KWF Grid Connection EIA Report 2023

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Chapter 9: Water

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Glossary of Terms

Term	Definition
Aquifer	A permeable geological stratum or formation that can both store and transmit water in significant quantities.
Baseflow	Water which enters streams/rivers from groundwater flow and maintains streamflow during dry periods.
Groundwater	Water under a pressure greater than atmospheric pressure which is present in the saturated zone of the soil.
Groundwater Body	A distinct volume of groundwater within an aquifer or system of aquifers, which is hydraulically isolated or partially isolated from nearby groundwater bodies.
Permeability	The rate at which a fluid flows through a porous medium under the hydraulic head operating within the medium. Usually, the greater the porosity, the greater the permeability.
Surface Water Runoff	Overland flow of water as a result of rainfall
Saturated Zone	The zone below the groundwater table in which all the soil pores and rock fractures are filled with water. It underlies the unsaturated zone (see below).
Spring	A flow of groundwater on the ground surface that occurs where the water table intercepts the ground surface.
Surface Water Catchment	The surface area determined by topographic features within which falling rain will contribute to run-off at a particular point under consideration.
Unsaturated Zone	The zone below the land surface and above the groundwater table which contains water and air in the open spaces, or pores.
Glossary of General Terms	
KWF Grid Connection (the subject development)	Underground cabling, additional plant and apparatus in the existing Woodhouse Substation, the construction a new link road, the widening of an existing forestry road and the use of the existing entrance and windfarm road network at Woodhouse Windfarm.
Authorised Knocknamona Windfarm	Not Constructed - Knocknamona Windfarm authorised in 2016 (ABP-PL 93.244006); Amendments to Knocknamona Windfarm to provide for larger turbines authorised in September 2022 (ABP-309412-21) and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower authorised in December 2022 (ABP-314219-22)
Whole Project	KWF Grid Connection with Authorised Knocknamona Windfarm
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.

List of Abbreviations

Abbreviation	Full Term
RWB/GWB/TWB	River Waterbodies / Groundwater Bodies/ Transitional Waterbodies
WFD	Water Framework Directive
SAC	Special Areas of Conservation as defined by the National Parks and Wildlife Services
NHA	Natural Heritage Area as defined by the National Parks and Wildlife Services

9 Environmental Factor: Water

9.1 Introduction to the Water Chapter

9.1.1 What is Water?

Water relates to the hydrology and hydrogeology in the area. Hydrology is the term used for surface water drainage within regional and local catchments. Hydrogeology is the distribution and movement of groundwater within aquifers in the local groundwater bodies. The local hydrology and hydrogeology are assessed with respect to river waterbodies, groundwater bodies, drinking water supplies, designated sites (i.e. SACs, NHAs etc) and WFD Status effects.

9.1.2 Overview of Water in the Local Environment

With respect of surface water hydrology, the existing environment comprises regional and local surface water catchments.

Regional surface water WFD Catchments in which the KWF Grid Connection is located include the Blackwater (Munster) Catchment and the Colligan-Mahon Catchment.

In relation to surface water catchments, the KWF Grid Connection is located within the Finisk_SC_010 and Goish_SC_010 Sub-Catchments which form part of the Blackwater (Munster) Catchment and also in the Colligan_SC_010 Sub-Catchment which forms part of the Colligan (Mahon) Catchment.

The nearest surface watercourse to the proposed development is the Mountodell Stream (Brickey_020) which flows within 280m of a short section of underground cabling and drains an area at the central portion of the site. The Mountodell Stream flows north for ca. 2km to meet the River Brickey, which flows east into Dungarvan Harbour.

The WFD Status of river waterbodies downstream of the KWF Grid Connection range from Poor (Brickey) to High (Finisk). The Lower Blackwater Estuary / Youghal Harbour and Brickey Estuary are Transitional Waterbodies located downstream of the KWF Grid Connection and both are assigned Moderate WFD Status (WFD Status 2016 – 2021).
Figure 9.1: Location of KWF Grid Connection in relation to Surface Water Catchments

In relation to designated sites; the Finisk and Goish rivers drain into the River Blackwater which has the following designations: Blackwater River (Cork/Waterford) SAC, Blackwater Estuary SPA, and the Blackwater River and Estuary pNHA. The Brickey River drains into Dungarvan Harbour which has the following designations: Dungarvan Harbour SPA and Dungarvan Harbour pNHA.
Figure 9.1.1: Location of KWF Grid Connection in relation to Designated Sites

In respect of groundwater, the existing environment comprises 2 no. groundwater bodies (GWBs) - the Helvic Head GWB and the Glenville GWB. Both these GWBs have been classified as “Good Status” by the Water Framework Directive (WFD) characterisation process (WFD Status 2016 – 2021). Both GWBs comprise Locally Important Aquifers (in the area of the proposed KWF Grid Connection) in terms of their potential productivity as a groundwater supply source and expected groundwater flowpath distance, as illustrated on Figure 9.5.
Figure 9.5: Location of KWF Grid Connection in relation to Groundwater Bodies

In relation to public supply, group scheme and private water supplies, there are no local surface water or

groundwater abstractions from local streams for public supply, and no springs supplying water in the vicinity of KWF Grid Connection. The closest water supply source is a groundwater well, which utilises the underlying bedrock aquifer located 138m to the west of the KWF Grid Connection. This well supplies water to farm buildings.

9.1.3 SENSITIVE ASPECTS of Water

Any receptor in the local environment which could be affected by a development is a Sensitive Aspect.

9.1.3.1 Sensitive Aspects included for detailed evaluation in this Topic Chapter

The following Sensitive Aspects are **included for detailed evaluation in this topic chapter** as it is likely or there is potential, for these Sensitive Aspects to be affected by the KWF Grid Connection:

Sensitive Aspect No. 1	**River Waterbodies** (quality, quantity and WFD status)	Section 9.2
Sensitive Aspect No. 2	**Groundwater Bodies** (quality, quantity and WFD status)	Section 9.3
Sensitive Aspect No. 3	**Designated Sites** (water dependant habitats and ecosystems)	Section 9.4

The above listed Sensitive Aspect is evaluated for impact in Section 9.2; Section 9.3 and Section 9.4 of this Chapter and in Appendix 9.1 to this Chapter.

9.1.3.2 Sensitive Aspects excluded from further evaluation

The following Sensitive Aspects are **excluded from further evaluation in this topic chapter** because there are no likely effects or the Sensitive Aspect is evaluated in one of the other topic chapters within the EIAR.

The following Sensitive Aspects **are excluded from this topic chapter**:

Local Water Supplies	Rationale for excluding this Sensitive Aspect: **No Likely effects** due to: The absence of any group water schemes and public water supplies in the area of the proposed development; The closest water supply source is a groundwater well, which utilises the underlying bedrock aquifer, 138m from KWF Grid Connection, this well supplies water to farm buildings; Due to the elevated nature of the proposed development site, shallow nature of the earthworks associated with the KWF Grid Connection, and the fact that no discharges to ground are proposed, no effects on local wells will occur.
Transitional Water bodies	Water quality effects in downstream Transitional Waters (i.e. Upper Blackwater M Estuary; Lower Blackwater M Estuary / Youghal Harbour; Colligan Estuary and Brickey Estuary) are not likely due to the small scale of the works combined with the downstream distance, the fact transitional water bodies are not freshwater dependent, along with tidal effects (i.e. dilution effects of saline waters) and also the large freshwater surface water catchment upstream of these estuaries (i.e dilution effects of river waterbody flows).

Wetlands of Biodiversity Importance	Rationale for excluding this Sensitive Aspect: **No likely effects**. An area in Woodhouse townland 2km to the southwest of KWF Grid Connection construction works area is designated locally as a wetland of biodiversity importance WD284 in the Waterford County Development Plan 2022-2028 Appendix 11: Natural heritage Assets. No element of the KWF Grid Connection interacts directly with this area nor does the proposed development site drain into the Wetland area.

9.1.4 The Authors of this Water Chapter

This report on the Environmental Factor Water has been written by David Broderick (P.Geo., BSc, H. Dip Env Eng, MSc): Hydrogeologist and Michael Gill (P.Geo., B.A., B.A.I., M.Sc., Dip. Geol, MIEI): Environmental Engineer of Hydro-Environmental Services (HES) which was established in 2005 as a hydrological, hydrogeological and environmental practice, specialising in peatland and upland hydrology in Ireland and Northern Ireland.

9.1.5 Sources of EIAR Information

The following sources of information were used to gather information on the baseline environment and evaluate impacts, including cumulative impacts.

Table 9-1: Sources of EIAR Information

Type	Information Source
Consultation	Feedback of a general nature was received from Uisce Eireann. Direct consultation with local landowners and local residents regarding local water supply See Chapter 3: The Scoping Consultations
Guidelines	• Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements; • National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes; • Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh; • Coillte (2009): Forest Operations & Water Protection Guidelines; • Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford; • Inland Fisheries Ireland 2016: Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters; • DoELG, EPA, and GSI (1999): Groundwater Protection Schemes. Department of the Environment and Local Government (DOELG), Environmental Protection Agency (EPA) and the Geological Survey of Ireland (GSI); • EPA Drinking Water Advice Note No. 7: Source Protection and Catchment Management to Protect Groundwater Supplies;

Type	Information Source
	• EPA Drinking Water Advice Note No. 8: Developing Drinking Water Safety Plans; and, • EPA Drinking Water Advice Note no. 14: Borehole Construction and Wellhead Protection
Desktop	• Environmental Protection Agency database and Viewer (www.epa.ie); • Geological Survey of Ireland Databases (www.gsi.ie) (including the database for wells with 100m mapped accuracy) • EPA Catchments (www.catchments.ie); • Met Eireann Meteorological Databases (www.met.ie); • National Parks & Wildlife Services Public Map Viewer (www.npws.ie); • OPW Flood Maps (www.floodinfo.ie); • Pre-surveyed dwelling house locations as an indicator of potential local groundwater supplies (i.e. wells). In co-ordination with and by review of the other EIA 2023 Report Chapters as follows: • Chapter 5: Description of Development • Chapter 7: Biodiversity • Chapter 8: Land & Soils Review of Authorised Knocknamona Windfarm Planning Docs • Knocknamona Windfarm Revised EIS 2015 • Amendment to Knocknamona Windfarm – Larger Turbines Revised EIAR 2021 • Junction & Bend Widening Works Screening for EIA 2022 Available in EIAR 2023 Volume F: Reference Documents
Fieldwork	• Walkover surveys and field mapping (February 2019, August 2019 & March 2023); • Trial Hole investigation (February 2019 and August 2019); and, • Surface Water Sampling (January 2019 and February 2023)

9.1.6 Methodology used to Describe the Baseline Environment and to Evaluate Impacts

The criteria used for evaluation of the Water Environment was based on the NRA (2008) guidance which is also an approach that was referenced by the Institute of Geologists Ireland (IGI) guidance (2013).

9.1.6.1 NRA Criteria for Estimating the Importance of Hydrology Attributes

Using the National Roads Authority (2008) guidance, an estimation of the importance of the hydrological and hydrogeological environment within the study area is quantified, using the criteria set out in Table 9-2 and Table 9-3 below.

Table 9-2: Estimation of Importance of Hydrology Attributes (NRA, 2008)

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on international	River, wetland or surface water body ecosystem protected by EU legislation, e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale.	River, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding Nationally important amenity site for wide range of leisure activities.
High	Attribute has a high quality or value on a local scale.	Salmon fishery Locally important potable water source supplying >1000 homes. Quality Class B (Biotic Index Q3-4). Flood plain protecting between 5 and 50 residential or commercial properties from flooding. Locally important amenity site for wide range of leisure activities.
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery. Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2-3). Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	Attribute has a low quality or value on a local scale.	Locally important amenity site for small range of leisure activities. Local potable water source supplying <50 homes. Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding. Amenity site used by small numbers of local people.

Table 9-3: Estimation of Importance of Hydrogeology Attributes (NRA, 2008)

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation, e.g. SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale.	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status. Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.

High	Attribute has a high quality or value on a local scale.	Regionally Important Aquifer Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source.
Medium	Attribute has a medium quality or value on a local scale.	Locally Important Aquifer Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality or value on a local scale.	Poor Bedrock Aquifer Potable water source supplying <50 homes.

9.1.6.2 NRA Criteria for Estimating the Magnitude of Impacts on Hydrology Attributes

The magnitude of the impact is evaluated using the NRA (2008) criteria outlined Table 9-4 and Table 9-5.

Table 9-4: Estimation of Magnitude of Impact on Hydrology Attributes (NRA, 2008)

Magnitude	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Loss or extensive change to a waterbody or water dependent. Habitat Increase in predicted peak flood level >100mm. Extensive loss of fishery Calculated risk of serious pollution incident >2% annually. Extensive reduction in amenity value
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Increase in predicted peak flood level >50mm. Partial loss of fishery. Calculated risk of serious pollution incident >1% annually. Partial reduction in amenity value.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm. Minor loss of fishery. Calculated risk of serious pollution incident >0.5% annually. Slight reduction in amenity value.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level. Calculated risk of serious pollution incident <0.5% annually.

Table 9-5: Estimation of Magnitude of Impact on Hydrogeology Attributes (NRA, 2008)

Magnitude	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >2% annually.

Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Removal of moderate proportion of aquifer Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >1% annually.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Removal of small proportion of aquifer Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >0.5% annually.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Calculated risk of serious pollution incident <0.5% annually.

9.1.6.3 NRA Criteria for Rating the Significance of Impacts on Hydrology Attributes

The rating of environmental impacts is evaluated using the NRA (2008) criteria outlined in Table 9-6.

Table 9-6: NRA Criteria for Rating the Significance of Impacts on Hydrology Attributes

	Magnitude of Impact			
Importance of Tribute	**Negligible**	**Small Adverse**	**Moderate Adverse**	**Large Adverse**
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/Moderate	Profound/Significant	Profound
High	Imperceptible	Moderate/Slight	Significant/Moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/Moderate

It should be noted that the NRA significance ratings correspond very closely with the EPA significance of impacts range (i.e. Imperceptible to Profound). ratings. The EPA significance rating has been applied to this table.

9.1.7 Certainty & Sufficiency of Information and Evaluation Provided for this Topic

A clear documentary trail is provided throughout this chapter and chapter appendices to the competency of data and methods used and the rationale for selection of same. The information used to compile this chapter is collated from site specific investigations, data and documents generated by public bodies and statutory agencies. The online baseline data was verified in the field.

The criteria used for water (hydrology and hydrogeology) appraisals are derived from the National Roads Authority (2008) guidance document.

It should be noted that the EPA and www.catchments.ie database names for Rivers/Waterbodies, River Sub Basins and Sub-Catchments have been used in this Chapter, and differ in some instances to those names used in the 2014/2015 planning documents for Knocknamona Windfarm, which used the WFD database, correct at that time. For ease of cross referencing to the 2015 EIS for Knocknamona Windfarm:

- Roaring Waters Stream (previous WFD database) is now named Mountodell Stream (EPA database),
- Monageela Stream (previous WFD database) is now named Goish Stream (EPA database),
- Ballynaparka River (previous WFD database) is now named Coolahest River (EPA database),
- River Blackwater catchment (previous WFD database) is now named Blackwater (Munster) catchment (EPA database), and
- River Brickey catchment (previous WFD database) is now named Colligan-Mahon catchment (EPA database).

In respect of Water (Hydrology and Hydrogeology) no limitations or difficulties were encountered.

9.2 Sensitive Aspect No.1: River Waterbodies

This Section 9.2 provides a description of the baseline environment and an evaluation of the likely impacts of KWF Grid Connection, both alone and cumulatively, on **River Waterbodies.**

9.2.1 Description of the BASELINE ENVIRONMENT for River Waterbodies

This Section 9.2.1 comprises the identification of the Study Area for direct or indirect effects and for cumulative effects, and a description of the context, character, importance and sensitivity of River Waterbodies in the area. Trends or changes in the baseline environment and expected receiving environment are also identified.

9.2.1.1 STUDY AREA for River Waterbodies

Study areas relate to areas which could be affected by impacts from KWF Grid Connection, whether direct impacts from the KWF Grid Connection on its own or cumulative impacts from KWF Grid Connection and other projects or activities.

Relevant Figure (at the end of this chapter)

Figure 9.1: Location of the KWF Grid Connection in Relation to Surface Water Catchments
Figure 9.4: Study Area for River Waterbodies
Figure 9.4.1: Study Area for River Waterbodies (Zoomed In)

Table 9-7: Study Area for River Waterbodies

KWF Grid Connection Study Area (direct or indirect effects)	Cumulative Study Area
Study Area Extent: WFD Sub-basins in which the KWF Grid Connection are located along with all down-stream sub-basins (up-stream sub-basins cannot be affected).	Study Area Extent: WFD sub-catchments in which the KWF Grid Connection is located (i.e. Goish, Finisk & Colligan SCs)
Justification for Study Area Extent: KWF Grid Connection cannot have any impact on sub-basins that are up-stream or not hydrologically connected to the development.	Justification for Study Area Extent: Cumulative effects can arise from other developments within sub-basins within the wider sub-catchment area (up-stream and downstream sub-basins). Cumulative effects downstream of the Goish and Finisk sub-catchments (i.e. in the Blackwater River itself) are not likely due to large regional catchment area of the Blackwater River (i.e. very large dilution effects) and the small scale of the KWF Grid Connection works. The Colligan SC drains into the sea therefore cumulative effects out the Colligan SC are very unlikely.
Relevant development stage Construction Justification: The potential for impacts to river waterbodies relates to the construction stage during which sources of	Relevant development stage Construction Justification: As the potential for KWF Grid Connection to cause effects to river waterbodies will occur during its

impacts such as soil excavation and use of large machinery, will be present. No sources of impacts in relation to Operation due to the minimal maintenance activities mainly within the hardcore substation compound, minimal use of vehicles and no groundworks expected to occur. No decommissioning groundworks associated with KWF Grid Connection – cabling can be pulled from the ducts and the ducting left in place if decommissioning is required. The works within Woodhouse Substation will be left permanently in place as part of the National Grid.	construction, the potential for cumulative effects with other projects is also limited to the construction stage. No sources of impacts in relation to Operation due to the minimal maintenance activities mainly within the hardcore substation compound, minimal use of vehicles and no groundworks expected to occur. No decommissioning groundworks associated with KWF Grid Connection – cabling can be pulled from the ducts and the ducting left in place if decommissioning is required. The works within Woodhouse Substation will be left permanently in place as part of the National Grid.

9.2.1.2 Description of the BASELINE CONTEXT and CHARACTER of River Waterbodies

The baseline context includes a description of the KWF Grid Connection Study Area and also the wider area which includes the Cumulative Study Area; Knocknamona Windfarm project area; Woodhouse Substation and Woodhouse Windfarm project areas.

9.2.1.2.1 Baseline for KWF Grid Connection Study Area (River Waterbodies)

Colligan- Mahon Catchment

Within the Colligan-Mahon Catchment, the KWF Grid Connection will only be located within the Colligan_SC_010 sub-catchment but will only actually drain into the Brickey_020 River sub-basins (i.e. the KWF Grid Connection does not drain to the Colligan River itself).

Within the Brickey_020 River sub-Basins c.830m of Underground Cabling and c.770m of forestry road widening are proposed. The section of the KWF Grid Connection development within the Brickey_020 River sub-basins comprises mainly existing forestry access roads.

The area of the KWF Grid Connection within the Brickey_020 River Sub-Basins initially drains to the Mountodell Stream (closest point 280m to the east) which flows northwards towards the Brickey River which is approximately 3.4km downstream of the KWF Grid Connection. The Brickey River then drains into Dungarvan Harbour approximately 9.1km downstream of the KWF Grid Connection development. The Brickey Estuary is Transitional Waterbody as defined by the WFD.

Blackwater (Munster) Catchment

Within the regional Blackwater (Munster) Catchment, KWF Grid Connection is located within the Finisk_SC_010 and Goish_SC_010 sub-catchments.

Within the Goish_SC_010 sub-catchment there is drainage from the KWF Grid Connection into the Goish_010 and Goish_020 sub-basins which are immediately upstream of the Blackwater River. Within the Finisk_SC_010 sub -catchment drainage is into the Finisk_030 River Sub Basin located also immediately upstream of the Blackwater River which is a Transitional Waterbody as defined by the WFD (The Lower Blackwater Estuary / Youghal Harbour).

The River Blackwater is approximately 8.5km downstream of the KWF Grid Connection development via the Finisk River and approximately 10.3km downstream via the Goish River.

The northern end of KWF Grid Connection, comprising Underground Cabling (870m), and works at the

existing Woodhouse Substation, and the 190m new Link Road, and 330m of existing forestry road widening are located within the Finisk_030 River Sub Basin. The section of the KWF Grid Connection development within the Finisk_030 River Sub Basin mainly comprises hardcore surfaces such as the existing Woodhouse Substation, existing Woodhouse Windfarm access roads, and forestry access road. Some works will also take place in a small section of scrub (190m of underground cabling and link road).

The southern extent of KWF Grid Connection, comprising 240m of Underground Cabling where it connects into the already consented Knocknamona Substation is located within the Goish_010 River Sub Basin. The section of the KWF Grid Connection development within the Goish_010 River Sub Basin mainly comprises 210m of existing forestry roads and 30m of felled forestry (within the footprint of the consented Knocknamona Windfarm substation). The Access Road through Woodhouse Windfarm Entrance is located in the Goish_020 River Sub Basin. No works are required for access through Woodhouse Windfarm Entrance.

Forestry and agriculture are the predominant landuses surrounding the development.

Existing Drainage at the KWF Grid Connection site

A walkover survey of the KWF Grid Connection site was completed to map any existing local drainage routes and any potential watercourse crossings.

Due to the elevated nature of the KWF Grid Connection site on the side of a hill **there are no natural watercourse within the KWF Grid Connection site** itself.

The Construction Works Area drains to three local river waterbodies, the Mountodell Stream (Brickey_020) which is 280m away to the east, the Monageela Stream (Goish_010) which is located 360m to the south of the site and the Clashnadarriv Stream (Finisk_030) located 0.95km to the northwest. The ground slope gradients in the area of the KWF Grid Connection site towards the local river waterbodies range between approximately 5% and 18%.

The existing drainage between the KWF Grid Connection site and these streams is discussed below.

The route of the KWF Grid Connection cable within the consented Knocknamona Windfarm is mainly along an existing forestry track which will require widening at some locations. The existing track is bordered mainly by forestry (in varies stages of growth including felled) and some scrub. Along the central section of the track there is also a 2 -3m green verge on the downslope side of the track. The proposed link road passes through a scrub area with some forestry.

Apart from a roadside drain at the junction where the consented Knocknamona Windfarm Substation is located, there is no other roadside drainage or under road drainage (i.e. culverts) present along this existing forestry track or proposed link road. Runoff from the existing forestry track is “over the edge” and onto the adjacent vegetated ground.

There is also an absence of drainage ditches in the adjacent forestry along the existing forestry track and proposed link road. A survey of ground conditions within a 10m corridor on each side of the existing forestry track and link road only identified linear ground mounding of ground/ribbons associated with the forestry planting. The furrows between the mounds/ribbons, which typically follow the ground slope, were noted to be dry and well vegetated with no evidence of discrete surface water runoff, channelled drainage or soil erosion due to runoff. The lack of discrete surface water flowpaths suggest the ground in the area has reasonably good natural drainage. This was also confirmed by the trial pits (8 no.) carried out along the KWF Grid Connection site (refer to Chapter 8 – Land & Soils).

Runoff from the existing forestry tracks dissipates and infiltrates into the surrounding ground. The fact that there are no culvert crossings intercepting the forestry track also suggests that there is no significant runoff

coming from ground higher upslope of the track either. The ground slope gradients are noted to be relatively steep in the area of the KWF Grid Connection, but there is no evidence of discrete surface water flowpaths between the proposed development site and downslope river water bodies.

Flood Risk

OPW's River Flood Extents Mapping, National Indicative Fluvial Mapping, Past Flood Event mapping (https://www.floodinfo.ie/map/floodmaps/) and historical mapping (i.e. 6" & 25" base maps) were consulted to identify those areas of the KWF Grid Connection site as being at risk of fluvial flooding. There are no mapped fluvial flood zones within the KWF Grid Connection site.

No recurring flood incidents within the KWF Grid Connection site were identified from OPW's Past Flood Event Mapping. The only mapped recurring flood incidents which exists downstream of the KWF Grid Connection site is on the Finisk River approximately 7km northwest of the site.

Flood risk is not an issue at the KWF Grid Connection work areas. Due to the elevated nature of the route, the works areas are not located within any mapped fluvial or pluvial flood extent zones and are considered to be areas at low risk to flooding being located within fluvial Flood Zone C (Low Risk).

Water Quality Status

The latest EPA Q Value status (2019 - 2022) of the River Brickey is Poor. The latest Q Value status of the Finisk River (2022) and Goish River (2021) is High and Moderate respectively.

The latest Q Value is consistent with the WFD status which is reported to be High (Finisk), Moderate (Goish) and Poor (Brickey) for the 2016 – 2021 cycle.

The Lower Blackwater Estuary / Youghal Harbour and Brickey Estuary (Transitional Waterbodies) are both assigned a Moderate status.

A total of 6 no. surface water samples were taken at 6 monitoring locations downstream of the KWF Grid Connection site in February 2023. All sampling results are tabulated in Appendix 9.2. The monitoring locations are shown on Figure 9.4.1: Study Area for Local River Waterbodies (Zoomed in). Overall, results for all watercourses were relatively consistent with at least Good Status threshold with respect to the Surface Water Regulations (S.I. No. 272 of 2009).

Relevant Figure (at the end of this chapter)

Figure 9.1: Location of KWF Grid Connection in relation to Surface Water Catchments
Figure 9.4: Study Area for River Waterbodies
Figure 9.4.1: Study Area for River Waterbodies (Zoomed In)

Relevant Appendix (at the end of this chapter)

Appendix 9.2 Surface Water Sampling Results
Appendix 9.3 Water Framework Directive Evaluation

9.2.1.2.2 Baseline for the Cumulative Study Area (River Waterbodies)

Authorised Knocknamona Windfarm: The majority of the Knocknamona Windfarm site exists within the Goish_010 River Sub Basin (6 of 8 no. turbines, including the consented Knocknamona Substation). The 2 no. remaining turbines exist within the Brickey_020 River Sub Basin.

It is reported in the Revised EIS 2015 that the soil and subsoil within the site and adjacent areas appears to be relatively free-draining. Trial pits excavated (8 no.) as part of the 2014 site investigations indicated low

water table levels with no groundwater being encountered in most cases. Therefore, surface water runoff rates are not thought to be high which would explain the relatively low drainage density within the forestry adjacent to the KWF Grid Connection site.

Authorised Junction & Bend Widening Works are located in the Goish_010 and Brickey_020 River Sub Basins. The Goish drains into the River Blackwater whereas the Brickey drains into Dungarvan Harbour. The nearest surface watercourse is the Ballycullane Beg Stream, which is located c.171m from HR3 and flows north for c. 2.4km to meet the River Brickey.

Operational Woodhouse Substation: The operational Woodhouse Substation exists within the Finisk_030 River Sub Basin. The local setting is well draining agricultural grassland. The local surface water drainage density is low. One stream, the Clashnadarriv stream, drains the local catchment of the Finisk River, 990m to the west of the Woodhouse Substation.

Operational Woodhouse Windfarm: The majority of the Woodhouse Windfarm exists within the Finisk_030 River Sub Basin (7 of 8 no. turbines). One turbine including the main entrance exist within the Goish_010 River Sub Basin. The local setting is well draining agricultural grassland. The local surface water drainage density is low. The Clashnadarriv stream drains the local catchment of the Finisk_030 River Sub Basin within the site. The section of the site within the Goish_010 River Sub-Basin drains to the Coolahest River which is a tributary of the Goish River.

9.2.1.2.3 Consideration of the Passage of time

The Revised Knocknamona Windfarm EIS 2015 was reviewed in the context of the current baseline conditions. The passage of time was considered during this review. Results of water sampling undertaken in 2023 for the subject application, was also reviewed and compared to the previous sampling results. There have been no significant changes in the baseline environment of the Knocknamona Windfarm site since 2014/2015, and the descriptions in the Revised Knocknamona Windfarm EIS 2015 remain relevant to this application.

It should be noted, that the naming system of watercourses in this EIAR 2023 differs slightly from that used in the Revised Knocknamona Windfarm EIS 2015. EIS 2015 used WFD and Ordnance Survey mapping names, correct at that time. This EIAR 2023 follows the more up to date EPA naming system.

For the avoidance of doubt, the following naming system is used throughout this EIAR 2023 and follows the EPA names for River Waterbodies and catchments, as provided on www.catchments.ie:

Names of river waterbodies/catchments in the Knocknamona Windfarm EIS 2015	Names of river waterbodies/ catchments in this EIAR 2023
Roaring Waters Stream	Mountodell stream
Goish stream	Monageela stream
Ballynaparka River	Coolahest River
River Blackwater catchment	Blackwater (Munster) catchment
River Brickey catchment	Colligan-Mahon catchment

9.2.1.3 IMPORTANCE of River Waterbodies

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU and 2014/101/EU 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 Directive is not compromised.

The River Waterbodies downstream of the KWF Grid Connection have been assigned a Poor to High Status by the WFD assignment. The Transitional Waterbodies have a Moderate status.

Where a High Status has been assigned, there will be a requirement to prevent deterioration and maintain High Status. Regardless of existing status, there will also be a requirement to protect, enhance and restore all waters with an aim to achieve at least Good Status by 2027. All Waterbodies are considered to be of **High Importance**.

9.2.1.4 SENSITIVITY of River Waterbodies

The Brickey_020 and Goish_020 are reported to "At Risk" of not achieving Good status by 2027 while the Goish_010 is under review. The Finisk_030 is "Not at Risk" of not achieving Good status by 2027. The significant Pressures and Activities in the Brickey sub-catchment are hydromorphology and agriculture and therefore it can be assumed that the Brickey sub-catchment is sensitive to change. The significant Pressures and Activities in the Goish_020 is agriculture.

The primary risks associated with KWF Grid Connection, albeit a very minor risk, is sediment run-off or contamination by oils/fuels or cementitious materials rather nutrients or hydromorphology.

There are no watercourse crossings required for the KWF Grid Connection and the grid route is largely along an exiting track. Therefore there is no potential to impact on watercourse morphology or change the flow regime in downstream surface waters. Also as discussed in the site drainage section above, there are no direct drainage pathways (i.e. drainage ditches/watercourses) between the KWF Grid Connection site and the closest downslope river waterbodies.

9.2.1.5 TRENDS for River Waterbodies in the Baseline Environment

Based on the EPA catchment mapping (www.catchments.ie), the Brickey_010, Brickey_020 and Goish_020 are "At Risk" of not achieving "Good" status by 2027 and therefore are likely to have deteriorating or no improvement in water quality.

The Finisk_030 River Sub Basin is 'Not At Risk' of deteriorating water quality or being at less than Good status in the future. It is assumed that High water quality trend in the Finisk_030 River Sub Basin is being maintained.

9.2.1.6 The 'Do Nothing Scenario' (the Environment if the Development is not carried out)

It is assumed that the status of the surface water bodies within the study area will be as reported above. This is the worst-case scenario as the Brickey_010, Brickey_020, Goish_010 and Goish_020 River Sub Basins may achieve Good Status in the coming years which means catchment pressures would have eased or have been addressed.

9.2.1.7 Description of the RECEIVING ENVIRONMENT for River Waterbodies.

The receiving environment is the likely state of the baseline environment at the time of construction/operation/decommissioning as relevant i.e. baseline + trends.

It is assumed that the status of the river waterbodies within the receiving environment will be as reported at Section 9.2.1.2.1 Baseline for KWF Grid Connection Study Area (River Waterbodies).

9.2.2 EVALUATION OF IMPACTS to River Waterbodies

In this Section, the direct or indirect impacts and the cumulative impacts of KWF Grid Connection on River Waterbodies are described.

9.2.2.1 Potential Impacts Evaluated for River Waterbodies

A conceptual site model exercise was carried out to identify potential impacts through the examination of the specific pathways between the project (source) and the sensitive aspect (receptor).

The potential for impacts from the proposed development, as described in **Chapter 5: Description of the Development including the description of development, standard construction methodologies, construction activities and operational activities described,** was firstly examined **in the absence of mitigation measures (Pre-Mitigation Effect)** and then following application of **mitigation measures (Residual Effects)**.

The potential impacts which were evaluated are listed in the 1st column of the table below. As summarised in the table below, **No Significant Pre-Mitigation or Residual Effects will occur**.

Table 9-8: Conclusion of the Evaluation of Potential Impacts to River Waterbodies

Potential Effects which were evaluated	Relevant Stage of KWF Grid Connection	Pre-Mitigation Effects of KWF Grid Connection (Direct/Indirect)	Residual Effects of KWF Grid Connection (Direct/Indirect)	Cumulative Impact of the Whole Project	Impact Woodhouse Windfarm and Woodhouse Substation and the activities Forestry & Agriculture	Cumulative Whole Knocknamona Windfarm Project Impact
Surface water quality impacts due to sediment entrainment	Construction	Slight	**Imperceptible**	No likely cumulative effect	No likely cumulative effect	**Not significant**
Surface Water quality impact due to Contamination by Fuels, Oils and Chemicals	Construction	Imperceptible	**No Residual Effects**	No likely cumulative effect	No likely cumulative effect	**Not significant**
Surface Water Quality Impacts from Cement Based Compounds	Construction	Imperceptible	**No Residual Effects**	No likely cumulative effect	No likely cumulative effect	**Not significant**
Increased Runoff / Flood Risk /Hydromorphology Effects	Construction	No Effect	**No Residual Effects**	No cumulative effect	No likely cumulative effect	**Not significant**
Negative Effects on WFD Status	Construction	No Effect	**No Residual Effects**	No cumulative effect	No likely cumulative effect	**Not significant**

In order to keep this EIA Report concise and focused on potential significant impacts, where the evaluation of potential impacts found no significant residual effects from the development, the evaluation tables are presented in the appendix to the chapter.

Impact Evaluation Tables for the potential impacts listed in the table above are in Appendix 9.1.

Relevant Appendix (at the end of this chapter)

Appendix 9.1 Evaluation of Potential Impacts to Water
Appendix 9.3 Water Framework Directive (WFD) Assessment

9.2.2.2 Summary of the Significance of the Effects to River Waterbodies

As outlined in the table above, **pre-mitigation effects to River Waterbodies as a result of KWF Grid Connection, where there are effects, will be no greater than Slight**, this is due to the relatively short scale and extent of KWF Grid Connection; the location of works mainly along existing access tracks and within the existing Woodhouse substation compound; the location of the works are spread over several River Sub Basins (i.e. Brickey_010, Brickey_020, Goish_010 and the Finisk_030) and not concentrated in one River Sub Basin; the transient nature of the construction works, the negligible volumes of concrete, fuels and oils on site at any one time. **Residual effects to River Waterbodies as a result of KWF Grid Connection, where there are effects, will be no greater than Imperceptible.**

Due to the elevated nature of the site and the absence of any watercourses and an overall lack of manmade drainage and the absence of peat at the site, it is considered that indirect effects from land slippage or flood risk are not a risk at the KWF Grid Connection development site.

There are no likely cumulative impacts of KWF Grid Connection with the Authorised Knocknamona Windfarm, this is generally due to the majority of the Knocknamona Windfarm site been located in the Goish_010 River Sub Basin while the majority of the KWF Grid Connection works located in the Brickey_010, Brickey_020 and Finisk_030 River Sub Basins. This greatly reduces the overall potential for cumulative impacts. The potential for cumulative impacts is further minimised through the implementation of the mitigation measures relating to the KWF Grid Connection and Environmental Management Plan and Sediment Control Plan for the Knocknamona Windfarm, which includes cement control, and fuel management and spill/leak response measures. **Overall the 'whole project' cumulative effect of KWF Grid Connection and Knocknamona Windfarm will not be significant**.

When Woodhouse Windfarm and Woodhouse Substation are also taken into account, there is no likely cumulative effect, this is generally due to fact that Woodhouse Windfarm and Woodhouse Substation are already constructed and have been operational since 2015, and therefore are not likely to contribute to cumulative surface water quality impacts. Cumulative contamination impacts to river waterbodies from oils/fuels/chemical spillages are not likely due to the storage of these oils/fuels/chemicals in bunded containers within the hardcore Woodhouse Substation compound.

9.2.2.3 Significance in the Context of the Water Framework Directive

WFD status for River Waterbodies hydraulically linked to the Proposed Development site are defined above.

The KWF Grid Connection does not involve any abstraction of surface water or alteration of drainage patterns. Therefore, the quantitative status (i.e., the available quantity (volume) of surface water locally) to the receiving waters will remain unaltered during the construction and operational phase of the proposed development.

There is no direct discharge from the KWF Grid Connection site to downstream receiving waters. Mitigation for the protection of surface water during the construction phase of the proposed development will ensure the qualitative status of the receiving waters will not be altered by the proposed development.

As such, the KWF Grid Connection will not impact upon any river waterbody as it will not cause a deterioration of the High status of the body and/or it will not jeopardise the attainment of Good status.

A Water Framework Directive (WFD) Assessment Report for the KWF Grid Connection is attached as Appendix 9.3.

9.3 Sensitive Aspect No.2: Groundwater Bodies

This Section 9.3 provides a description of the baseline environment and an evaluation of the likely impacts of KWF Grid Connection, both alone and cumulatively, on **Groundwater Bodies (GWBs).**

9.3.1 Description of the BASELINE ENVIRONMENT for Groundwater bodies (GWBs)

This Section 9.3.1 comprises the identification of the Study Area for direct or indirect effects and for cumulative effects, and a description of the context, character, importance and sensitivity of GWBs in the area. Trends or changes in the baseline environment and expected receiving environment are also identified.

9.3.1.1 STUDY AREA for Groundwater Bodies

Study areas relate to areas which could be affected by impacts from KWF Grid Connection, whether direct impacts from the KWF Grid Connection on its own or cumulative impacts from KWF Grid Connection and other projects or activities.

Relevant Figure (at the end of this chapter)

Figure 9.2: Location of the KWF Grid Connection in relation to Groundwater Bodies

Figure 9.5: Study Area for Local Groundwater Bodies

Table 9-8: Study Area for Groundwater Bodies

KWF Grid Connection Study Area (direct or indirect effects)	Cumulative Study Area
Study Area Extent: GWBs in which the KWF Grid Connection Construction Works Area boundary (CWA) is located as described below (Glenville GWB and the Helvick Head GWB).	Study Area Extent: The aquifer underlying the KWF Grid Connection is classified as Locally Important and therefore groundwater flowpaths will be limited to 200 – 300m in length with flow direction largely influenced by local topography. Groundwater will discharge to the local river waterbodies as described in Section 9.2 above as springs and seeps. Therefore, the cumulative study area is limited to 300m set back distance from the KWF Grid Connection Construction Works Area boundary (CWA).
Justification for Study Area Extent: The KWF Grid Connection can only affect GWBs in which the development is located.	Justification for Study Area Extent: Only other developments within a 300m distance of the KWF Grid Connection CWA can contribute to cumulative groundwater effects. Outside of the distance groundwater flowpaths do not interact with other areas of the groundwater body.
Relevant development stage Construction Justification:	Relevant development stage Construction Justification:

The potential for impacts to GWBs relates to the construction stage during which sources of impacts such as soil excavation and use of fuels, oils an cementitious materials. No sources of impacts in relation to the operation of the KWF Grid Connection due to the minimal maintenance activities mainly within the hardcore substation compound, minimal use of vehicles and no groundworks expected to occur. No decommissioning works associated with KWF Grid Connection, cabling can be pulled from the ducts and the ducting left in place if decommissioning is required. The works within Woodhouse Substation will be left permanently in place as part of the National Grid.	As the potential for KWF Grid Connection to cause effects to groundwater will occur during its construction, the potential for cumulative effects with other projects is also limited to the construction stage. No decommissioning works associated with KWF Grid Connection, cabling can be pulled from the ducts and the ducting left in place if decommissioning is required. The works within Woodhouse Substation will be left permanently in place as part of the National Grid.

9.3.1.2 Description of the BASELINE CONTEXT and CHARACTER of Groundwater Bodies

The baseline context includes a description of the KWF Grid Connection Study Area and also the wider area which includes the Cumulative Study Area; Knocknamona Windfarm project area; Woodhouse Substation and Woodhouse Windfarm project areas.

9.3.1.2.1 Baseline for KWF Grid Connection Study Area (Groundwater Bodies)

The KWF Grid Connection lies within two groundwater bodies (GWB), the Glenville GWB and the Helvick Head GWB.

The Glenville GWB extends from east County Kerry, through County Cork as far as Dungarvan in County Waterford. Its elevation is generally between sea level and 200mOD and is predominantly an upland area. The GWB is composed mainly of Old Red Sandstone rocks which are poor to locally important in character and generally of low transmissivity and storativity. Overall groundwater flow is locally to the rivers and streams.

Recharge is diffuse and occurs over the entire GWB via rainfall percolating through the subsoil. The GSI initial characterisation indicates that there is probably limited interaction between surface water and groundwater and that the lack of permeability in most of the aquifer will tend to restrict discharge. Base flow to rivers and streams is likely to be relatively low (GSI 2004a). Groundwater flowpaths at the KWF Grid Connection site are estimated up to a maximum of 200 - 300m in length due to the local aquifer characterises and well defined topography. Groundwater flow directions are expected to mimic topography with discharge to river waterbodies downslope of the site.

The Helvick Head GWB extent is defined to the north by the boundary between the limestones of Dungarvan Harbour and the Devonian sandstones to the south. To the west the Drum Hills define the boundary between the SERBD and the SWRBD. Diffuse recharge from rainfall mostly enters the groundwater at exposed areas of outcrop or rock close to the surface. The overall pattern of groundwater discharge will be towards the coast. There may also be some discharge to local streams although this may occur at certain times of the year. Groundwater flow is likely to be dominated by flow from the hills, which act as recharge mounds. Due to the proximity of the River Basin District boundary to the coast there is insufficient area for major rivers to form. The only surface drainage features present are small streams flowing down the flanks of the Drum Hills. In the northern area of the groundwater body, surface streams flow north off the higher elevations of the Drum Hills onto the Dungarvan GWB. Elsewhere the surface water bodies discharge to the coast. Vulnerability is mostly HIGH with significant areas of EXTREME where there is outcrop and rock close to the

surface. There is a small area of LOW vulnerability to the south. The bedrock aquifer underlying the site is locally important. Groundwater flowpaths at the KWF Grid Connection are also estimated up to a maximum of 200 - 300m in length within the Helvick Head GWB.

The northern end of KWF Grid Connection, comprising Underground Cabling (870m), works at the existing Woodhouse Substation, 190m new Link Road and 330m of existing forestry road widening are located within the Glenville GWB. The section of the KWF Grid Connection development mainly comprises hardcore surfaces - the existing Woodhouse Substation, existing Woodhouse Windfarm access roads, and forestry access road. Some works will also take place in a small section of scrub (190m of underground cabling and link road). The southern end of the Underground Cabling (270m) including road widening at the consented Knocknamona Windfarm substation is also located in the Glenville GWB.

The middle section of KWF Grid Connection, comprising 790m of Underground Cabling is located within the Helvic Head GWB.

Both GWBs are currently assigned 'Good Status' (2016 – 2021 WFD cycle), which is defined based on the quantitative status and chemical status of the GWB.

Relevant Figure (at the end of this chapter)

Figure 9.2: Location of KWF Grid Connection in relation to Groundwater Bodies
Figure 9.5: Study Area for Local Groundwater Bodies.

9.3.1.2.2 Baseline for the Cumulative Study Area (Groundwater Bodies)

Authorised Knocknamona Windfarm: The majority of the Knocknamona Windfarm site exists within the Glenville GWB (6 of 8 no. turbines, including the consented Knocknamona Substation). The 2 no. remaining turbines exist within the Helvick Head GWB. However, there is only 1 no. turbine within 300m (cumulative study area) of the KWF Grid Connection CWA along with the consented Knocknamona Substation, both of which are within the Glenville GWB.

Operational Woodhouse Substation: The operational Woodhouse Substation exists in the Glenville GWB and is within 300m (cumulative study area) of the KWF Grid Connection CWA.

Operational Woodhouse Windfarm: All of the Woodhouse Windfarm exists within the Glenville GWB and one of these turbines is within 300m (cumulative study area) of the KWF Grid Connection CWA.

9.3.1.2.3 Consideration of the Passage of time

There have been no significant changes in the baseline environment of the Knocknamona Windfarm site since 2014/2015 with regard GWBs and local aquifers. The descriptions in the Knocknamona Windfarm Revised EIS 2015 remain relevant to this application. Both the Glenville GWB and Helvick Head GWB have been assigned 'Good Status' since the 1st WFD cycle (2009 – 2015).

9.3.1.3 IMPORTANCE of Groundwater Bodies

Both local groundwater bodies within the study area have been classified as 'Good Status' by the Water Framework Directive (WFD) characterisation process and comprise 'Locally Important Aquifers' in terms of their potential productivity as a groundwater supply sources. All Local Groundwater Bodies are considered to be of High Importance.

9.3.1.4 SENSITIVITY of Groundwater Bodies

Groundwater bodies in Ireland are typically more sensitive to water quality effects rather than quantitive effects (i.e. volumes/levels effects from abstractions). Agriculture Groundwater Pressures are reported by the WFD in the Glenville GWB but not in the Helvick Head GWB. This suggests the Glanville GWB is likely to be sensitive to groundwater nutrification (i.e. nitrates).

With regard the KWF Grid Connection, potential groundwater quality effects will only be oils/fuels and cement related and not nutrients. There will be no groundwater level effects (quantity effects) as a result of the KWF Grid Connection works due to the shallow of the excavations required and its route primarily along an existing forestry track.

9.3.1.5 TRENDS for Groundwater Bodies in the Baseline Environment

Both the Helvic Head GWB and the Glenville GWBs have been classified 'Good Status' in all previous WF cycles to date, therefore no significant trends are noted. However, Agriculture Groundwater Pressures are reported by the WFD in the Glenville GWB but not in the Helvick Head GWB.

9.3.1.6 The 'Do Nothing Scenario' (the Environment if the Development is not carried out)

It is assumed that the status of the groundwater bodies within the study area will be as reported above.

9.3.1.7 Description of the RECEIVING ENVIRONMENT for Groundwater Bodies

The receiving environment is the likely state of the baseline environment at the time of construction/operation/decommissioning as relevant i.e. baseline + trends.

It is assumed that the status of the GWBs within the receiving environment will be as reported above.

9.3.2 EVALUATION OF IMPACTS to Groundwater Bodies

In this Section, the direct or indirect impacts and the cumulative impacts of KWF Grid Connection on Groundwater Bodies are described.

9.3.2.1 Potential Impacts Evaluated for Groundwater Bodies

A conceptual site model exercise was carried out to identify potential impacts through the examination of the specific pathways between the project (source) and the sensitive aspect (receptor).

The potential for impacts from the proposed development, as described in **Chapter 5: Description of the Development including the description of development, standard construction methodologies, construction activities and operational activities described,** was firstly examined **in the absence of mitigation measures (Pre-Mitigation Effect)** and then following application of **mitigation measures (Residual Effects)**.

The potential impacts which were evaluated are listed in the 1st column of the table below. As summarised in the table below, **No Significant Pre-Mitigation or Residual Effects will occur**.

Table 9-9: Conclusion of the Evaluation of Potential Impacts to Groundwater Bodies

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Pre-Mitigation Effect of KWF Grid Connection (Direct/Indirect)	Residual Effect of KWF Grid Connection (Direct/Indirect)	Cumulative Impact of the Whole Project	Impact Woodhouse Windfarm and Woodhouse Substation and the activities Forestry & Agriculture	Cumulative Whole Knocknamona Windfarm Project Impact
Groundwater Quality impacts due to Contamination by Fuels, Oils and Chemicals	Construction	Imperceptible	**No Residual Effects**	No likely cumulative Impact	No likely cumulative Effect	**Not significant**
Groundwater Quality Impacts from Cement Based Compounds	Construction	Imperceptible	**No Residual Effects**	No likely cumulative Effect	No likely cumulative Impact	**Not significant**
Effects on WFD Status	Construction	No Effect	**No Residual Effects**	No cumulative Effect	No likely cumulative Impact	**Not significant**

In order to keep this EIA Report concise and focused on potential significant impacts, where the evaluation of potential impacts found **no significant residual effects** from the development, the evaluation tables are presented in the appendix to the chapter.

The Impact Evaluation Tables for the potential impacts listed in the table above are in Appendix 9.1.

Relevant Appendix (at the end of this chapter)

Appendix 9.1 Evaluation of Potential Impacts to Water
Appendix 9.3 Water Framework Directive Assessment

9.3.2.2 Summary of the Significance of the Potential Impacts to Groundwater Bodies

As outlined in the table above, negative **pre-mitigation effects to Local Groundwater Bodies where there is potential for effect will be imperceptible** and this is due to minimal volumes of fuel/chemicals and cements present on-site at any one time, the transient nature of the work, the localised groundwater flow regime at the KWF Grid Connection site along with application of best practice mitigation measures during construction. **No Residual Effects on Groundwater Bodies are expected as a result of the KWF Grid Connection.**

There is no likely cumulative impacts of KWF Grid Connection with the Authorised Knocknamona Windfarm, this is generally due to the small scale of the proposed grid works and very localised groundwater interaction between the KWF Grid Connection and the Knocknamona Windfarm.

The potential for cumulative impacts is further minimised through the implementation of best practice mitigation measures at the KWF Grid Connection along with the Environmental Management Plan and Sediment Control Plan for the Knocknamona Windfarm, which includes cement control, and fuel management and spill/leak response measures. **Overall the 'whole project' effect of KWF Grid Connection and Knocknamona Windfarm will not be significant**.

When Woodhouse Windfarm and Woodhouse Substation are also taken into account, there will be no likely cumulative impact, this is generally due to fact that Woodhouse Windfarm and Woodhouse Substation are already constructed and have been operational since 2015, and therefore are not likely to contribute to cumulative groundwater quality impacts. Cumulative contamination impacts to groundwater bodies from oils/fuels/chemical spillages are not likely due to the storage of these oils/fuels/chemicals in bunded containers within the hardcore Woodhouse Substation compound.

9.3.2.3 Significance in the Context of the Water Framework Directive

WFD status for GWBs in which the KWF Grid Connection is located are defined above.

The KWF Grid Connection does not involve any abstraction of groundwater or alteration of drainage patterns. Therefore, the quantitative status (i.e., the available quantity (volume) of groundwater locally) to the receiving GWB will remain unaltered during the construction and operational phase of the proposed development.

There are no discharges from the KWF Grid Connection site to groundwaters. Mitigation for the protection of groundwater during the construction phase of the proposed development will ensure the qualitative status of the GWBs will not be altered by the proposed development.

There will be no change in GWB status resulting from the proposed development. There will be no change in quantitative (volume) or qualitative (chemical) status, and the underlying GWBs are protected from any potential deterioration from chemical pollution.

As such, the KWF Grid Connection will not impact upon any groundwater body as it will not cause a deterioration of the Good status of the groundwater body. The KWF Grid Connection will have no negative effects on the WFD Status.

A Water Framework Assessment Report for the KWF Grid Connection is attached as Appendix 9.3.

9.4 Sensitive Aspect No.3: Designated Sites (SAC, SPA & NHA)

This Section 9.4 provides a description of the baseline environment and an evaluation of the likely impacts of KWF Grid Connection, both alone and cumulatively, on **Designated Sites.**

9.4.1 Description of the BASELINE ENVIRONMENT for Designated Sites

This Section 9.4.1 comprises the identification of the Study Area for direct or indirect effects and for cumulative effects, and a description of the context, character, importance and sensitivity of Designated Sites in the area. Trends or changes in the baseline environment are also identified.

9.4.1.1 STUDY AREA for Designated Sites

Study areas relate to areas which could be affected by impacts from KWF Grid Connection, whether direct impacts from the KWF Grid Connection on its own or cumulative impacts from KWF Grid Connection and other projects or activities.

Relevant Figure (at the end of this chapter)

Figure 9.3: Location of the KWF Grid Connection in relation to Designated Sites.

Table 9-10: Study Area for Designated Sites

KWF Grid Connection Study Area (direct or indirect effects)	Cumulative Study Area
Study Area Extent: Designated sites which are downstream of the KWF Grid Connection (via groundwater and surface water flowpaths) as defined below.	Study Area Extent: WFD sub-catchments in which the KWF Grid Connection is located (i.e. Finisk and Goish).
Justification for Study Area Extent: KWF Grid Connection cannot have any impact on designated sites that are up-stream or not hydrologically connected to the development.	Justification for Study Area Extent: Cumulative effects downstream of the Goish and Finisk sub-catchments (i.e. in the Blackwater River itself) are not likely due to large regional catchment area of the Blackwater River (i.e. very large dilution effects) and the small scale of the KWF Grid Connection works. The Colligan SC drains into the sea therefore cumulative effects out the Colligan SC are very unlikely.
Relevant development stage Construction Only Justification: The potential for impacts via groundwater and surface water pathways relates to the construction stage during which sources of impacts such as soil excavation and use of large machinery, will be present. No significant sources of impacts in relation to Operation due to the minimal maintenance activities mainly within the hardcore substation compound,	Relevant development stage Construction Only Justification: As the potential for KWF Grid Connection to cause effects via surface water and groundwater pathways will occur during its construction, the potential for cumulative effects with other projects is also limited to the construction stage.

minimal use of vehicles and no groundworks expected to occur. No decommissioning groundworks associated with KWF Grid Connection – cabling can be pulled from the ducts and the ducting left in place if decommissioning is required. The works within the Woodhouse Substation will be left permanently in place as part of the National Grid.	No decommissioning groundworks associated with KWF Grid Connection – cabling can be pulled from the ducts and the ducting left in place if decommissioning is required. The works within the Woodhouse Substation will be left permanently in place as part of the National Grid.

9.4.1.2 Description of the BASELINE CONTEXT and CHARACTER of Designated Sites

The baseline context includes a description of the KWF Grid Connection Study Area and also the wider area which includes the Cumulative Study Area; Knocknamona Windfarm project area; Woodhouse Substation and Woodhouse Windfarm project areas.

9.4.1.2.1 Baseline Context for KWF Grid Connection Study Area (Designated Sites)

There are no Designated Sites in close proximity to the KWF Grid Connection and therefore all hydrological connections to downstream designations are indirect via river waterbodies (i.e. surface water flowpaths). Groundwater flowpath distances are too short (i.e 300m) to act an indirect flowpath to the downstream Designated Sites.

The Finisk and Goish rivers drain into the River Blackwater which has the following designations: Blackwater River (Cork/Waterford) SAC, Blackwater Estuary SPA, and the Blackwater River and Estuary pNHA.

The northern end of KWF Grid Connection, comprising Underground Cabling (870m), and works at the existing Woodhouse Substation, and the 190m new Link Road, and 330m of existing forestry road widening are located upstream of the River Blackwater designations via the Finisk River.

The southern extent of KWF Grid Connection, comprising 240m of Underground Cabling where it connects into the already consented Knocknamona Substation is located upstream of the River Blackwater designations via the Goish River.

The downstream distances from the KWF Grid Connection to the above-mentioned River Blackwater designations is 4.3km, 19.5km and 4.3km respectively.

The Brickey River drains into Dungarvan Harbour which has the following designations: Dungarvan Harbour SPA and Dungarvan Harbour pNHA.

Proposed development relating to the KWF Grid Connection upstream of the Dungarvan Harbour designation include c.830m of Underground Cabling and c.770m of forestry road widening. The section of the KWF Grid Connection development within the Brickey River comprises mainly forestry access road.

The downstream distance from the KWF Grid Connection to the above mentioned Dungarvan Harbour designations sites is 9.1km.

As stated above, the pathway to downstream Designated Sites is indirectly via the river waterbodies only. However, as discussed in the River Waterbody section above, there are no direct drainage pathway links (i.e. drainage ditches/watercourses) between the KWF Grid Connection site and the closest downslope river waterbodies. Surface water runoff from the KWF Grid Connection makes its way to the closest downslope river waterbodies via dispersed overland flow and shallow groundwater flow.

Both these flowpaths have a natural buffering capacity to attenuate surface water runoff from the KWF Grid Connection.

The ground slope gradients are noted to be relatively steep in the area of the KWF Grid Connection, but there is no evidence of discrete surface water flowpaths between the proposed development site and downslope river water bodies that drain into these designated sites.

Relevant Figure (at the end of this chapter)

Figure 9.1.1: Location of KWF Grid Connection in relation to Designated Sites.

9.4.1.2.2 Baseline Context and Character of Designates Sites in the Cumulative Study Area

Authorised Knocknamona Windfarm: The majority of the Knocknamona Windfarm site exists within the Goish_010 River Sub Basin (6 of 8 no. turbines, including the consented Knocknamona Substation are upstream of the River Blackwater designations). The 2 no. remaining turbines exist within the Brickey catchment are upstream of the Dungarvan Harbour designations.

Authorised Junction & Bend Widening Works are located in the Goish_010 and Brickey_020 river sub catchments and therefore drain to both the Dungarvan Harbour and River Blackwater designations.

Operational Woodhouse Substation: The operational Woodhouse Substation exists is upstream of the River Blackwater designations within the Finisk catchment.

Operational Woodhouse Windfarm: All of the Woodhouse Windfarm drains to the River Blackwater designations via the Goish and Finisk river waterbodies.

9.4.1.2.3 Consideration of the Passage of time

The Knocknamona Windfarm Revised EIS 2015 was reviewed in the context of the current baseline conditions. The passage of time was considered during this review. There have been no reported changes in the baseline environment of downstream designated sites since 2014/2015, and the descriptions in the Revised Knocknamona Windfarm EIS 2015 remain relevant to this application.

9.4.1.3 IMPORTANCE of Designates Sites

SACs and SPAs (European Sites) are protection under European legislation. No significant effects on European Sites are permitted. All designated are considered to be of **Very High Importance**.

9.4.1.4 SENSITIVITY of Designated Sites

Designated Sites located downstream of the KWF Grid Connection are mainly within Transitional Water areas (i.e. they are not freshwater dependant). These designated sites are then unlikely to be sensitive to variations in sediments (i.e. TSS and turbidity) in the short term (i.e. KWF Grid Connection construction phase). Agriculture (nutrients) is typically the main pressure affecting Transitional Waters.

The primary risks associated with KWF Grid Connection is sediment run-off or contamination by oils/fuels or cementitious materials rather nutrients.

9.4.1.5 TRENDS for Designates Sites in the Baseline Environment

The Lower Blackwater M Estuary / Youghal Harbour and Brickey Estuary have been assigned a Moderate Status since the first WFD cycle in 2010. The WFD status is also a reflection of the ecological status and the associated designated sites/habitats.

9.4.1.6 The 'Do Nothing Scenario' (the Environment if the Development is not carried out)

It is assumed that the Designates Sites within the study area will be as reported above.

9.4.1.7 Description of the RECEIVING ENVIRONMENT for Designated Sites

The receiving environment is the likely state of the baseline environment at the time of construction/operation/decommissioning as relevant i.e. baseline + trends.

It is assumed that Designates Sites within the receiving environment will be as reported above.

9.4.2 EVALUATION OF IMPACTS to Designates Sites

In this Section, the direct or indirect impacts and the cumulative impacts of KWF Grid Connection on Designates Sites are described.

9.4.2.1 Potential Impacts Evaluated for River Waterbodies

A conceptual site model exercise was carried out to identify potential impacts through the examination of the specific pathways between the project (source) and the sensitive aspect (receptor).

The potential for impacts from the proposed development, as described in **Chapter 5: Description of the Development including the description of development, standard construction methodologies, construction activities and operational activities described,** was firstly examined **in the absence of mitigation measures (Pre-Mitigation Effect)** and then following application of **mitigation measures (Residual Effects)**.

The potential impacts which were evaluated are listed in the 1st column of the table below. As summarised in the table below, **No Significant Pre-Mitigation or Residual Effects are likely to occur**.

Table 9-11: Conclusion of the Evaluation of Potential Impacts to Designates Sites

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Pre-Mitigation Effects of KWF Grid Connection (Direct/indirect effects)	Residual Effects of KWF Grid Connection (Direct/indirect effects)	Cumulative Impact of the Whole Project	Impact Woodhouse Windfarm and Woodhouse Substation and the activities Forestry & Agriculture	Cumulative Whole Knocknamona Windfarm Project Impact
Surface water quality impacts due to sediment entrainment, Fuels, Oils, Chemicals and cement based compounds	Construction	No Effect	**No Residual Effects**	No likely cumulative Effect	No likely cumulative Effect	**Not significant**

In order to keep this EIA Report concise and focused on potential significant impacts, where the evaluation of potential impacts found **no significant residual effects** from the development, the evaluation tables are presented in the appendix to the chapter.

Impact Evaluation Tables for the potential impacts listed in the table above are in Appendix 9.1.

Relevant Appendix (at the end of this chapter)

Appendix 9.1 Evaluation of Potential Impacts to Water
Appendix 9.3 Water Framework Directive Assessment

9.4.2.2 Summary of the Significance of the Potential Impacts to Designated Sites

As outlined in the table above, there will be **No impact on Designated Sites as a result of KWF Grid Connection**, this is due to the imperceptible effects on river waterbodies immediately downstream of the KWF Grid Connection site, the downstream distance to the actual Designates Site boundary, the estuarine nature of the Designates Sites and the increasing dilution effects with downstream distance along with the significant dilution effects afforded by the Transitional Water themselves (i.e. Tidal effects).

There is no likely cumulative impacts of KWF Grid Connection with the Authorised Knocknamona Windfarm, this is generally due to the majority of the Knocknamona Windfarm site been located in the Goish_010 River Sub Basin while the majority of the KWF Grid Connection works located in the Brickey_010, Brickey_020 and Finisk_030 River Sub Basins. This greatly reduces the overall potential for cumulative impacts. The potential for cumulative impacts is further minimised through the implementation of the of the Environmental Management Plan and Sediment Control Plan for the Knocknamona Windfarm, which includes cement control, and fuel management and spill/leak response measures. **Overall the 'whole project' effect of KWF Grid Connection and Knocknamona Windfarm will not be significant**.

There is no likely cumulative impact when Woodhouse Windfarm and Woodhouse Substation are also taken into account, this is generally due to fact that Woodhouse Windfarm and Woodhouse Substation are already constructed and have been operational since 2015, and therefore are not likely to contribute to cumulative surface water quality impacts. Cumulative contamination impacts to river waterbodies from oils/fuels/chemical spillages are not likely due to the storage of these oils/fuels/chemicals in bunded containers within the hardcore Woodhouse Substation compound.

9.5 Summary of the Water Chapter

The Water chapter examines the effects of KWF Grid Connection on the hydrology and hydrogeology in the area. Hydrology is the term used for surface water drainage within regional and local catchments. Hydrogeology is the distribution and flow of groundwater within aquifers in the local groundwater bodies.

There are no watercourses on site. The nearest surface watercourse to the proposed development is the Mountodell Stream which flows within 280m of a short section of underground cabling and drains an area at the central portion of the site. The Mountodell Stream flows north for ca. 2km to meet the River Brickey, which flows east into Dungarvan Harbour. The development is partially located within the Finisk_030 and Goish_010 River Sub Basins which form part of the Blackwater (Munster) Catchment and is also partially located within the Brickey_010 and Brickey_020 River Sub Basins which form part of the Colligan (Mahon) Catchment.

In respect of groundwater, the existing environment comprises 2 no. local groundwater bodies (GWBs) - the Helvic Head GWB and the Glenville GWB. In relation to public and private water supplies, there are no local surface water or groundwater abstractions from local streams for public supply, and no springs supplying water in the vicinity of KWF Grid Connection CWA. The closest water supply source is a groundwater well, which utilises the underlying bedrock aquifer, c.135m from KWF Grid Connection , this well supplies water to farm buildings.

The following aspects of Water were considered during scoping for this topic chapter: **River Waterbodies, Groundwater Bodies, Designated water dependant sites** (Blackwater River SAC, Blackwater Estuary SPA, Blackwater River and Estuary pNHA, Dungarvan Harbour SPA and Dungarvan Harbour pNHA), **Local Water Supplies** and **Transitional Waterbodies**.

River Waterbodies, Groundwater Bodies and Designated water dependant sites were aspects deemed to be sensitive to the development and were scoped in for detailed examination.

The other aspects were scoped out because effects are not likely to occur. (Rationale for scoping out Section 9.1.3.2).

In relation to all assessed Water aspects which were scoped in for evaluation, the results are that potential negative residual effects were evaluated as ranging from **No Impact to Imperceptible** at worst. No significant cumulative effects were identified.

With regard to WFD status, the KWF Grid Connection will not impact upon any waterbody as it will not cause a deterioration of the High status of any waterbody and/or it will not jeopardise the attainment of Good status. Therefore, the KWF Grid Connection is compliant with WFD requirements.

Related Documents

Non-Technical Summary of this chapter can be found in Volume C1: Non-Technical Summary: Section 9

Figures for Water chapter

Figure 9.1: Location of KWF Grid Connection in relation to Surface Water Catchments
Figure 9.2: Location of KWF Grid Connection in relation to Groundwater Bodies
Figure 9.3: Location of KWF Grid Connection in relation to Designated Sites
Figure 9.4: Study Area for River Waterbodies

Figure 9.4.1: Study Area for River Waterbodies (Zoomed In)
Figure 9.5: Study Area for Groundwater Bodies

Appendices for Water chapter

Appendix 9.1 Evaluation of Potential Impacts to Water
Appendix 9.2 Surface Water Sampling Results
Appendix 9.3 Water Framework Directive Assessment

9.6 Reference List

Geological Survey of Ireland (1995) Bedrock Geology 1:100,000 scale map series, Sheet 22 (Geology of East Cork and Waterford).

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Malachy Walsh and Partners (2014): Windfarm Development Knocknamona, Dungarvan, Co. Waterford - Geotechnical Assessment Report (EIS Chapter 14).

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Malachy Walsh and Partners (2014): Windfarm Development Knocknamona, Dungarvan, Co. Waterford - Sediment, Erosion and Stormwater Control Plan.

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National Parks and Wildlife Services (2016): Blackwater River (Cork/Waterford) SAC Site Synopsis Report Version date 9.2.2016 (002170).

National Parks and Wildlife Services (7.7.2014): Blackwater Estuary SPA Site Synopsis Report (004028).

National Parks and Wildlife Services (7.7. 2014): Dungarvan Harbour SPA Site Synopsis Report (004032).

Waterford City and County Council. *Waterford County Development Plan 2022-2028*.

Figure 9.1 - Location of KWF Grid Connection in relation to Surface Water Bodies

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Catchment:

- Blackwater (Munster) Catchment
- Colligan - Mahon Catchment

Sub Catchments:

- Sub Catchment outlines
- Finisk_SC_010 — Sub Catchment names

Sub Basins:

- Brickey_020 River Sub Basin
- Brickey_010 River Sub Basin
- Finisk_030 River Sub Basin
- Goish_010 River Sub Basin
- Goish_020 River Sub Basin

Finisk_SC_010
Colligan_SC_010
Colligan - Mahon Catchment
Blackwater (Munster) Catchment
Goish_SC_010
Lismore
Villierstown
Aglish
Youghal
Dungarvan
Finisk_030
Brickey_010
Brickey_020
Goish_020
Goish_010
Helvick Head
Ceann Heilbhic
Mine Head
Mine Ard
N

Figure 9.2 - Location of KWF Grid Connection in relation to Groundwater Bodies

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Ground Water Bodies:

- Glenville GWB (Groundwater Body)
- Helvick Head GWB (Groundwater Body)

Aquifer Type:

- Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Regionally Important Aquifer - Karstified (diffuse)
- Locally Important Aquifer - Karstified
- Regionally Important Aquifer - Fissured bedrock

Helvick Head GWB

Glenville GWB

N

Figure 9.3 - Location of KWF Grid Connection in relation to Designated Sites

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Designated Sites

- Special Areas of Conservation (SAC)
- Special Protected Areas (SPA)
- Proposed Natural Heritage Areas (pNHA)

Comeragh Mountains pNHA (001952)
Comeragh Mountains SAC (001952)
Lismore Woods pNHA (000667)
Blackwater Callows SPA (004094)
Glendine Wood SAC (002324)
Mid-Waterford Coast SPA (004193)
Dungarvan Harbour pNHA (000663)
Blackwater River (Cork/Waterford) SAC (002170)
KWF Grid Connection
Dungarvan Harbour SPA (004032)
Helvick Head SAC (000665)
Blackwater River and Estuary pNHA (000072)
Helvick Head to Ballyquin SPA (004192)
6km
Blackwater River (Cork/Waterford) SAC (002170)
Glenna Wood pNHA (001698)
10km
Blackwater Estuary SPA (004028)
Ballyeelinan Wood pNHA (001692)
15km
Ardmore Head SAC (002123)

N

Figure 9.4 - Study Area for River Waterbodies

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Study Area Extents:

Colligan - Mahon Catchment:

- Brickey_020 River Sub Basin
- Brickey_010 River Sub Basin

Blackwater (Munster) Catchment:

- Finisk_030 River Sub Basin
- Goish_10 River Sub Basin
- Goish_10 River Sub Basin

Whole Project:

- Authorised Knocknamona Windfarm and amendments
- Authorised Junction & Bend widening works

Other Projects:

- Existing Woodhouse Substation
- Existing Woodhouse Windfarm

EPA Biological Monitoring Stations Status

- Good
- Moderate
- Poor

Finisk_030 River Sub Basin (Blackwater (Munster) Catchment)

Brickey_010 River Sub Basin (Colligan-Mahon Catchment)

Existing Woodhouse Substation

KWF Grid Connection Construction Works Area

Goish_020 River Sub Basin (Blackwater (Munster) Catchment)

Brickey_020 River Sub Basin (Colligan-Mahon Catchment)

Existing Woodhouse Windfarm

Authorised Knocknamona Windfarm and amendments

Authorised Junction & Bend widening works

Goish_010 River Sub Basin (Blackwater (Munster) Catchment)

N

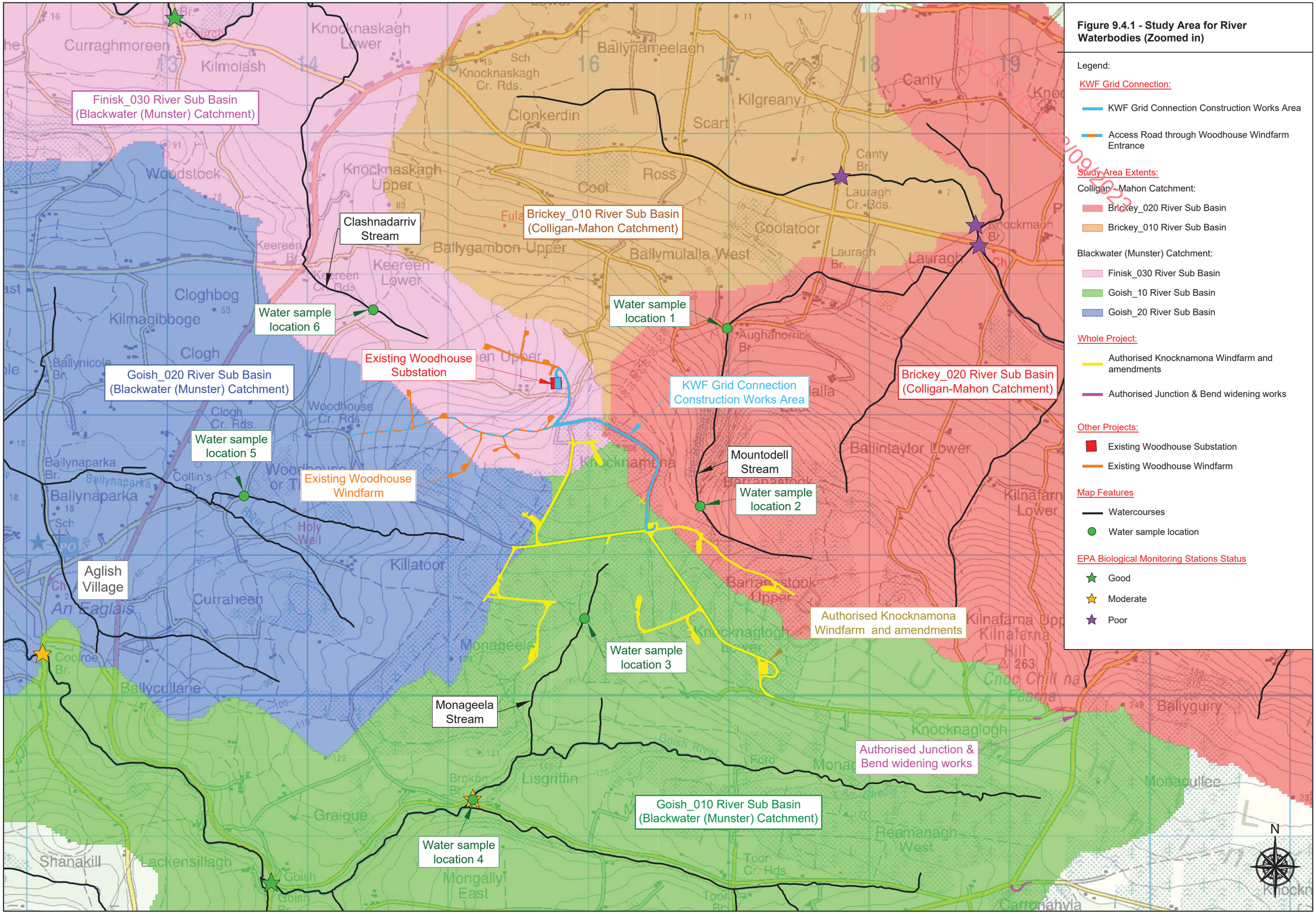


Figure 9.4.1 - Study Area for River Waterbodies (Zoomed in)

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Study Area Extents:

Colligan - Mahon Catchment:

- Brickey_020 River Sub Basin
- Brickey_010 River Sub Basin

Blackwater (Munster) Catchment:

- Finisk_030 River Sub Basin
- Goish_10 River Sub Basin
- Goish_20 River Sub Basin

Whole Project:

- Authorised Knocknamona Windfarm and amendments
- Authorised Junction & Bend widening works

Other Projects:

- Existing Woodhouse Substation
- Existing Woodhouse Windfarm

Map Features

- Watercourses
- Water sample location

EPA Biological Monitoring Stations Status

- Good
- Moderate
- Poor

Figure 9.5 - Study Area for Local Groundwater Bodies

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Ground Water Bodies:

- Glenville GWB (Groundwater Body)
- Helvick Head GWB (Groundwater Body)

Aquifer Type:

- Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Regionally Important Aquifer - Karstified (diffuse)
- Locally Important Aquifer - Karstified
- Regionally Important Aquifer - Fissured bedrock

Existing Woodhouse Substation

KWF Grid Connection Construction Works Area

Existing Woodhouse Windfarm

Authorised Knocknamona Windfarm and amendments

Authorised Junction & Bend widening works

Helvick Head GWB

Glenville GWB

N

Appendix 9.1: Evaluation of Potential Impacts to Water

This Appendix contains Impact Evaluation Table for the following Sensitive Aspect:

Sensitive Aspect Details as per Main EIA Report		Relevant Section of Main EIA Report:
Sensitive Aspect No. 1	**River Waterbodies** (quality, quantity and WFD status)	Section 9.2 of the Main EIA Report
Sensitive Aspect No. 2	**Groundwater Bodies** (quality, quantity and WFD status)	Section 9.3 of the Main EIA Report
Sensitive Aspect No. 3	**Designated Sites** (water dependant habitats and	Section 9.4 of the Main EIA Report

Evaluation of Potential Impacts to River Waterbodies

In relation to **River Waterbodies**, the following potential impacts were evaluated:

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Evaluated in this Appendix in Table:
Surface water quality impacts due to sediment entrainment	Construction	A9.1, Table 1
Surface water quality impacts due to Contamination by Fuels, Oils and Chemicals	Construction	A9.1, Table 2
Surface water quality impacts from Cement Based Compounds	Construction	A9.1, Table 3
Increased Runoff / Flood Risk /Hydromorphology Effects	Construction	A9.1, Table 4
Negative Effects on WFD Status	Construction	A9.1, Table 5

A9.1 Table 1 River Waterbodies - Surface water quality impacts due to sediment entrainment

Impact Source	Earthworks/Storage of Overburden
Impact Pathway (between Source and Sensitive Aspect)	Runoff and surface water flowpaths
Brief Impact Description	Indirect surface water quality impacts from entrained sediment in surface water runoff arising during excavations and groundworks. Overburden storage areas also have the potential to create entrained sediment in runoff as a result of their erosion. In relation to KWF Grid Connection, 40m³ of Soil excavations will be temporarily stored alongside the underground cable trench for typically 1 – 2 days. Permanent storage of 370m³ of soils will also occur alongside the widened section of forestry road and alongside the new Link Road.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Pre-mitigation Effect** will have a **Slight** significance because: • The relatively short length of KWF Grid Connection and the fact that's its mainly along existing access tracks; • Apart from a roadside drain at the junction where the consented Knocknamona Windfarm Substation is located, there is no other roadside drainage or under road drainage (i.e. culverts) present along this existing forestry track or proposed link road. Runoff from the existing forestry track is "over the edge" and onto the adjacent vegetated ground (acting as natural vegetation filter); • The proposed work is spread out within several River Sub Basins (i.e. Brickey_010, Brickey_020, Goish_010 and the Finisk_030). The development works are not concentrated in one Sub Basin and therefore effects are diluted; • There are no watercourse crossings or forestry drains along the proposed route and therefore there are no direct surface water linkages to the downstream Surface Water Bodies – the closest watercourse is the Mountodell Stream, and is 280m from KWF Grid Connection works at the closest point; • The transient nature and duration of the proposed works (i.e. construction work will be carried out in stages over a period of 4 months); • Only short sections of cable trench, approx. 50m long will be excavated at any one time. Following the excavation of the section of trench, the ducting and cabling and ancillary equipment will be installed in the trench and the trench backfilled before excavations begin on the next section. The work will progress thus in a linear fashion; • No works required along the delivery route for abnormal loads either on the public road network or within the Woodhouse Windfarm and, • Any surface water quality effects will be localised, brief to temporary in duration and reversible.
Mitigation Measures	**<u>Water Quality Protection – Suspended Solids</u>** Single silt fences will be installed at construction works areas down-gradient of the proposed works. Temporary silt fencing / silt trap arrangements will also be placed along potential runoff drainage routes (i.e. between forestry mounds/ribbons). The roadside drain at the Knocknamona Windfarm Substation will be temporarily

	blocked during trenching works upslope of this drain. Silt fences are effective at removing larger particle sized solids, and the erection of silt fences, silt traps and blocking of drains at the KWF Grid Connection site will prevent entry to watercourses of sand and gravel sized sediment released from excavations and entrained in surface water runoff from works areas. This measure is a standard form of best practice sediment control commonly used on windfarm construction sites. Silt-fencing will be installed, by the Construction Contractor, ahead of groundworks. Silt fencing and silt trap arrangements will be regularly inspected and maintained during the construction phase to ensure their continued functioning to stated purpose. They will remain in place throughout the entire construction phase. If required, the silt fencing will be left in place until the ground has re-vegetated. Temporary spoil heaps will be covered with polyethylene sheets during heavy rainfall events, and the excavation of cable trench, substation works and link road works will not be undertaken during periods of intense or prolonged rainfall. These measures will reduce the volumes of excavated material exposed to heavy rainfall, thereby reducing the risk of entrainment of suspended sediment in surface water runoff.
Residual Effect	Due to the small scale, spread out and transient nature of the KWF Grid Connection works along with the proposed mitigation measures, residual Effects will be **Imperceptible** on downstream river waterbodies
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No Likely Cumulative Effects** because: because: • The non-significant water quality effects as a result of the KWF Grid Connection Works; • The majority of the Authorised Knocknamona Windfarm site is located in the Goish_010 River Sub Basin while the majority of the KWF Grid Connection route is located in the Brickey_020 and Finisk_030 River Sub Basins. This greatly reduces the overall potential for cumulative impacts; • The Larger Turbines require no additional groundworks or larger foundations than the originally authorised Knocknamona Windfarm; • The Junction and Bend Widening Works are widening works for turbine blade access to the Knocknaglogh Lower windfarm entrance will be typically minor and localised and will only require shallow excavations; • Implementation of the Knocknamona Windfarm Environmental Management Plan and Sediment Control Plan; and, • Impacts to Water as a result of the Authorised Knocknamona Windfarm was previously assessed by An Bord Pleanála as not significant. When the additional effects of KWF Grid Connection are taken into account, the cumulative effect remains not significant.
C: Cumulative Impact with Woodhouse Substation, Woodhouse Windfarm.	**No Likely Cumulative Effect** because: • The non-significant water quality effects as a result of the KWF Grid Connection Works; • Cumulative impacts of KWF Grid Connection and the Authorised Knocknamona Windfarm will not be significant; Cumulative impacts of Knocknamona Windfarm with Woodhouse Windfarm in the Goish_010 River Sub Basin will not be

	significant due to the already operational status of Woodhouse Windfarm and the implementation of the Sediment Control Plan for Knocknamona Windfarm; • The Woodhouse Windfarm and Woodhouse Substation are operational and therefore are not likely to contribute to surface water quality effects.

A9.1 Table 2 River Waterbodies - Surface Water Quality Impacts due to Contamination by Fuels, Oils and Chemicals

Impact Source	Fuels, Oils and Chemicals
Impact Pathway (between Source and Sensitive Aspect)	Runoff and surface water flowpaths
Brief Impact Description	The plant and equipment that will be used during the construction phase will be run on fuels and oils. This creates the potential for spillage and leakage of hydrocarbons from plant during refuelling or storage of oils and fuels which can impact on downstream surface water bodies.
Project Stage:	Construction stage
A: Direct/Indirect Impacts of KWF Grid Connection	The **Pre-mitigation effect** will have an **Imperceptible** significance because: • Only relatively small volumes of fuels / oils will be on-site at any one time and therefore no significant spills/leakages are expected; • Therefore, any incidents that do occur will largely be limited to small, isolated, low volume spills / leaks that may occur along the KWF Grid Connection construction works area; and, • The absence of watercourse crossings and forestry drains (flowpaths) along the KWF Grid Connection.
Mitigation measures	**<u>Water Quality Protection – Fuels and Oils</u>** All fuels required for construction activities will be stored in a designated location, away from main traffic activity, at the Woodhouse Substation Compound. All fuel will be stored in bunded, locked storage containers. Where refuelling is required along the proposed route, fuel will be brought to site by a 4x4 in a double skinned bowser with drip trays. The bowser will be bunded appropriately for the fuel usage volume for the time period of the construction. These measures will be implemented by the Construction Contractor, and will prevent the escape of fuels from storage containers, in line within best practice. The plant and machinery used on-site will be regularly inspected for leaks and fitness for purpose, in order to minimise the risk of oil leakages from vehicles. Spill kits and absorbent material will be readily available on site, with a kit available in the bowser/4x4 and in all plant and machinery used on site. Both machinery operators and delivery personnel will be fully trained to deal with any accidental spills. This measure will ensure that any leaks are contained quickly and effectively and that the risk to downslope water bodies is minimised.
Residual Effects	Proven and effective measures to mitigate the risk of releases of fuels, oils and chemicals have been proposed above and will break the pathway between the potential source and each receptor. Also, given the small scale, spread out and transient nature of the grid connection works, there will be **No residual Effects** on river waterbodies.

B: : Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No Likely Cumulative Effect** because: • No significant contamination effects on river waterbodies from fuel, oils and chemicals during the KWF Grid Connection works are anticipated; and, • Implementation of the Environmental Management Plan for the Authorised Knocknamona Windfarm, which includes fuel management and spill/leak response measures.
C: Cumulative Impact of KWF Grid Connection with Woodhouse Substation, and Woodhouse Windfarm	**No Likely Cumulative Effect** because: • Significant contamination effects on river water bodies from fuel, oil and chemicals during the KWF Grid Connection works will not occur; • No cumulative effects are likely with respect to the KWF Grid Connection and the Knocknamona Windfarm; • The Woodhouse Substation and Woodhouse Windfarm are operational, the use of fuels, oils or chemicals will be limited to inside the turbines and within the hardcore substation compound, and therefore cumulative contamination impacts to river waterbodies from Oils, Fuels and Chemicals spillages is not likely.

A9.1 Table 3 River Waterbodies - Surface Water Quality Impacts from Cement Based Compounds

Impact Source	Cement Based Compounds
Impact Pathway (between Source and Sensitive Aspect)	Runoff and surface water flowpaths
Brief Impact Description	Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills. Entry of cement-based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to water quality and to the aquatic environment.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Pre-mitigation effect** will have an **Imperceptible** significance because: • The lack of surface water courses and forestry drains along the proposed route means there are no direct surface water linkages (flowpaths) to the downstream river waterbodies; • Wet cement will be used within the hardcore area of the Woodhouse Substation compound, the surrounding hardcore yard will prevent the mobility of cement; • The volumes of cement required for the KWF Grid Connection are small (4 loads) and limited to works within the Woodhouse Substation compound area; • Lean mix concrete will limit the mobility of the compound through potentially porous soil thereby restricting the effects to the contact area; and, • Based on trial pit investigation undertaken along the KWF Grid Connection cable route which did not record any groundwater or surface water inflows, and based on the elevated location, there will be no requirement to dewater/pump out the trench or foundations during cement placement.
Mitigation measures	**<u>Water Quality Protection – Cements</u>** No batching of wet cement will take place on-site. Concrete requirements for the KWF Grid Connection are limited to c.4 loads of ready-mix concrete to construct the control building foundation, and the plinths and bunds in the Woodhouse Substation Compound. Therefore large volumes of cement will not be present on-site at any time. Where concrete is delivered on site (at Woodhouse Substation compound only), only the chute will be cleaned, using the smallest volume of water practicable. No discharge of concrete washout waters to any artificial drain or watercourse will be allowed. Concrete washout bags will be placed under the chute to catch any washout wastewater. These measures will be implemented by the Construction Contractor during concrete pours, to prevent the concrete washout from entering drainage networks/watercourses, thus effectively removing the pathway for impacts to downstream waterbodies. Weather forecasting will be used to plan pouring concrete for dry days; and, the pour site will be kept free of standing water and plastic covers will be ready in case

	of sudden rainfall event. This measure will minimize the exposure of wet concrete to rainwater runoff.
Residual Effects	Proven and effective measures to mitigate the risk of releases of cement based compounds have been proposed above and will break the pathway between the potential source and each receptor. Also, given the small scale, low volumes present, spread out and transient nature of the grid connection works, there will be **No Residual Effects.**
B: : Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	• **No Likely Cumulative Effect** because: • Significant effects on river waterbodies from cement-based compounds during the KWF Grid Connection works will not occur; • The majority of the Authorised Knocknamona Windfarm is located in the Goish_010 River Sub Basin while the majority of the KWF Grid Connection route is located in the Brickey_020 and Finisk_030 River Sub Basins. This greatly reduces the overall potential for cumulative impacts; • The implementation of the Environmental Management Plan and Sediment Control Plan for Knocknamona Windfarm, which includes Concrete Control measures will minimise the effect of concrete use at the windfarm site; • The Larger Turbines require no additional groundworks or larger foundations than the originally authorised Knocknamona Windfarm; • The Junction and Bend Widening Works require only a very small amount of cement; • Impacts to Water as a result of the Authorised Knocknamona Windfarm was previously assessed by An Bord Pleanála as not significant. When the additional effects of KWF Grid Connection 2022 are taken into account, cumulative impact remains not significant.
C: Cumulative Impact of KWF Grid Connection with Woodhouse Substation, Woodhouse Windfarm	**No Likely Cumulative Effects** because: • Significant effects on river waterbodies from cement-based compounds during the KWF Grid Connection works will occur; • No cumulative effects with respect the KWF Grid Connection and the Authorised Knocknamona Windfarm will occur; • The Woodhouse Substation and Woodhouse Windfarm are operational and therefore there will likely be no significant requirement for cement based compounds.

A9.1 Table 4 River Waterbodies - Increased Runoff / Flood Risk /Hydromorphology Effects

Impact Source	Drainage alteration and increased runoff due to hardstand area placement
Impact Pathway (between Source and Sensitive Aspect)	Runoff and surface water flowpaths
Brief Impact Description	Indirect downstream effects can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Increased runoff from hard standard surfaces.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Pre-mitigation effect** is **No Effect** because: • The relatively short length of KWF Grid Connection and the fact that's its mainly along existing access tracks; • Small additional footprint area due to road widening; • The proposed development footprint spreads out over several sub-basins; • Apart from a roadside drain at the junction where the consented Knocknamona Windfarm Substation is located, there is no other roadside drainage or under road drainage (i.e. culverts) present along this existing forestry track or proposed link road. Runoff from the existing forestry track is "over the edge" and onto the adjacent vegetated ground. This drainage regime will not be altered; and, • There are no watercourse crossings or forestry drains along the proposed route and therefore there are no direct surface water linkages to the downstream river waterbodies.
Mitigation Measures	No mitigation measures are required with regard Increased Runoff / Flood Risk /Hydromorphology Effects
Residual Effect	Due to the small footprint, spread out nature and lack of existing drainage alteration with regard the KWF Grid Connection works, there will be **No Residual Effects** on downstream river waterbodies
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at	**No Cumulative Effects** because: • The lack of negative effects arising from the KWF Grid Connection Works; • The majority of the Authorised Knocknamona Windfarm site is located in the Goish_010 River Sub Basin while the majority of the KWF Grid Connection route is located in the Brickey_020 and Finisk_030 River Sub Basins; and, • The implementation of the Environmental Management Plan and Sediment Control Plan for Knocknamona Windfarm, which includes drainage attenuation measures.

Knocknaglogh Lower	
C: Cumulative Impact with Woodhouse Substation, Woodhouse Windfarm	**No Likely Cumulative Effects** because: • The lack of negative effects arising from the KWF Grid Connection Works; • The majority of the Woodhouse Substation and Windfarm site is located in the Finisk_030 River Sub Basin while the majority of the KWF Grid Connection route is located in the Brickey_020 and Goish_010 River Sub Basins; and, • The Environmental Management Plan and Sediment Control Plan for Woodhouse Windfarm, which includes drainage attenuation measures.

A9.1 Table 5 River Waterbodies – Negative Effect on WFD Status

Impact Source	Surface water quality effects, drainage alteration and hydromorphology effects
Impact Pathway (between Source and Sensitive Aspect)	Runoff and surface water flowpaths
Brief Impact Description	Surface water quality effects (suspended sediments) and hydromorphological effects
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Pre-mitigation effect** is **No Effect** because: • Lack of significant effects of the KWF Grid Connection works on river waterbodies with regard surface water quality and hydromorphology; • The relatively short length of KWF Grid Connection and the fact that's its mainly along existing access tracks; and, • The proposed work is spread out within several River Sub Basins (i.e. Brickey_020, Goish_010 and the Finisk_030). The development works are not concentrated in one Sub Basin.
Mitigation Measures	No additional mitigation measures are required other than those presented in Tables 1 to 3 above.
Residual Effect	Due to the small scale, spread out nature and lack of significant effects with regard the KWF Grid Connection works, there will be **No Residual Effects** on the WFD status of river waterbodies.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No Cumulative Effects** because: • The lack of significant negative effects arising from the KWF Grid Connection Works; • The majority of the Authorised Knocknamona Windfarm site is located in the Goish_010 River Sub Basin while the majority of the KWF Grid Connection route is located in the Brickey_020 and Finisk_030 River Sub Basins; and, The implementation of the Environmental Management Plan and Sediment Control Plan for Knocknamona Windfarm, which includes drainage attenuation measures.
C: Cumulative Impact with Woodhouse	**No Likely Cumulative Effects** because:

Substation, Woodhouse Windfarm	• The lack of significant negative effects arising from the KWF Grid Connection Works; • The majority of the Woodhouse Substation and Windfarm site is located in the Finisk_030 River Sub Basin while the majority of the KWF Grid Connection route is located in the Brickey_020 and Goish_010 River Sub Basins; and, • The operational status of the Woodhouse Windfarm and Substation and lack of potential for significant surface water quality effects.

Relevant Appendix (at the end of Water chapter)

Appendix 9.3 Water Framework Directive Evaluation

Evaluation of Potential Impacts to Groundwater Bodies

In relation to **Groundwater Bodies**, the following potential impacts were evaluated:

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Evaluated in this Appendix in Table:
Groundwater quality impacts due to Contamination by Fuels, Oils and Chemicals	Construction	A9.1, Table 6
Groundwater Quality Impacts from Cement Based Compounds	Construction	A9.1, Table 7
Negative effects on WFD Status	Construction	A9.1, Table 8

A9.1 Table 6 Groundwater Bodies – Groundwater Quality impacts due to Contamination by Fuels, Oils and Chemicals

Impact Source	Groundwater Quality impacts due to Contamination by Fuels, Oils and Chemicals
Impact Pathway (between Source and Sensitive Aspect)	Recharge and Groundwater flowpaths
Brief Impact Description	The plant and equipment that will be used during the construction phase will be run on fuels and oils. This creates the potential for spillage and leakage of hydrocarbons from plant during refuelling or storage of oils and fuels which can impact on groundwater quality
Project Stage:	Construction stage
A: Direct/Indirect Impacts of KWF Grid Connection	The **Pre-mitigation Effect** will have an **Imperceptible** significance because: • Only relatively small volumes of fuels / oils will be on-site at any one time and therefore no significant spills/leakages are expected; • Therefore, any incidents that do occur will largely be limited to small, isolated, low volume spills / leaks that may occur along the KWF Grid Connection construction works area; • The majority of works will be carried out off an existing forestry track surface and therefore any minor spills will be contained; • The localised nature of groundwater flow in the area of the KWF Grid Connection due to the poorly productive nature of the underlying aquifer; • The negligible footprint area of the KWF Grid Connection in comparison to the local GWBs size.
Mitigation measures	• Refer to Table 2 above for mitigation measures relating to oils, fuels and chemicals.
Residual Effects	Proven and effective measures to mitigate the risk of releases of oils, fuels and chemicals have been proposed above and will break the pathway between the potential source and each receptor. Also, given the small scale, spread out and transient nature of the grid connection works, there will be **No Residual Effects**.
B: : Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component	**No Likely Cumulative Impact** because: • The lack of significant negative effects arising from the KWF Grid Connection Works; • The lack of any significant groundwater flow interaction between the KWF Grid Connection and Authorised Knocknamona Windfarm due to the localised groundwater flow regime; and, The implementation of the Environmental Management Plan and Sediment Control Plan for Knocknamona Windfarm, which includes drainage attenuation and pollution prevention measures.

access through the windfarm site entrance at Knocknaglogh Lower	
C: Cumulative Impact of KWF Grid Connection with Woodhouse Substation, Woodhouse Windfarm	**No Likely Cumulative Effect** because: • The lack of significant negative effects arising from the KWF Grid Connection Works; • The lack of significant groundwater flow interaction between the KWF Grid Connection and Woodhouse Windfarm/Substation due to the localised groundwater flow regime; and, • The operational status of the Woodhouse Windfarm/Substation and therefore low volumes of fuels, oils and chemicals will be on-site at any one time.

A9.1 Table 7 Groundwater Bodies – Groundwater Quality impacts due to Cement Based Compounds

Impact Source	Cement Based Compounds
Impact Pathway (between Source and Sensitive Aspect)	Groundwater flowpaths
Brief Impact Description	Concrete and other cement-based products are highly alkaline and corrosive and can have negative impacts on groundwater quality which may indirectly affect downstream receptors such as surface water courses and groundwater supplies.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Pre-mitigation Effect** will have an **Imperceptible** significance because: • The localised nature of groundwater flow at the KWF Grid Connection site; • Wet cement will be used within the hardcore area of the Woodhouse Substation compound, the surrounding hardcore yard will prevent the mobility of cement; • The volumes of cement required for the KWF Grid Connection are small (4 loads) and limited to works within the Woodhouse Substation compound area; • Lean mix concrete will limit the mobility of the compound through potentially porous soil thereby restricting the effects to the contact area; • Based on trial pit investigation undertaken along the KWF Grid Connection cable route which did not record any groundwater inflows, therefore significant alteration of groundwater chemistry below the KWF Grid Connection site will not occur; and, • The localised nature of groundwater flow in the area of the KWF Grid Connection due to the poorly productive nature of the underlying aquifer.
Mitigation measures	• Refer to Table 3 above for mitigation measures relating to cement-based compounds
Residual Effects	• Proven and effective measures to mitigate the risk of releases of cement based compounds have been proposed above and will break the pathway between the potential source and each receptor. Also, given the small scale, low volumes present, spread out and transient nature of the grid connection works, there will be **No Residual Effects** on local groundwater bodies.
B: : Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component	**No Likely Cumulative Effects** because: • The lack of significant negative effects arising from the KWF Grid Connection Works; • The lack of significant groundwater flow interaction between the KWF Grid Connection and Authorised Knocknamona Windfarm due to the localised groundwater flow regime; and, • The implementation of the Environmental Management Plan and Sediment Control Plan for Knocknamona Windfarm, which includes drainage attenuation measures.

access through the windfarm site entrance at Knocknaglogh Lower	
C: Cumulative Impact of KWF Grid Connection with Woodhouse Substation, Woodhouse Windfarm	**No Likely Cumulative Impact** because: • The lack of significant negative effects arising from the KWF Grid Connection Works; and, • The operational nature of the Woodhouse Windfarm/Substation and therefore the general lack of use with regard cement based compounds on-site.

A9.1 Table 8 Groundwater Bodies – Negative effects on WFD Status	
Impact Source	Earthworks, excavations and drainage alteration
Impact Pathway (between Source and Sensitive Aspect)	Groundwater recharge and groundwater flowpaths
Brief Impact Description	Groundwater quality effects and groundwater flow (quantity) effects
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Pre-mitigation** is **No Effect** because: • Lack of significant effects of the KWF Grid Connection works on groundwater bodies with regard quality and flows (quantity); • The localised nature of groundwater flow in the of the KWF Grid Connection works due to the underlying poorly productive aquifers; • The negligible scale of the KWF Grid Connection works with regard the size of the local groundwater bodies.
Mitigation Measures	No additional mitigation measures are required other than those listed in Tables 2 to 3 above
Residual Effects	Due to the small scale, spread out nature and lack of significant effects with regard the KWF Grid Connection works, there will be **No Residual Effects** on the WFD status of groundwater bodies.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No Cumulative Effects** because: • The lack of negative effects arising from the KWF Grid Connection Works; • The lack of significant groundwater flow interaction between the KWF Grid Connection and Authorised Knocknamona Windfarm due to the localised groundwater flow regime; and, The implementation of the Environmental Management Plan and Sediment Control Plan for Knocknamona Windfarm, which includes drainage attenuation measures and pollution prevention measures.
C: Cumulative Impact with Woodhouse Substation,	**No Likely Cumulative Impact** because: • The lack of negative effects arising from the KWF Grid Connection Works; and,

Woodhouse Windfarm	• The operational nature of the Woodhouse Windfarm/Substation and therefore the lack of cement-based compounds on-site and minimal requirement for oils, fuels and chemicals.

Evaluation of Potential Impacts to Downstream Designated Sites

In relation to **Designated Sites**, the following potential impacts were evaluated:

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Evaluated in this Appendix in Table:
Surface water quality impacts due to sediment entrainment, Fuels, Oils, Chemicals and cement based compounds	Construction	A9.1, Table 9

A9.1 Table 9	Surface water quality impacts due to sediment entrainment, Fuels, Oils, Chemicals and Cement Based Compounds

Impact Source	Earthworks/Storage of Overburden, fuels/oils and Cement Based Compounds
Impact Pathway (between Source and Sensitive Aspect)	Runoff and surface water flowpaths
Brief Impact Description	Indirect surface water quality impacts from entrained sediment in surface water runoff arising during excavations and groundworks along with spills of oils/fuels and cements
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Pre-mitigation Effect** will have a **No Effect** significance because: • Due to the assessed Imperceptible to Slight effects on local river waterbodies and those immediately downstream of the KWF Grid Connection site; • The downstream distance to the actual designates site boundary along with the increasing surface flows, particularly in the regional Blackwater River (high dilution effects); • The estuarine nature of the downstream designates sites along with the significant dilution effects afforded by the Transitional Water themselves (i.e. Tidal effects and intermixing with freshwater); and, • Downstream designated sites are unlikely to be sensitive to variations in sediments (i.e. TSS and turbidity) in the short term due to the natural estuarine environment in which they exist.
Mitigation Measures	• No additional mitigation required other than that outlined in Table 1 to Table 3 above for TSS, oils/fuels and cements.
Residual Effect	No residual effects on downstream designated sites will occur.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No Likely Cumulative Effects** because: because: • The non-significant water quality effects as a result of the KWF Grid Connection Works; • The majority of the Authorised Knocknamona Windfarm site is located in the Goish_010 River Sub Basin while the majority of the KWF Grid Connection route is located in the Brickey_020 and Finisk_030 River Sub Basins. This greatly reduces the overall potential for cumulative impacts; • The Larger Turbines require no additional groundworks or larger foundations than the originally authorised Knocknamona Windfarm; • The Junction and Bend Widening Works are widening works for turbine component access to the Knocknaglogh Lower windfarm entrance will be typically minor and localised and will only require shallow excavations; • Implementation of the Knocknamona Windfarm Environmental Management Plan and Sediment Control Plan; and, • Impacts to Water as a result of the Authorised Knocknamona Windfarm was previously assessed by An Bord Pleanála as not significant. When the additional

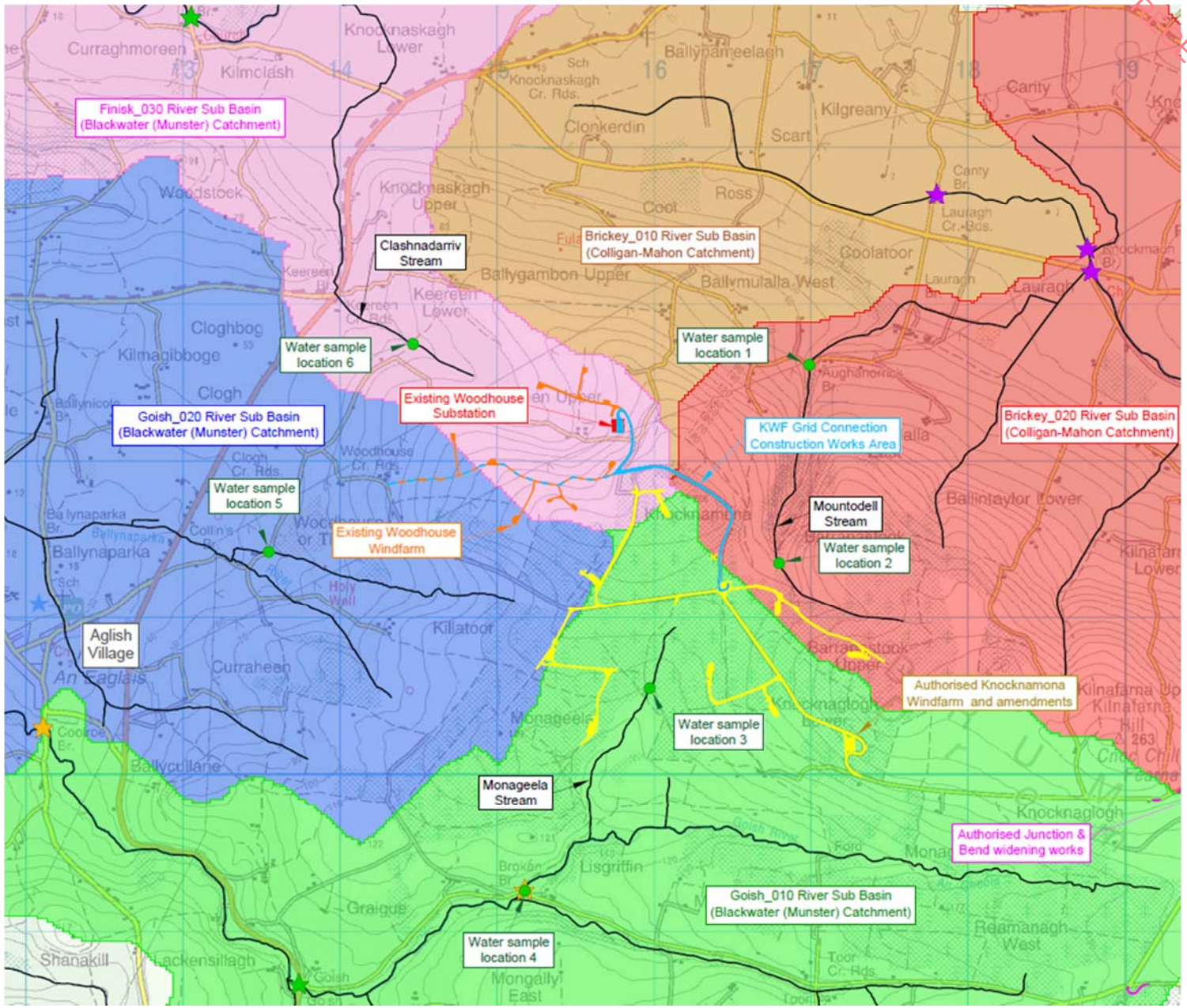
	effects of KWF Grid Connection are taken into account, the cumulative effect remains not significant.
C: Cumulative Impact with Woodhouse Substation, Woodhouse Windfarm	**No Likely Cumulative Effect** because: • The non-significant water quality effects as a result of the KWF Grid Connection Works; • Cumulative impacts of KWF Grid Connection and the Authorised Knocknamona Windfarm will not be significant; • Cumulative impacts of Knocknamona Windfarm with Woodhouse Windfarm in the Goish_010 River Sub Basin will not be significant due to the already operational status of Woodhouse Windfarm and the implementation of the Sediment Control Plan for Knocknamona Windfarm; • The Woodhouse Windfarm and Woodhouse Substation are operational and therefore are not likely to contribute to surface water quality effects.

Appendix 9.2: Surface Water Sampling Results

The data and descriptions in this appendix have informed Chapter 9: Water of the EIA Report, in relation to water quality in the existing environment.

CONTENTS

A9.2.1 Surface Water Sampling Locations



A9.2.2 SURFACE WATER RESULTS

Table 1: Surface Water Sampling Results

Sample Location	Sampling Date	BOD (mg/L)	Chloride (mg/L)	Electrical Conductivity (uS/cm)	Ammonical Nitrogen (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Ortho-Phosphate (mg/L)	Total Phosphorous (mg/L)	pH (pH Units)	Suspended Solids (mg/L)	Total Nitrogen (mg/L)	Turbidity (NTU)
1	28/02/2023	1	19.78	145	0.08	0.03	14.96	0.04	0.05	7.2	2	1.5	1.47
2	28/02/2023	1	19.5	119.6	0.02	<0.03	6.64	0.01	<0.013	6.6	2	0.7	<0.02
3	28/02/2023	1	18.07	83.2	0.04	<0.03	<2.2	0.01	<0.013	6.4	5	<0.5	<0.02
4	28/02/2023	1	19.28	107.4	0.09	<0.03	7.04	0.05	0.05	7.1	3	<0.5	<0.02
5	28/02/2023	1	22.94	165.6	0.02	<0.03	13.6	0.01	<0.013	7.8	5	1.5	2.73
6	28/02/2023	1	19.06	171.3	0.05	0.03	23.63	0.02	0.03	7.3	3	3.3	2.81

Table 2: Surface Water Sampling Results – Max, Min & Average

	BOD (mg/L)	Chloride (mg/L)	Electrical Conductivity (uS/cm)	Ammonical Nitrogen (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Ortho-Phosphate (mg/L)	Total Phosphorous (mg/L)	pH (pH Units)	Suspended Solids (mg/L)	Total Nitrogen (mg/L)	Turbidity (NTU)
MAXIMUM	1	22.94	171.3	0.09	0.03	23.63	0.05	0.05	7.8	5	3.3	2.81
MINIMUM	1	18.07	83.2	0.02	<0.03	<2.2	0.01	<0.013	6.4	2	<0.5	<0.02
AVERAGE	1	19.8	132.0	0.05	0.03	11.3	0.02	0.03	7.1	3.3	1.3	1.2

A9.2.3 Test Reports

IAS LABORATORIES

Independent Analytical Supplies

Test Report

Lab Report Number: **16836S004**

RECEIVED: 08/09/2023

Customer ID:	ECO.P1	**Analysis Type:**	99A (99A)
Contact Name:	PHILOMENA KENNEDY	**Delivery By:**	CUSTOMER
Company Name:	ECO POWER	**Sample Card Number:**	75193
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	**Condition on Receipt:**	Acceptable
Sample Type:	SURFACE WATER	**Date Sample Received:**	03/02/2023
Sample Reference:	WATER SAMPLES	**Date Analysis Commenced:**	03/02/2023
Sample Description:	SP1	**Date Certificate Issued:**	28/02/2023

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2065	19.78	mg/l
Conductivity	SOP 2076	145.0	µS/cm 20°C
Ammonia Nitrogen	SOP 2057	0.08	mg/l NH_3-N
Nitrite	SOP 2059	0.03	mg/l NO_2
Nitrate	SOP 2060	14.96	mg/l NO_3
Orthophosphate P	SOP 2061	0.04	mg/l P
Total Phosphorus^	Subcontracted	0.05	mg/l P
pH	SOP 2004	7.2	pH units
Total Suspended Solids	SOP 2016	2	mg/l
Total Nitrogen	SOP 2075	1.5	mg/l
Turbidity	SOP 2022	1.47	NTU

Signed: Laura Kavanagh Date: 28/02/2023

Laura Kavanagh - Laboratory Manager

*** = not INAB Accredited** **^ = Subcontracted**

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.275T

IAS LABORATORIES

Independent Analytical Supplies

Test Report

Lab Report Number: **16836S003**

RECEIVED: 08/09/2023

Customer ID:	ECO.P1	**Analysis Type:**	99A (99A)
Contact Name:	PHILOMENA KENNEDY	**Delivery By:**	CUSTOMER
Company Name:	ECO POWER	**Sample Card Number:**	75193
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	**Condition on Receipt:**	Acceptable
Sample Type:	SURFACE WATER	**Date Sample Received:**	03/02/2023
Sample Reference:	WATER SAMPLES	**Date Analysis Commenced:**	03/02/2023
Sample Description:	SP2	**Date Certificate Issued:**	28/02/2023

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2065	19.50	mg/l
Conductivity	SOP 2076	119.6	µS/cm 20°C
Ammonia Nitrogen	SOP 2057	0.02	mg/l NH_3-N
Nitrite	SOP 2059	<0.03	mg/l NO_2
Nitrate	SOP 2060	6.64	mg/l NO_3
Orthophosphate P	SOP 2061	0.01	mg/l P
Total Phosphorus^	Subcontracted	<0.013	mg/l P
pH	SOP 2004	6.6	pH units
Total Suspended Solids	SOP 2016	2	mg/l
Total Nitrogen	SOP 2075	0.7	mg/l
Turbidity	SOP 2022	<0.02	NTU

Signed: Laura Kavanagh Date: 28/02/2023

Laura Kavanagh - Laboratory Manager

*** = not INAB Accredited** **^ = Subcontracted**

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.275T

IAS LABORATORIES

Independent Analytical Supplies

Test Report

Lab Report Number: **16836S002**

RECEIVED: 08/09/2023

Customer ID:	ECO.P1	**Analysis Type:**	99A (99A)
Contact Name:	PHILOMENA KENNEDY	**Delivery By:**	CUSTOMER
Company Name:	ECO POWER	**Sample Card Number:**	75193
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	**Condition on Receipt:**	Acceptable
Sample Type:	SURFACE WATER	**Date Sample Received:**	03/02/2023
Sample Reference:	WATER SAMPLES	**Date Analysis Commenced:**	03/02/2023
Sample Description:	SP3	**Date Certificate Issued:**	28/02/2023

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2065	18.07	mg/l
Conductivity	SOP 2076	83.2	µS/cm 20°C
Ammonia Nitrogen	SOP 2057	0.04	mg/l NH_3-N
Nitrite	SOP 2059	<0.03	mg/l NO_2
Nitrate	SOP 2060	<2.2	mg/l NO_3
Orthophosphate P	SOP 2061	0.01	mg/l P
Total Phosphorus^	Subcontracted	<0.013	mg/l P
pH	SOP 2004	6.4	pH units
Total Suspended Solids	SOP 2016	5	mg/l
Total Nitrogen	SOP 2075	<0.5	mg/l
Turbidity	SOP 2022	<0.02	NTU

Signed: Laura Kavanagh Date: 28/02/2023

Laura Kavanagh - Laboratory Manager

*** = not INAB Accredited** **^ = Subcontracted**

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.275T

IAS LABORATORIES

Independent Analytical Supplies

Test Report

Lab Report Number: **16836S001**

RECEIVED: 08/09/2023

Customer ID:	ECO.P1	**Analysis Type:**	99A (99A)
Contact Name:	PHILOMENA KENNEDY	**Delivery By:**	CUSTOMER
Company Name:	ECO POWER	**Sample Card Number:**	75193
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	**Condition on Receipt:**	Acceptable
Sample Type:	SURFACE WATER	**Date Sample Received:**	03/02/2023
Sample Reference:	WATER SAMPLES	**Date Analysis Commenced:**	03/02/2023
Sample Description:	SP4	**Date Certificate Issued:**	28/02/2023

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2065	19.28	mg/l
Conductivity	SOP 2076	107.4	µS/cm 20°C
Ammonia Nitrogen	SOP 2057	0.09	mg/l NH_3-N
Nitrite	SOP 2059	<0.03	mg/l NO_2
Nitrate	SOP 2060	7.04	mg/l NO_3
Orthophosphate P	SOP 2061	0.05	mg/l P
Total Phosphorus^	Subcontracted	0.05	mg/l P
pH	SOP 2004	7.1	pH units
Total Suspended Solids	SOP 2016	3	mg/l
Total Nitrogen	SOP 2075	<0.5	mg/l
Turbidity	SOP 2022	<0.02	NTU

Signed: Laura Kavanagh Date: 28/02/2023

Laura Kavanagh - Laboratory Manager

*** = not INAB Accredited** **^ = Subcontracted**

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IAS LABORATORIES

Independent Analytical Supplies

Test Report

Lab Report Number: **16836S006**

RECEIVED: 08/09/2023

Customer ID:	ECO.P1	**Analysis Type:**	99A (99A)
Contact Name:	PHILOMENA KENNEDY	**Delivery By:**	CUSTOMER
Company Name:	ECO POWER	**Sample Card Number:**	75193
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	**Condition on Receipt:**	Acceptable
Sample Type:	SURFACE WATER	**Date Sample Received:**	03/02/2023
Sample Reference:	WATER SAMPLES	**Date Analysis Commenced:**	03/02/2023
Sample Description:	SP5	**Date Certificate Issued:**	28/02/2023

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2065	22.94	mg/l
Conductivity	SOP 2076	165.6	µS/cm 20°C
Ammonia Nitrogen	SOP 2057	0.02	mg/l NH_3-N
Nitrite	SOP 2059	<0.03	mg/l NO_2
Nitrate	SOP 2060	13.60	mg/l NO_3
Orthophosphate P	SOP 2061	0.01	mg/l P
Total Phosphorus^	Subcontracted	<0.013	mg/l P
pH	SOP 2004	7.8	pH units
Total Suspended Solids	SOP 2016	5	mg/l
Total Nitrogen	SOP 2075	1.5	mg/l
Turbidity	SOP 2022	2.73	NTU

Signed: Laura Kavanagh Date: 28/02/2023

Laura Kavanagh - Laboratory Manager

*** = not INAB Accredited** **^ = Subcontracted**

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.275T

IAS LABORATORIES

Independent Analytical Supplies

Test Report

Lab Report Number: 16836S005

RECEIVED: 08/09/2023

Customer ID:	ECO.P1	**Analysis Type:**	99A (99A)
Contact Name:	PHILOMENA KENNEDY	**Delivery By:**	CUSTOMER
Company Name:	ECO POWER	**Sample Card Number:**	75193
Address:	ZETEC HOUSE PURCELLSINCH IDA BUS PK DUBLIN ROAD KILKENNY	**Condition on Receipt:**	Acceptable
Sample Type:	SURFACE WATER	**Date Sample Received:**	03/02/2023
Sample Reference:	WATER SAMPLES	**Date Analysis Commenced:**	03/02/2023
Sample Description:	SP6	**Date Certificate Issued:**	28/02/2023

Parameter	Method	Result	Unit
Biochemical Oxygen Demand	SOP 2006	1	mg/l
Chloride	SOP 2065	19.06	mg/l
Conductivity	SOP 2076	171.3	µS/cm 20°C
Ammonia Nitrogen	SOP 2057	0.05	mg/l NH_3-N
Nitrite	SOP 2059	0.03	mg/l NO_2
Nitrate	SOP 2060	23.63	mg/l NO_3
Orthophosphate P	SOP 2061	0.02	mg/l P
Total Phosphorus^	Subcontracted	0.03	mg/l P
pH	SOP 2004	7.3	pH units
Total Suspended Solids	SOP 2016	3	mg/l
Total Nitrogen	SOP 2075	3.3	mg/l
Turbidity	SOP 2022	2.81	NTU

Signed: Laura Kavanagh Date: 28/02/2023

Laura Kavanagh - Laboratory Manager

*** = not INAB Accredited ^ = Subcontracted**

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Appendix 9.3: Water Framework Directive Assessment

The data and descriptions in this appendix have informed Chapter 9: Water

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Water Framework Directive Assessment
Knocknamona Windfarm Grid Connection,
Co. Waterford

FINAL REPORT

PREPARED FOR:
KNOCKNAMONA WINDFARM LIMITED

PREPARED BY:
HYDRO-ENVIRONMENTAL SERVICES

DOCUMENT INFORMATION

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Issue Date:	9th August 2023
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current revision no:	Final_F0
Author:	Michael Gill David Broderick Jenny Law
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) were requested by Ecopower, to complete a Water Framework Directive (WFD) Compliance Assessment for a planning application for the proposed Knocknamona Wind Farm (KWF) Grid Connection (Proposed Development). The Proposed Development comprises underground cabling, additional plant and apparatus in the existing Woodhouse Substation, the construction of a new link road, the widening of an existing forestry road and the use of the existing entrance and windfarm road network at Woodhouse Windfarm.

The purpose of this WFD assessment is to determine if any specific components or activities associated with the proposed development will compromise WFD objectives or cause a deterioration in the status of any surface water or groundwater body and/or jeopardise the attainment of good surface water or groundwater status. This assessment will determine the water bodies with the potential to be impacted, describe the proposed mitigation measures and determine if the project is in compliance with the objectives of the WFD.

This WFD Assessment is intended to supplement the EIAR submitted as part of the project planning application.

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 David Broderick, Michael Gill and Jenny Law.

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 projects and private residential and commercial developments. In addition, he has substantial experience in wastewater engineering and site suitability assessments, contaminated land investigation and assessment, wetland hydrology/hydrogeology, water resource assessments, surface water drainage design and SUDs design, and surface water/groundwater interactions. For example, Michael has worked on the EIS/EIARs for Slievecallan WF, Cahermurphy (Phase I & II) WF, Carrownagowan WF, and Croagh WF and over 100 other wind farm related projects across the country.

David Broderick (P.Geo, BSc, H.Dip Env Eng, MSc) is a hydrogeologist with over 14 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. David was also involved in the preparation of EIS/EIAR for Oweninny WF, Cloncreen WF, Croagh WF and Yellow River WF, and over 100 other wind farm related projects across Ireland.

Jenny Law (BSc, MSc) is an Environmental Geoscientist, holding an M.Sc. in Applied Environmental Geoscience (2022) from University College Cork. Jenny has also completed a B.Sc. in Earth and Ocean Science (2019) from National University of Ireland, Galway. Jenny has prepared the Land, Soils and Geology and Hydrology and Hydrogeology chapters for

several wind farm and grid connection EIAR projects, and she also has experience in preparing flood risk assessments and WFD assessment reports.

1.3 WATER FRAMEWORK DIRECTIVE

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

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

The WFD is implemented through the River Basin Management Plans (RBMP) which comprises a six-yearly cycle of planning, action and review. RBMPs include identifying river basin districts, water bodies, protected areas and any pressures or risks, monitoring and setting environmental objectives. In Ireland the first RBMP covered the period from 2010 to 2015 with the second cycle plan covering the period from 2018 to 2021.

The River Basin Management Plan (2018 - 2021) objectives, which have been considered during the design of the proposed development, include:

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

Furthermore, the Department of Housing, Local Government and Heritage are currently reviewing the submissions made on the Draft River Basin Management Plan (2022 - 2027) which was out for public consultation in Q4 of 2021 and Q1 of 2022. The draft plan will be updated with a view to finalization and publication in Q3/Q4 of 2022. As of yet, no final publications have been made.

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 AND CLASSIFICATION

2.1 INTRODUCTION

This section identifies those surface water, groundwater bodies and protected areas with potential to be affected by the Proposed Development and reviews any available WFD information.

2.2 SURFACE WATERBODY IDENTIFICATION

The Proposed Development is located amongst the catchment divide between the Blackwater (Munster) Catchment within the South Western River Basin District (SWRBD) and the Colligan Mahon Catchment within the South Eastern River Basin District (SERBD). In relation to surface water catchments, the KWF Grid Connection is located within the Finisk_SC_010 and Goish_SC_010 Sub-Catchments which form part of the Blackwater (Munster) Catchment and also in the Colligan_SC_010 Sub-Catchment which forms part of the Colligan (Mahon) Catchment.

Within the Colligan_SC_010 Sub-Catchment the Mountodell Stream (Brickey_020 river sub basin) flows within 280m of a short section of underground cabling and drains an area at the central portion of the site. The Mountodell Stream flows north for ~2km to meet the River Brickey, which flows east into the Brickey Estuary, which in turn drains into the Colligan Estuary. Further out to sea is Dungarvan Harbour and the Eastern Celtic Sea (HAs 13;17) coastal waterbodies. A stretch of approximately 40m of the KWF Grid Connection is mapped to lie within the Brickey_010 river sub basin, however, there are no mapped watercourses in the vicinity of the Proposed Development at this location.

The Monageela headwater stream (Goish_010), within the Goish_SC_010 Sub-Catchment, is mapped by the EPA to originate ~360m southwest from the KWF Grid Connection at its most southern point. The Monageela 1st order stream flows southwest for approximately 1.5km and feeds into the Goish River. The Goish River (Goish_010 and Goish_020) generally flows north west to discharge into the Upper Blackwater M Estuary transitional waterbody after approximately 7.4km.

Staying within the Goish_SC_010 Sub-Catchment, the Clashnadarriv Stream (Finisk_030 river sub basin) is located 0.95km to the northwest of the Proposed Development. The Clashnadarriv Stream flows northwards and feeds into the Finisk River after ~3.2km. From this point the Finisk River (Finisk_030) generally continues north-westwards for ~4km and discharges into the Upper Blackwater M Estuary transitional waterbody.

Further downstream the Upper Blackwater M Estuary transitional waterbody feeds into the Lower Blackwater M Estuary / Youghal Harbour transitional waterbody, which in turn discharges into the Youghal Bay coastal waterbody. Further out to sea is the Western Celtic Sea (HAs 18;19;20) coastal waterbody.

Due to the elevated nature of the KWF Grid Connection site on the side of Drum Hills there are no natural watercourses within the KWF Grid Connection site itself. Furthermore, there are no forestry drain crossings required for the KWF Grid Connection and the grid route is largely along an existing forestry track.

The route of the KWF Grid Connection cable within the consented Knocknamona Windfarm is mainly along an existing forestry track which will require widening. The existing track is bordered mainly by forestry (in varies stages of growth including felled) and some scrub. Along the central section of the track there is also a 2 -3m green verge on the downslope side of the track. The proposed link road passes through a scrub area with some forestry.
Apart from a roadside drain at the junction where the consented Knocknamona Windfarm Substation is located, there is no other roadside drainage or under road drainage (i.e.

culverts) present along this existing forestry track or proposed link road. Runoff from the existing forestry track is "over the edge" and onto the adjacent vegetated ground.

A survey of ground conditions within a 10m corridor on each side of the existing forestry track and link road only identified linear ground mounding of ground/ribbons associated with the forestry planting. The furrows between the mounds/ribbons, which typically follow the ground slope, were noted to be dry and well vegetated with no evidence of discrete surface water runoff, channelled drainage or soil erosion due to runoff. The lack of discrete surface water flowpaths suggest the ground in the area has reasonably good natural drainage. This was also confirmed by the trial pits (8 no.) carried out along the KWF Grid Connection site (refer to Chapter 8 of EIAR – Land, Soils and Geology).

Table A presents the catchment area of each river waterbody downstream of the Proposed Development from which the waterbodies in the vicinity of the site drain to. The Brickey_010 and Goish_010 river waterbodies in the vicinity of the proposed development have relatively small catchment areas at 10.6 and 21.5 km² respectively, in comparison to the catchment area of the Finisk_030 waterbody at 109.02 km². Therefore, the waterbodies with smaller catchment areas are more susceptible to water quality impacts as a result of activities associated with the proposed development. However, the works in all catchments is relatively minor.

The potential for the proposed project to impact the Finisk_030 waterbody decreases due to the larger catchment area of the surface waterbody, resulting increase in flow volumes.

Table A: Catchment Area Downstream of KWF Grid Connection

WFD River Sub-Basin	Total Upstream Catchment Area (km²)
Colligan Mahon Catchment (Colligan_SC_010)	
Brickey_010	10.6
Brickey_020	42.9
Blackwater (Munster) Catchment (Goish_SC_010)	
Goish_010	21.5
Goish_020	40.2
Blackwater (Munster) Catchment (Finisk_SC_010)	
Finisk_030	109.02

Figure A below is a local hydrology map of the area.

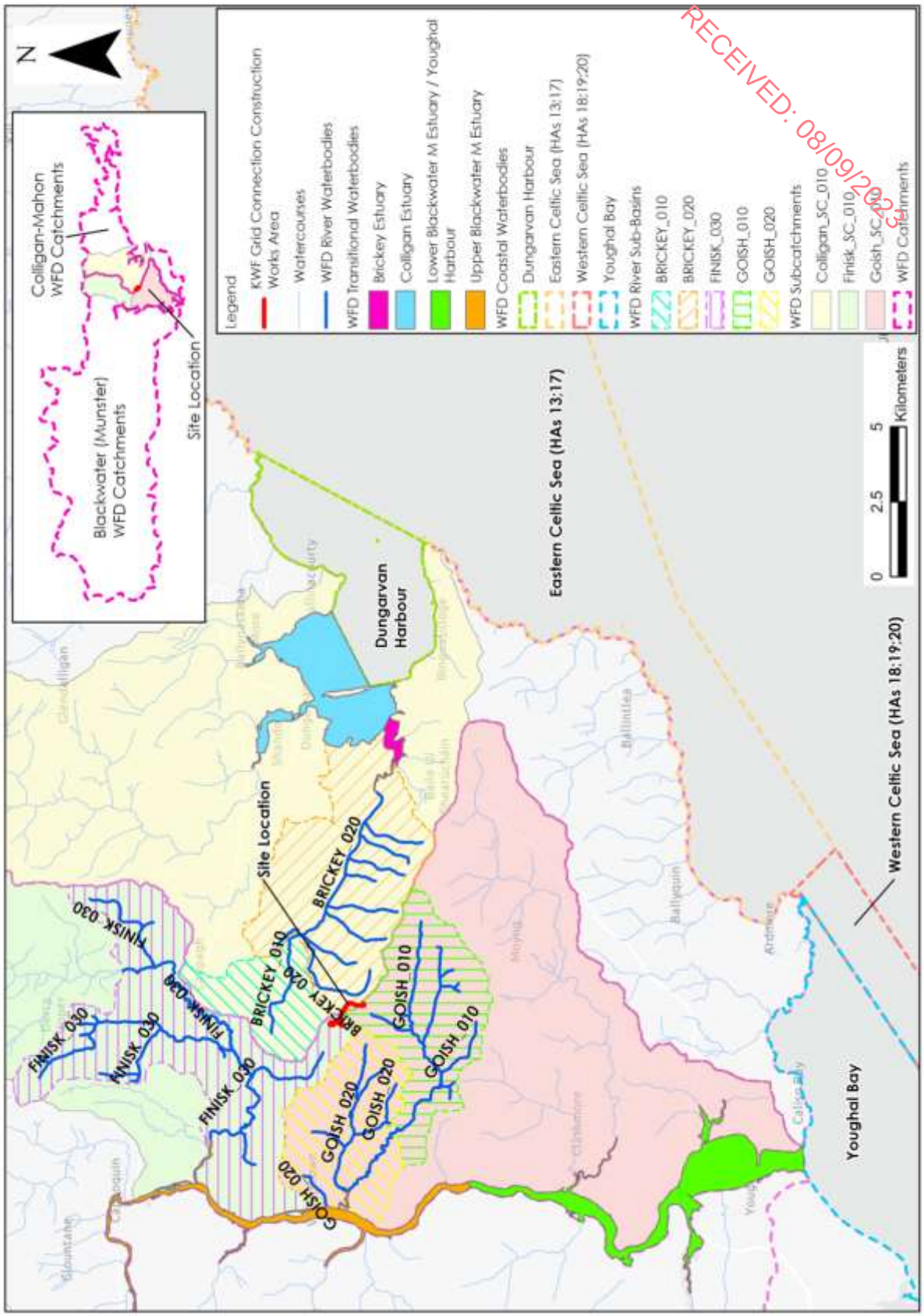

Figure A: Local Hydrology Map

2.3 RIVER WATERBODY CLASSIFICATION

A summary of the WFD status and risk result for River Waterbodies (RWBs) downstream of the Proposed Development are shown in **Table B**. The overall status is based on the ecological, chemical and quantitative status of each SWB.

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

As described in **Section 2.2** above, the central portion of the Proposed Development is drained by the Brickey River. Both the Brickey_010 and the Brickey_020 RWB's achieved "Poor status" in the latest WFD cycle (2016-2021). The Brickey River drains into the Brickey Estuary which in turn feeds into the Colligan Estuary. Both the Brickey Estuary and the Colligan Estuary transitional waterbodies achieved "Moderate status". Further out to sea the Dungarvan Harbour coastal waterbody achieved "Good status", whilst the Eastern Celtic Sea (HAs 13;17) achieved "High status" in the latest WFD cycle.

The Brickey River (Brickey_010 & Brickey_020 SWB's) are both "At risk" of failing to meet their WFD objectives in the future. Agricultural activities and domestic wastewater are identified as significant pressures acting on the Brickey_010 river waterbody. The concentration of domestic wastewater treatment systems in close proximity to the Brickey_010 RWB is a significant issue as excess nutrients and organic matter are entering the waters, made evident by the microbiological pollution identified in Brickey_010 river waterbody. Agriculture and hydromorphology are the significant pressures impacting the Brickey_020 RWB. Channelisation (straightening) and embankments have both been highlighted as hydromorphological sub-pressure impacting on the Brickey_020 which are deemed to be contributing to the sediment issues in the waterbody.

The Brickey Estuary is currently "Under review" regarding its WFD risk status, whereas the Colligan Estuary has been deemed to be "At risk". The significant pressure impacting the Colligan Estuary is Urban wastewater. Both the Dungarvan Harbour and the Eastern Celtic Sea (HAs 13;17) coastal waterbodies are "Not at risk".

Within the Blackwater (Munster) Catchment the Goish River segments (Goish_010 and Goish_020) both achieved "Moderate Status" in the latest WFD cycle (2016-2021), whilst the Finisk _030 RWB achieved "High status" in the latest WFD cycle. Downstream, the Upper Blackwater M Estuary and the Lower Blackwater M Estuary / Youghal Harbour transitional waterbodies both achieved "Moderate status". The Youghal Bay coastal waterbody and the Western Celtic Sea (HAs 18;19;20) coastal waterbody achieved "Moderate status" and "High status" respectively.

Currently the Goish_010 RWB is "Under review", however the Goish_020 RWB has been deemed to be "At risk" of failing to meet its WFD objectives in the future. The Finisk_030 RWB has been classified as "Not at risk". Both the Upper Blackwater M Estuary and the Lower Blackwater M Estuary / Youghal Harbour transitional waterbodies have been deemed to be "At risk" with agricultural activities impacting the Lower Blackwater M Estuary / Youghal Harbour transitional waterbody. The significant pressures acting on the Upper Blackwater M Estuary are yet to be identified.

Further out to sea Youghal Bay coastal waterbody has been deemed to be "At risk" of failing to meet its WFD objectives with agricultural activities listed as a significant pressure on the waterbody. The Western Celtic Sea (HAs 18;19;20) is "Not at risk".
The RWB status for the 2016-2021 WFD cycle are shown on **Figure B.**

Table B: Summary WFD Information for River Water Bodies

RWB	Overall Status 2010-2015	Risk Status 2nd Cycle	Overall Status 2013-2018	Overall Status 2016-2021	Risk Status 3rd Cycle	Pressures
	Colligan sub-catchment (Colligan_SC_010)					
Brickey_010	Poor	At risk	Poor	Poor	At risk	Agriculture & domestic wastewater
Brickey_020	Unassigned	Under Review	Moderate	Poor	At risk	Agriculture & hydromorphology
Brickey Estuary	Unassigned	Under Review	Unassigned	Moderate	Under review	-
Colligan Estuary	Moderate	At risk	Poor	Moderate	At risk	Urban Wastewater
Dungarvan Harbour	High	Not at risk	High	Good	Not at risk	-
Eastern Celtic Sea (HAs 13;17)	Unassigned	Not at risk	Good	High	Not at risk	-
	Goish sub-catchment (Goish_SC_010)					
Goish_010	Moderate	At risk	Good	Moderate	Under review	-
Goish_020	Moderate	At risk	Good	Moderate	At risk	No information is currently available on significant pressures impacting this SWB
	Finisk sub-catchment (Finisk_SC_010)					
Finisk_030	Good	Not at risk	Good	High	Not at risk	-
Upper Blackwater M Estuary	High	Under review	High	Moderate	At risk	No information is currently available on significant pressures impacting this SWB
Lower Blackwater M Estuary / Youghal Harbour	Moderate	At risk	Moderate	Moderate	At risk	Agriculture
Youghal Bay	Good	At risk	Moderate	Moderate	At risk	Agriculture
Western Celtic Sea (HAs 18;19;20)	Unassigned	Not at risk	High	High	Not at risk	-

2.4 GROUNDWATER BODY IDENTIFICATION

In respect of groundwater, the existing environment comprises 2 no. local groundwater bodies (GWBs) - the Helvic Head GWB and the Glenville GWB. The boundary between these GWB's is defined by the boundary between the SERBD and the SWRBD amongst the Drum Hills, in the vicinity of the Proposed Development.

The Helvic Head GWB is classified as poorly productive bedrock (PP) and groundwater flow is likely to be dominated by flow from the hills, which act as recharge mounds.

The Glenville GWB is classified as poorly productive bedrock (PP) and most groundwater flow probably occurs in an upper shallow weathered zone. Local groundwater flow is towards the rivers and streams, and flow path will not usually exceed a few hundred metres in length within this GWB.

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

2.5 GROUNDWATER BODY CLASSIFICATION

The GWBs are assigned a status based on the assessment of groundwater chemical and quantitative figures. A summary of the WFD status and risk result for Groundwater Bodies (GWBs) downstream of the Proposed Development are shown in **Table C.**

The Helvic Head GWB (Code: IE_SE_G_073) and the Glenville GWB (Code: IE_SW_G_037) underly the KWF Grid Connection site and have each been assigned 'Good status' in the latest WFD round (2016-2021). The Helvic Head GWB has been deemed to be 'Not at risk' of failing to achieve its WFD objective. The Glenville GWB, however, has been deemed to be "At risk" and is under significant pressure from agricultural activities which are causing chemical pollution.

Table C: Summary WFD Information for Groundwater Bodies

GWB	Overall Status 2010-2015	Risk Status 2nd cycle	Overall Status 2013-2018	Overall status 2016-2021	Risk Status 3rd Cycle	Pressures
Helvic Head GWB	Good	Under review	Good	Good	Not at risk	-
Glenville GWB	Good	Under review	Good	Good	At risk	Agriculture

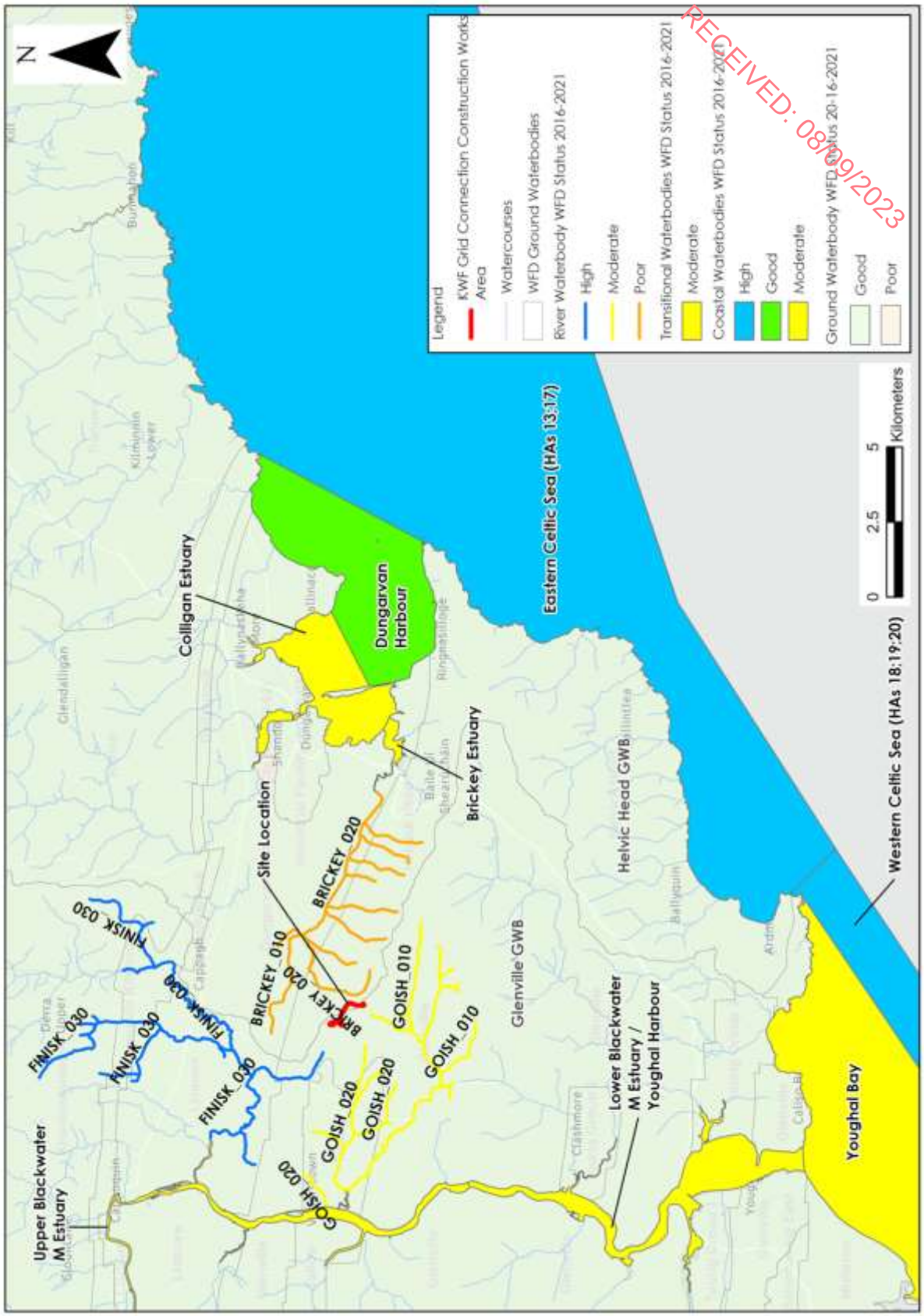

Figure B: WFD Groundwater and Surface Waterbody Status (2016-2021)

2.6 PROTECTED AREAS 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 looked 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.

The Proposed Development is not mapped within any Ramsar or European (Natura 2000) designated sites however, there are downstream hydrological connections with downstream designated sites.

The Finisk and Goish rivers drain into the River Blackwater which has the following designations:

- Blackwater River (Cork/Waterford) SAC (Site Code: 002170) is located, at its closest, ~4.3km downstream of the KWF Grid Connection via the Finisk_030 River.
- Blackwater Estuary SPA (Site Code: 004028) situated, at its closest, ~19.5km downstream of the KWF Grid Connection via the Goish River.
- Blackwater River and Estuary pNHA (Site Code: 000072) mapped, at its closest, ~7.3km downstream of the KWF Grid Connection via the Finisk_030 River.

The Brickey River drains into Dungarvan Harbour which has the following designations:

- Dungarvan Harbour SPA (Site Code: 004032)
- Dungarvan Harbour pNHA (Site Code: 000663)

The downstream distance from the KWF Grid Connection to the above mentioned Dungarvan Harbour designation sites is ~9.1km.

2.6.2 Bathing Waters

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

There are no bathing water sites located in the vicinity of the Proposed Development site. The Proposed Development site is ~13km north of Ardmore (IESEBWC050_0000_0100), the nearest bathing water site (as the crow flies).

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). Once the regulations are in place, and nutrient sensitive areas have been identified, additional nutrient removal must be applied (if not already applied) to waste water treatment plants discharging

to the sensitive area. If this treatment was in place the objective was deemed to have been met.

The Colligan Estuary NSA is downstream of the Proposed Development via the Brickey River. The objectives for this NSA have not been met according to the 3rd Cycle Draft Colligan-Mahon Catchment Report (HA 17), (EPA, 2021).

The Finisk and Goish rivers drain into the Blackwater Estuary Upper NSA, which in turn feeds into the Blackwater Estuary Lower NSA. According to the 3rd Cycle Draft Blackwater (Munster) Catchment Report (HA 18), (EPA, 2021) each of these NSA's have met their NSA objectives.

2.6.4 Shellfish Area

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

The Proposed Development site is ~13.5km upstream of Dungarvan Harbour (IEPA2_0045), the nearest shellfish area site.

2.6.5 Drinking Water

At its most western point the Proposed Development is ~8km east of Bride [Waterford]_010 DWPA (IEPA1_SW_18B051000), the nearest DWPA.

2.6.6 Wetlands of Biodiversity Importance

An area in Woodhouse townland 2km to the southwest of KWF Grid Connection construction works area is designated locally as a wetland of biodiversity importance WD284 in the Waterford County Development Plan 2022-2028 Appendix 11: Natural heritage Assets. It is a Wetland Policy Objective in Chapter 9 of the Plan to "protect wetland sites listed in Appendix A11 and other wetlands that may be identified of biodiversity value from infilling and other developments that may affect the biodiversity value of these sites" (BD 16).

The Proposed Development site does not drain into this wetland area.

3 WFD SCREENING

As discussed in **Section 2**, there are a total of 13 no. waterbodies which are located in the vicinity and downstream of the Proposed Development. There are 5 no. river waterbodies, 4 no. transitional waterbodies and 4 no. coastal waterbodies downstream of the proposed development site. In addition, 2 no. groundwater bodies underlie the Proposed Development. Furthermore, there are protected areas downstream of the Proposed Development including designations along the River Blackwater and at Dungarvan Harbour.

3.1 SURFACE WATER BODIES

The waterbodies in the immediate vicinity and downstream of the proposed 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 proposed project, it is considered that the Brickery_010, Brickery_020, Goish_010 and the Finisk_030 RWB's have been included for further assessment due to the presence of Proposed Development works within these river sub-basins.

The Goish_020 RWB has also been screened in for further assessment due to its location downstream of the southern extent of the KWF Grid Connection.

Further downstream of the Proposed Development the Brickey Estuary, Colligan Estuary, Upper Blackwater M Estuary and the Lower Blackwater M Estuary / Youghal Harbour transitional waterbodies have been screened out of the WFD assessment due to their distal locations from any proposed works and due to their increased catchment area's, flow volumes and saline nature of these waters, making them less susceptible to potential water quality impacts associated with the Proposed Development. The proposed works have no potential to cause a deterioration in the status of these screened out RWBs and/or jeopardise their attainment of good surface water status.

The Dungarvan Harbour, Eastern Celtic Sea (HAs 13;17), Youghal Bay and Western Celtic Sea (HAs 18;19;20) coastal waterbodies have been screened out due to the large volumes of water within these SWBs and the saline nature of these waters. The Proposed Development has no potential to cause a deterioration in status of these RWBs and/or jeopardise the attainment of good surface water status in the future.

3.2 GROUNDWATER BODIES

With respect to groundwater bodies, the Helvic Head and the Glenville GWBs are carried through to the WFD Impact Assessment due to their location directly underlying the Proposed Development.

3.3 PROTECTED AREAS

The mapped extent of the Blackwater River (Cork/Waterford) SAC extends beyond the Blackwater River itself and is mapped to include a portion of the Finisk_030 SWB. The northern end of KWF Grid Connection, comprising Underground Cabling (870m), and works at the existing Woodhouse Substation, and the 190m new Link Road, and 170m of existing forestry road widening are located upstream of the River Blackwater (Cork/Waterford) SAC via the Finisk_030 River. With consideration for the construction, operational and decommissioning phases of the Proposed Development, it is considered that the Blackwater River (Cork/Waterford) SAC is carried through into the WFD Impact Assessment due to its mapped location within the Finisk_030 and Goish_020 river sub-basins.

The Blackwater Estuary SPA is mapped within the Lower Blackwater M Estuary / Youghal Harbour transitional waterbody, approximately 19.5km downstream of the KWF Grid Connection. The Blackwater Estuary SPA has been screened out of the WFD assessment due

to its distal location from any proposed works and due to its increased catchment area, flow volumes and saline nature of these waters. The KWF Grid Connection has no potential to cause a deterioration in the status of this SPA.

The Blackwater River and Estuary pNHA is predominantly mapped within the Upper Blackwater M Estuary transitional waterbody approximately 7.3km downstream of the KWF Grid Connection via the Finisk_030 River. Although the pNHA is mapped within the Upper Blackwater M Estuary transitional waterbody, which has been screened out of the WFD assessment (for reasons described in **Section 3.1** above), to err on the side of caution, the Blackwater River (Cork/Waterford) pNHA is carried through into the WFD Impact Assessment due to its proximal location downstream of the Proposed Development and sensitivity of the pNHA.

The Dungarvan Harbour SPA and pNHA is predominantly mapped within the Brickey Estuary and the Colligan Estuary transitional waterbodies and the Dungarvan Harbour Coastal waterbody approximately 9.1km downstream of the KWF Grid Connection via the Brickey River. Although the SPA and pNHA are mapped within the previously mentioned transitional waterbodies and coastal waterbody, which have been screened out of the WFD assessment (for reasons described in **Section 3.1** above), to err on the side of caution, the Dungarvan Harbour SPA and pNHA have been carried through into the WFD Impact Assessment due to their proximal location downstream of the Proposed Development and sensitivity of the SPA and pNHA.

The bathing waters at Ardmore have been screened out due to its distal location (~13km) from the KWF Grid Connection. The proposed development has no potential to cause a deterioration to the bathing area at Ardmore.

The Colligan Estuary NSA, mapped within the Colligan Estuary transitional waterbody, has been screened out of the WFD assessment due to its distal location from any proposed works and due to its increased catchment area, flow volumes and saline nature of these waters. The KWF Grid Connection has no potential to cause a deterioration in the status of this NSA. The Blackwater Estuary Upper NSA and the Blackwater Estuary Lower NSA have also been screened out due to their distal location from the KWF Grid Connection within the River Blackwater and its increased catchment area, flow volumes and saline nature of these waters.

The Shellfish areas at Dungarvan Harbour have been screened out due to its distal location from the Proposed Development (~13.5km). The KWF Grid Connection has no potential to cause a deterioration to the shellfish area.

The Bride [Waterford]_010 DWPA has no direct hydrological linkage to the site as it is mapped within a different sub-catchment (Bride[Waterford]_SC_030) to the KWF Grid Connection . The Proposed Development has no potential to cause a deterioration in the status of this DWPA and has been screened out.

The wetland of biodiversity at Woodhouse townland 2km to the southwest of KWF Grid Connection construction works has also been screened out because there is no hydrological connection/pathway between the wetland and the KWF Grid Connection works.

3.4 WFD SCREENING SUMMARY

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

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

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
Water Body	Colligan sub-catchment			
	River	Brickey_010	Yes	A small section of the Proposed Development (~40m) is mapped within the Brickey river sub-basin. An assessment is required to consider the potential impacts of the Proposed Development on this SWB.
	River	Brickey_020	Yes	The central portion of the Proposed Development is mapped within the Brickey_20 river sub-basin. An assessment is required to consider the potential impacts of the Proposed Development on this SWB
	Transitional	Brickey Estuary	No	The Brickey Estuary has been screened out due to the saline nature of its waters and the large volumes of water within the Estuary. The Proposed Development has no potential to impact the status of this SWB.
	Transitional	Colligan Estuary	No	The Colligan Estuary has been screened out due to the saline nature of its waters and the large volumes of water within the Estuary. The Proposed Development has no potential to impact the status of this SWB.
	Coastal	Dungarvan Harbour	No	The Dungarvan Harbour coastal waterbody has been screened out due to the saline nature of its waters and the large volumes of water within the Harbour. The Proposed Development has no potential to impact the status of this SWB.
	Coastal	Eastern Celtic Sea (HAs 13;17)	No	The Eastern Celtic Sea (HAs 13;17) coastal waterbody has been screened out due to the saline nature of its waters and the large volumes of water within the SWB. The Proposed Development has no potential to impact the status of this SWB.
	Goish sub-catchment			
	River	Goish_010	Yes	The southern extent of the Proposed Development is mapped within the Goish_010 river sub-basin. An assessment is required to consider the potential impacts of the Proposed Development on this SWB
	River	Goish_020	Yes	The Goish_020 SWB is mapped directly downstream of the Goish_010 SWB. An assessment is required to consider the potential impacts of the Proposed Development on this SWB
	Finisk sub-catchment			
	River	Finisk_030	Yes	The northern end of the Proposed Development is mapped within the Finisk_030 river sub-basin. An assessment is required to consider the potential impacts of the Proposed Development on this SWB.
	Transitional	Upper Blackwater M Estuary	No	The Upper Blackwater M Estuary has been screened out due to the saline nature of its waters and the large volumes of water within the Estuary. The Proposed Development has no potential to impact the status of this SWB.

	Transitional	Lower Blackwater M Estuary / Youghal Harbour	No	The Lower Blackwater M Estuary / Youghal Harbour has been screened out due to the saline nature of its waters and the large volumes of water within the Estuary. The Proposed Development has no potential to impact the status of this SWB.
	Coastal	Youghal Bay	No	The Youghal Bay coastal waterbody has been screened out due to the saline nature of its waters and the large volumes of water within the Bay. The Proposed Development has no potential to impact the status of this SWB.
	Coastal	Western Celtic Sea (HAs 18;19;20)	No	The Western Celtic Sea (HAs 18;19;20) coastal waterbody has been screened out due to the saline nature of its waters and the large volumes of water within the Bay. The Proposed Development has no potential to impact the status of this SWB.
Groundwater Bodies				
Groundwater Body	Groundwater	Helvic Head	Yes	The Proposed Development is mapped to overlie the Helvic Head GWB. An assessment is required to consider the potential impacts of the Proposed Development on this GWB.
	Groundwater	Glenville	Yes	The Proposed Development is mapped to overlie the Glenville GWB. An assessment is required to consider the potential impacts of the Proposed Development on this GWB.
	Protected Areas			
Protected Areas	Nature Designations	Blackwater River (Cork/Waterford) SAC	Yes	Blackwater River (Cork/Waterford) SAC encompasses a portion of the Finisk_030 SWB. The northern end of the Proposed Development is mapped within the Finisk_020 river sub-basin. An assessment is required to consider the potential impacts of the Proposed Development on this SAC.
		Blackwater Estuary SPA	No	The Blackwater Estuary SPA has been screened out due to its distal location from the Proposed Development site (~19.5km). The Proposed Development has no potential to impact this SPA.
		Blackwater River and Estuary pNHA	Yes	The Blackwater River and Estuary pNHA is located roughly 7.3km downstream of the proposed route. An assessment is required to consider the potential impacts of the Proposed Development on this pNHA.
		Dungarvan Harbour SPA and pNHA	Yes	The Dungarvan Harbour SPA and pNHA is located roughly 9.1km downstream of the proposed route. An assessment is required to consider the potential impacts of the Proposed Development on this SPA/ pNHA.
	Bathing Waters	Ardmore	No	The Ardmore bathing waters have been screened out due to its distal location from the Proposed Development site (13km). The Proposed Development has no potential

				to impact these Bathing Waters
	Nutrient Sensitive Areas	Colligan Estuary NSA	No	The Colligan Estuary NSA has been screened out due to the saline nature of its waters and the large volumes of water within the Estuary. The Proposed Development has no potential to impact the status of this NSA.
		Blackwater Estuary Upper NSA	No	The Blackwater Estuary Upper NSA has been screened out due to the saline nature of its waters and the large volumes of water within the Estuary. The Proposed Development has no potential to impact the status of this NSA.
		Blackwater Estuary Lower NSA	No	The Blackwater Estuary Lower NSA has been screened out due to the saline nature of its waters and the large volumes of water within the Estuary. The Proposed Development has no potential to impact the status of this NSA.
	Shellfish Areas	Dungarvan Harbour	No	The Dungarvan Harbour shellfish area has been screened out due to its distal location downstream from the Proposed Development site (~13.5km). The Proposed Development has no potential to impact this Shellfish Area.
	Drinking Water	Bride [Waterford] _010 DWPA	No	There are no hydrological linkages between the Proposed Development and Bride [Waterford]_010 DWPA, as the DWPA is located in a different sub catchment from the proposed grid route. Therefore, no hydrological or hydrogeological impacts will occur on this DWPA.

4 WFD COMPLIANCE ASSESSMENT

4.1 PROPOSALS

The KWF Grid Connection comprises underground cabling, additional plant and apparatus in the existing Woodhouse Substation, the construction a new link road (190m), the widening of an existing forestry road and the use of the existing entrance and windfarm road network at Woodhouse Windfarm.

The underground cabling (1940m in length) comprises cables, ducts and other apparatus installed in a trench. Each cable will comprise two lengths of cable which will be jointed under the access road approximately halfway along the cable route. The cables will be routed through lands comprising; felled forestry, forestry road; scrub; farm track; Woodhouse Windfarm roads; Public Road crossing via directional drill; and grassland and will finish at the cable chair located in the existing Woodhouse Substation compound. The underground cabling will join the authorised Knocknamona Windfarm substation to the existing Woodhouse Substation.

The additional electrical plant and apparatus in Woodhouse Substation comprises a new control building; main 110kV transformer; 110kV transformer bay; two lightening masts; and ancillary electrical equipment. Works will also include a new access track and an internal palisade gateway and fencing within the compound and two new gateways in the existing perimeter fence.

Due to the nature of the Proposed Development works, being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments.

The primary risks to groundwater at the site will be chemical pollution of groundwater from cementitious materials, hydrocarbon spillage and leakages. The primary risk to surface waters will be entrained suspended sediments (soil particles) in site runoff during earthworks with release cement-based compounds and/or hydrocarbons.

The Proposed Development has no potential to change surface water runoff volumes and flow patterns.

4.2 POTENTIAL EFFECTS ASSESSMENT

4.2.1 Construction Phase

The construction phase will involve shallow excavations and storage of overburden, the presence/operation of machinery run on hydrocarbons along the cable route and access roads, and the use of cement based compounds in the Woodhouse Substation compound.

There are a number of potential adverse effects to both surface and groundwater.

4.2.1.1 Potential Surface Water Quality Effects along Proposed Development

The Proposed Development passes through 4 no. WFD river sub-basins (Brickey_010, Brickey_020, Goish_010 and the Finisk_030).

Due to the elevated nature of the KWF Grid Connection site on the side of Drum Hill there are no natural watercourses within the KWF Grid Connection site itself. Furthermore, there are no watercourse crossings required for the KWF Grid Connection and the grid route is largely along an existing track. A negligible portion (~40m) of the KWF Grid Connection is mapped within the Brickey_010 river sub basin and there are no watercourses in the vicinity of the Proposed Development that drain towards the Brickey_010 SWB.

The southern extent of KWF Grid Connection, comprising 240m of Underground Cabling where it connects into the already consented Knocknamona Substation is located within the Goish_010 River Sub Basin. Further downstream the status of the Goish_020 river waterbody is less at risk.

There are no watercourse crossings required for the KWF Grid Connection and the grid route is largely along an exiting track with the exception of the short link road. Therefore there is no potential to impact on watercourse morphology or change the flow regime in downstream surface waters. Also as discussed in the site drainage section above, there are no direct drainage pathways (i.e. drainage ditches/watercourses) between the KWF Grid Connection site and the closest downslope river waterbodies.

The **Pre-mitigation Effect** will only have a temporary **Slight** significance on local RWBs because:

- The relatively short length of KWF Grid Connection and the fact that's its mainly along existing access tracks;
- Apart from a roadside drain at the junction where the consented Knocknamona Windfarm Substation is located, there is no other roadside drainage or under road drainage (i.e. culverts) present along this existing forestry track or proposed link road. Runoff from the existing forestry track is "over the edge" and onto the adjacent vegetated ground;
- The proposed work is spread out within several River Sub Basins (i.e. Brickey_010, Brickey_020, Goish_010 and the Finisk_030). The development works are not concentrated in one Sub Basin;
- There are no watercourse crossings or forestry drains along the proposed route and therefore there are no direct surface water linkages to the downstream Surface Water Bodies – the closest watercourse is the Mountodell Stream, and is 280m from KWF Grid Connection works at the closest point;
- The transient nature of the proposed works (i.e. construction work will be carried out in stages over a period of 4 months); and,
- Only short sections of cable trench, approx. 50m long will be excavated at any one time. Following the excavation of the section of trench, the ducting and cabling and ancillary equipment will be installed in the trench and the trench backfilled before excavations begin on the next section.

A summary of potential status change to RWBs arising from surface water quality impacts from activities during the construction phase of the proposed development in the unmitigated scenario are outlined in **Table E.**

Due to the assessed pre-mitigation effect of **Slight** there will be no potential to negatively affect the current status of any downstream river waterbody.

Table E: Surface Water Quality Impacts (Grid Route) during Construction Phase (Unmitigated)

RWB	WFD Code	Current Status	Assessed Potential Status Change
Brickey_010	IE_SE_17B010050	Poor	Poor
Brickey_020	IE_SE_17B010090	Poor	Poor
Goish_010	IE_SW_18G120200	Moderate	Moderate
Goish_020	IE_SW_18G120300	Moderate	Moderate
Finisk_030	IE_SW_18F020500	High	High

4.2.1.2 Potential Groundwater Quality Impacts

The Proposed Development is located within the Helvic Head and the Glenville GWBs.

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 groundwater body.

The **Pre-mitigation Effect** will have an **Imperceptible** significance on local GWBs because:

- Only relatively small volumes of fuels / oils will be on-site at any one time and therefore no significant spills/leakages can occur;
- Therefore, any incidents that do occur will largely be limited to small, isolated, low volume spills / leaks that may occur along the KWF Grid Connection construction works area;
- Both GWB are classified as poorly productive bedrock (PP) and most groundwater flow occurs in an upper shallow weathered zone. Local groundwater flow is towards the rivers and streams, and flow path will not usually exceed a few hundred metres in length within this GWB. Therefore significant effects on the GWBs cannot occur;
- The localised nature of groundwater flow in the of the KWF Grid Connection works; and,
- The negligible scale of the KWF Grid Connection works with regard the size of the local groundwater bodies.

A summary of potential status change to GWBs arising from potential groundwater quality impacts during the construction phase of the proposed project in the unmitigated scenario are outlined in
Table F.

Due to the assessed pre-mitigation effect of **Imperceptible** there will be no potential to negatively affect the current status of any local groundwater body.

Table F: Groundwater Quality Impacts during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Helvic Head	IE_SE_G_073	Good	Good
Glenville	IE_SW_G_037	Good	Good

4.2.1.3 Potential Impacts on Protected Areas

Blackwater River (Cork/Waterford) SAC

The mapped extent of the Blackwater River (Cork/Waterford) SAC extends beyond the Blackwater River itself and is mapped to include a portion of the Finisk_030 SWB. The River Blackwater is one of the largest rivers in Ireland.

This designated site is hydrologically connected to the Proposed Development, at its closest point via the Finisk and also the Goish River. The Proposed Development works could potentially transfer poor quality surface water that may negatively affect the Qualifying Interests of the SAC, as listed below (* = priority species/habitats):

- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1220] Perennial Vegetation of Stony Banks
- [1310] Salicornia Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [3260] Water courses of plain to montane level with Floating River Vegetation
- [91A0] Old Oak Woodlands
- [91E0] Alluvial Forests*
- [91J0] *Taxus baccata woods of the British Isles
- [1029] Freshwater Pearl Mussel (Margaritifera margaritifera)
- [1092] White-clawed Crayfish (Austropotamobius pallipes)
- [1095] Sea Lamprey (Petromyzon marinus)
- [1096] Brook Lamprey (Lampetra planeri)
- [1099] River Lamprey (Lampetra fluviatilis)
- [1103] Twaite Shad (Alosa fallax)
- [1106] Atlantic Salmon (Salmo salar)
- [1355] Otter (Lutra lutra)
- [1421] Killarney Fern (Trichomanes speciosum)

However, there are no direct drainage pathways (i.e. drainage ditches/watercourses) between the KWF Grid Connection site and the closest downslope river waterbodies (Finisk_030 and Goish_010). Surface water runoff from the KWF Grid Connection makes its way to the closest downslope river waterbodies via dispersed overland flow and shallow groundwater flow. Both these flowpaths have a natural buffering capacity to attenuate surface water runoff from the KWF Grid Connection before reaching the downslope river waterbodies.

In addition, due to the localised nature of the Proposed Developments infrastructure and the increase in catchment area, as outlined in **Table A** within the Finisk_030 river sub basin (109.02km^2), it can be concluded that the Proposed Development has no potential to significantly affect water quality within the Blackwater River (Cork/Waterford) SAC even in an unmitigated scenario throughout the construction phase.

Blackwater River and Estuary pNHA

This designated site is hydrologically connected to the Proposed Development, at its closest point via the Finisk (7.3km) and also the Goish River. The Proposed Development works could potentially transfer poor quality surface water that may negatively affect the pNHA.

However, there are no direct drainage pathways (i.e. drainage ditches/watercourses) between the KWF Grid Connection site and the closest downslope river waterbodies (Finisk_030 and Goish_010). Surface water runoff from the KWF Grid Connection makes its way to the closest downslope river waterbodies via dispersed overland flow and shallow

groundwater flow. Both these flowpaths have a natural buffering capacity to attenuate surface water runoff from the KWF Grid Connection before reaching the downslope river waterbodies.

Furthermore, the Blackwater River and Estuary pNHA is predominantly mapped within the Upper Blackwater M Estuary transitional waterbody, which has a significantly increased catchment area, increased flow volumes and estuarine nature of these waters. These characteristics increase dilution effects and hence make the Blackwater River and Estuary pNHA less susceptible to potential water quality impacts associated with the Proposed Development.

Therefore, it can be concluded that the KWF Grid Connection has no potential to significantly affect water quality in the Blackwater River and Estuary pNHA even in an unmitigated scenario throughout the construction phase.

Dungarvan Harbour SPA and pNHA

The Dungarvan Harbour SPA and pNHA is predominantly mapped within the Brickey Estuary and the Colligan Estuary transitional waterbodies and the Dungarvan Harbour coastal waterbody, approximately 9.1km downstream of the KWF Grid Connection via the Brickey River. The absence of a large river entering the Dungarvan Harbour SPA and pNHA means that the bay is essentially a marine habitat, although it dries out at low tide to give extensive mud and sand flats. The qualifying interests of the SPA comprise bird species and wetland habitat:

- A005 Great Crested Grebe
- A046 Light-bellied Brent Goose
- A048 Shelduck
- A069 Red-breasted Merganser
- A130 Oystercatcher
- A140 Golden Plover
- A141 Grey Plover
- A142 Lapwing
- A143 Knot
- A149 Dunlin
- A156 Black-tailed Godwit
- A157 Bar-tailed Godwit
- A160 Curlew
- A162 Redshank
- A169 Turnstone
- A999 Wetlands

The Proposed Development works could potentially transfer poor quality surface water that may negatively affect the Special Conservation Interests of the SPA, as listed below. However, there are no direct drainage pathways (i.e. drainage ditches/watercourses) between the KWF Grid Connection site and the closest downslope river waterbodies (Brickey_010 and Brickey_020). Surface water runoff from the KWF Grid Connection makes its way to the closest downslope river waterbodies via dispersed overland flow and shallow groundwater flow.

In addition, it is noted that even if some material was to enter the Brickey River and downstream transitional and coastal waterbodies, the actual Special Conservation Interests of the SPA, as listed above, would not be affected as these species and habitats are not associated with watercourses.

Therefore, it can be concluded that the KWF Grid Connection has no potential to significantly affect water quality in the Dungarvan Harbour SPA and pNHA even in an unmitigated scenario throughout the construction phase.

4.2.1.4 Construction Phase Mitigation Measures

Regardless of the assessed pre-mitigation effect of **Imperceptible to Slight**, mitigation measures are proposed to ensure the protection of waterbodies downstream of the Proposed Development.

4.2.1.4.1 Mitigation Measures Relating to Suspended Solids Entrainment in Surface Water

There are no watercourse crossings required for the KWF Grid Connection and the grid route is largely along an existing track. There will be no interactions with any watercourse and therefore no requirement for avoidance measures.

Single silt fences will be installed at construction works areas down-gradient of the proposed works. Temporary silt fencing / silt trap arrangements will also be placed along potential runoff drainage routes (i.e. between forestry mounds/ribbons). The roadside drain at the Knocknamona Windfarm Substation will be temporarily blocked during trenching works upslope of this drain. Silt fences are effective at removing larger particle sized solids, and the erection of silt fences, silt traps and blocking of drains at the KWF Grid Connection site will prevent entry to watercourses of sand and gravel sized sediment released from excavations and entrained in surface water runoff from works areas. This measure is a standard form of best practice sediment control commonly used on windfarm construction sites. Silt-fencing will be installed by the Construction Contractor ahead of groundworks. Silt fencing and silt trap arrangements will be regularly inspected and maintained during the construction phase to ensure their continued functioning to stated purpose. They will remain in place throughout the entire construction phase. If required, the silt fencing will be left in place until the ground has re-vegetated.

Temporary spoil heaps will be covered with polyethylene sheets during heavy rainfall events, and the excavation of cable trench, substation works and link road works will not be undertaken during periods of intense or prolonged rainfall. These measures will reduce the volumes of excavated material exposed to heavy rainfall, thereby reducing the risk of entrainment of suspended sediment in surface water runoff.

Excavation of cable trench, substation works and link road works will not be undertaken during periods of intense or prolonged rainfall. This will minimise the risk of entrainment of suspended sediment in surface water runoff and transport via this pathway to surface watercourses.

4.2.1.4.2 Mitigation Measures Relating to Oils, Fuels

All fuels required for construction activities will be stored in a designated location, away from main traffic activity, at the Woodhouse Substation compound. All fuel will be stored in bunded, locked storage containers. Where refuelling is required along the proposed route, fuel will be brought to site by a 4x4 in a double skinned bowser with drip trays. The bowser will be bunded appropriately for the fuel usage volume for the time period of the construction. This measure will prevent the escape of fuels from storage containers, in line within best practice.

The plant and machinery used on-site will be regularly inspected for leaks and fitness for purpose, in order to minimise the risk of oil leakages from vehicles. Spill kits and absorbent material will be readily available on site, with a kit available in the bowser/4x4 and in all plant and machinery used on site. Both machinery operators and delivery personnel will be fully trained to deal with any accidental spills. This measure will ensure that any leaks are contained quickly and effectively and that the risk to downslope water bodies is minimised.

4.2.1.4.3 Mitigation Measures Relating to Cements

No batching of wet cement will take place on-site. Concrete requirements for the KWF Grid Connection are limited to c.4 loads of ready-mix concrete to construct the control building foundation, and the plinths and bunds in the Woodhouse Substation Compound. Therefore large volumes of cement will not be present on-site at any time;

Where concrete is delivered on site (at Woodhouse Substation compound), only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to any artificial drain or watercourse will be allowed. Concrete washout bags will be placed under the chute to catch any washout wastewater. These measures will prevent the concrete washout from entering drainage networks/watercourses, thus effectively removing the pathway for impacts to downstream waterbodies

Weather forecasting will be used to plan pouring concrete for dry days; and, the pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event. This measure will minimize the exposure of wet concrete to rainwater runoff.

4.2.1.5 Construction Phase Post mitigation evaluation

The potential for the release of suspended solids, oils, fuels and cements to watercourse receptors is a risk to water quality and the aquatic quality of the receptor. Proven and effective measures to mitigate the risk of releases of sediment and cement are proposed and will break the pathway between the potential sources and the receptor. The construction phase residual effect will be imperceptible, indirect, short term, likely impact on down gradient rivers and water quality. Due to the scale and nature of operational and decommission phase works, and with the implementation of the above listed mitigation measures, the KWF Grid Connection will not have the potential to affect the WFD status of any waterbody during construction works.

4.2.2 Operational Phase & Decommissioning

Little maintenance work will be required during the operational phase, with routine maintenance mainly occurring in the Woodhouse Substation compound. Routine maintenance of the KWF Grid Connection has no potential to impact on the status of downstream SWBs or underlying GWBs due to lack of significant earthworks and heavy construction machinery. The potential impacts associated with any cable replacement or removal works would be significantly less than its construction as the cables would be removed from the ground by pulling through the ducts, with groundworks limited to the reopening and reinstatement of the jointing location. Because the cable route is located under the centreline of the forestry/link roads, the works to reopen the jointing location will take place entirely on the hardcore road and no soils or vegetated ground will be disturbed during cable replacement/removal works. The impact (pre-mitigation) on water quality will be no effect.

Regardless of the small scale of any cable replacement or removal works, the following mitigation measures will be implemented during these works to minimise the risk of sediment or fuels/oils in any site run-off and to ensure no impacts on receiving waters or WFD status:

- To minimise the risk of erosion of excavations by rainfall, works will not be undertaken during periods of intense or prolonged rainfall.
- To remove any suspended sediments in runoff from the works area, temporary silt fencing will be placed downslope of the jointing location before works commence.
- In order to minimise the risk of fuel/oil leaks, any machinery used will be inspected for leaks and fitness for purpose before being transported to the site, and spill kits will be readily available to deal with accidental spillage at all times.

Due to the scale and nature of operational and decommission phase works, and with the implementation of the above listed mitigation measures, the KWF Grid Connection will not have the potential to affect the WFD status of any waterbody during these phases.

4.2.3 Mitigation Measures for Protected Areas

The mitigation controls as described in **Section 4.2.1.4** above will be implemented during the construction, operational and decommissioning phases. These measures include the use of silt fences, silt traps and check dams. Emphasis will also be placed on prevention of hydrocarbon releases to local watercourses. It can be concluded that no additional mitigation measures are required in relation to protecting water quality in downstream designated sites.

4.3 SUMMARY OF EFFECTS

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

SWB	WFD Code	Current Status	Assessed Status - Unmitigated	Assessed Status with Mitigation Measures
Colligan sub-catchment				
Brickey_010	IE_SE_17B010050	Poor	Poor	Poor
Brickey_020	IE_SE_17B010090	Poor	Poor	Poor
Goish sub-catchment				
Goish_010	IE_SW_18G120200	Moderate	Moderate	Moderate
Goish_020	IE_SW_18G120300	Moderate	Moderate	Moderate
Finisk sub-catchment				
Finisk_030	IE_SW_18F020500	High	High	High
Groundwater Bodies				
Helvic Head	IE_SE_G_073	Good	Good	Good
Glenville	IE_SW_G_037	Good	Good	Good

5 REPORT CONCLUSION

WFD status for RWBs (Riverwater Bodies), GWBs (Groundwater Bodies) and Protected Areas hydraulically linked to the proposed project site are defined in **Section 2** above.

The proposed project does not involve any abstraction 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, operational and decommissioning phase of the proposed project.

Due to the small scale of the project, which is spread out over several river sub-basins and across two groundwater bodies, effects on local river waterbodies will be Slight in the absence of mitigation, and Imperceptible following mitigation.

Nevertheless, mitigation for the protection of the Blackwater River (Cork/Waterford) SAC, Blackwater River and Estuary pNHA, Dungarvan Harbour pNHA and SPA and 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 proposed project.

Therefore, there will be no change in the underlying GWB or RWB status or downstream RWBs resulting from the proposed project. There will be no change in quantitative (volume) or qualitative (chemical) status, and the underlying GWBs are protected from any potential deterioration from chemical pollution.

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

In the event where the current status of the waterbody is 'Poor' (Brickey_010 & Brickey_020) or Moderate (Goish_010 & Goish_020) the proposed project will not prevent them from achieving Good Status in the future.

As such, the Proposed Development:

- 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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