Borrisbeg Grid Connection

Appendix 8-3: Water Framework Directive Compliance Assessment

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APPENDIX 8-3: WATER FRAMEWORK DIRECTIVE COMPLIANCE ASSESSMENT

FINAL REPORT

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TETRA TECH RPS

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1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) were requested by Tetra Tech RPS to complete a Water Framework Directive (WFD) Compliance Assessment for the Proposed Grid Connection. The Proposed Grid Connection will connect the Consented Wind Farm to the national grid via a loop in loop out connection to the existing Ikerrin to Thurles 110kV overhead line.

The purpose of this WFD Compliance Assessment is to determine if any specific components or activities associated with the Proposed Grid Connection 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 Compliance Assessment is written to accompany Chapter 8 of the Environmental Impact Assessment Report (EIAR) for the Proposed Grid Connection. The Proposed Grid Connection is described in full in Chapter 3 of the EIAR.

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.

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

Michael Gill P. Geo. (B.A.I., MSc, Dip. Geol., MIEI) is a Civil/Environmental Engineer and Hydrogeologist with over 24 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. Michael has substantial experience in wastewater engineering and site suitability assessments, contaminated land investigation and assessment, karst hydrology/hydrogeology, water resource assessments, surface water drainage design and SUDs design, and surface water/groundwater interactions. For example, Michael has completed numerous hydrological and hydrogeological impact assessments of wind farms and renewable projects in Ireland. He has substantial experience in surface water drainage design and SUDs design and surface water/groundwater interactions. For example, Michael has worked on the EIS/EIARs for Borrisbeg WF, Oweninny WF, Cloncreen WF, Derrinlough WF, and Yellow River WF, and over one hundred other wind farm-related projects.

Conor McGettigan (MSc, BSc) is an Environmental Scientist with over 5 years' experience in the environmental sector in Ireland. Conor holds an MSc in Applied Environment Science and a BSc in Geology. Conor routinely completed hydrological and hydrogeological impact assessment, flood risk assessments and WFD compliance assessments for a range of proposed developments including wind farms, residential developments, industrial developments, and quarries.

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), as amended.

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 2009 to 2015 with the second cycle plan covering the period from 2016 to 2021, and the third cycle covers the period from 2022 to 2027[1]. The RBMPs are forward looking.

The Water Action Plan 2024 is Ireland's 3rd River Basin Management Plan (2022 - 2027). The objectives of the Water Action Plan 2024 have been integrated into the design of the Project and 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 during the third cycle.

[1] *The WFD RBMP cycles are forward looking plans, so 2009-2015 (1st Cycle), 2016-2021 (2nd Cycle), and 2022-2027 (3rd Cycle) are the plans and they use status from the previous 6 years.*
The EPA updates status every three years, but they also complete an additional assessment mid-RBMP cycle. The mid-cycle status does not get reported to the Commission.
The linkage between the two is that the 2nd Cycle plan uses the 2009-2015 status, the 3rd Cycle plan uses the 2016-2021 status. The 2013-2018 status was not used in the RBMP and the 2019-2024 status will not be used in the next RBMP.

2. WATERBODY IDENTIFICATION AND CLASSIFICATION

2.1 INTRODUCTION

This section identifies those Surface Waterbodies (SWBs), Groundwater Bodies (GWBs) and protected areas with potential to be affected by the Proposed Grid Connection and reviews all available WFD information.

2.2 SURFACE WATERBODY IDENTIFICATION

On a regional scale, the Site is located within the Upper Suir Estuary South Eastern surface water catchment and Hydrometric Area 16 of the Shannon River Basin District. More locally the Site is located in the Suir River WFD sub-catchment (Suir_SC_010) Wood River WFD sub-catchment (Wood_SC_010), and the Clonmore Stream (Suir_010) and the Suir_020 WFD river sub-basin.

The north of the Site, including the proposed 110kV substation, the temporary construction compound, 80m of new access track and approximately 800m of the underground cabling route are mapped in the Suir_020 WFD river sub-basin. Meanwhile, approximately 1.1km of new access track, the 2 no. end masts and approximately 1.3km of the underground cabling route are mapped in the Clonmore Stream (Suir)_010 WFD river sub-basin.

Within the Clonmore Stream (Suir)_010 WFD river sub-basin, a small 1st order stream flows to the northwest, approximately 60m from the northern proposed end mast. This stream is locally unnamed but is referred to as the Lahagh Stream (EPA Code: 16L41) on the EPA blueline database and forms part pf the Clonmore Stream (Suir)_010 SWB. This stream flows to the northwest before it discharges into the Clonmore Stream (EPA Code: 16C11) which flows to the west. The underground cabling route crosses the Clonmore Stream at an existing bridge located along the L7039. A new watercourse crossing, over a tributary of the Clonmore Stream, is also proposed along the underground cabling route where the route is proposed to pass through agricultural pastures to the north of the Dublin-Cork Railway Line. Here it is proposed to construct a new access track over a small 1st order stream, referred to by the EPA as the Strogue Stream (EPA Code: 16S60). All SWBs in this area form part of the Clonmore Stream (Suir)_010 SWB.

Within the Suir_020 WFD river sub-basin, the River Suir flows to the south approximately 150m west of the proposed 110kV substation. The Clonmore Stream discharges into the River Suir downstream of the Site, before the River Suir continues to flow to the south, past Templemore.

A local hydrology map is presented as Figure A below.

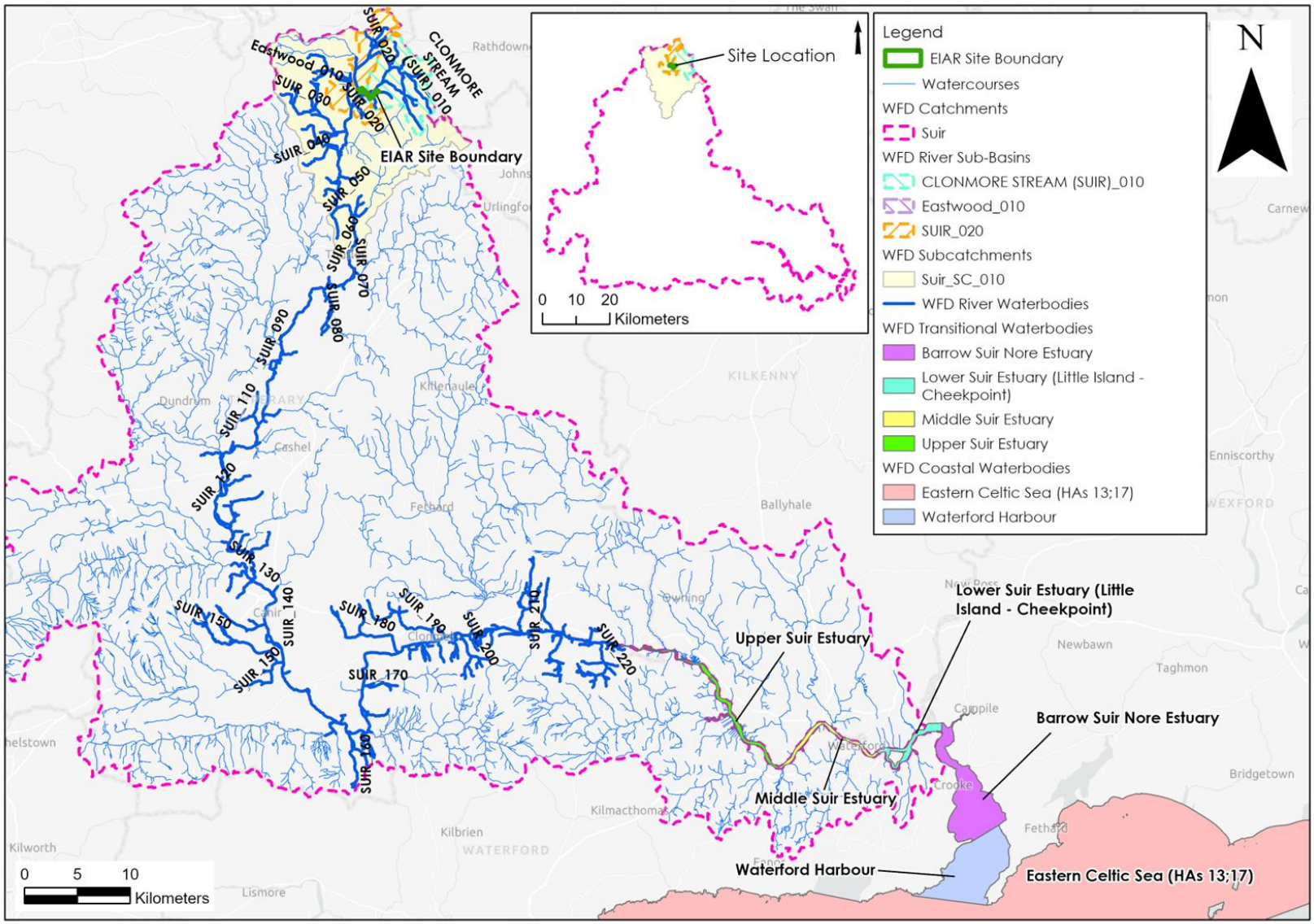

Figure A: Local Hydrology Map

2.3 SURFACE WATER BODY CLASSIFICATION

A summary of the WFD status and risk result for SWBs downstream of the Proposed Grid Connection are shown in **Table A**. The overall status of SWBs is based on the ecological, chemical and quantitative status of each SWB. Local SWB status information is available from (www.catchments.ie).

The Clonmore Stream (Suir)_010 SWB achieved "Moderate" status in all 3 no. WFD cycles. The Suir_020 SWB achieved "Poor" status in the latest WFD cycle, this represented a deterioration from the "Moderate" status which this SWB achieved in the 2013-2018 cycle. Further downstream the Suir_030 SWB achieved "Moderate" status in all 3 no. WFD cycles.

In terms of risk status, the Clonmore Stream (Suir)_010, Suir_020 and Suir_030 SWBs are all deemed to be "at risk" of failing to meet their respective WFD objectives. The 3rd cycle Suir Catchment Report identifies peat drainage and peat extraction as significant pressures on the Clonmore Stream (Suir)_010 SWB (EPA, 2024).

Meanwhile, agriculture and hydromorphology are identified significant pressure on the Suir_020 SWB. Agriculture and urban wastewater are identified significant pressures on the Suir_030 SWB.

Summary WFD information for all SWBs downstream of the Site as far as the Suir_080 SWB are provided in **Table A**. The Suir_080 SWB is located downstream of Thurles and ~22km downstream of the Site. Given the distance between the Site and all other downstream SWBs, the ZoI will not extend downstream of the Suir_080 SWB.

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

Table A: Summary WFD Information for Surface Water Bodies

SWB	Overall Status (2010-2015)	Overall Status (2013-2018)	Overall Status (2016-2021)	WFD Risk	Pressures
Suir_SC_010 Sub Catchment					
Clonmore Stream (Suir)_010	Moderate	Moderate	Moderate	At Risk	Peat Drainage and Extraction
Suir_020	Poor	Moderate	Poor	At Risk	Agriculture, Hydromorphology.
Suir_030	Moderate	Moderate	Moderate	At Risk	Agriculture, Urban Wastewater
Suir_040	Unassigned	Good	Moderate	Review	None
Suir_050	Good	Good	Good	Not At Risk	None
Suir_060	Moderate	Moderate	Poor	At Risk	Unknown
Suir_070	Good	Moderate	Moderate	At Risk	Agriculture, Urban Runoff, Urban Wastewater
Suir_080	Good	Moderate	Moderate	At Risk	Agriculture

2.4 GROUNDWATER BODY IDENTIFICATION

Based on the GSI bedrock mapping, the Ballysteen Formation and Lisduff Oolite Member are mapped to underlie the Site. The Ballysteen Formation (Dinantian Lower Impure Limestones) are classified by the GSI (www.gsi.ie) as a Locally Important Aquifer (Ll), having bedrock which is moderately productive only in local zones. The Lisduff Oolite Member are also classified Locally Important Aquifer (Lm), having bedrock which is Generally Moderately Productive

In terms of Groundwater Bodies (GWBs), the Site is mapped to be underlain by the Templemore GWB (IE_SE_G_131) which is characterised by "poorly productive bedrock".

2.5 GROUNDWATER BODY CLASSIFICATION

The Templemore GWB (IE_SE_G_131) achieved "Good" status in all 3 no. WFD cycles. This status is defined based on the quantitative status and chemical status of the GWB. The Templemore GWB is deemed to be 'at risk' of failing to achieve its WFD objectives. Agriculture is identified as a significant pressure impacting this GWB.

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

Table B: Summary WFD Information for Groundwater Bodies

GWB	Overall Status (2010-2015)	Overall Status (2013-2018)	Overall Status (2016-2021)	WFD Risk	Pressures
Templemore	Good	Good	Good	At Risk	Agriculture

2.6 ZONE OF INFLUENCE

The potential Zone of Influence (ZoI) extends to the following SWBs and GWBs:

- River waterbodies: Suir_010, Suir_020, Suir_030, Suir_040, Suir_050, Suir_060, Suir_070 and Suir_080. Note that the Suir_080 SWB is located in excess of 22km downstream of the Site. Given the distance between the Site and all other downstream SWBs, the ZoI will not extend past the Suir_080 SWB.

- GWBs: Templemore

Note that the Suir_080 SWB is located in excess of 22km downstream of the Site. Given the distance between the Site and all other downstream SWBs, the ZoI will not extend downstream of the Suir_080 SWB.

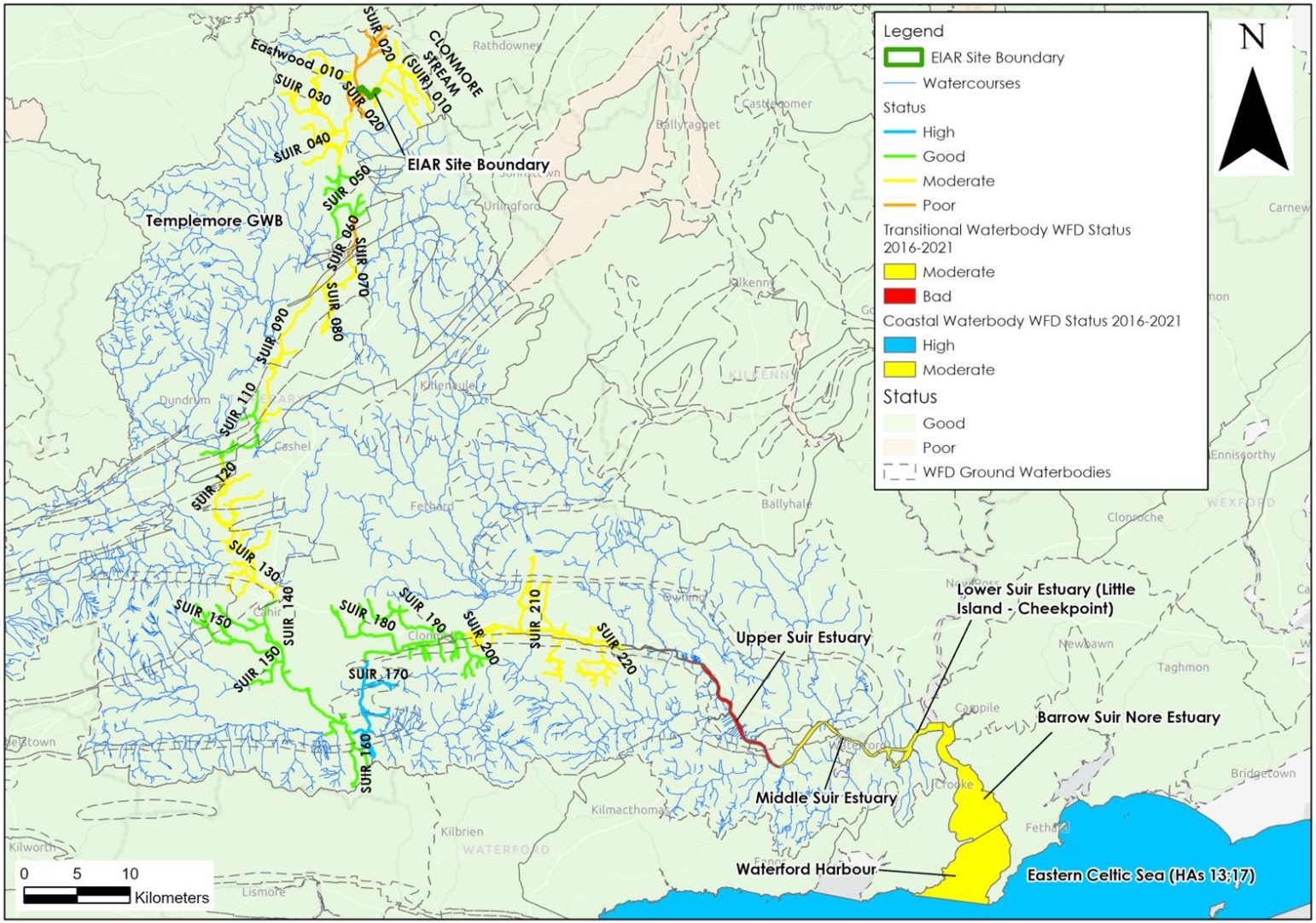

Figure B: WFD Groundwater and Surface Waterbody Status (2016-2021)

2.7 PROTECTED AREAS IDENTIFICATION

The WFD requires that the Proposed Grid Connection is 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 as part of the assessment.

2.7.1 Nature Conservation Designations

Within the Republic of Ireland designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), and European Sites: Special Area of Conservation (SAC) and Special Protection Area (SPA).

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 Site is not located within any designated conservation site. However there are downstream hydrological connections to several designated sites as described below:

- The Lower River Suir SAC (Site Code: 002137) is located ~18km south and downstream of the Proposed Grid Connection along the River Suir. The length of the hydrological flowpath between the Site and this SAC is approximately 24.5km.
- The Cabragh Wetlands pNHA (Site Code: 001934) is located ~18.5km to the south and downstream of the Proposed Grid Connection along the River Suir. The length of the hydrological flowpath between the Site and this pNHA is approximately 25.3km.
- The Ormond's Mill, Loughmoe, Templemore pNHA (Site Code: 002066) is located ~7.5km downstream of the Site along the River Suir.

Other designated site in close proximity to the Site include:

- Templemore Wood pNHA (Site Code: 000942) which is located directly north of Templemore town, approximately 3.9km southwest of the Site.
- The Kilduff, Devilsbit Mountain pNHA and SAC (Site Code: 000934) is located approximately 7.2km west from the Site.
- Nore Valley Bogs NHA (001853) is located approximately 9.6km to the north.

2.7.2 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 within the ZoI.

The closest downstream designated bathing waters in the Mahon Estuary are located at Bunmahon Beach and associated with the Mouth of the Eastern Celtic Sea. These bathing waters are ~80km south of the Site (straight line distance).

2.7.3 Nutrient Sensitive Areas

Nutrient Sensitive Areas (NSA) comprise Nitrate Vulnerable Zones and polluted waters designated under the Nitrates Directive (91/676/EEC).

There are no NSAs within close proximity to the Site. However, the River Suir downstream of Thurles, including the Suir_080 SWB is listed as a NSA.

2.7.4 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 designated shellfish areas located within the ZoI.

2.7.5 Freshwater Pearl Mussel

The freshwater pearl mussel (*Margaritifera*) is a bivalve mollusc found in clean, fast-flowing rivers, and occasionally in lakes. It is listed under Annex II and Annex V of the E.U Habitats Directive (Council Directive 92/43/EEC).

The Suir Catchment is listed as a Margaritifera sensitive area and is a catchment with previous records but the current status is unknown.

2.7.6 Drinking Water

There are no SWBs in the vicinity of the Proposed Grid Connection, or within the ZOI, which are identified as DWPAs. The nearest downstream DWPA is the Suir_140 SWB approximately 60km downstream of the Proposed Grid Connection . The length of the hydrological flowpath between the Site and this DWPA is in excess of 67km.

All GWB's in Ireland are considered as DWPAs. The closest GSI mapped source protection area is associated with the Templemore PWS, with the River Suir acting as a hydrological barrier between the Proposed Grid Connection and this PWS. The Castleiney GWS is mapped approximately 2.6km to the south of the Site. There is no connectivity between the Site and this GWS, as groundwater at the Site will discharge as baseflow to the River Suir and its tributaries. The currently in service Templetouhy Source Borehole is located approximately 4.6km to the southeast of the Site. Note that there is no hydrological or hydrogeological connectivity between the Site and these abstractions locations. Groundwater at the site will discharge into the River Suir to the southwest of the Site.

3. WFD SCREENING

3.1 SURFACE WATER BODIES

With consideration for the construction and operational phases of the Proposed Grid Connection, it is considered that the Clonmore Stream(Suir)_010 and Suir_020 SWBs will be included in the WFD Compliance Assessment due to the occurrence of components of the Proposed Grid Connection within these WFD river sub-basins. The Suir_030 SWB has also been included due to its location direction directly downstream of the Suir_020 SWB. The Proposed Grid Connection 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.

Meanwhile, the Suir_040, Suir_050, Suir_060, Suir_070 and Suir_080 SWBs has been screened out due to their distant location from the Site, the large volumes of water within the River Suir and the small scale of the proposed works. The Proposed Grid Connection has no potential to cause deterioration of the WFD status of these SWBs.

Note that the Proposed Grid Connection does not in any way rely on dilution or the assimilative capacity of any downstream waterbody. The mitigation measures prescribed in the EIAR, and summarised in Section 4.3, are the primary method for surface water quality and quantity protection and ensure that there will be no impact on any downstream SWB.

3.2 GROUNDWATER BODIES

With respect to GWBs, the Templemore GWB has been screened in due to its location directly underlying the Site. The proposed works must not in any way result in a deterioration in the status of this GWB and/or prevent it from meeting the biological and chemical characteristics for good status in the future.

3.3 PROTECTED AREAS

3.3.1 Nature Conservation Designations

The Kilduff, Devilsbit Mountain SAC/ pNHA, Templemore Wood pNHA and Nore Valley Bogs NHA are screened out of the impact assessment as there is no hydrological and hydrogeological connectivity with the Site. Groundwater at the Site will discharge to the River Suir and its tributaries. There is no potential for effects on these designated sites.

Meanwhile, Cabragh Wetlands pNHA, Lower River Suir SAC, and the Ormond's Mill, Loughmoe, Templemore pNHA are included for the purposes of a conservative assessment. These designated sites are located downstream of Thurles and includes the Suir_080 SWB. Given the separation distance (~18km) and the large volumes of water within the River Suir there is very limited potential for effects. Nevertheless, they are included to ensure a conservative approach.

3.3.2 Bathing Waters

There are no bathing waters within or adjacent to the Site.

3.3.3 Nutrient Sensitive Areas

As no NSAs are currently defined within or adjacent to the Site.

The River Suir NSA, associated with the Suir_080 SWB is included for the purposes of a conservative assessment.

3.3.4 Shellfish Areas

There are no shellfish areas within or vicinity of the Site.

3.3.5 Freshwater Pearl Mussel

The Suir Catchment is listed as a Margaritifera sensitive area and will be included in the assessment.

3.3.6 Drinking Water Protected Areas

The Templemore DWPA underlying the Site will be assessed (in this report) in the overall assessment on the Templemore GWB.

3.4 WFD SCREENING SUMMARY

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

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

Type	WFD Classification	Water body Name/ID	Inclusion in Assessment	Justification
Suir_SC_010 Sub Catchment				
Surface Water Body	River	Clonmore Stream (Suir)_010	**Yes**	Approximately 1.1km of new access track, the 2 no. end masts and approximately 1.2km of underground cabling route are mapped in the Clonmore Stream (Suir)_010 WFD river sub-basin. An assessment is required to consider whether the potential impacts associated with the Proposed Grid Connection will cause a deterioration in the status of this SWB.
	River	Suir_020	**Yes**	The north of the Site, including the proposed 110kV substation, the temporary construction compound, 80m of new access track and approximately 800m of the underground cabling route are mapped in the Suir_020 WFD river sub-basin. An assessment is required to consider whether the potential impacts associated with the Proposed Grid Connection will cause a deterioration in the status of this SWB.
	River	Suir_030	**Yes**	The Suir_030 is located directly downstream of the Suir_020 SWB. This SWB has been screened in due to its proximal location downstream and hydrological connection to the Site. An assessment is required to consider whether the potential impacts associated with the Proposed Grid Connection will cause a deterioration in the status of this SWB.
	River	Suir_040	No	The Suir_040 SWB has been screened out due to its distant location downstream of the Site and the increasing volumes of water within the River Suir. The Proposed Grid Connection therefore has no potential to result in a deterioration in the status of this SWB.
	River	Suir_050	No	The Suir_050 SWB has been screened out due to its distant location downstream of the Site and the increasing volumes of water within the River Suir. The Proposed Grid Connection therefore has no potential to result in a deterioration in the status of this SWB.
	River	Suir_060	No	The Suir_060 SWB has been screened out due to its distant location downstream of the Site and the increasing volumes of water within the River Suir. The Proposed Grid Connection therefore has no potential to result in a deterioration in the status of this SWB.
	River	Suir_070	No	The Suir_070 SWB has been screened out due to its distant location downstream of the Site and the increasing volumes of water within the River Suir. The Proposed Grid Connection therefore has no potential to result in a deterioration in the status of this SWB.
	River	Suir_080	No	The Suir_080 SWB has been screened out due to its distant location downstream of the Site and the increasing volumes of water within the River Suir. The Proposed Grid Connection therefore has no potential to result in a deterioration in the status of this SWB.
Groundwater Bodies				
Ground Water Body	Groundwater	Templemore	Yes	The Templemore GWB will be brought forward into the WFD Compliance Assessment as it lies directly underneath the Site. An assessment is required to consider whether the potential impacts associated with the Proposed Grid Connection will cause a deterioration in the status of this GWB.
Protected Area	Nature Conservation Site	Ormond's Mill, Loughmoe, Templemore pNHA	**Yes**	For the purpose of a conservative assessment, the Ormond's Mill, Loughmoe, Templemore has been screened in as it is located downstream of the Site along the River Suir.
		Templemore Wood pNHA	No	The Templemore Wood pNHA has been screened out due to the lack of hydrological and hydrogeological connectivity with the Site.

		Kilduff, Devilsbit Mountain SAC/ pNHA	No	The Kilduff, Devilsbit Mountain SAC/ pNHA has been screened out due to the lack of hydrological and hydrogeological connectivity with the Site.
		Nore Valley Bogs NHA	No	The Nore Valley Bogs NHA has been screened out due to the lack of any hydrological or hydrogeological connection between the Site and the NHA. The proposed works have no potential to degrade the ecological quality of these protected sites.
		Lower River Suir SAC	**Yes**	For the purpose of a conservative assessment, the Lower River Suir has been included in the assessment.
		Cabragh Wetlands pNHA	**Yes**	For the purpose of a conservative assessment, the Cabragh Wetlands has been included in the assessment.
	NSA	Suir NSA	**Yes**	For the purpose of a conservative assessment, the Suir NSA has been included in the assessment.

4. WFD COMPLIANCE ASSESSMENT

4.1 DEVELOPMENT PROPOSALS

The Proposed Grid Connection is described in full in Chapter 3 of the EIAR.

The main characteristics of the Proposed Grid Connection which could affect the hydrological and hydrogeological environment are described below:

- Approx 2.1km of an underground cabling route between the proposed 110kV substation and the Ikerrin to Thurles OHL involving the excavation of a shallow trench (approximately 1.2m deep), placement of ducting and backfilling with aggregate, lean-mix concrete, and excavated material, as appropriate (depending on the location of the cable trench);
- Construction of 2 no. end masts and associated foundations at the Ikerrin to Thurles OHL connection;
- Construction of the on-site 110kV substation with a subsoil bearing foundation. Welfare facilities will be provided at the substation along with a temporary construction compound;
- New access track following the off-road sections of the proposed underground cabling route through agricultural lands; and,
- Construction of 1 no. new watercourse crossing (clear span design) on the Strogue Stream, Horizontal Directional Drilling under 1 no. existing bridge crossing on the Clonmore stream and crossing of manmade field drains.

4.2 POTENTIAL EFFECTS

4.2.1 Construction Phase (Unmitigated)

4.2.1.1 Potential Surface Water Quality Effects

Construction phase activities including the establishment of the temporary construction compound, the construction of the substation compound, new access tracks, end masts and works along the underground cabling route will require earthworks resulting in removal of vegetation cover and excavation of soil and subsoils within the Site. The above works have the potential to impact water quality. The main risk will be from sediment in surface water runoff from bare soil and spoil storage areas during the construction works.

Hydrocarbons and cement-based compounds will also be used during the construction phase. The unintended release of effluent from temporary welfare facilities used during the construction phase also has the potential to impact on surface water quality.

These activities can result in the release of suspended solids and pollutants in runoff water and could result in an increase in the suspended sediment load, resulting in increased turbidity, increased pH and contamination which in turn could affect the water quality and fish stocks of downstream waterbodies.

There is also a requirement for 2 no. watercourse crossings along the underground cable route, these will be undertaken via horizontal directional drilling (HDD) and a clear span crossing, thereby avoiding in-stream works.

Some minor groundwater/surface water seepages will likely occur in excavations and this will create additional volumes of water to be treated by the runoff management system. Inflows will require management and treatment to reduce suspended sediments.

A summary of potential status change to SWBs arising from surface water quality impacts during the construction phase of the Proposed Grid Connection in the unmitigated scenario are outlined in **Table D**.

Table D: Potential Deterioration in Surface Waterbody Status During the Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Clonmore Stream (Suir)_010	IE_SE_16C111000	Moderate	Moderate
Suir_020	IE_SE_16S020200	Poor	Poor
Suir_030	IE_SE_16S020300	Moderate	Moderate

4.2.1.2 Potential Groundwater Quality/Quantity Effects

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a major pollution risk to groundwater. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Chemicals such as cement-based compounds also pose a threat to the groundwater environment. Runoff from concrete works can impact on groundwater quality. These sources of contamination have the potential to impact on groundwater quality in the underlying GWB.

In terms of groundwater quantity, no significant dewatering is being proposed. Due to the shallow, short-term and transient nature of the proposed works

Furthermore, due to the low permeability of the bedrock aquifer and the shallow nature of the proposed works, there is limited potential for the Proposed Grid Connection to result in a deterioration in the overall quantitative status of the underlying GWBs. The potential for the Proposed Grid Connection to result in a deterioration in the overall status of the GWB is further limited by the scale of the Templemore GWB (930km^2).

A summary of potential status change to GWB arising from potential groundwater quality/quantity impacts during the construction phase of the Proposed Grid Connection in the unmitigated scenario are outlined in **Table E**.

Table E: Potential Deterioration of Groundwater Body Status during the Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Templemore	IE_SE_G_131	Good	Good

4.2.1.3 Potential Effects on Protected Areas

The surface water and groundwater connections from the Proposed Grid Connection could transfer poor quality surface water that may affect the conservation objectives of these designated sites. However, the effect is limited due to the length of the hydrological flowpaths between the Site and the Lower River Suir SAC, the Cabragh Wetlands pNHA and the Suir NSA, and the large volumes of water within the River Suir.

Any potential deterioration in surface water quality associated with the Proposed Grid Connection may impact water quality in the River Suir and its tributaries and have an adverse impact on the Freshwater Pearl Mussel populations. However, given the scale of the proposed works in this catchment there is limited potential for effects on the downstream water quality.

4.2.2 Operational Phase (Unmitigated)

4.2.2.1 Potential Surface Water Quantity Effects

Progressive replacement of the soil or vegetated surfaces with impermeable surfaces could potentially result in an increase in the proportion of surface water runoff reaching the surface water drainage network. This could potentially increase runoff from the Proposed Grid Connection and increase flood risk downstream.

The assessed permanent Proposed Grid Connection footprint (approx. 17,190m^2) comprises the 110kV Substation compound (11,600m^2), access roads and 2 no. end masts (5,590m^2). The temporary construction compound (2,540m^2) will be reinstated following the completion of the construction works and is not included in the permanent development footprint.

During storm rainfall events, additional runoff coupled with increased velocity of flow could increase hydraulic loading, resulting in erosion of watercourses and impact on aquatic ecosystems.

Note that where the underground cabling route is located in the carriageway of the existing road corridor, there will be no change in surface water runoff rates as the trench and road surface will be reinstated.

A summary of potential status change to SWBs arising from increased runoff during the operation phase of the Proposed Grid Connection in the unmitigated scenario are outlined in **Table F**.

Table F: Potential Deterioration in Surface Waterbody Status Due to Quantitative Effects During Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Clonmore Stream (Suir)_010	IE_SE_16C111000	Moderate	Moderate
Suir_020	IE_SE_16S020200	Poor	Poor
Suir_030	IE_SE_16S020300	Moderate	Moderate

4.2.2.2 Potential Surface Water Quality Effects

During the operational phase, the potential for silt-laden runoff is much reduced compared to the construction phase. In addition, all permanent drainage controls will be in place and the disturbance of ground and excavation works will be complete. Some minor maintenance works may be completed, and 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 road material is added during maintenance works.

A summary of potential status change to SWBs arising from surface water quality effects during the operation phase of the Project in the unmitigated scenario are outlined in **Table G**.

Table G: Potential Deterioration in Surface Waterbody Status due to Qualitative Effects During Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Clonmore Stream (Suir)_010	IE_SE_16C111000	Moderate	Moderate
Suir_020	IE_SE_16S020200	Poor	Poor
Suir_030	IE_SE_16S020300	Moderate	Moderate

4.2.2.3 Potential Groundwater Quality/Quantity Effects

The potential for effects on groundwater quality is reduced in comparison with the construction phase. Any leakage of oils or wastewater at the Site would have the potential to result in a deterioration in the qualitative status of local groundwater. However, due to the nature of the operational phase and the overall scall of the underlying GWB, there is no potential for a deterioration in the overall qualitative status of the underlying GWB to be impacted.

A summary of potential status change to GWBs arising from potential groundwater quality impacts during the operational phase of the Proposed Grid Connection in the unmitigated scenario are outlined in **Table H**.

Table H: Potential Deterioration in Groundwater Body Status Due to Qualitative and Quantitative Effects During Operational Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Templemore	IE_SE_G_131	Good	Good

4.2.2.4 Potential Effects on Protected Areas

During the operational phase, the potential for silt-laden runoff is much reduced compared to the construction phase. In addition, all permanent drainage controls will be in place and the disturbance of ground and excavation works will be complete.

Therefore, the risk of any operational phase activities that may affect the conservation objectives of the protected areas is reduced from that defined for the construction phase (i.e. the greatest potential for the deterioration in the status of downstream protected areas occurs during the construction phase).

4.3 MITIGATION MEASURES

In order to mitigate against any deterioration of surface and groundwater quality, quantity and flow patterns, mitigation measures will be implemented during the construction and operational phases of the Proposed Grid Connection. These are outlined below.

4.3.1 Construction Phase

4.3.1.1 Potential Effects from Earthworks Resulting in Suspended Sediment Entrainment in Surface Waters

Mitigation by Avoidance:

The key mitigation measure during the construction phase is the avoidance of sensitive hydrological features where possible, by application of suitable buffer zones (i.e. 50m to main watercourses). All of the key Proposed Grid Connection areas are located significantly away from the delineated 50m watercourse buffer zones. No natural drainage routes will be modified as part of the Proposed Grid Connection. The foundations for the substation and end masts are designed to avoid crossing natural watercourses. Where the cabling route for the underground grid connection crosses watercourses, this will be undertaken via horizontal directional drilling (HDD) and a clear span crossing, thereby avoiding in-stream work.

The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively.

The buffer zones will:

- Avoid physical damage (river/stream banks and river/stream beds) to watercourses and the associated release of sediment.
- Avoid excavations within close proximity to surface watercourses.
- Avoid the entry of suspended sediment from earthworks into watercourses.
- Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.

Mitigation by Design:

- Source controls:
    - Interceptor drains, diversion drains, erosion and velocity control measures such as the use of sand bags, oyster bags filled with gravel, filter fabrics and other similar/equivalent or appropriate systems.
    - Small working areas, covering temporary stockpiles, weathering off temporary stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.

- In-Line controls:
    - Interceptor drains/swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps, sediment traps, temporary pumping systems, settlement ponds, or other similar/equivalent or appropriate systems.

- Treatment systems:
    - Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as "Siltbuster", and/or other similar/equivalent or appropriate systems.

There will be no direct discharges into any natural watercourses or land drains; instead, all drainage water will be managed as overland flows. All discharges from the proposed work areas will be directed over vegetation filters at an appropriate distance from natural watercourses and drains.

It should be noted for this site that a network of drains already exists, and these will be integrated and enhanced as required and used within the proposed drainage system. The integration of the existing drainage network and the proposed network is relatively simple. The key elements being the upgrading and improvements to existing water treatment elements, such as in line controls and treatment systems, including silt traps and settlement ponds.

The main elements of interaction with existing drains will be as follows:

- There will be no direct discharges into natural watercourses or drains. All discharges from the proposed works areas or interceptor drains will be directed over vegetated ground at a suitable distance from watercourses. This will reduce the potential for any increased risk of downstream flooding or sediment transport/erosion.
- Where artificial drains currently exist near the proposed work sites, these drains may need to be redirected to minimize water accumulation in the vicinity of the work areas. If it is not feasible to divert the artificial drains, drains will be blocked to prevent sediment-laden water from flowing directly into other watercourses. Blocking of the drains will only occur after an alternative drainage system to manage the same water has been established.
- Existing artificial drains near the L-7039/1, L7038 and R433 will be preserved in their existing locations where possible. If it is expected that these artificial drains will receive drainage water from works areas post treatment, check dams will be added to control flows and sediment loads in these existing artificial drains. If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain.
- Silt traps will be placed in the existing drains upstream of any streams where construction works is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area.

Pre-Commencement Temporary Drainage Works: Prior to the commencement of road upgrades (or new road installs) the following key temporary drainage measures will be installed:

- All existing dry drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using forestry check dams/silt traps.
- Clean water diversion drains will be installed upgradient of the works areas.
- Check dams/silt fence arrangements (silt traps) will be placed in all existing forestry drains that have surface water flows and also along existing forestry roadside drains.
- A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zone.

Silt Fences:
Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to the existing drainage network of sand and gravel-sized sediment, released from the excavation of mineral sub-soils of glacial and glacio-fluvial origin and entrained in surface water runoff. Inspection and maintenance of these structures during the construction phase are critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase

Silt Bags:
Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through.

Settlement Ponds:
The Proposed Grid Connection footprint will be divided into drainage catchments (based on topography, outfall locations, catchment size) and stormwater runoff rates based on the 10-year return period rainfall event will be calculated for each catchment. These flows will then be used to design settlement ponds for each drainage catchment. The settlement ponds will

either be designed for 11 hr or 24hr retention times used to settle out medium silt (0.01mm) and fine silt (0.004mm) respectively (EPA, 2006). Settlement ponds along Site access tracks will have 11 hr retention as there is additional in-line drainage controls proposed along Site access tracks.

Level Spreaders and Vegetation Filters:
The purpose of level spreaders is to release treated drainage flow in a diffuse manner, and to prevent the concentration of flows at any one location thereby avoiding erosion. Level spreaders are not intended to be a primary treatment component for development surface water runoff. They are not stand alone but occur as part of a treatment train of systems that will reduce the velocity of runoff prior to be released at the level spreader. In the absence of level spreaders, the potential for ground erosion is significantly greater than not using them.

Vegetation filters are essentially end-of-line polishing filters that are located at the end of the treatment train. In fact, vegetation filters are ultimately a positive consequence of not discharging directly into watercourses which is one of the mitigation components of the drainage philosophy.

Again, vegetation filters are not intended to be a single or primary treatment component for treatment of works area runoff. They are not stand alone but are intended as part of a treatment train of water quality improvement/control systems (i.e. source controls >check dams > silt traps > settlement ponds > level spreaders > silt fences> vegetation filters).

Water Treatment Train:
If the discharge water from construction areas fails to be of a high quality, then a filtration treatment system (such as a 'Siltbuster' or similar equivalent treatment train (sequence of water treatment processes)) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply to all of the construction phase.

Drainage Management along the Cable Trench:
Cable trenches are typically constructed in short, controlled sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences.

To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator bucket. Should any rainfall cause runoff from the excavated material, the material is therefore collected and contained in the downgradient cable trench. Some of the excavated materials from the Grid Connection underground electrical cabling route will go to an appropriate licenced facility as required. This is dependent on the road makeup at locations along the underground electrical cabling route. The remaining spoil will be managed into linear berms alongside the new access tracks proposed along the grid connection cable route within agricultural fields

Pre-emptive Site Drainage Management:
The works programme for the groundworks part of the construction phase of the Proposed Grid Connection will also take account of weather forecasts and predicted rainfall in particular. The site Construction Manager is responsible for making the decision to postpone or abandon works. Movements of overburden or large-scale soil stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

The following forecasting systems are available and will be used on a daily/weekly basis, as required, to allow site staff to direct proposed and planned construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Éireann website (www.met.ie). These provide general information on weather patterns

including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates.
- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale.
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events.
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Éireann website (www.met.ie). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive.
- Consultancy Service: Met Éireann provide a 24-hour telephone consultancy service. The forecaster will provide an interpretation of weather data and give the best available forecast for the area of interest.

Earthworks will be suspended in the event of an orange or red warning for rainfall. Prior to earthworks being suspended the following further control measures will be completed:

- All open spoil excavations will be secured and sealed.
- Temporary or emergency drainage will be created to prevent back-up of surface runoff.
- Working during heavy rainfall and for up to 24 hours after heavy events will not be allowed to ensure drainage systems are not overloaded.
- All drainage systems will be inspected after orange rainfall events to ensure functionality, and any identified repairs will be completed.

Management of Runoff from Spoil Storage Area:
It is proposed that all excavated spoil material will be managed on-site, either placed within the identified spoil management areas (i.e. linear berms along access roads or the 4m berm alongside the substation) or temporarily stockpiled locally for reuse for landscaping purposes.

Proposed surface water quality protection measures regarding the spoil storage areas are as follows:

- During the initial emplacement of spoil, silt fences, straw bales and biodegradable matting will be used to control surface water runoff.
- Discharge from the storage areas will be intermittent and will depend on preceding rainfall amounts.
- Once the storage areas have been seeded and vegetation is established the risk to downstream surface water is significantly reduced.

Timing of Site Construction Works:
Construction of the site drainage system will only be carried out during periods of low 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. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works.

4.3.1.2 Potential Effects on Groundwater Levels During Excavation Works

No specific mitigation measures in relation to potential effects on local groundwater levels will be required due to the shallow nature of the proposed works.

There will be no effects on local groundwater levels for the following reasons:

- The shallow nature of the proposed excavation works.
- The temporary and short duration of the excavations along the underground cabling route.
- The lack of any shallow water bearing granular subsoils, or a shallow overburden aquifer (sand and gravel aquifer). Site investigations at the proposed substation (TP16) encountered low permeability limestone till and no significant inflows of groundwater were recorded (refer to Appendix 7-1 and Appendix 7-2, for Trial Pit logs and Borehole logs, respectively).
- The site investigation works do not indicate the presence of any karstified limestone in the area of the site. Nevertheless, the shallow works will not encounter the underlying Locally Important Aquifers.
- Therefore, no significant dewatering will be required during the construction phase. Direct rainfall and surface water runoff will be the main inflows that will require water volume and water quality management in excavations. For the avoidance of doubt, we would generally define dewatering as a requirement to temporarily drawdown the local groundwater table by means of over pumping, e.g. as would be required for the operation of a bedrock quarry in a valley floor. We consider that this example is incomparable to the Proposed Grid Connection.

4.3.1.3 Potential Effects from Excavation Dewatering and Potential Effects on Surface Water Quality

Management of surface water and 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 put in place.
- If required, pumping of excavation inflows will prevent build-up of water in the excavation.
- The interceptor drainage will be discharged to the Site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters.
- The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a Siltbuster unit.
- There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur.
- Daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken.
- A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available onsite for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. 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. They will be used as final line of defence if needed.

4.3.1.4 Potential Effects from the Release of Hydrocarbons

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- Where possible maintenance of construction vehicles and refuelling will be completed off-site.
- On-site refuelling will take place in designated refuelling areas located throughout the Site. Heavy plant and machinery will be refuelled on-site by a fuel truck that will arrive to Site as required on a scheduled basis. Other refuelling will be carried out using a mobile double-skinned fuel bowser, with spill kits on the ready for any minor accidental leakages or spillages. When not in use the fuel bowser, will be parked only on a level area within the Site.

- Fuels stored on Site will be minimised but will be in bunded locations.
- Only trained and authorised personnel will be permitted to refuel equipment on-site.
- Mobile measures, such as dip trays and fuel absorbent mats, will be used during refuelling activities as necessary.
- The substation transformer and oil interceptor will be on a bunded concrete plinth capable of holding 110% of the stored oil volume and to prevent leakage to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor.
- All waste tar material arising from the public roads during construction of the underground electrical cabling route will be removed off-site and taken to an appropriately licenced facility.
- The plant used during construction will be regularly inspected for leaks and fitness for purpose.
- An emergency plan for the construction phase to deal with accidental spillages will be contained within the Construction Environmental Management Plan (CEMP) Appendix 3-2 of this EIAR. Spill kits will be available to deal with accidental spillage in and outside of re-fuelling areas.

4.3.1.5 Potential Effects from Wastewater Disposal

- During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at the temporary construction compound, 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 to the Site.

4.3.1.6 Potential Effects from the Release of Cement-Based Products

- No batching of wet-concrete products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- Where possible pre-cast elements for culverts and concrete works will be used.
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined concrete washout pond. The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a Siltbuster-type concrete wash unit or equivalent.
- Concrete trucks bodies will be washed out at batching plants only.
- The arrangements for concrete deliveries to the Site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout and discussing emergency procedures.
- Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted at the Site.
- Weather forecasting will be used to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast.
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event. Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets.
- Restricting concrete pumps and machine buckets from slewing over watercourses (including drains and ditches) while placing concrete.
- Ensuring that covers are available, and used, when necessary, for freshly placed concrete to avoid the surface washing away in heavy rain.

- Placement of any potential, small surplus of concrete after completion of a pour in suitable locations away from any watercourse or sensitive habitats.

4.3.1.7 Potential Effects from New Proposed Watercourse Crossing

- The proposed new stream crossing will be a clear span bridge crossing and the existing banks will remain undisturbed. No in-stream excavation works are proposed at this location and therefore there will be no direct impact on the stream at the proposed crossing location. Abutments will be constructed from precast units combined with in-situ foundations.
- All guidance / mitigation measures required by the OPW and/or the Inland Fisheries Ireland (IFI) is incorporated into the design of the proposed crossing.
- All drainage measures will be installed in advance of the works.
- Plant and equipment will not be permitted to track across the watercourse.
- Once the foundations have been completed at both sides of the watercourse, the pre-cast clear span crossing will be installed using a crane and there will be no contact with the watercourse.
- Where the pre-cast clear span crossing is installed in sections, the joint will be sealed to prevent granular material entering the watercourse;
- As a further precaution, near stream construction work, will only be carried out during the period permitted by IFI for in-stream works according to the IFI (2016) guidance document "Guidelines on protection of fisheries during construction works in and adjacent to waters", 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);
- Where works are necessary inside the 50m buffer double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase; and,
- All new river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.
- The watercourse crossings will be constructed to the specifications of the OPW bridge design guidelines 'Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945', and in consultation with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material.
- Confirmatory inspections of the proposed new watercourse crossing location will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.

4.3.1.8 Potential Effects from the Use of Siltbuster

Measures employed to prevent overdosing and potential chemical carryover:

- The Siltbuster system comprises an electronic in-line dosing system which provides an accurate means of adding reagents, so overdosing does not occur.
- Continued monitoring and water analysis of pre and post treated water by means of an inhouse lab and dedicated staff, means the correct amount of chemical is added by the dosing system.
- Dosing rates of chemical to initiate settlement is small, being in the order of 2-10 mg/L and the vast majority of the chemical is removed in the deposited sediment.
- Final effluent not meeting the discharge criteria is recycled and retreated, which has a secondary positive effect of reducing carryover.
- Use of biodegradable chemical agents can be used at very sensitive sites (i.e. adjacent to SACs).

4.3.1.9 Potential Effects Associated with Horizontal Directional Drilling

- 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. 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.
- Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channels.
- Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered.
- The area around the 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 cleaned up immediately and contained in an adequately sized skip before been taken off-site.
- 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 compound 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.
- The silt fencing upslope of the river will be left in place and maintained until the disturbed ground has re-vegetated.
- There will be no batching of cement along the underground cabling route.
- There will be no refuelling allowed within 100m of the watercourse crossing.
- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing.
- Fracture Blow-out (Frac-out) Prevention and Contingency Plan:
    - The drilling fluid will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used).
    - Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility.
    - 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.
    - If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location.

4.3.1.10 Potential Effects on Surface Water Quality Due to Fluvial Flooding During Construction

- The substation and construction compound are located outside of the NIFM mapped and modelled flood zones.

- The foundations of the end masts will be constructed as close to ground level as possible.
- All access roads proposed within the floodplain will be constructed as close to existing ground level as possible.

Despite the low likelihood of a fluvial flood event occurring during the construction of the Proposed Grid Connection, weather/rainfall events of those magnitudes likely to generate significant rainfall which would in turn cause fluvial flooding would be forecastable.

An emergency response system has been development for the construction phase to respond to high rainfall events which may result in fluvial flooding.

A potential fluvial flooding event at the Site would likely be identified ~5-7 days in advance, with more accurate forecasts of severity within 24-48 hours of occurrence. Weather warnings would be issued from Met Eireann at least 60 hours before an event, but there would be indications from a week out that a likely significant event might occur. Preparation for a significant event would need to begin from the initial indications of the pending flood event. This would allow time for preparation and the implementation of additional emergency mitigation measures outlined below if there were to be a pending risk of an extreme flooding event. A forecast red weather warning (combining high river levels and heavy rainfall) is the defined trigger for the Managed Retreat described below.

The first point of mitigation is ongoing monitoring of weather forecasts, weather warnings, wind direction, and rainfall depths. The project Environmental Manager or the site ECoW will be responsible for monitoring weather forecasts during the construction phase.

When a pre-determined rainfall trigger levels is exceeded (e.g., sustained rainfall (any foreseen rainfall event longer than 4 hour duration) and/or any yellow or greater rainfall warning (>25mm/hour) issued by Met Eireann), planned responses will be undertaken.

- Cessation of all construction works until the storm event, including the storm runoff has passed. All construction works will cease during storm events such as yellow warning rainfall events. Following heavy rainfall events, and before construction works recommence, the Site will be inspected and corrective measures implemented to ensure safe working conditions e.g. dewatering of standing water in open excavations, etc.
- Exposed soils/peat (exposed temporary stockpiles) will be covered with plastic sheeting during all relatively heavy rainfall events and during periods where works have temporarily ceased before completion at a particular area (e.g., overnight and weekends).
- With regards to the fluvial flood zones at the Site, a managed retreat from the fluvial flood zones will be implemented in the event of a high intensity rainfall event and/or weather warning related to rainfall. This will include the following:
- Any areas where soil/subsoil is exposed at the surface will be compacted firmly with a digger bucket of a suitably sized excavator.
- Open trenches will be backfilled and compacted.
- All oils, fuels and waste material will be removed from the flood zones.
- Existing sediment control measures will be removed, as these may be washed away and deposited elsewhere by the floodwaters.
- Site access tracks will be scraped and any excess soft material will be removed from the flood zones.
- All plant/machinery and equipment will be removed from the flood zones.

4.3.2 Operational Phase

4.3.2.1 Potential Effects from the Replacement of Natural Surfaces with Lower Permeability Surfaces

The operational phase drainage system of the Proposed Grid Connection will be installed and constructed in conjunction with the road and hardstanding construction work as described below):

- Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader;
- Swales/road side drains will be used to collect runoff from access roads 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') will be constructed in the surface layer of the road to divert any runoff off the road into swales/road side drains;
- Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock;
- Settlement ponds, emplaced downstream of road swale sections, 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 have been designed in consideration of the greenfield runoff rate.

4.3.2.2 Potential Effects on Downstream Flood Risk

The elements of the Proposed Grid Connection within the floodplain have a very small area in comparison with the mapped extent of the floodplain.

Proposed new roads in flood zones will be kept close to existing ground level to avoid alteration of surface water flows and reduced potential road damage during flood events.

Other than the Proposed Grid Connection drainage control measures/SuDs, no additional mitigation measures are necessary with regard flood risk.

4.3.2.3 Potential Effects from Runoff Resulting in Contamination of Surface Waters

Mitigation measures for sediment control are the same as those outlined for the construction phase in **Section 4.3.1.1**.

Mitigation measures for the control of hydrocarbons during maintenance works are similar to those outlined in **Section 4.3.1.4** and include:

- Onsite re-fuelling of normal operational vehicles will not be carried out during the operational phase of the development. These vehicles will be refuelled offsite.
- Fuels stored on site will be minimised and any hydrocarbons stored on-site will be bunded. The bund capacity will be sufficient to contain 110% of the storage tank's maximum capacity;
- The substation transformer and oil interceptor will be on a bunded concrete plinth capable of holding 110% of the stored oil volume and to prevent leakage to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- Any plant used during the operational phase will be regularly inspected for leaks and fitness for purpose; and,
- Spill kits will be available to deal with accidental spillages.

4.3.2.4 Potential Effects Due to Wastewater Contamination

On-site wastewater treatment is not planned. Wastewater from the staff welfare facilities in the control buildings will be managed using a sealed underground storage tank, with all wastewaters being transported off-site by a licensed waste collector to a permitted wastewater treatment facility.

The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. The wastewater storage tank alarm will be part of a continuous stream of data from the Proposed Grid Connection and Consented Wind Farm that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the substation underground storage tank. There will be no discharge of wastewater at the site.

4.3.2.5 Potential Effects Associated with Water Supply

The abstraction rate for the proposed groundwater well at the substation will be comparable to a domestic well, with a well supplying a single household typically abstracting less than 1m3/day. The well is proposed in a Locally Important Aquifer (LI) which forms part of the Templemore GWB. Due to the proposed abstraction rate, no effects on local groundwater levels will occur. For these reasons no mitigation measures are required.

4.3.1 Decommissioning Phase

There are no potential impacts associated with decommissioning of the Proposed Grid Connection as it will remain in place as it will become part of the National Electricity Grid under the ownership and control of the ESB and EirGrid.

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 I** below.

Table I: Summary of WFD Status for Unmitigated and Mitigated Scenarios

SWB	WFD Code	Current Status	Assessed Potential Status Change (Unmitigated)	Assessed Potential Status Change (Mitigated)
Clonmore Stream (Suir)_010	IE_SE_16C111000	Moderate	Moderate	Moderate
Suir_020	IE_SE_16S020200	Poor	Poor	Poor
Suir_030	IE_SE_16S020300	Moderate	Moderate	Moderate
Templemore	IE_SE_G_131	Good	Good	Good

4.4 CUMULATIVE ASSESSMENT

This section presents an assessment of the potential cumulative effects associated with the Proposed Grid Connection and other developments (existing and/or proposed) on the hydrological and hydrogeological environment.

The main likelihood of cumulative effects is assessed to be hydrological (surface water quality) rather than hydrogeological (groundwater). Due to the local hydrogeological setting (i.e. groundwater flow towards the nearby River Suir) and the near surface nature of construction

activities, cumulative effects with regard groundwater quality or quantity arising from the Proposed Grid Connection are not likely to extend beyond the EIAR Study Area.

The primary potential for cumulative effects will occur during the construction phase of the Proposed Grid Connection as this is when earthworks and excavations will be undertaken. The potential for cumulative effects during the operational phase will be significantly reduced as there will be no exposed excavations, there will be no sources of sediment to reach watercourses, there will be no use of cementitious materials and fuels/oil will be kept to a minimum at the site. As the Proposed Grid Connection will remain part of the national grid infrastructure, it will not be decommissioned. Therefore, no cumulative effects are foreseen during the decommissioning of the Consented Wind Farm.

4.4.1 Cumulative Effects with Agriculture

Agriculture is the largest pressure on water quality in Ireland (EPA, 2024). Agricultural practices such as the movement of soil and the addition of fertilizers and pesticides can lead to nutrient losses and the entrainment of suspended solids in local surface watercourses. This can have a negative effect on local and downstream surface water quality.

In an unmitigated scenario the construction of the Proposed Grid Connection would have the potential to interact with these agricultural activities and contribute to a deterioration of downstream surface water quality through the emissions of elevated concentrations of suspended solids and ammonia.

However, the mitigation measures detailed above in Section 4.3 will ensure the protection of downstream surface water quality.

For these reasons, and with the implementation of the referenced mitigation measures, it is considered that there will be no deterioration in WFD status of SWBs arising from cumulative effects associated with agricultural activities.

4.4.2 Cumulative Effects with Forestry

The most common water quality problems arising from forestry relate to the release of sediment and nutrients to the aquatic environment and impacts from acidification. Forestry felling may also give rise to modified stream flow regimes caused by associated land drainage.

Given that most of the main forestry plantations are located a significant distance from the Proposed Grid Connection, the likelihood of significant potential effects occurring is low. Furthermore, the mitigation measures detailed for the construction and operation of the Proposed Grid Connection will ensure the protection of downstream surface water quality.

For these reasons it is considered that there will not be a significant cumulative effect associated with forestry activities.

4.4.3 Cumulative Effects with the Consented Wind Farm

The location of the Consented Wind Farm (ABP Ref: 318704) is located immediately to the west and northwest of the Proposed Grid Connection. The Consented Wind Farm comprises of a 9 no. turbine wind farm which is drained by the River Suir and its tributary the Eastwood River. Any potential overlap between the construction of the wind farm and the Proposed Grid Connection could potentially, in the absence of mitigation measures, result in cumulative effects on the local hydrological environment.

However, the EIAR for Consented Wind Farm details potential hydrological and hydrogeological issues relating to the construction, operation and decommissioning phases of this development and proposes a suite of best practice mitigation measures designed to ensure that the Consented Wind Farm does not in any way have a negative effect on downstream surface water quality and quantity. Similarly, the mitigation and best practice measures

proposed in this EIAR chapter will ensure that the Proposed Grid Connection does not have the potential to result in significant effects on the hydrological/hydrogeological environment.

Therefore, with the implementation of the proposed mitigation measures (both for the Proposed Grid Connection and for the Consented Wind Farm) there will be no cumulative effects associated with the construction or operational phases of the Proposed Grid Connection.

4.4.4 Cumulative Effects with One Off Housing Developments

A detailed cumulative assessment has been carried out for all planning applications (granted and awaiting decisions) within the cumulative assessment area described above. Refer to Appendix 15-1 of this EIAR for details.

There are applications are for new dwellings or renovations of existing dwellings, as well as for the erection of farm buildings. Based on the scale of the works, their proximity to the Proposed Grid Connection and the temporal period of likely works, no cumulative effects will occur as a result of the Proposed Grid Connection (construction and operation phases).

5. REPORT SUMMARY

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

The Proposed Grid Connection does not involve the abstraction of any significant volume of groundwater. The only groundwater abstraction will occur during the operational phase with a groundwater well proposed at the substation compound. The abstraction rate will be very small, equivalent to the abstraction rate of a domestic well. Therefore, the quantitative status (i.e., the available quantity (volume) of groundwater locally) of the receiving GWBs will remain unaltered by the Proposed Grid Connection.

There is no direct discharge from the Site to downstream receiving surface waters. Mitigation for the protection of surface water during the construction and operational phases of the Proposed Grid Connection will ensure the qualitative status of the receiving waters will not be altered by the Proposed Grid Connection. The design of the Proposed Grid Connection combined with the drainage measures will ensure that there is no displacement of floodwaters as a result of the Proposed Grid Connection. These measures will ensure that the quantitative status of the receiving SWB will remain unaltered.

There is also mitigation proposed to protect groundwater quality. These mitigation measures will ensure the qualitative status of the underlying GWB will not be altered during the construction, or operation phases of the Proposed Grid Connection.

There will be no change in GWB or SWB status in the underlying GWB or downstream SWBs resulting from the Proposed Grid Connection. 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.

As such, the Proposed Grid Connection will not impact upon any surface water or groundwater body as it will not cause a deterioration of the status of the body and/or it will not jeopardise the attainment of good status.

As such, the Proposed Grid Connection, alone or in combination with other developments:

- will not cause a deterioration in the status of any surface and groundwater bodies;
- will not jeopardise the achievement of 'Good' quality 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 ecological potential;
- 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 and not likely to compromise the ability of any water bodies to meet the objectives of the Water Framework Directive (2000/60/EC) as amended and its transposing legislation;
- does not degrade the ecological quality of the protected sites associated with connected waterbodies nor jeopardise the goals and/or targets set out for these protected sites: 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 8.1.4 of the EIAR).

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6. REFERENCES

Department of Housing, Local Government and Heritage (2024). Water Action Plan 2024. A River Basin Management Plan for Ireland.

Environmental Protection Agency (2024). Cycle 3: HA 16 Suir Catchment Report.

Water Framework Directive "catchments.ie" Map Viewer (www.catchments.ie).

Directives and Legislation

Council Directive (76/160/EEC) Bathing Water and revised (2006/7/EC).

Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources (Nitrates Directive).

Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment.

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption.

Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy.

Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014, amending Directive 2011/92/EU of the European Parliament and the Council of 13 December 2011 on the assessment of the impacts of certain public and private projects on the environment.

S.I. No. 293/1988: Quality of Salmon Water Regulations.

S.I. No. 722/2003 – European Communities (Water Policy) Regulations 2003.

S.I. No. 268/2006 - European Communities (Quality of Shellfish Waters) Regulations 2006.

S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010, as amended.

S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009, as amended.

S.I. No. 350/2014 - European Union (Water Policy) Regulations 2014.

S.I. No. 351/2011 - Bathing Water Quality (Amendment) Regulations 2011.

S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011.

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