unit is also mapped within the Barrow_SC_120 sub–catchment, whilst being situated more locally in the Monefelim_010 river sub-basin (Monefelim River catchment).

The majority of the electricity line is also located in the Barrow_SC_120 sub–catchment with the exception of 1.3km which is located in the Barrow_SC_110 sub-catchment and more locally within the Old Leighlin Stream_010 river waterbody sub-basin (Old Leighlin Stream catchment).

In all, the electricity line passes through 4 no. sub-basins; the Monefelim_010 (c. 1.4km), Monefelim_030/Paulstown Stream (c. 2.1km), Old Leighlin Stream_010 (c. 1.3km) and Moanmore_010 (c. 4.0km).

Figure A below presents the waterbody sub-basins downstream of the project. The catchment area for the waterbodies increases progressively downstream. Therefore, those waterbodies which are located in close proximity to the project site are more susceptible to water quality impacts as a result of activities associated with the project.

The potential for the project to impact a waterbody decreases further downstream due to the increasing catchment area to the surface waterbody and resulting increase in flow volumes. This is discussed further below.

Figure A below illustrates the water receiving environment downstream of the project.

Table A: Catchment Area of River Waterbodies Downstream of Project

WFD River Sub-Basin	Total Upstream Catchment Area (km²)
Barrow_SC_110 Sub-catchment	
Old Leighlin Stream_010	8.0
Old Leighlin Stream_020	20.24
Barrow_190	2397
Barrow_SC_120 sub-catchment	
Monefelim_010	7.85
Monefelim_020	15.77
Monefelim_030	55.48
Moanmore_010	12.01
Barrow_200	2,406
Barrow_210	2,523
Barrow_SC_130 - Barrow_SC_150	
Barrow_220	2,616
Barrow_230	2,750
Barrow_240	2,809

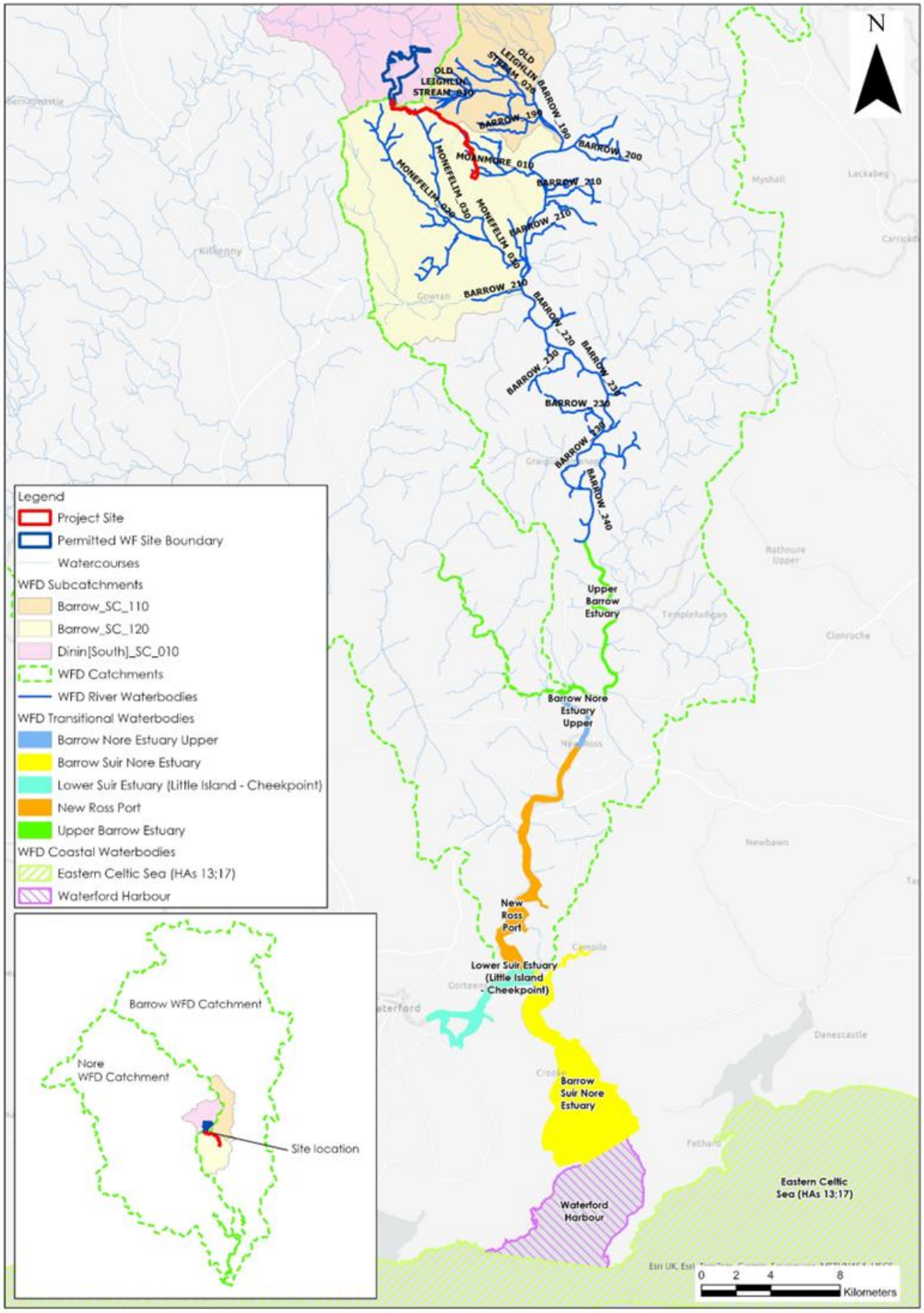

Figure A: Hydrology Map

2.3 SURFACE WATER BODY CLASSIFICATION

A summary of the WFD status and risk result for SWBs downstream of the project is shown in **Table B**. The overall status 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).

As described in **Section 2.2** above, the project is mapped within the Barrow Catchment (HA:14) and 2 no. sub catchments: the Barrow_SC_120 and the Barrow_SC_110.

The Monefelim_010 SWB, achieved 'High' status in the latest WFD cycle, which is an improvement from the 'Good' status achieved in the 1st and 2nd WFD Cycles. The Monefelim_010 SWB is 'not at risk' of failing to meet its WFD objectives. The Monefelim_010 flows into the Monefelim_020 SWB, which achieved 'Good' status in the 3rd WFD Cycle and is currently 'Under review'.

The Monefelim_030 SWB achieved 'Moderate' status in the 3rd WFD Cycle and is 'at risk' of failing to meet its WFD Objectives. The EPA have identified Agriculture and domestic waste water as significant pressures acting on this SWB. The Monefelim_030 continues to flow southeast for ~11.3km, where it discharges into the River Barrow (Barrow_210). Within the Moanmore_010 river sub-basin, the project is drained by ta number of unnamed tributaries of the Moanmore_010 SWB. The Moanmore_010 achieved 'Good' status in the latest WFD Cycle, which is an improvement from the 'Moderate' status achieved in the 2nd WFD Cycle. The Moanmore_010 risk status is currently 'under review'.

The Old Leighlin Stream_010 is 'not at risk' of failing to meet its WFD objectives. The Old Leighlin Stream_010 flows into the Old Leighlin Stream_020, which achieved a 'Moderate' status in the latest WFD cycle. The Old Leighlin Stream_020 is 'at risk' of failing to meet its WFD objectives. The EPA have identified Agriculture as a significant pressure on this SWB. The Old Leighlin Stream_020 SWB discharges into the River Barow (Barrow_190) approximately 5.6km downstream of the project (as the crow flies).

The Barrow_190 achieved a 'Moderate' status in the latest WFD Cycle, and its risk status is currently 'Under review'. The Barrow_190 flows into the Barrow_200, which has been assigned 'Moderate' status, which is a decline from the 'Good' status achieved in both the 1st and 2nd WFD Cycles. The Barrow_200 is 'At risk' of failing to meet its WFD objectives in the future. The EPA have identified agriculture, urban run-off, and urban wastewater as the significant pressures acting on this SWB. Further downstream the Barrow_200 merges with the Barrow_210, which achieved a 'Poor' status in all 3 WFD cycles and is 'at risk' of failing to meet its WFD objectives. The significant pressures acting on this SWB are agriculture, aquaculture, hydromorphology, and urban runoff.

The Barrow_210 flows into the Barrow_220, which achieved a 'Moderate Status, and is 'at risk' of failing to meet its WFD objectives. The significant pressure impacting this SWB is agriculture. The Barrow_220 merges with the Barrow_230, which achieved 'Poor' status in all 3 no. WFD Cycles. This SWB is 'at risk' of failing to meet its WFD objectives, with Anthropogenic and Hydromorphology identified as the significant pressures acting on this SWB. The Barrow_230 merges with the Barrow_240, which has achieved a 'Moderate' status, and its risk status is currently 'Under review'. The Barrow_240 SWB discharges into the Upper Barrow Estuary ~21.9km southeast of the project (as the crow flies) and achieved a 'Moderate' status in the 3rd WFD cycle. This is a decrease from the 'Good' Status achieved in the previous 2 no. WFD cycles (2010-2015, and 2013-2018). This transitional SWB is 'at risk' of failing to meet its WFD objectives, with agriculture being identified as the significant pressure impacting this SWB. The Upper Barrow Estuary discharges into New Ross Port, which achieved a 'Moderate' status across all 3 no. WFD cycles and is 'at risk' of failing to meet its WFD objectives. The significant pressure acting on this transitional SWB is agriculture. The New Ross Harbour flows into the Lower Suir Estuary (Little Island - Cheekpoint) transitional SWB, which achieved a 'Moderate' status in the latest WFD Cycle and is 'at risk' of failing to meet its WFD objectives in the future.

Agriculture has been identified as the significant pressure acing on this SWB. The Lower Suir Estuary (Little Island - Cheekpoint) flows merge with the Barrow Suir Nore Estuary ~46km downstream from the project the crow flies). This transitional SWB has achieved a 'Moderate' status and is 'at risk' of failing to meet its WFD objectives in the future. Agriculture has been identified as the significant pressure impacting the Barrow Suir Nore Estuary.

The Barrow Suir Nore Estuary flows into Waterford harbour ~57.4km, which has achieved a 'Moderate' status in the 2nd and 3rd WFD cycles. This coastal SWB is 'at risk' of failing to meet its WFD objectives, with agriculture and urban run-off identified as significant pressures acting on this SWB. Waterford Harbour discharges in the Eastern Celtic Sea (HAs 13;17) ~63.7km downstream from the project.

The Eastern Celtic Sea (HAs 13;17) has achieved a 'High' status in the latest WFD cycle, which is an improvement grom the 'Good' status achieved in the 2nd WFD Cycle. This coastal SWB is 'not at risk' of failing to meet its WFD Objectives.

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

Table B: Summary WFD Information for River Water Bodies

SWB	Overall Status 2010-2015	Overall Status 2013-2018	Overall Status 2016-2021	Risk Status 3rd Cycle	Pressures
Barrow WFD Catchment					
Monefelim_010	Good	Good	High	Not at Risk	None
Monefelim_020	Moderate	Good	Good	Review	None
Monefelim_030	Moderate	Moderate	Moderate	At Risk	Agriculture, Domestic Waste Water
Moanmore_010	Unassigned	Moderate	Good	Review	None
Old Leighlin Stream_010	Good	Good	Good	Not at risk	None
Old Leighlin Stream_020	Moderate	Moderate	Moderate	At Risk	Agriculture
Barrow_190	Unassigned	Unassigned	Moderate	Review	None
Barrow_200	Good	Good	Moderate	At Risk	Agriculture, Urban Run Off , Urban Waste Water
Barrow_210	Poor	Poor	Poor	At Risk	Agriculture, Aquaculture, Hdyromorphology, Urban runoff
Barrow_220	Moderate	Moderate	Moderate	At Risk	Agriculture
Barrow_230	Poor	Poor	Poor	At Risk	Anthropogenic, Hydromorphology
Barrow_240	Unassigned	Moderate	Moderate	Review	None
Upper Barrow Estuary	Good	Good	Moderate	At Risk	Agriculture
New Ross Port	Moderate	Moderate	Moderate	At risk	Agriculture
Lower Suir Estuary (Little Island - Cheekpoint)	Moderate	Good	Moderate	At risk	Agriculture
Barrow Suir Nore Estuary	Good	Moderate	Moderate	At risk	Agriculture
Waterford Harbour	Good	Moderate	Moderate	At risk	Agriculture, Urban run-off
Eastern Celtic Sea (HAs 13;17)	Unassigned	Good	High	Not at risk	None

2.4 GROUNDWATER BODY IDENTIFICATION

The Dinantian limestones that underly the electrical substation location and southernmost section of the electricity line route are classified by the GSI (www.gsi.ie) as a Regionally Important Aquifer – Karstified (diffuse) (Rkd). Regional groundwater flows are likely to occur in this aquifer type.

The Westphalian Shales and Sandstones which underlie the electrical control unit and the northern section of the electricity line route are classified by the GSI (www.gsi.ie) as a Poor Aquifer - Bedrock which is Generally Unproductive (Pu) and Locally Important Aquifer – Bedrock which is Generally Moderately Productive (Lm).

Namurian Sandstones, Siltstones and mudstones which underlie the central section of the electricity line route are classified as a Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones (Pl) and Bedrock which is Generally Unproductive (Pu).

In terms of local Groundwater Bodies (GWBs), the electrical control unit and the northern section of the electricity line route are located in the Castlecomer GWB (IE_SE_G_034). The central section of the electricity line route is mapped in the Shanragh GWB (IE_SE_G_124). The substation location and southernmost section of the electricity line route are mapped within the Bagenalstown Lower GWB (IE_SE_G_157).

The Namurian and Westphalian rocks generally have an absence of inter-granular permeability and most groundwater flow is expected to be in the uppermost part of the aquifer comprising a broken and weathered zone typically less than 3m thick, a zone of interconnected fissuring 10m thick.

During the trial pit investigation (refer to Chapter 6 of EIAR), no groundwater inflows were noted in the trial pits carried out at the electricity substation or the electrical control unit.

Groundwater flowpaths in the Namurian and Westphalian rocks are likely to be short (30-300m), with groundwater discharging to nearby streams and small springs. Water strikes deeper than the estimated interconnected fissure zones suggest a component of deep groundwater flow, however shallow groundwater flow is considered to be dominant.

Groundwater flow directions are anticipated to follow topography; and, therefore, groundwater directions within the site are expected to be towards the primary streams within the valleys of the study area (GSI, 2004).

Baseflow contribution to streams tends to be low, particularly in summer as the groundwater regime cannot sustain summer baseflows due to low storativity within the aquifer. In winter, low permeabilities will lead to a high water table and possible water logging of soils.

2.5 GROUNDWATER BODY CLASSIFICATION

The GWBs are assigned a status based on the assessment of groundwater chemical and quantitative figures. Summary WFD information for GWBs underlying the Project is presented in **Table C**.

All GWB's have been assigned 'Good' status and have been deemed to be 'not at Risk'.

The GWB status for the 2016-2021 WFD cycle 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 3rd Cycle	Pressures
Castlecomer	Good	Good	Good	Not at risk	None
Shanragh	Good	Good	Good	Not at risk	None

Bagenalstown Lower	Good	Good	Good	Not at risk	None

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), shellfish areas and drinking water protected area's (DWPA) are considered at 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.

There are no designated sites mapped within or adjacent to the project. The nearest designated site is the Whitehall Quarries pNHA (Site Code: 000855), approximately 0.5km southwest of the electricity line. There is no hydrological connection between the project and this designated site.

The River Barrow and River Nore cSAC (Site Code: 002162) is mapped ~2.7km east and downstream of the project at is closest point (i.e. electricity substation).

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 designated bathing waters downstream of the project.

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.

The River Barrow (Barrow_050 to Barrow_230) have been assigned as a NSA by the EPA.

2.6.4 Shellfish Areas

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 areas mapped downstream of the project. The nearest mapped shellfish area is Waterford Harbour (Cheekpoint/Arthurstown/Creadan) (IE_SE_100_0100), which is approximately 45.5km south of the project site.

2.6.5 Drinking Water Protected Areas

The electricity line route passes through the GSI mapped Castlewarren GWS and Paulstown PWS groundwater Source Protection Areas (SPA). The electricity line also passes through the groundwater catchment to the Shankill GWS source for 0.5km (catchment assumed based

on topography as no GSI SPA mapping is available for this source). Refer to Chapter 7 (Water) of the EIAR for more detailed information on these sources.

The Monefelim River and Paulstown Stream channels are included in the inner protection zone for the Paulstown Public Water Supply as the they provide, an albeit limited, recharge to the limestone aquifer which sustains the spring source.

Based on the GSI *Paulstown PWS Source Protection Report* (May 2002), the streams/rivers flowing off the Castlecomer Plateau indirectly recharge the limestone aquifer from which the spring source emerges. However, the proportion coming from the Monefelim River (and Paulstown Stream) catchment is reported by the GSI to be less important.

The electrical control unit and northern section of the electricity line route are located in the Monefelim River catchment. However, all works inside the Monefelim River catchment are remote from the Monefelim watercourse with the exception of 1 no. watercourse crossing on the Paulstown Stream along the electricity line route.

Also, according to the Uisce Éireann scoping response, there is an abstraction point on the River Barrow (Barrow_200) at Bagenalstown. Within the project study area, only the Old Leighlin Stream flows into the River Barrow upstream of Bagenalstown. The length of the electricity line route within the Old Leighlin Stream catchment is 1.3km.

Meanwhile, all GWBs within the catchment are listed as DWPAs.

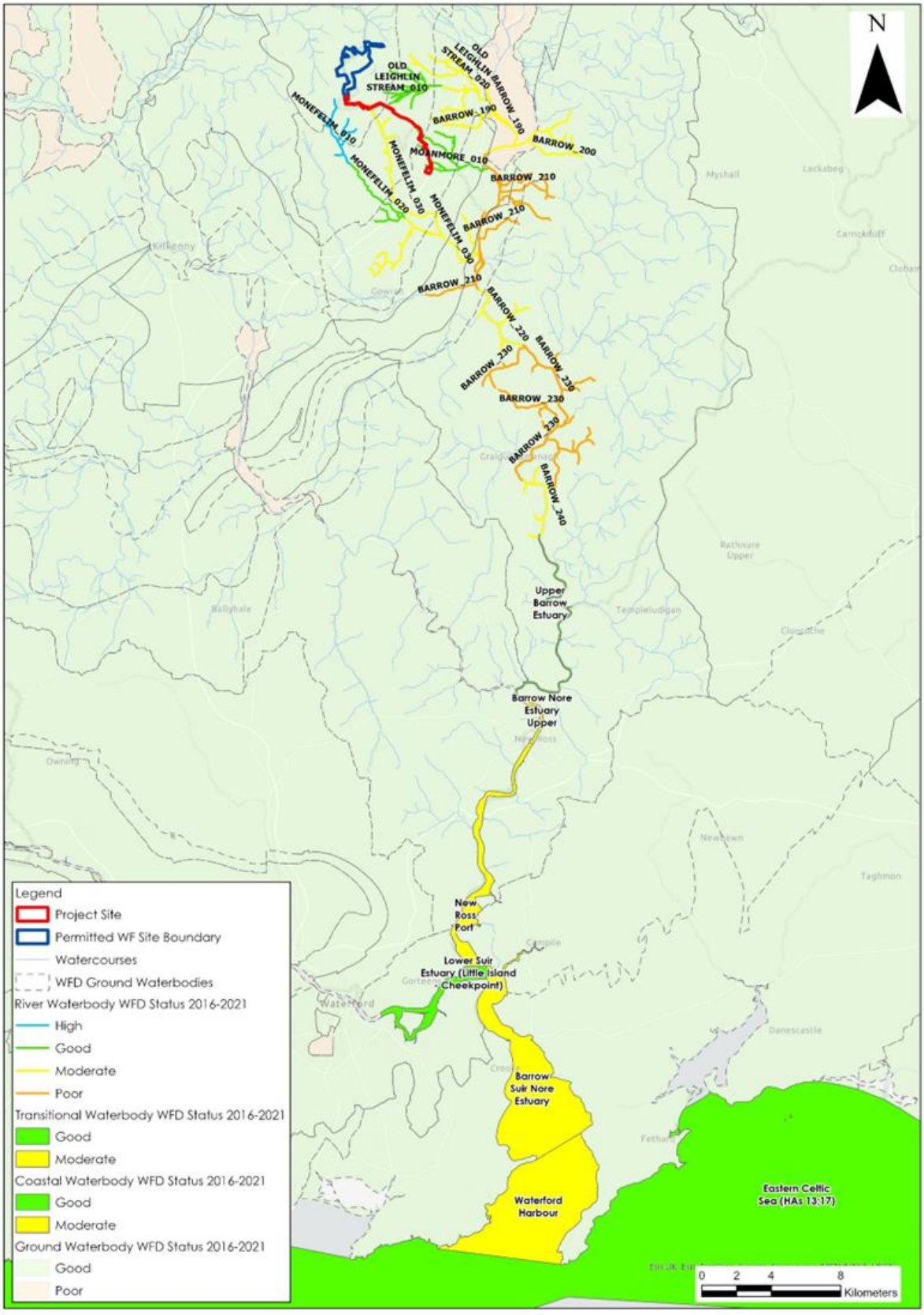

Figure B: WFD Groundwater and Surface Waterbody Status (2016-2021)

3. WFD SCREENING

As discussed in **Section 2**, there are a total of 18 no. waterbodies which are located in downstream of the project.

These include 12 no. river waterbodies, 4 no. transitional waterbodies, and 2 no. coastal waterbodies.

In addition, 3 no. groundwater bodies underlie the project. Furthermore, there are a number of protected areas in the vicinity and downstream of the project.

3.1 SURFACE WATER BODIES

The river waterbodies downstream of the project site are shown in **Figure A** and described in **Section 2.2** above.

With consideration for the construction, operational and decommissioning phases of the project, it is considered that the Monefelim_010, Monefelim_020, Monefelim_030, Old Leighlin Stream_010, Old Leighlin Stream_020 and Moanmore_010 river waterbodies are carried through into the WFD Impact Assessment due to the project's location inside the waterbody.

The Barrow_190, Barrow_200 and Barrow_210 are also included as they are located immediately downstream of the project river waterbodies mentioned above.

The project works must not in any way result in a deterioration in the status of these river waterbodies and/or prevent them from meeting the biological and chemical characteristics for good status in the future.

Further downstream of these SWBs, the River Barrow (Barrow_220 to Barrow_240) have been screened out due to its distal location, intervening lands, and increasing volume of water within the River Barrow.

As outlined in **Table A**, the catchment area increases dramatically immediately downstream. The potential for the project to impact a waterbody decreases further downstream due to the increasing catchment area to the surface waterbody and resulting increase in flow volumes.

Downstream, the Upper Barrow Estuary, Barrow Nore Estuary Upper, New Ross Port, Lower Suir Estuary (Little Island - Cheekpoint), and Barrow Suir Nore Estuary Transitional waterbodies have been screened out due to their distant location, intervening lands, and increasing volumes of water. As outlined in **Figure A**, the catchment area increases dramatically immediately downstream. The potential for the project to impact a waterbody decreases further downstream due to the increasing catchment area to the surface waterbody and resulting increase in flow volumes.

Further downstream, the Waterford Harbour and Eastern Celtic Sea (HAs 13;17) coastal waterbodies have been screened out due to their distal locations (~57.3km and ~63.5km respectively), intervening lands, and increasing volumes of water within the SWBs.

3.2 GROUNDWATER BODIES

With respect to GWBs, the Castlecomer, Shanragh, and Bagenalstown Lower GWBs have been screened in due to their location directly underling the project site. The project works must not in any way result in a deterioration in the status of these GWB and/or prevent them from meeting the biological and chemical characteristics for good status in the future.

3.3 PROTECTED AREAS

Whitehill Quarries pNHA (Site Code: 000855) is located approximately 0.5km southwest of the project and has been screened out due to lack of hydraulic connectivity.

River Barrow and River Nore cSAC (Site Code: 002162) is located approximately ~2.7km east of the project and is comprised of the freshwater stretches of the River Nore and River Barrow and some tidal elements as far as Creadun Head, Co. Waterford. There are 12 no. habitats listed under Annex I of the EU Habitats Directive(92/43/EEC), and 10 no. species listed under Annex II of the Habitats Directive found within the site.

Listed habitats include Atlantic Salt Meadows, Dry Heath, Petrifying Springs, and Alluvial Forests, with the latter 2 being listed as priority habitats under the Habitats Directive. Protected species found within the site include Freshwater Pearl Mussel, Otter, and River Lamprey. The River Barrow and River Nore cSAC is also of ornithological importance for several species listed under Annex I of the EU Birds Directive (2009/147/EC), including the Whooper Swan, Bar-tailed Godwit, and Peregrine. There are also numerous plant and animal species listed under the Irish Red Data Book present throughout the site. Impacts on the cSAC may be experienced due to its close proximity and hydrological connection to the project. Therefore, an assessment must be conducted to ensure that the project does impact this designated site, and thus the River Barrow and River Nore cSAC has been screened in.

There are 3 no. Nutrient Sensitive Areas (NSAs) mapped downstream of the project. Impacts on the Barrow_190 to Barrow_210 NSAs may be experienced due to their close proximity and hydrological connection to the project. Therefore, an assessment must be conducted to ensure that the project does impact these Nutrient sensitive areas.

Impacts on the Barrow_220 to Barrow_240 NSAs may be discounted due to their distal location downstream, intervening lands, and increasing volumes of water within the River Barrow.

Impacts on the Upper Barrow Estuary NSAs may be discounted due to its distal location downstream, intervening lands, and increasing volumes of water within the River Barrow Estuary. Therefore, there is no potential for the project to impact this NSA.

The Waterford Harbour (Cheekpoint/Arthurstown/Creadan) Shellfish Area is mapped approximately 45.5km downstream of the project. Impacts on the Shellfish Area can be discounted due to its distal location, intervening lands, and increasing volumes of water within Waterford Harbour. Therefore, there is no potential for the project to impact the designated area, thus the Waterford Harbour (Cheekpoint/Arthurstown/Creadan) Shellfish Area has been screened out.

3.4 DRINKING WATER PROTECTED AREAS

Castlewarren GWS, Paulstown PWS, Shankill GWS and the Uisce Éireann abstraction are all scoped in for further assessment due to the project's location inside respective surface water or groundwater catchments/source protection areas.

3.5 WFD SCREENING SUMMARY

A summary of WFD Screening for SWBs and GWBs discussed above is shown in **Table D** below.

Table D: Screening of WFD water bodies downstream of the project

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
	Barrow WFD Catchment			
	River	Monefelim_010	**Yes**	The project is mapped within the Monefelim_010 river sub-basin. An assessment is required to consider the potential impacts of the project on this SWB.
	River	Monefelim_020	**Yes**	The Monefelim_020 SWB is located directly downstream of the Monefelim_010. An assessment is required to consider the potential impacts of the project on this SWB.
	River	Monefelim_030	**Yes**	The project is mapped within the Monefelim_030 river sub-basin. An assessment is required to consider the potential impacts of the project on this SWB.
	River	Old Leighlin Stream_010	**Yes**	The project is mapped within the Old Leighlin Stream_010 river sub-basin. An assessment is required to consider the potential impacts of the project on this SWB.
	River	Old Leighlin Stream_020	**Yes**	The Old Leighlin Stream_020 is located directly downstream of the Old Leighlin Stream_010. An assessment is required to consider the potential impacts of the project on this SWB.
	River	Moanmore_010	**Yes**	The project is mapped within the Moanmore_010 river sub-basin. An assessment is required to consider the potential impacts of the project on this SWB.
	River	Barrow_190	**Yes**	Barrow_190 is located immediately downstream of SWBs in which the project is directly located.
	River	Barrow_200	**Yes**	Barrow_200 is located immediately downstream of SWBs in which the project is directly located.
	River	Barrow_210	**Yes**	Barrow_210 is located immediately downstream of SWBs in which the project is directly located.
	River	Barrow_220	No	The Barrow_220 SWB has been screened out due to its distal location from the project (~7.8km), intervening lands, and increasing volumes of water within the River Barrow. Therefore, the project has no potential to affect the status of this SWB.
	River	Barrow_230	No	The Barrow_230 SWB has been screened out due to its distal location from the project (~11.6km), intervening lands, and increasing volumes of water within the River Barrow. Therefore, the project has no potential to affect the status of this SWB.
	River	Barrow_240	No	The Barrow_240 SWB has been screened out due to its distal location from the project (~18.8km), intervening lands, and increasing volumes of water within the River Barrow. Therefore, the project has no potential to affect the status of this SWB.
	Transitional	Upper Barrow Estuary	No	The Upper Barrow Estuary SWB has been screened out due to its distal location from the project (~21.6km), intervening lands, and increasing volumes of water within the River Barrow. Therefore, the project has no potential to affect the status of this transitional SWB.
	Transitional	Barrow Nore Estuary Upper	No	The Barrow Nore Estuary Upper SWB has been screened out due to its distal location from the Project (~30.3km), intervening lands, and increasing volumes of water within the River Barrow Estuary. Therefore, the project has no potential to affect the status of this transitional SWB.
	Transitional	New Ross Port	No	The New Ross Port SWB has been screened out due to its distal location from the project (~33.5km), intervening lands, and increasing volumes of water within the River Barrow Estuary. Therefore, the project has no potential to affect the status of this transitional SWB.
	Transitional	Lower Suir Estuary (Little	No	The Lower Suir Estuary (Little Island - Cheekpoint) SWB has been screened out due to its distal location from the project (~45.9km), intervening lands, and increasing volumes of water within

		Island - Cheekpoint)		the River Barrow Estuary. Therefore, the project has no potential to affect the status of this transitional SWB.
	Transitional	Barrow Suir Nore Estuary	No	The Barrow Suir Nore Estuary SWB has been screened out due to its distal location from the project (~46km), intervening lands, and increasing volumes of water within the River Barrow Suir Nore Estuary. Therefore, the project has no potential to affect the status of this transitional SWB.
	Coastal	Waterford Harbour	No	The Upper Barrow Estuary SWB has been screened out due to its distal location from the project (~57.3km), intervening lands, and increasing volumes of water within Waterford Harbour. Therefore, the project has no potential to affect the status of this Coastal SWB.
	Coastal	Eastern Celtic Sea (HAs 13;17)	No	The Eastern Celtic Sea (HAs 13;17) SWB has been screened out due to its distal location from the Project (~63.5km), intervening lands, and increasing volumes of water within the Eastern Celtic Sea. Therefore, the project has no potential to affect the status of this Coastal SWB.
Groundwater Bodies				
Groundwater Body	Groundwater	Castlecomer	**Yes**	The project is mapped to overlie the Castlecomer GWB. An assessment is required to consider the potential impacts of the project on this GWB.
	Groundwater	Shanragh	**Yes**	The project is mapped to overlie the Shanragh GWB. An assessment is required to consider the potential impacts of the Project on this GWB.
	Groundwater	Bagenalstown Lower	**Yes**	The project is mapped to overlie the Bagenalstown Lower GWB. An assessment is required to consider the potential impacts of the Project on this GWB.
Protected Areas				
Protected Areas	Nature Conservation Designations	Whitehill Quarries pNHA	No	White Hill Quarry pNHA has been screened out as due to lack of hydrological connection to the project.
		River Barrow and River Nore cSAC	**Yes**	The River Barrow and River Nore cSAC has been screened in due to its proximal location downstream (~3km) and hydrological connection to the project. An assessment is required to consider the potential impacts of the Project on this cSAC.
	Nutrient Sensitive Areas	Barrow_190 to Barrow_210	**Yes**	The Barrow_190 to 210 NSAs have been screened in due to its proximal distance to the project and hydrological connections. An assessment is required to consider the potential impacts of the Project on these NSAs.
		Barrow_220 to Barrow_240	No	The Barrow_220 to Barrow_240 NSAs have been screened out due to their distal location downstream, intervening lands, and increasing volumes of water within the River Barrow. Therefore, the project has no potential to affect the status of these NSAs.
		Upper Barrow Estuary	No	The Upper Barrow Estuary NSA has been screened out due to its distal location downstream, intervening lands, and increasing volumes of water within the Upper Barrow Estuary. Therefore, the Project has no potential to affect the status of this NSA.
	Shellfish Area	Waterford Harbour (Cheekpoint/Arthurstown/Creadan)	No	Waterford Harbour (Cheekpoint/Arthurstown/Creadan) Shellfish area has been screened out due to its distal location downstream, intervening lands, and increasing volumes of water within Waterford Harbour. Therefore, the project has no potential to impact on this protected area.
	Drinking Water	Castlewarren GWS,	**Yes**	The project is located within the groundwater or surface water catchment to these sources.

		Paulstown PWS, Shankill GWS and Bagenalstown abstraction		

4. WFD COMPLIANCE ASSESSMENT

4.1 PROPOSALS

The project comprises a 110kV electricity substation; including all associated development works to accommodate its construction, operation, maintenance and the export of electricity to the national grid via the existing Kellis-Kilkenny overhead electricity transmission line; an electrical control unit and c. 8.8km of underground electricity line.

During the construction phase, earthworks will arise from the excavation of topsoil, subsoil and bedrock (where present) in order to achieve the required levels for the electricity substation, electrical control unit, control buildings, electrical equipment, and access tracks.

The electricity line will be installed within ducting in an excavated trench of c. 1.2m deep and c. 2m wide. 12 no. jointing plinths will be required along with Horizontal Directional Drilling (HDD) at 5 no. watercourse crossing locations. The works will require a bottomless culvert install at one of the crossing locations to accommodate an access track.

Where excess material is generated at the electricity substation site or along the route of the underground electricity line which cannot be utilised for reinstatement or landscaping purposes, it is proposed to develop 2 no. dedicated spoil deposition areas immediately northeast of the electricity substation where excess material will be stored permanently.

Spoil will be transported to the deposition areas where is will be placed in layers in accordance with best-practice methods. Appropriate drainage management measures will be implemented.

Operational phase drainage control will incorporate SuDs design (Sustainable Urban Drainage) along with water quality protection measures (i.e. hydrocarbon interceptors).

There may be a requirement for an on-site water supply well, subject to the availability of a connection to the Shankill GWS; however, the required yield will be significantly less than 25m^3/day (EPA abstraction register threshold) and, therefore, will be akin to as domestic well source. The abstraction will have no likelihood of affecting the local hydrogeological regime or GWB WFD status (during either construction or operation of the substation).

The electricity substation will form part of the national electricity network and decommissioning will not occur. The underground electricity line will be decommissioned upon decommissioning of the White Hill Wind Farm. The electricity line will be removed from its ducting and transported to an approved waste handling facility for re-use or recycling. The electrical control unit will be decommissioned and removed from site for re-use or recycling. Works involving removal/demolition during the decommissioning phase will take place predominantly above ground and will largely mimic the construction phase, in reverse order.

Mitigation measures will ensure that surface runoff from the project site will be of a high quality and will not affect the quality of downstream surface water bodies. Any introduced drainage works at the project site will mimic the existing hydrological regime thereby avoiding changes to flow volumes leaving the project site.

4.2 POTENTIAL EFFECTS

4.2.1 Construction Phase (Unmitigated)

4.2.1.1 Potential Surface Water Quality Effects from Construction/Earthworks

Construction phase activities that will require earthworks resulting in removal of vegetation cover and excavation of soil and mineral subsoil are detailed at Chapter 3 of the EIAR.

Due to the generally shallow nature of excavations, substantial volumes of spoil are not predicted to be generated. Subsoil will, insofar as possible, be utilised to make up levels at the

electricity substation and electrical control unit; while topsoil will be used in the post-construction reinstatement of the project.

There is also a possibility of runoff along the underground electricity line entering nearby watercourses at the 5 no. watercourse crossing locations (including culvert install works).

Other than at the locations at which the underground electricity line crosses a watercourse and the crossing of the unnamed stream by the access track leading to the electricity substation, no infrastructure is located within 50m of a natural surface water feature.

Hydrocarbons and cement-based compounds will be used during the construction phase, albeit small volumes.

Given the projects linear distribution, spread-out nature over a relatively large geographical area and the fact the electricity substation and electrical control unit are not adjacent to a natural watercourse, the effects on the Monefelim, Moanmore, Paulstown Stream and Old Leighlin Stream waterbodies will not be significant even in the absence of mitigation.

Surface water effects in the further downstream River Barrow are assessed as unlikely due to dilution/assimilation capacity effects in the River Barrow channel. Also, the project drains to the River Barrow via several sub-catchments (i.e. Moanmore Stream, Monefelim River, Paulstown Stream and Old Leighlin Stream) which also significantly dilutes/disperses any potential of effects in the River Barrow.

A summary of potential status change to SWBs arising from works during the construction phase of the project in the unmitigated scenario are outlined in **Table E.**

Table E: Potential Surface Water Quality Effects During Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Monefelim_010	IE_SE_14M030100	High	Good
Monefelim_020	IE_SE_14M030600	Good	Moderate
Monefelim_030	IE_SE_14M031000	Moderate	Moderate
Old Leighlin Stream_010	IE_SE_14O020500	Good	Moderate
Old Leighlin Stream_020	IE_SE_14O020700	Moderate	Moderate
Moanmore_010	IE_SE_14M240860	Good	Moderate
Barrow_190	IE_SE_14B012820	Moderate	Moderate
Barrow_200	IE_SE_14B012920	Moderate	Moderate
Barrow_210	IE_SE_14B013100	Poor	Poor

4.2.1.2 Potential Groundwater Quality/Quantity Effects

Hydrocarbons and cement-based compounds will be used during the construction phase, albeit in small volumes. The pathways for the rapid transport of any spilt chemicals are limited due to poorly productive bedrock or thick subsoils.

The shallow nature of the excavation works required for the project means there will be no effects on groundwater levels or flows.

A summary of potential status change to GWBs arising during the construction phase of the project in the unmitigated scenario are outlined in **Table F**.

Table F: Potential Groundwater Effects during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Castlecomer	IE_SE_G_034	Good	Good
Shanragh	IE_SE_G_124	Good	Good
Bagenalstown Lower	IE_SE_G_157	Good	Good

4.2.1.3 Potential Construction Phase Effects on Conservation Protected Areas

The project site is hydrologically connected to the River Barrow and River Nore cSAC (Site Code: 002162). At its closest point, this designated site is located approximately 2.7km to the east (as crow flies) of the electricity substation and is downstream (hydrologically connected) via the Moanmore Stream, Monefelim River, Paulstown Stream and Old Leighlin Stream.

Surface water effects in the downstream River Barrow are assessed as unlikely due to dilution/assimilation capacity effects in the River Barrow channel. No effects on River Barrow and River Nore cSAC are expected.

Notwithstanding this, surface water management and mitigation is proposed to protect local surface water and avoid significant negative downstream surface water quality effects.

4.2.1.4 Potential Construction Phase Effects on Drinking Water Protected Area

Sections of the electricity line route are located inside the Castlewarren GWS SPA and the Paulstown PWS SPA. Furthermore, the electrical control unit and sections of the underground electricity is located within the Monefelim River/Paulstown Stream catchment which forms part of the Paulstown PWS SPA. A 0.5km section of the electricity line is also likely to be located within the groundwater catchment of the Shankill GWS spring.

The likelihood of effects on the Castlewarren GWS and Paulstown PWS is relatively low due to the localised and shallow nature of the electricity line and electrical control unit (in terms of groundwater flow disturbance), the poor productivity of the bedrock aquifers along the electricity line route within the SPAs, as well as the large set back distance of the majority of the project from the Monefelim River and Paulstown Stream.

Similarly, due to the short distance (0.5km) of electricity line route (public road) immediately upslope of the Shankill GWS source, there is no likelihood of affecting groundwater serving the source spring.

The sensitivity of the Uisce Éireann abstraction point on the River Barrow at Bagenalstown is also low due to the large assimilative capacity of the River Barrow (large flows) and the fact that only 1.3km of the electricity line is located within the potential catchment to this source.

No significant effects on drinking water protected areas are likely even in the absence of mitigation.

Notwithstanding this, surface water management and mitigation is proposed to protect local surface water and avoid significant negative downstream surface water quality effects.

4.2.2 Operational Phase (Unmitigated)

The operational phase of the project will have no potential to affect the WFD status of downstream waterbodies due to the project design measures such stormwater management and pollution prevent measures.

Stormwater control measures are as follows:

- During the operational phase, stormwater from the substation and electrical control unit compound areas will be discharged to local drains or to ground via soakaways following attenuation;
- Stormwater discharge from the project site will be limited to greenfield runoff rates, therefore there will be no increase in storm water runoff rates entering the local environment; and,
- Runoff from the compound areas will also be passed through an oil interceptor to prevent any discharge of hydrocarbons.

4.2.3 Decommissioning Phase (Unmitigated)

The electricity substation will form part of the national electricity network and decommissioning will not occur.

The electricity line will be removed from its ducting, while the ducting will remain in the ground.

The electrical control unit will be decommissioned and removed from site for re-use or recycling. Works involving removal/demolition during the decommissioning phase will take place predominantly above ground and therefore minimal excavation requirements.

The decommissioned phase of the project will have no potential to affect the WFD status of downstream waterbodies due to the minimal amount of construction work required.

4.3 MITIGATION MEASURES

In order to mitigate against the potential negative effects on surface and groundwater quality, quantity and flow patterns, mitigation measures will be implemented during the construction phases of the project.

4.3.1 Construction Phase

4.3.1.1 Mitigation Measures to Protect Surface Water Quality during Earthworks

Electricity Substation and Electrical Control Unit

The management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:

- Prior to the commencement of earthworks, silt fencing will be placed down-gradient of the construction areas, as required, until the full range of construction phase measures are installed;
- These will be embedded into the local soils to ensure all site water is captured and filtered;
- Clean water drains will include check dams to control flow rates and avoid erosion or scouring of the drain;
- Water from the clean drains will be discharged by a buffered outfall or level spreader at greenfield runoff rates;
- Water will be discharged from the clean drains over natural grassland or to existing agricultural drains which will provide further filtration;
- All surface water runoff from works areas, excavations, stockpiles at the electricity substation site and electrical control unit site will be intercepted by downslope drains which will also include check dams;
- These dirty water drains will direct water to stilling ponds where water for treatment and attenuation;
- From the stilling ponds, water will be discharged to lagoon-type settlement ponds for final treatment. The settlement ponds will follow a design outlined by Altmuller and Dettmer (2006);

- The treated water will then be discharged via a buffered outfall or level spreader, at greenfield rates, over natural grassland which will provide additional filtration and treatment;
- The precise design, sizing and sitting of the drainage infrastructure will be confirmed as part of the post-consent detailed design process, however the design will be reflective of predicted rainfall levels with an appropriate allowance for climate change
- Daily monitoring of the excavation/earthworks, the water treatment and pumping system and the discharge areas will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter will enter the main drainage channel;
- If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied; and,
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses.

The construction of the site drainage system will be carried out, at the respective locations, prior to other activities being commenced. The construction of the drainage system will only be carried out during periods of, where possible, no rainfall, therefore avoiding runoff. This will avoid 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 will also ensure that attenuation features associated with the drainage system will be in place and functional for all subsequent construction works.

Electricity Line

The majority of the underground electricity line is in excess of 50m from any nearby watercourse with the exception of the 5 no. watercourse crossings.

No in-stream works are required at the crossing locations as HDD is proposed, however due to the proximity of the watercourses to the construction works, there is a risk of surface water quality effects during trench excavation work.

Mitigation measures which are outlined below will be implemented to ensure that silt laden or contaminated surface water runoff from the trenching work does not discharge directly to the water:-

- All existing dry drains that intercept the works area will be temporarily blocked down-gradient of the works using temporary check dams/silt traps (e.g. straw bales);
- Clean water diversion drains will be installed upgradient of the works areas, as required;
- Check dams/silt fence arrangements (silt traps or straw bales) will be placed in all existing drains that have surface water flows and also along existing roadside drains; and,
- A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zones such as at watercourse crossing locations

4.3.1.2 Mitigation Measures to Protect Against Release of Hydrocarbons

The potential release of hydrocarbons will be mitigated by the provision of appropriate controls and working methods. These include best practice methods for storage and handling of fuels and chemicals and include:

- The volume of fuels or oils stored on site will be minimised. All fuel and oil will be stored in an appropriately bunded area within the temporary construction compounds. Only an appropriate volume of fuel will be stored at any given time. The bunded area will be roofed to avoid the ingress of rainfall and will be fitted with a storm drainage system and an appropriate oil interceptor;
- All bunded areas will have 110% capacity of the volume to be stored;

- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer, will be re-filled at the temporary compound and will be towed around the site by a 4x4 jeep to where plant and machinery is located. The 4x4 jeep will also be fully stocked with fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations to avoid any accidental leakages;
- All plant and machinery used during construction will be regularly inspected for leaks and fitness for purpose;
- Spill kits will be readily available to deal with and accidental spillage;
- All waste tar material arising from road cuttings (from trenching or other works in public roads) will be removed off-site and taken to a licensed waste facility. Due to the possibility of contamination of soils and subsoils, it is not proposed to utilise this material for any reinstatement works or for storage within the spoil deposition areas; and
- An outline emergency plan for the construction phase to deal with accidental spillages is contained within the Planning-Stage CEMP (**Annex 3.5**). This emergency plan will be further developed prior to the commencement of development, and will be agreed with the Planning Authority as part of the detailed CEMP.

4.3.1.3 Mitigation Measures to Prevent Release of Wastewater

The best practice methods for wastewater management at the proposed on-site construction compound during the construction phase include:

- During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site construction compounds, maintained by the providing contractor, and removed from site on completion of the construction works;
- Water supply for the site office and other sanitation will be brought to site and removed after use from the site to be discharged at a suitable off-site treatment location; and,
- No water or wastewater will be sourced on the site, nor discharged at the site.

4.3.1.4 Mitigation Measures to Prevent Release of Cement-Based Products

Best practice methods for cement-based compounds includes:

- No batching of wet-cement products will occur on site. Ready-mixed concrete will be brought to site as required and, where possible, emplacement of pre-cast products, will take utilised;
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. Chute cleaning will be undertaken at lined cement washout ponds within the temporary construction compound with waters being tankered off site and disposed of at an approved licensed facility. There will be no discharge of cement contaminated waters to the construction drainage system or to any drain;
- Weather forecasting will be used to ensure that prolonged or intense rainfall is not predicted during concrete pouring activities; and,
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

4.3.1.5 Mitigation Measures to Prevent Morphological Changes to Surface Watercourses

The following mitigation measures are proposed in respect of the installation of the culvert to the north of the electricity substation:-

- The stream crossing will be a clear span bridge (bottomless culvert) and the stream bed will remain undisturbed. No in-stream excavation works are proposed or anticipated as being required;
- Any guidance/mitigation measures proposed by the OPW or the Inland Fisheries Ireland will be incorporated into the design of the proposed crossing;
- As a further precaution, in-stream construction work (if required) will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters* (2016) (i.e., July to September inclusive). This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);
- During the near stream construction work, double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed on-site; and,
- The installation of the culvert will require a Section 50 license application to the OPW in accordance with the Arterial Drainage Act 1945. The stream crossing will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

Directional Drilling Mitigation:

- Although no in-stream works are proposed, the drilling works will only be done over a dry period between July and September (as required by IFI for in-stream works) to avoid the salmon spawning season and to have more favourable (dryer) ground conditions;
- The crossing works areas will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance;
- There will be no storage of material/equipment or overnight parking of machinery inside a 10m buffer zone which will be imposed around the watercourses;
- Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channel along the 10m buffer zone boundary;
- Additional silt fencing or straw bales (pinned down firmly with stakes) will be placed across any natural surface depressions/channels that slope towards the watercourse;
- Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered;
- The area around the bentonite batching, pumping and recycling plant will be bunded using Terram (as it will clog) and sandbags in order to contain any spillages;
- Drilling fluid returns will be contained within a sealed tank/sump to prevent migration from the works area;
- Spills of drilling fluid will be clean up immediately and stored in an adequately sized skip before been taken off-site;
- If rainfall events occur during the works, there will be a requirement to collect and treat small volumes of surface water from areas of disturbed ground (i.e. soil and subsoil exposures created during site preparation works);
- This will be completed using a shallow swale and sump down slope of the disturbed ground; and water will be pumped to a proposed percolation area at least 50m from the watercourses;
- The discharge of water onto vegetated ground at the percolation area will be via a silt bag which will filter any remaining sediment from the pumped water. The entire percolation area will be enclosed by a perimeter of double silt fencing;
- Any sediment laden water from the works area will not be discharged directly to a watercourse or drain;
- Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted;

- Daily monitoring of the works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter is discharged to the watercourse;
- If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;
- On completion of the works, the ground surface disturbed during the site preparation works and at the entry and exit pits will be carefully reinstated;
- The silt fencing upslope of the river will be left in place and maintained until the works area has been fully reinstated;
- There will be no batching or storage of cement allowed at the watercourse crossing;
- There will be no refuelling allowed within 100m of the watercourse crossing; and,
- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing.

A Fracture Blow-out (Frac-out) Prevention and Contingency Plan will be prepared by the drilling contractor prior to construction and will include the following measures:

- The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used);
- The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags to contain any potential spillage;
- A double row of silt fencing will be placed between the works area and the adjacent river;
- Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility;
- Adequately sized skips will be used where temporary storage of arisings are required;
- The drilling process/pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;
- This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped;
- Any frac-out material will be contained and removed off-site;
- The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and,
- If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location.

4.3.1.6 Mitigation Measures to Protect Water Quality During Excavation Dewatering

Management of groundwater seepages and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations, will be installed as relevant;
- The interceptor drainage will not be discharged directly to surface waters to ensure that Greenfield runoff rates are mimicked;
- If required, pumping of excavation inflows will prevent build up of water in the excavation;
- All pumped water will be directed to the surface water drainage system for treatment prior to discharge. In the case of the electricity line, any pumped waters will be discharged over grassland to allow for filtration;
- There will be no direct discharge to local drains, and therefore no risk of hydraulic loading or contamination will occur;
- Daily monitoring of site excavations by the EM will occur during the construction phase. If high levels of seepage inflow occur, excavation work at this location will cease immediately and a geotechnical assessment undertaken; and,

- A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available on-site for emergencies. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites and will be used as final line of defence, if required.

4.3.1.7 Mitigation Measures for Protected Areas

The proposed mitigation measures for protection of surface water and groundwater quality, discussed above and further detailed at Annex 3.5 of EIAR, will ensure the protection of downstream conservation protected areas and drinking water protected areas.

Surface water quality effects in the downstream River Barrow and River Nore cSAC, even in the absence of mitigation, are unlikely to be significant due to dilution/assimilation capacity effects in the River Barrow channel.

Due to the relatively small scale and shallow depth of the works within the Castlewarren GWS and Paulstown PWS source protection areas, the prevailing hydrology and hydrogeology (which limits pathways for potential effects), in addition to the proven and effective measures to mitigate the risk of releases of sediment and contaminants to surface water and groundwater, no effects on the either Castlewarren GWS and Paulstown PWS are expected. Similarly, no effects are expected on the Shankill GWS.

Due to the large assimilative capacity of the River Barrow (large flows) at Bagenalstown, the fact that only 1.3km of the electricity line is located within the catchment to this source and the mitigation measures proposed above; no effects on the Bagenalstown abstraction are assessed as likely.

4.3.2 Potential Effects with the Implementation of Mitigation

In all instances, the mitigation measures described in **Section 4.3** are sufficient to meet the WFD Objectives. The assessment of WFD elements for the WFD waterbodies is summarised in **Table G** below.

Table G: Summary of WFD Status for Unmitigated and Mitigated Scenarios (Construction Phase)

SWB	WFD Code	Current Status	Assessed Status – Unmitigated (worst case)	Assessed Status with Mitigation Measures
Barrow WED Catchment				
Monefelim_010	IE_SE_14M030100	High	Good	High
Monefelim_020	IE_SE_14M030600	Good	Moderate	Good
Monefelim_030	IE_SE_14M031000	Moderate	Moderate	Moderate
Moanmore_010	IE_SE_14M240860	Good	Moderate	Good
Old Leighlin Stream_010	IE_SE_14O020500	Good	Moderate	Good
Old Leighlin Stream_020	IE_SE_14O020700	Moderate	Moderate	Moderate
Barrow_190	IE_SE_14B012820	Moderate	Moderate	Moderate
Barrow_200	IE_SE_14B012920	Moderate	Moderate	Moderate
Barrow_210	IE_SE_14B013100	Poor	Poor	Poor
Groundwater Bodies				
Castlecomer	IE_SE_G_034	Good	Good	Good
Shanragh	IE_SE_G_124	Good	Good	Good
Bagenalstown Lower	IE_SE_G_157	Good	Good	Good

5. SUMMARY AND CONCLUSION

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

The project does not involve dewatering of groundwater or alteration of drainage patterns. Therefore, the quantitative status (i.e., the available quantity (volume) of groundwater and surface water locally) to the receiving waters will remain unaltered during the construction and operational phase of the project.

There is no direct discharge from the project to downstream receiving waters. Mitigation for the protection of surface water during the construction, operation and decommissioning phases of the development will ensure the qualitative status of the receiving waters will not be altered by the project.

There is also mitigation proposed to protect groundwater quality within the project scheme during the construction, operational and decommissioning phases of the development. These mitigation measures will ensure the qualitative status of the underlying GWB will not be altered by the Project.

There will be no change in GWB or SWB status in the underlying GWB or downstream SWBs resulting from the project. There will be no change in quantitative (volume) or qualitative (chemical) status, and the underlying GWB and downstream SWBs are protected from any potential deterioration.

There will be no effects on conservation or drinking water protected areas.

As such, the project :

- 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).

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