# 6 AQUATIC ECOLOGY

## 6.1 INTRODUCTION



This chapter assesses the impacts of the Project (**Figure 1.2**) on aquatic ecology. The Project refers to all elements of the application for the construction of Letter Wind Farm (**Chapter 2: Development Description**). Where negative effects are predicted, the chapter identifies appropriate mitigation strategies therein. The assessment will consider the potential effects during the following phases of the Project:

- Construction of the Project
- Operation of the Project
- Decommissioning of the Project

Common acronyms used throughout this EIAR can be found in **Appendix 1.2**. This chapter of the EIAR is supported by Figures provided in Volume III.

A Construction and Environmental Management Plan (CEMP) is appended to the EIAR in **Appendix 2.1**. This document will be developed into a Site-Specific Letter CEMP post consent/pre-construction once a contractor has been appointed and will cover construction of the Project. It will include all of the mitigation recommended within the EIAR. For the purpose of this application, a summary of the mitigation measures is included in **Appendix 17.1**.

### 6.1.1 Statement of Authority

This Chapter has been prepared by Mr. Pat Doherty BSc., MSc, MCIEEM, of DEC Ltd. Mr. Doherty is a consultant ecologist with over 20 years' experience in completing ecological impact assessments and environmental impact assessments. Pat has been involved in the completion of assessment reports for proposed developments and land use activities under the EIA Directive and Article 6 of the Habitats Directive since 2003 and 2006 respectively. He has extensive experience completing such reporting for projects located in a variety of environments and has a thorough understanding of the biodiversity issues that may arise from proposed land use activities.

Pat has completed focused certified professional development training in freshwater ecology and freshwater biodiversity surveys including macroinvertebrate surveys, otter surveys and fisheries habitat assessments. Training has been completed by approved training providers such as CIEEM, Field Studies Council (UK), and the Freshwater Biological Association.

### 6.1.2 Assessment Structure

In line with the revised EIA Directive and current EPA guidelines the structure of this Aquatic Ecology chapter is as follows:

- Assessment Methodology and Significance Criteria
- Description of baseline conditions at the Site
- Identification and assessment of impacts to ornithology associated with the Development, during the construction, operational and decommissioning phases of the Development
- Mitigation measures to avoid or reduce the impacts identified
- Identification and assessment of residual impact of the Development considering mitigation measures.
- Identification and assessment of cumulative impacts if and where applicable.

## 6.2 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

### 6.2.1 Guidance

The 'CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine'[1] (the CIEEM Guidelines"), published by the Chartered Institute of Ecology and Environmental Management ("CIEEM"), are the acknowledged reference on ecological impact assessment and reflect the current thinking on good practice in ecological impact assessment across the UK and Ireland. They are consistent with the British Standard on Biodiversity, which provides recommendations on topics such as professional practice, proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring. These CIEEM Guidelines have the endorsement of the Institute of Environmental Management and Assessment ("IEMA"), the Chartered Institute of Water and Environmental Management (CIWEM), Northern Ireland Department of the Environment (DoeNI), Scottish Natural Heritage (SNH), The Wildlife Trusts and other leading environmental organisations.

### 6.2.2 Desktop Analysis

#### *6.2.2.1 Existing Freshwater Fauna Records*

The NPWS and NBDC were consulted in order to establish historic records of important and protected aquatic species, or the likelihood of their occurrence (through range information).

[1] CIEEM (2018 v 1.1) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester. Version 1.1. Updated September 2019 – Available online at: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-Sept-2019.pdf (Accessed March 2023).

NBDC collects and manages biodiversity data for the island of Ireland and incorporates data from a number of different sources. The NBDC records were reviewed to inform this assessment. An area of search was used to collate all records held for the proposed Development and a surrounding buffer area of 2km. A 2km distance was set as this buffer area will provide adequate coverage for all terrestrial non-volant mammal species, invertebrate species and flora species that may be sensitive to the proposed Development. For instance, terrestrial mammals' species are sensitive to proposed Development activities to a distance of c. 150m from the source of the activity (NRA, 2008). The area of search is shown on **Figure 6.1**. A Data Information Request was issued to the NPWS for all protected species records occurring within the area of search shown on **Figure 6.1**.



### 6.2.3 Site Investigations

#### *6.2.3.1 Fisheries Habitat Assessment*

An assessment of the salmonid fisheries habitat potential of the streams draining the study area was carried out and consisted of walkover surveys recording general characteristics to provide an indication of the quality of habitat, and thus its potential suitability, for salmonid fish such as salmon and brown trout.

The descriptive terminology to be used in the survey will be based on the Life Cycle Unit method (Kennedy, 1984) currently used by the Loughs Agency and DAERA Inland Fisheries (see also DANI advisory leaflet No 1). In summary, habitat type is recorded as:

- Nursery (shallow rock/cobble riffle areas for juvenile fish - fry/parr);
- Holding (deeper pools/runs for adult fish);
- Spawning (shallow gravel areas for fish spawning);
- Unclassified (unsuitable for fish – shallow bedrock areas or heavily modified sections of channel).

Each stretch of a particular habitat type is also graded 1 to 3, based on a series of criteria as set out in Annex 1 of the DANI advisory leaflet. In essence, this is similar to the 4-point habitat scale used by the cross-border Loughs Agency; three of fisheries interest (Nursery, Holding and Spawning) and one of non-fisheries interest (unclassified) which generally describes a substrate of fine silt, or extensive bridge invert, or engineered channel with solid bed and possibly constrained banks.

#### 6.2.3.2 Macroinvertebrate Surveys



A baseline quality survey of the Owengar Stream was completed on the 8th of September 2023.

Monitoring was completed at the three field sampling locations, SW1, SW2 and SW3. SW1 is located at grid reference ITM 587,263E 824,145N. SW2 is located at grid reference ITM 587,611E 823,434N. SW2 is located at grid reference ITM 589,148E 823,321N. **Figure 6.2** shows the location of the three sampling points.

The biological water quality survey was based on the Biotic Index or Q-value system as outlined by the EPA (McGarrigle, 2002). The EPA Q-Value system is a listed criteria for calculating surface water ecological status as outlined in Schedule 5 of the Surface Water Regulations 2009 (SI No. 272 of 2009).

A three-minute kick sample was undertaken along a 10m section of the Owengar Stream at SW1, SW2, and SW3.

The kick samples were completed on the 8th September 2023. The kick samples were undertaken using a kick-net (mesh size: 1mm). The samples were washed and analysed in the field. A 500µm sieve was used to wash the sample and remove silt material while stones and other organic detritus (such as leaves wood fragments etc.) were washed into the sieve and removed by hand. The samples were transferred to a white sorting tray for analysis. Each sample was sorted for 30 minutes.

Macroinvertebrates were identified to the level required by the EPA Q-rating system using both low and high-powered microscopes where necessary. Based on the relative abundance of indicator taxa a biotic index (Q-value) was determined for the watercourse. As different taxa show different levels of tolerance and sensitivity to pollution, the presence or absence of specific organisms in the water indicates the level of water quality in a watercourse. The Q-value system is based on a five-point biotic index as outlined in **Table 6.1**. The intermediate values i.e., Q1 -2, Q3 – 4 etc. denote transitional conditions. The Q-values listed in **Table 6.1** are assigned according to the abundance of different invertebrate groups. The abundance of each indicator group will determine the Q-value assigned. The abundance categories that apply when assigning Q-values are also outlined in **Table 6.2**.

**Table 6.1: Q-Value system with Five Point Biotic Index and Intermediate Values (Source: EPA, 2006).**



| Biotic Index | Water Quality | Pollution Status |
|---|---|---|
| Q5 | Good | Unpolluted |
| Q4 – 5 | Fair – Good | |
| Q4 | Fair | |
| Q3 – 4 | Doubtful – Fair | Slight to moderate pollution |
| Q3 | Doubtful | |
| Q2 – 3 | Poor | |
| Q2 | Poor | Serious pollution |
| Q1 – 2 | Bad – Poor | |
| Q1 | Bad | |

**Table 6.2: Abundance Values and Frequency of Occurrence for assigning Q-Values (Source: EPA, 2006)**

| Abundance Category | Approximate Percentage frequency of Occurrence |
|---|---|
| Present | 1 or 2 individuals |
| Scarce/Few | <1% |
| Small numbers | <5% |
| Fair numbers | 5 – 9% |
| Common | 10 – 24% |
| Numerous | 25 – 54% |
| Dominant | 50 – 75% |
| Excessive | >75% |

#### *6.2.3.3 White-clawed Crayfish Surveys*

Two 100m stretches of the Owengar River were searched in detail for the presence of crayfish. The stretches of watercourse searched are shown in **Figure 6.2**. The survey of these stretches of stream followed the guidance outlined in Peay (2003) for carrying out manual searches of watercourses for crayfish. The suitability of the stretches of watercourses surveyed was assessed in terms of its potential to support crayfish. A viewing aid, in the form of a bathyscope was used during the survey.

#### *6.2.3.4 Limitations & Coverage*

Limitations can arise during the course of ecological assessments. These limitations may be foreseen, whilst others will not present themselves until the assessment is underway.

The limitations can be associated with methods, equipment and health and safety considerations.



No limitations were encountered during the completion of desktop and baseline studies and surveys.

### 6.2.4 Impact Assessment Methodology

#### *6.2.4.1 Establishing the Potential Zone of Influence of the Project*

The 'zone of influence' for a project is the area over which ecological features may be subject to significant impacts as a result of the Project and associated activities. The Zone of Influence (ZoI), or distance over which a likely significant effect may occur will differ across the Ecological Receptors identified for the Project, depending on the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken have established the habitats and species present at and surrounding the Site. The ZoI is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Project.

The ZoI of the Project in relation to aquatic habitats and fauna is limited to such receptors occurring downstream of the Project. With regard to hydrological impacts, the distances over which aqueous pollutants are likely to remain at concentrations that have potential to result in perturbations to water quality and associated freshwater habitats is difficult to quantify. The potential for such effects to occur are also highly site-specific and related to the predicted magnitude of any pollution event. The impact of a pollution event will depend on the volumes of discharged waters, concentrations and types of pollutants (in the case of the proposed Project these being comprised of sediment, hydrocarbons, cement-based products and other related construction solutions), volumes of receiving waters, and the sensitivity of the ecology of the receiving waters. With respect to the Project, this includes all freshwater habitat and ecological receptors downstream of the Project that have been identified as ecological receptors.

#### *6.2.4.2 Evaluating Aquatic Receptors within the Zone of Influence*

The nature conservation value of aquatic habitats and fauna occurring within the proposed Project are based upon an established geographic hierarchy of importance as outlined by the National Roads Authority (NRA, 2009). The outline of this geographic hierarchy is provided below, and this has been used to determine ecological value in line with the ecological valuation examples provided by the NRA (see NRA, 2009). The geographic evaluation hierarchy is as follows:

- International Sites (Rating A)
- National Importance (Rating B)
- County Importance (Rating C)
- Local Importance (higher value) (Rating D)
- Local Importance (lower value) (Rating E)

**Table 6.3: Geographic frame of reference used to determine value of ecological resources[2]**

| Importance | Criteria |
|---|---|
| **International Importance (Rating A)** | • 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.<br>• Proposed Special Protection Area (pSPA).<br>• Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).<br>• Features essential to maintaining the coherence of the Natura 2000 Network.<br>• Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.<br>• Resident or regularly occurring populations (assessed to be important at the national level) of the following:<br>  ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or,<br>  ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.<br>• Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).<br>• World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).<br>• Biosphere Reserve (UNESCO Man & The Biosphere Programme).<br>• Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).<br>• Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).<br>• Biogenetic Reserve under the Council of Europe.<br>• European Diploma Site under the Council of Europe.<br>• Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988). |
| **National Importance (Rating B)** | • Site designated or proposed as a Natural Heritage Area (NHA).<br>• Statutory Nature Reserve.<br>• Refuge for Fauna and Flora protected under the Wildlife Acts.<br>• National Park.<br>• Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.<br>• Resident or regularly occurring populations (assessed to be important at the national level) of the following:<br>  • Species protected under the Wildlife Acts; and/or,<br>  • Species listed on the relevant Red Data list.<br>  • Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive. |
| **County Importance (Rating C)** | • Area of Special Amenity.<br>• Area subject to a Tree Preservation Order.<br>• Area of High Amenity, or equivalent, designated under the County Development Plan. |

[2] Adapted from CIEEM 2018 v 1.1 - Available online at: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-Sept-2019.pdf and NRA 2009 - Available at: http://www.tii.ie/technical-services/environment/planning/Guidelines-for-Assessment-of-Ecological-Impacts-of-National-Road-Schemes.pdf [Accessed March 2023].

| Importance | Criteria |
|---|---|
| | • Resident or regularly occurring populations (assessed to be important at the County level) of the following:<br>  • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;<br>  • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;<br>  • Species protected under the Wildlife Acts; and/or<br>  • Species listed on the relevant Red Data list.<br>• Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.<br>• County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared.<br>• Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.<br>• Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level. |
| **Local Importance (Higher Value) (Rating D)** | • Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared.<br>• Resident or regularly occurring populations (assessed to be important at the Local level) of the following:<br>• Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;<br>• Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;<br>• Species protected under the Wildlife Acts; and/or<br>• Species listed on the relevant Red Data list.<br>• Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality.<br>• Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value. |
| **Local Importance (Lower Value) (Rating E)** | • Sites containing small areas of semi-natural habitat that are of some local importance for wildlife.<br>• Sites or features containing non-native species that is of some importance in maintaining habitat links. |

The Ecological Receptors of the Project are those features which are within the ZoI and are evaluated as being of Local Importance or greater.



#### 6.2.4.3 Identification & Characteristics of Effects

When describing the magnitude or scale of ecological impacts reference should be made to the following characteristics:

- Positive or negative
- Extent: the size of the affected area/habitat and/or the proportion of a population affected by the effect
- Duration: the period of time over which the impact will occur. The EPA's guidelines on information to be included in Environmental Impact Assessment Reports (EPA, 2022) sets out the following terms for defining the duration of an impact: Momentary Effects - effects lasting from seconds to minutes; Brief Effects - effects lasting less than a day; Temporary Effects - effects lasting less than a year; Short-term Effects - effects lasting one to seven years; Medium-term Effects - effects lasting seven to fifteen years; Long-term Effects - effects lasting fifteen to sixty years; Permanent Effects - effects lasting over sixty years.
- Frequency & Timing: how often the effect will occur; particularly in the context of relevant life-stages or seasons; and,
- Reversibility: will the effect be permanent or temporary. Will an impact reverse, either spontaneously or as a result of a specific action.

The assessment describes those characteristics relevant to understanding the ecological effect and determining the significance, and as such it does not need to incorporate all stated characteristics (CIEEM, 2018 v.1.1).

#### 6.2.4.4 Significant Effects on Important Ecological Features

For the purpose of Ecological Impact Assessment, a 'significant effect', is an effect to an ecological feature from an impact, that either supports or undermines biodiversity conservation objectives for those ecological features which have been identified as important. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy). As such, effects can be considered significant in a wide range of geographic scales from international to local. Consequently, 'significant effects' should be qualified with reference to the appropriate geographic scale (CIEEM, 2018 v.1.1).

In order to predict likely ecological impacts and effects, the assessor must take account of the relevant aspects of the ecosystem structure and function, which include (CIEEM, 2018 v.1.1):

- The resources available (e.g. territory, prey availability, habitat connectivity etc.);
- Environmental processes (e.g. eutrophication, drought, flooding etc.);
- Ecological processes and relationships (e.g. population / vegetation dynamics, food webs etc.);
- Human influences (e.g. fertilisation, turbary, grazing, burning etc.);
- Historical context (natural range, trends etc.);
- Ecosystem properties (e.g. the carrying capacity, fragility etc.); as well as,
- Other environmental influences such as air quality, hydrology, water quality, nutrient inputs and salinity etc.



The determination of significance is made in line with the terminology set out in the EPA's guidelines on information to be included in Environmental Impact Assessment Reports. These criteria are as follows:

- No change – no discernible change in the ecology of the affected features
- Imperceptible effect - An effect capable of measurement but without noticeable consequences
- Not Significant - An effect which causes noticeable changes in the character of the
- environment but without significant consequences.
- Slight effect - An effect which causes noticeable changes in the character of the
- environment without affecting its sensitivities.
- Moderate effect - An effect that alters the character of the environment that is consistent with existing and emerging trends.
- Significant effect - An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.
- Very Significant - An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
- Profound effect - An effect which obliterates sensitive characteristics.

#### 6.2.4.4.1 Integrity

The integrity of an ecological receptor refers to the coherence of the ecological structure and function that enables the ecological receptor to be sustained (NRA, 2009). The term 'integrity' is most often used when determining impact significance in relation to designated areas for nature conservation (e.g. SACs, SPAs or pNHA/NHAs) but can often be the most

appropriate method to use for non-designated areas of biodiversity value where the component habitats and/or species exist with a defined ecosystem at a given geographic scale.



An impact on the integrity of an ecological site or ecosystem is considered to be significant if it moves the condition of the ecosystem away from a favourable condition: removing or changing the processes that support the sites' habitats and/or species; affect the nature, extent, structure and functioning of component habitats; and/or, affect the population size and viability of component species.

#### 6.2.4.4.2 Conservation Status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status.

As per the definitions provided in the EU Habitats Directive, the conservation status of a habitat is favourable when:

- Its natural range and areas it covers within that range are stable or increasing
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
- The conservation status of its typical species is favourable as defined below under species.

The conservation status of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

According to the TII/CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international). In some cases, an impact may not be significant at the geographic scale at which the ecological feature has been valued but may be significant at a lower geographical level. For example, a particular impact may not be considered likely to have a negative effect on the overall conservation status of a habitat

which is considered to be internationally important. However, an impact may occur at a lower geographic scale on this internationally important habitat. Under such a scenario, such an impact on an internationally important habitat is considered to be significant only at the lower scale e.g. local, county, rather than international scale.



#### *6.2.4.5 Assessment of Cumulative Effects*

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location (CIEEM, 2018 v.1.1). Different types of actions can cause cumulative impacts and effects. As such, these types of impacts may be characterised as;

- Additive/incremental – in which multiple activities/projects (each with potentially insignificant effects) add together to contribute to a significant effect due to their proximity in time and space (CIEEM, 2018 v.1.1); and,
- Associated/connected – a development activity 'enables' another development activity e.g. phased development as part of separate planning applications. Associated developments may include different aspects of the project which may be authorised under different consent processes. It is important to assess the potential impacts of the 'project' as a whole and not ignore impacts that fall under a separate consent process (CIEEM, 2018 v.1.1).

#### *6.2.4.6 Assessment of Residual Effects*

After characterising the potential impacts of the Project and assessing the potential effects of these impacts on the 'Important ecological features', mitigation measures are proposed to avoid and / or mitigate the identified ecological effects. Once measures to avoid and mitigate ecological effects have been finalised, assessment of the residual impacts and effects should be undertaken to determine the significance of their effects on the 'Important ecological features'.

## 6.3 BASELINE DESCRIPTION

### 6.3.1 General Site Description

The Site is located within a cutaway peatland landscape near the Corry Mountains, Co. Leitrim. The Site is located approximately 2.9km west of Drumkeeran Village, Co. Leitrim and approximately 21km southeast of Sligo Town. The Site is located within the townlands of Letter, Boleybaun and Stangaun. The proposed grid connection is located in the townlands of Letter, Greaghnadarragh, Stangaun, Corralustia, Turpaun, Gortnasillagh West, Lugmeeltan, Leckaun, Lisgavneen, Treannadullagh, Drumcashlagh and Corderry.

Temporary works will be required to accommodate the delivery of the turbine components. These temporary works are not included as part of the planning application but are assessed a part of this EIAR and are located on the R263, N56, N15, N4, R285, and R280. The Site extends to c. 45ha and has a mixed use as both commercial forestry and upland grazing.



The closest inhabited dwelling (H3) is located 710m from the nearest turbine. There are 17 houses within 1.5km of the proposed turbines.

The Northern portion of the site is connected via partially existing and proposed new access tracks. The Southern portion of the site requires new access tracks which includes for connection to a substation at the site. The Site is characterised by relatively complex (hilly) topography with associated elevations ranging between c. 170 to 260 metres above datum (mAOD). The site can be broken up into two sections, the north-western section is mostly forestry and has elevations around 250-260mAOD, the south-eastern section is mostly peatland and ranges from 170 – 240mAOD.

Landcover at the proposed site is predominantly comprised of blanket peatlands, turbary, mature forestry and areas of improved and semi-improved grassland. Land cover exists along the Grid Connection Route (Corine 2018); 'land principally occupied by agriculture with natural vegetation', 'transitional woodland scrub', 'peat bogs'. The Turbine Delivery Route traverses the previously described land use as well as areas of 'discontinuous urban fabric', 'continuous urban fabric', 'pastures', 'beaches, sand dunes', 'intertidal flats', and 'industrial and commercial units'.

Land in the vicinity of the proposed Letter Wind Farm site is predominantly underlain by the Dergvone Shale Formation. Where blanket peat is absent the underlying mineral soils are consistent with tills derived from Namurian Shales.

The Site is characterised by a network of non-mapped natural and artificial drainage channels which are often found in forestry plantations and peat turbary areas. Commercial forestry inherently possesses extensive drainage networks. Historic peat cutting activities have left drains present on the site. These can be categorised as both non-mapped significant drains (which feed into the mapped river for example) and minor drains. While some drains were generally dry during site visits, the Site is considered to have a flashy regime with low permeability soils and standing water in some areas. A flashy regime is

where intense rainfall periods will raise the levels of the rivers significantly as the groundwater recharge will reach capacity quickly.



The Site and the southern part of the and Grid Connection Route are situated within the Upper Shannon Catchment (ID:26A; Area: 604.47km$^2$). The Northern part of the and Grid Connection Route is situated in the Sligo Bay Catchment (ID:35, Area: 1605.94km$^2$). The Turbine Delivery Route passes through the Donegal Bay North Catchment (ID:37, Area: 807km$^2$), the Erne Catchment (ID:36, Area: 3440.55km$^2$) the Sligo Bay Catchment (ID:35, Area: 1605.94km$^2$), the Upper Shannon Catchment (ID:26B, Area: 674.13km$^2$), the Upper Shannon Catchment (ID:26; Area: 604.47km$^2$) near the red line boundary of the Site.

Surface water runoff associated with the Site drains into two sub catchments and/or three river sub basins, or three no. rivers, 1 no. lough:

- Sub Catchment: Owengar (Leitrim)_SC_10, River Sub Basins: Owengar (Leitrim)_SC_010 and Diffagher_10, Rivers: Owengar (Leirtim)_010, Owengar (Leitrim)_020, Diffagher_010

- Sub Catchment: Shannon Upper_SC_020; River Sub Basin: Shannon Upper_040, Lough: Lough Allen

All of the above sub-catchments are located within the Upper Shannon catchment (Catchment ID26A). The surface waters draining from the Site eventually combine into Lough Allen, from which waters eventually flow to the Upper Shannon, Lough Corry, Tap North and Lough Boderg, Lough Forbes, Lough Ree, the Lower Shannon, Lough Derg, and Shannon Estuary through to the mouth of the Shannon and into the Southwestern Atlantic Seaboard.

The WFD status (2016-2021) for surface water bodies / rivers and streams directly draining the Site range are Good.

### 6.3.2 Designated Areas

All designated areas for nature conservation in the wider regional area surrounding the project have been identified and listed in **Table 5.6, Chapter 5: Terrestrial Ecology.** The designated areas that have been identified in Chapter 5 as occurring within the zone of influence of the project and that occur downstream and are designated for their role in supporting freshwater dependent habitats and species are listed in **Table 6.4** below.

**Table 6.4: Designated Area with Freshwater-Dependent Habitats & Fauna occurring within the Zone of Influence of the Project**

| Designated Areas | Qualifying Interests (QI's) | Approximate Distance (Km) (overland) from Site (at closest point) | Does the Designated Area occur within the zone of influence of the project |
|---|---|---|---|
| **Lough Gill SAC (Site Code: 001976)** | Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150]<br>Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]<br>Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]<br>Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae, Salicion albae*) [91E0]<br>*Austropotamobius pallipes* (White-clawed Crayfish) [1092]<br>*Petromyzon marinus* (Sea Lamprey) [1095]<br>*Lampetra planeri* (Brook Lamprey) [1096]<br>*Lampetra fluviatilis* (River Lamprey) [1099]<br>*Salmo salar* (Salmon) [1106]<br>*Lutra lutra* (Otter) [1355] | 5.5km from the proposed grid connection route.<br>8.3km from the proposed wind farm site<br>11km from the nearest turbine delivery route widening location. | Yes, see Screening for Appropriate Assessment. |

| Designated Areas | Qualifying Interests (QI's) | Approximate Distance (Km) (overland) from Site (at closest point) | Does the Designated Area occur within the zone of influence of the project |
|---|---|---|---|
| **Lough Forbes Complex SAC (Site Code : 001818)** | Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150]<br>Active raised bogs [7110]<br>Degraded raised bogs still capable of natural regeneration [7120]<br>Depressions on peat substrates of the *Rhynchosporion* [7150]<br>Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae*, *Salicion albae*) [91E0] | 45km from the proposed wind farm site and the proposed grid connection route.<br>34km from the nearest turbine delivery route widening location. | Yes, see Screening for Appropriate Assessment. |
| **Unshin River SAC (Site Code: 001898)** | Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation [3260]<br><br>Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]<br><br>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] | 13.6km from the proposed wind farm site and the proposed grid connection route.<br><br>14km from the nearest turbine delivery route widening location. | Yes, see Screening for Appropriate Assessment. |

| Designated Areas | Qualifying Interests (QI's) | Approximate Distance (Km) (overland) from Site (at closest point) | Does the Designated Area occur within the zone of influence of the project |
|---|---|---|---|
| | Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae, Salicion albae*) [91E0]<br><br>*Salmo salar* (Salmon) [1106]<br><br>*Lutra lutra* (Otter) [1355 | | |

### 6.3.3 Desktop Study

#### *6.3.3.1 Previous Landslide Events*



In a submission made by Inland Fisheries Ireland to Leitrim County Council with respect to the Croagh Wind Farm planning application they noted that the Owengar River is a salmonid watercourse, which has good stocks of wild brown trout. The IFI reported (IFI, 2011) that the landslide event in September 2008 impacted the entire Owengar River from the source of the slide to where the river enters Lough Allen. A number of resident trout had to be relocated from the lower reaches of the river before the landslide reached this location. The resident trout were relocated to Lough Allen. The landslide occurred at the Garvagh Glebe Wind Farm, located approximately 1km to the southwest of the proposed Letter Wind Farm. The IFI further noted that the landslide severely undermined the water quality and instream habitats along this watercourse and the fisheries supported by it.

A fisheries rehabilitation programme along the river was initiated subsequent to the landslide event in 2010 (IFI, 2013). By 2011 approximately 3km of the river channel had been restored at locations upstream of the R280 road bridge, at a spill over dam site and upstream of Rogan's Bridge. Rehabilitation works included Rip-Rap protection of eroding banks where a stepped bank protection system with stone is put in place in order to protect the eroding banks, creation of level bed deflectors within the channel, removal of tree debris, re-instating remediation works on areas affected by further debris and creating natural rock steps above the R280 Bridge for fish passage. Rubble mats were identified by the IFI to be the most successful structures in the Owengar Restoration programme, due to their low level to the bed of the river and their capacity to mimic the natural in-stream features found in similar spate rivers such as the Yellow and Arigna Rivers. Initial electrofishing surveys carried out during 2013 indicated a recovery in trout numbers to the rehabilitated areas (IFI, 2013).

The lower reaches of the Owengar River were again affected in 2020 as a result of the Shass Mountain/Diffagher River Landslide, which occurred during June 2020. The IFI (IFI, 2020) noted the impact of this landslide on the lower reach of the Owengar River between its tributary with the Diffagher River and its mouth at Lough Allen.

#### *6.3.3.2 EPA Biological River Monitoring Data*

There are four no. EPA biological water quality monitoring stations within the Owengar River catchment. These are set out in **Table 6.5** below along with the results of water quality monitoring, as published by the EPA between 1992 and 2020.

**Table 6.5: EPA Biological River Monitoring Data: Owengar River**

| Station Code | Station Name | River | 1992 | 1996 | 1999 | 2002 | 2005 | 2008 | 2009 | 2011 | 2014 | 2017 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26O020050 | Bandon River S Glassalt | Gowlaunrevagh (Trib. of Owengar) | - | - | - | - | - | 1 | - | 2-3 | 3 | 3 | 4 |
| 26O020075 | SE Letter | Owengar (main channel u/s Gowlaunrevagh confl.) | - | - | - | 4-5 | 4-5 | - | - | 4 | 4 | 4 | 4 |
| 26O020100 | Bridge at Barragh | Owengar (main channel) | 4-5 | 4 | 4-5 | 4-5 | - | - | 4 | 4 | 4 | 4 | 4-5 |
| 26O020200 | Bridge at Annaghgerry | Owengar (main channel) | 5 | 4 | 3-4 | - | 4 | 4 | - | 4 | 4-5 | 4 | 4-5 |

Of note in **Table 6.5** is the Q1 Bad water quality recorded for the Gowlaunrevagh Stream in 2008. The Gowlaunrevagh Stream is a tributary of the Owengar River and has been monitored since 2008 following the landslide incident at Garvagh Glebe Wind Farm described above. This stream was rated Q1* 'bad' status in 2008; since recovering to Q2-3 'poor' status then Q3 'poor' by 2017 to 'Good' status by 2020. AS noted by RPS (2020), the EPA record in relation to the landslide in the Owengar catchment (and Gowlaunrevagh Stream) provides an insight into the potential trajectory of water quality and habitat recovery following a landslide event. While the affected tributary was at Q1* 'bad status, the Owengar main channel at Annagerry Bridge was at Q4* 'good' status. The asterix in these cases almost certainly relates to sedimentation (peat mass) in the channel. It is noted that in the 6 years between 2011 and 2017, the affected tributary has progressed through Q2-3 to Q3 'poor' status, while the main channel sites upstream and downstream of the tributary remained at Q4/Q4-5, with 'good' status as a minimum. Results from the EPA for the 2020 samples indicate that these sites continue to improve. The fisheries and habitat rehabilitation works carried out in the Owengar since the 2010, as detailed above, may have contributed to the recovery of the downstream situation on the Owengar main channel.



### *6.3.3.3 Existing Freshwater Fauna Records*

The results of the desk study are provided in **Table 6.6** below:

**Table 6.6: Rare, Threatened or Protected Freshwater Species Records**

| Species | Scientific Name | Habitats Dir. (Annex II / IV) | Birds Dir. (Annex I) | Wildlife Acts (as amended) | Red List Status | Flora Protection Order | Birds of Conservation Concern (2021– 2026) | Likelihood on the Site | Likelihood within 2km | Most recent record | Record Source |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fish** | | | | | | | | | | | |
| **Otter** | *Lutra lutra* | Y | - | Y | LC | - | - | 3 | 1 | 2010 | NBDC & NPWS |
| **Invertebrates** | | | | | | | | | | | |
| **White-clawed crayfish** | *Austropotamobius pallipes* | Y | - | Y | LC | - | - | 3 | 1 | 2014 | NBDC |
| **Plants** | | | | | | | | | | | |
| **None Recorded** | | | | | | | | | | | |
| **Invasive Species** | | | | | | | | | | | |
| **None Recorded** | | | | | | | | | | | |

*6 LC = Least Concern; Key to likelihood of species presence: 1 = Confirmed; 2 = Likely; 3 = Possible; 4 = Unlikely*

### 6.3.4 Aquatic Habitats

#### *6.3.4.1 Proposed Wind Farm Site*

The Site is entirely located within the Upper Shannon Catchment (ID:26; Area: 604.47km$^2$). The footprint of the proposed wind farm site drains to the Owengar River. The Owengar River at the proposed wind farm site is an examples of a small 1$^{st}$ order stream with high gradients.

#### *6.3.4.2 Proposed Grid Connection Route*

The southern part of the proposed grid connection route is situated within the Upper Shannon Catchment (ID:26; Area: 604.47km$^2$). The Northern part of the proposed grid connection route is situated in the Sligo Bay Catchment (ID:35, Area: 1605.94km$^2$). the proposed grid connection route comprises 7 no. watercourse crossings, 5 of which are located within the Upper Shannon Catchment, whilst the remaining 2 are located within the Sligo Bay Catchment. The location of these watercourse crossings are shown on **Figure 6.3.**

Watercourse crossing no. 1 (WCC1) crosses a minor first order un-named stream, which eventually drains to the Diffagher River

Watercourse crossing no. 2 (WCC2) crosses a minor first order un-named stream, that is not mapped by the EPA. This stream eventually drains to the Diffagher River.

Watercourse crossing no. 3 (WCC3) crosses a minor first order un-named stream, which eventually drains to the Diffagher River.

Watercourse crossing no. 4 (WCC4) crosses a minor first order un-named stream, which eventually drains to the Diffagher River.

Watercourse crossing no. 5 (WCC5) crosses a minor first order stream, EPA Name – Boleybaun Stream, which drains to the Diffagher River.

Watercourse crossing no. 6 (WCC6) crosses a minor first order stream, EPA Name – Gortnasillagh West, which drains to the Greagh Stream (EPA Name).

Watercourse crossing no. 7 (WCC7) crosses the upper first order reach of the Greagh Greagh Stream, which drains to the Diffagher River.

Each of the above streams are already culverted by the existing public road crossings and engineering inspections of the crossings have confirmed that there is sufficient depth of material in 6 of the 7 crossings to enable the Grid Connection to be laid on top of the culverts avoiding any instream works. As crossing 1 lacks sufficient depth, the grid connection here will comprise of a short section of overhead line.

#### *6.3.4.3 Proposed Turbine Delivery Route*

No EPA mapped watercourses occur at any of the proposed turbine delivery route widening locations. A minor drainage ditch occurs at the proposed turbine delivery route widening location no. 3. The drainage ditch is representative of an ephemeral roadside drain that drains surface water runoff from the adjacent R285 to the north and agricultural land to the south, in an easterly direction towards the Arigna River.

### 6.3.5 Fisheries Habitat Survey

#### *6.3.5.1 SW1*

SW1 is located at the upper reaches of the Owengar River. The stream at this location and for the remainder of its stretch bounding the proposed wind farm site to the east and south flows through a steep V-shaped valley, with a bankfull height in excess of 4m. The steep banks are bounded by denuded shale bedrock. The stream rises approximately 1km to the west of SW1. It is subject to high variations in flows, almost drying out during periods of drought and running as a high-energy riffle during times of flood. The substrate is dominated by shale bedrock (20%), slate cobbles (60%) flat and angular in nature and small boulders (20%). Depths are shallow ranging between <0.1m to 0.4m during times of flood. Macrophytes are absent from this stretch of the channel. Bryophytes are also rarely occurring. This section of the Owengar does not provide any habitat for fish. It is too small, and the gradient is too high along this section and particularly along the stretch downstream between SW1 and SW2.

#### *6.3.5.2 SW2*

The habitat conditions at SW2 were previously surveyed in August 2019 as part of the Croagh Wind Farm planning application (Triturus, 2019). This location was again surveyed during the current Letter Wind Farm baseline surveys in September 2023. The September 2023 survey confirmed that the findings of the previous 2019 survey are still valid.

SW2 is located at a road crossing and is representative of a high-energy upland eroding small stream with cascading sequences flowing over siliceous, shale bedrock. The

meandering channel was dominated by small boulder substrata (40%) with large cobble in the form of flat and angular slate, co-dominating (30%) substrata. The slate cobble material is unstable in the stream bed and is likely subject to wash out. Smaller amounts of bedrock (10%) with greater quantities of angular coarse and medium gravel (20%) were locally present in pockets. The channel was 0.75m wide with a water and channel width of 1.0m. Overall, the channel was shallow at 0.2m deep with the deepest areas 0.3m. The stream flowed through a steep V-shaped valley with a bankfull height of 2.5-3m. The river profile was predominantly fast riffle (80%) with 10% glide and 10% pool. Above the road crossing the channel flowed over a moderate gradient before steepening considerably downstream and flowing predominantly over bedrock.



Riparian areas were composed of scattered gorse, grey willow, bramble scrub and patches of hazel woodland. The channel was heavily shaded (40%) due to overhanging trees and scrub. No macrophytes were present instream given the high energy but yellow fringe-moss and water earwort were present locally attached to instream boulders. Big shaggy-moss and common liverwort grew on muddy banks.

#### *6.3.5.3 SW3*

The habitat conditions at SW3 were previously surveyed in August 2019 as part of the Croagh Wind Farm planning application (Triturus, 2019). This location was again surveyed during the current Letter Wind Farm baseline surveys in September 2023. The September 2023 survey confirmed that the findings of the previous 2019 survey are still valid.

SW3 is located upstream of a bridge featuring two 1.5m pipe culverts, the Owengar River at SW3 was a high-energy upland eroding small river (FW1) with boulder cascade sequences over siliceous rock. Instream works including bridge repair and boulder revetments had evidently been previously completed at the site. However, a meandering semi-natural channel remained and was dominated by boulder substrata (70%) with large frequent cobble (30%). Smaller amounts of coarse and medium gravel were present in pockets under boulder and cobble. The channel was 2m wide with a 3m channel with. The depth varied between 0.2m in riffles to 0.5m in pools. Historical boulder revetment works that were very well constructed maintained sinuosity and channel form, which was broadly V-shaped with a bankfull height of 2.5m with occasional littoral exposed cobble bars on meanders (2 stage channel). The river profile was predominantly riffle (70%) with 20% glide and 10% pool.

Riparian areas were of scattered gorse, sally willow, bramble scrub with species poor wet grassland (GS4; rough pasture). The channel was quite open with limited overhanging trees. No macrophytes were present instream given the high energy nature of the site but epiphytic moss species such as yellow fringe-moss, along with the water earwort liverwort, were present locally attached to instream boulders. Localised rusty feather moss (*Brachythecium plumosum*) grew above the waterline on the bridge structure. The former species prefers rocky outcrops in fast flowing water in base poor habitats of the west. Big shaggy-moss was common higher up on the river banks.



#### *6.3.5.4 Fisheries Habitat Rating*

The habitat rating for SW1 SW2 and SW3 is provided in **Table 6.7**. This rating has been undertaken in line with the guidance outlined in Department of Agriculture's (Northern Ireland) (DANI) Fisheries Division Advisory Leaflet "*The Evaluation of Habitat for Salmon and Trout*".

**Table 6.7: Assessment of Fishery Habitat (No = Grades as per DANI Advisory Leaflet)**

| Habitat | SW1 | SW2 | SW3 |
|---|---|---|---|
| Spawning | 4 | 3 | 4 |
| Nursery | 4 | 4 | 4 |
| Holding | 4 | 4 | 4 |

A grade score of 3 to 4 for spawning, nursery and holding habitat equates to a river stretch where suitable conditions to sustain spawning, nursery or holding habitat is absent. Each of the three sites surveys are considered to be of poor salmonid habitat.

### 6.3.6 Macroinvertebrate Survey

The results of biological macroinvertebrate surveys completed at SW1, SW2 and SW3 are provided in **Table 6.8** below.

**Table 6.8: Macroinvertebrate Survey Results**

| Group | Pollution Sensitivity/tolerance | Taxon | SW1 | SW2 | SW3 |
|---|---|---|---|---|---|
| A | Pollution Sensitive | Plecoptera (except Leuctra spp.) | 5 | 4 | 2 |

| Group | Pollution Sensitivity/tolerance | Taxon | SW1 | SW2 | SW3 |
|---|---|---|---|---|---|
| | | Heptageniidae | 2 | 3 | 2 |
| B | Less Pollution Sensitive | Cased Trichoptera | 9 | | 16 |
| | | Leuctra spp. | 6 | 8 | 5 |
| | | Baetidae | 3 | 4 | 2 |
| C | Pollution Tolerant | Ephemerellidae | | 2 | 4 |
| | | Gammurus | | 12 | 8 |
| | | Uncased Trichoptera | 1 | 3 | 4 |
| | | Baetis rhodani | | 2 | 3 |
| | | Hydrobidae | 2 | | 5 |
| | | Coleoptera | | 3 | 2 |
| | | Gastropoda | | 2 | 4 |
| | | Chironomidae | | | 1 |
| D | Very Pollution tolerant | Hydracarina | | | |
| | | Asellidae | 0 | 0 | 0 |
| E | Most Pollution Tolerant | None Recorded | 0 | 0 | 0 |



The results of the macroinvertebrate survey as outlined in **Table 6.8** for SW1 recorded Group A (pollution sensitive) taxa as numerous; Group B (less pollution sensitive) taxa as dominant; Group C (relatively pollution tolerant) taxa as common. No Group D or E species were recorded. The macroinvertebrate community recorded at the Site along with the stream conditions are indicative of a **Q-value of 4-5**. This Q-value has been assigned at this Site due to the presence of at least one Group A taxa at numerous levels in the recorded sample; Group B taxa at dominated levels in the sample recorded; and Group C taxa at no more than common levels in the sample recorded. This Q-value is indicative of High-water quality.

The results of the macroinvertebrate survey as outlined in **Table 6.8** for SW2 recorded Group A (pollution sensitive) taxa as common; Group B (less pollution sensitive) taxa as numerous; Group C (relatively pollution tolerant) taxa as dominant. No Group D or E species were recorded. The macroinvertebrate community recorded at this site along with the stream conditions are indicative of a **Q-value of 4**. This Q-value has been assigned at this site due to the presence of at least one Group A taxa at more than fair levels in the recorded sample; Group B taxa at more than common levels in the sample recorded; and Group C taxa at dominant levels in the sample recorded. This Q-value is indicative of Good water quality.



The results of the macroinvertebrate survey as outlined in **Table 6.8** for SW3 recorded Group A (pollution sensitive) taxa in fair numbers; Group B (less pollution sensitive) taxa as numerous; Group C (relatively pollution tolerant) taxa as dominant. No Group D or E species were recorded. The macroinvertebrate community recorded at this site along with the stream conditions are indicative of a **Q-value of 4**. This Q-value has been assigned at this site due to the presence of at least one Group A taxa at fair levels in the recorded sample; Group B taxa at more than common levels in the sample recorded; and Group C taxa at dominant levels in the sample recorded. This Q-value is indicative of Good water quality.

### 6.3.7 White-clawed Crayfish Survey

White-clawed crayfish (*Austropotamobius pallipes*) is listed on Annex II of the EU Habitats Directive and protected under national legislation.

No white-clawed crayfish were identified during a search for this species along the two 100m sections of the Owengar River downstream of the proposed Site.

The white-clawed crayfish is associated with specific habitat conditions in Ireland. They require relatively hard water with a pH of 7 or above and a calcium concentration of at least 5mg/l (Reynolds, 1998). Due to these requirements, they are typically associated with limestone areas. With regard to instream habitat preferences white-clawed crayfish generally prefer slow-flowing glides, riffles and pools with large boulders and tend to avoid high-energy areas with fast flow rates and eroding banksides (Peay, 2003). They are sensitive to acidity and are generally restricted to lower altitude due to temperature constraints and the availability of alkaline water.

The general conditions along the Owengar River draining the Site meet the habitat requirements for white-clawed crayfish in that they are characterised by a high pH, greater

than pH 7, and a calcium concentration of greater than 5mg/l. However, the main feature of this watercourse that detracts from the likelihood of white-clawed crayfish occurring is its high flow rates. This high flow rate is likely to limit the occurrence of this species within the stretches of the Owengar River downstream of the Site. It is further noted that there are no historical records for the presence of white-clawed crayfish along the Owengar River, which has been routinely surveyed at four locations (see **Table 6.5**) above by the EPA since 1992. In addition, white-clawed crayfish surveys, completed for the Croagh Wind Farm planning application in 2019, did not record any evidence indicating the presence of this species within the Owengar River.



## 6.4 ASSESSMENT OF POTENTIAL EFFECTS

### 6.4.1 Do Nothing Impact

In the event that the Development does not proceed, lands at and in the vicinity of the Site will continue to be used for forestry and agricultural purposes. This 'do-nothing' scenario would result in no significant change to aquatic ecology and habitats within or downstream of the Site subject to the continuation of current activities and practices. The conifer plantation is managed as a commercial forest. This forest will continue to be managed as a commercial forest with harvesting occurring on maturation of the stock followed by replanting. The rotation of harvesting and replanting is likely to continue to occur in these areas of commercial forestry. In the absence of appropriate safeguards future forestry felling will have the potential to result in the loss of pollutants such as sediment and nutrients to the Owengar River catchment

### 6.4.2 Construction Phase Potential Effects

#### *6.4.2.1 Direct Effects*

##### 6.4.2.1.1 Potential Direct Effects on Designated Areas During the Construction Phase

No element of the Site permanent or temporary infrastructure is located within the boundary of any European Sites, NHAs or pNHAs. There will be no direct effects, in terms of direct habitat loss, damage or disturbance on any designated conservation areas as a result of the construction phase of the Project; the provision of the grid connection cable along the public road between the Site and the 110kV substation at Corderry; or the provision of the five widening areas along the turbine delivery route.

#### 6.4.2.1.2 Potential Direct Effects on Watercourses, Fisheries & Associated Aquatic Fauna During the Proposed Wind Farm Site Construction

The proposed wind farm will comprise 1 no. crossing of the upper Owengar River as well as the crossing of artificial drainage channels. The upper Owengar River, at the crossing point is representative of a small upland eroding stream within the wind farm site and at the crossing point. The remaining crossings at the wind farm site will comprise the crossing of artificial drainage channels.

These drainage features are artificial in nature, being representative of man-made drainage features provided for the management of waters within peatland habitats during past turbary activity. These crossings will comprise culverts. They are representative of aquatic habitat features of low ecological value and importance. Works associated with the installation of culverts along these drainage features will represent a temporary, reversible and imperceptible effect.

The crossing of the minor stream tributary of the upper Owengar River will consist of a 4m high clear span bridge and 14m wide infrastructure, with material fill required to bring the track to the elevated height. The design of the crossing eliminates the need for instream works and as such there will be no potential for direct effects to the upper Owengar River at the proposed crossing location. The potential for indirect effects to the Owengar River during the construction of the stream crossing is examined in **Section 6.4.2.2.2** below.

#### 6.4.2.1.3 Potential Direct Effects on Watercourses, Fisheries & Associated Aquatic Fauna During the Installation of the Proposed Grid Connection Route

No new watercourse crossings are required as part of the proposed grid connection route. The potential for works associated with these elements of the proposed Development, in the vicinity of watercourses and drains to result in perturbations to water quality, is considered further in **Section 6.4.2.2.3** below.

#### 6.4.2.1.4 Potential Direct Effects on Watercourses, Fisheries & Associated Aquatic Fauna During the Widening Along the Proposed Turbine Delivery Route

No new watercourse crossings are required as part of the proposed turbine delivery route widening locations. The potential for works associated with these elements of the proposed Development, in the vicinity of watercourses and drains to result in perturbations to water quality, is considered further in **Section 6.4.2.2.4.**

#### *6.4.2.2 Indirect Effects*

##### 6.4.2.2.1 Potential Indirect Effects on Designated Areas during the Construction and Decommissioning Phase



The designated conservation areas that support freshwater-dependent habitats and species that have been identified as occurring within the zone of influence of the Project and representative of key biodiversity features are:

Lough Gill SAC

Lough Forbes SAC; and

Unshin River SAC

The potential for indirect impacts to these designated conservation areas have been examined within the Screening Report for Appropriate Assessment and the NIS prepared for the project.

The Screening Report for Appropriate Assessment for the project concluded that it cannot be excluded, on the basis of objective information, that the Project, individually or in combination with other plans or projects, will not have a significant effect on freshwater dependent habitats and species of the following European Sites:

Lough Gill SAC;

Lough Forbes SAC; and

Unshin River SAC

As such, an Appropriate Assessment is required for the proposed Project and an NIS has been prepared to assist the competent authority during the completion of its Appropriate Assessment.

The NIS for the project has concluded that in light of the best scientific knowledge in the field, the project, alone or in-combination with other plans or projects, will not result in adverse effects to relevant European Sites provided all mitigation measures set out in the NIS are implemented in full. These mitigation measures have been evaluated for their effectiveness to remove the potential for adverse effects to European Sites. These measures have been found to represent effective safeguards. These findings have been reached in the absence of reasonable scientific doubt and it is concluded that the Project will not adversely affect the integrity of the relevant European Sites examined.

#### 6.4.2.2.2 Potential Indirect Effects on Watercourses, Fisheries & Associated Aquatic Fauna During the Proposed Wind Farm Site Construction and Decommissioning

The construction of a new watercourse crossing over the upper Owengar River will have an inherent risk of resulting in adverse effects to surface waters due to the required ground disturbance through excavations and the movement of heavy plant and machinery and the proximity to the primary sensitive receptor which is the watercourse itself. Release of elevated suspended solids to stream due to excavations or other earthworks etc., or the accidental release of any form of anthropogenic contaminant such as fuels or chemicals during construction of the new watercourse crossing have the potential to result in significant, medium to long-term effects.

In addition to the specific construction works associated with the Owengar River crossing, general earthworks associated with the construction phase of the Development will necessitate the denuding of surfaces. In the absence of appropriate mitigation measures such activities will have the potential to generate silt-laden runoff from the works area and for this runoff to be discharged via existing preferential surface water flow pathways and drainage channels to the Owengar River and its tributaries that drain the Site.

In the event of a peat slide event, the potential will exist for the conveyance of significant quantities of peat materials to the Owengar River and associated sub-catchment. The hazard ranking for a peat slide event at each of the infrastructure elements of the proposed wind farm has been examined in **Chapter 8: Soils and Geology**. This examination has assigned the following hazard rankings and associated risk to infrastructure element:

- T1: hazard ranking of 3 which places the turbine construction at this location in the negligible risk category.
- T2: hazard ranking of 8 which places the turbine construction at this location in the low-risk category.
- T3: hazard ranking of 8 which places the turbine construction at this location in the low-risk category.
- T4: hazard ranking of 6 which places the turbine construction at this location in the low-risk category.
- Substation 1: hazard ranking of 9 which places the substation construction at this location in the low-risk category.
- Site Track between T1 – T2: hazard ranking of 4 which places the site track construction at this location in the negligible risk category.
- Site Track between T2 – T3: hazard ranking of 6 which places the site track construction at this location in the low-risk category.

- Site Track between T3 – T4: hazard ranking of 6 which places the site track construction at this location in the low-risk category.
- Site Track between Substation – T4: hazard ranking of 9 which places the site track construction at this location in the low-risk category.



In summary, all infrastructure elements associated with the proposed wind farm will result in a negligible to low risk of a peat slide occurring. Whilst the possibility of a peat slide at the Site has been assessed to be representative of a low risk, poorly managed construction activities (including traffic movement) can increase the risk. Any peat slide or slope failure which occurs will have the potential to result in medium to long-term significant negative effects to the water quality, habitats and fisheries supported by the Owengar River. Such an event would also have the potential to undermine the significant efforts invested by the IFI in rehabilitating this watercourse and its fisheries since the 2008 landslide.

The discharge of silt-laden runoff to the Owengar River as a result of a peat slide event or poorly treated silt-laden surface water runoff will have the potential to result in significant negative impacts to invertebrates, plant life and on all life stages of salmonid fish. The negative impacts of silt-laden runoff to fish species such as salmonids include:

- The settlement of silt on spawning redds resulting in the infilling of intra-gravel voids and the smothering of eggs and newly hatched fish.
- Increase in turbidity and water colour resulting in a reduction in light penetration and perturbation to instream salmonid habitats.
- The settlement of silt on riverbeds can smother and displace macroinvertebrates, reducing the prey resource for fish species.
- Suspended solids can settle in pool and riffle habitats resulting in a reduction in the availability and quality of rearing habitat for fish.
- Silt-laden runoff can result in a reduction in transparency, impairing the ability of fish and otters to find food.

Suspended solids can abrade or clog salmonid fish gills. Whilst high concentrations of suspended solids are required to clog fish gills, small concentrations can result in abrasion to gills a create the potential for infection.

The clearance of surface peatland vegetation and the exposure of underlying peat substrate can result in the mobilisation of nutrients stored within peat substrates and the generation of nutrient-laden surface water runoff (Tuukkanen, 2017; Monteverde, 2022). In addition, the felling and clearance of forestry associated with construction works required for the

proposed turbines T1 and T2, will have the potential to result in the generation of nutrient-laden surface water runoff from the proposed turbine location. Felling of forestry in peatland catchments, such as that occurring at the proposed turbine location, has been identified as a significant potential source of nutrient leaching to watercourses (Hutton et al. 2008; Kennedy 2005; Campbell & Foy, 2008; Rodgers et al. 2008; McCarrigle, 2008).



It is further noted that the potential for nutrient mobilisation is not just associated with peat substrates and forestry removal. Inputs of suspended solids can also contribute to nutrient enrichment in receiving waters as a result of the release of nutrient bound to sediments following mobilisation (Sharpley et al., 1992; Ballantine et al. 2006). This degree to which sediment loss contributes to nutrient enrichment is dependent on the type of soil. Peat and other soils / subsoils will contribute varying degrees of loading of various compounds and nutrients, including Nitrogen (N) and Phosphorous (P) compounds, which are attributed to nutrient enrichment, or excessive loading of N and P in waters. The release of such sediment in silt-laden surface water runoff from works at the wind farm site will have the potential to contribute to nutrient inputs to receiving waters within the Owengar catchment and their conveyance downstream to Lough Allen. The lake habitat at Lough Allen, at the outfall of the Owengar River is representative of a mesotrophic lake habitat and is currently classed as being 'At Risk' (EPA, 2021). The EPA have cited excess nutrients as one of two of the most prevalent issues to the water quality and status of Lough Allen. The source of excess nutrient losses to the lake has been identified by the EPA to originate from agricultural land use. The issue related to agriculture in this catchment is diffuse phosphorus loss to surface waters from, for example, direct discharges, or runoff from yards, roadways or other compacted surfaces, or runoff from poorly draining soils. Sediment is also a problem from land drainage works, bank erosion from animal access or stream crossing, with landslides common in one river waterbody. Any further loss of nutrients to the Owengar River and downstream to Lough Allen as a result of vegetation and forestry clearance or the loss of sediment to this watercourse could combine with existing source of agricultural nutrient losses to further undermine the status of this lake habitat downstream.

The discharge of nutrient laden surface water to the Owengar River and downstream to the Lough Allen will have the potential to result in/contribute to reductions in water quality, increasing primary productivity leading to eutrophication and decreasing oxygen saturation. High oxygen levels in freshwaters are critical for all life stages of sensitive aquatic fauna such as salmonids. Such changes in water quality will have the potential to contribute towards the degradation of habitat conditions with the Owengar catchment and Lough Allen downstream and their potential to support fisheries and other species such as otters.

Plant equipment and vehicles associated with excavation, material transport, and construction activities introduce the risk of hydrocarbon (fuel and oil) spillages and leaks, particularly in relation to regular refuelling which in turn implies the requirement of a fuelling station or will be supplied by fuel tanker scheduled to refuel the plant machinery directly. Similar to suspended solids arising from excavation activities, hydrocarbons accidentally introduced to the environment will likely be intercepted by drainage and surface water networks that drain the proposed wind farm site.

Hydrocarbons are a pollutant risk due to their toxicity to all flora and fauna organisms. Hydrocarbons chemically repel water and sparingly dissolve in water. The majority of hydrocarbons are light non-aqueous phase liquids (L-NAPL's) which means that they are less dense than water and therefore float on the water's surface. Hydrocarbons adsorb ('stick') onto the majority of natural solid objects they encounter, such as vegetation, animals, and earth materials such as soil. They burn most living organic tissue, such as vegetation, due to their volatile chemistry. They are also a nutrient supply for adapted micro-organisms, which can deplete dissolved oxygen at a rapid rate and thus kill off water-based vertebrate such as salmonids and invertebrate life. Hydrocarbons are known to bioaccumulate in salmonids (e.g. McCain *et al.* 1990), with Atlantic salmon known to be physically affected by short term exposure leading to loss of condition, and also known to avoid areas containing hydrocarbons (e.g. Maynard and Weber 1981) leading to the effective loss of habitat or migration routes for the species.

Works associated with the construction and/or decommissioning phase of the proposed wind farm will have the potential to result in the accidental spillage or deposition of materials such as cementitious materials into soils and in turn impact on surface water runoff, or accidental spillages directly intercepted by drainage or surface water networks associated with the Site.

Depending on the material in question, the introduction of such materials can lead to a local change in hydrochemistry and impact on the aquatic ecology of the receiving waterbody. For example, the introduction of cementitious material (concrete / cement / lean mix etc.) can lead to changes in soil and water pH, and increased concentrations of sulphates and other constituents of concrete. Fresh or wet concrete is a much more significant hazard when compared to old or set concrete which is considered inert in comparison, however it should also be noted that any construction materials or non-natural materials deposited, even if inert, are considered contaminants.

#### 6.4.2.2.3 Potential Indirect Effects on Watercourses, Fisheries & Associated Aquatic Fauna During the Installation of the Proposed Grid Connection Route



During the installation of the proposed grid connection route along the public road, sediment runoff to surrounding and receiving waterbodies could result from:

- Excavations associated with construction of a trench along culverts and bridges over watercourses.
- Disturbance of the existing road surface followed by excavation.
- Stockpiling of soils and excavated materials.
- Run-off from the hard road surface.

A greater risk of sediment run-off would be expected during and following periods of heavy and sustained rainfall.

The proposed grid connection route and watercourse intersections all occur within streams or rivers that have high potential for salmonid populations. In the event of a potential spillage or release of plant fuel, oil or other polluting substances, this could reach important sections of rivers downstream, such as the Greagh River, Belhavel Lough and the Lough Gill catchment, and the Diffagher and Owengar Rivers and Lough Allen, with adverse impacts for the potential of these rivers and downstream lake habitats to support resident salmonids as well as other aquatic fauna. The implication of the emission of such materials to receiving waterbodies for aquatic fauna will be similar to those outlined above for the proposed wind farm, albeit the significance of the impact is predicted to be representative of a moderate effect of short to medium term duration and reversible.

#### 6.4.2.2.4 Potential Indirect Effects on Watercourses, Fisheries & Associated Aquatic Fauna During the Widening along the Proposed Turbine Delivery Route

The proposed widening works at the six no. locations along the turbine delivery route are not located within the vicinity of any watercourse or lake habitats. Each of the widening areas are buffered by over 50m from natural freshwater habitats and all, with the exception of widening location no. 3, are not connected via hydrological pathway to freshwater habitats. As such the construction works associated with the proposed turbine delivery route widening locations No. 1, 2, 4, 5, & 6 are not predicted to have the potential to result in significant negative impacts to aquatic habitats and the fauna supported by them.

A drainage ditch occurs at the proposed turbine delivery route widening location no. 3 and as such there is a risk of a loss of contaminated surface water runoff from the widening location to this drainage ditch with subsequent conveyance downstream to the Arigna River.

The implication of the emission of such materials to the Arigna River and associated aquatic fauna will be similar to those outlined above for the proposed wind farm, albeit the significance of the impact is predicted to be representative of a moderate effect of short to medium term duration and reversible.



### 6.4.3 Operation phase Potential Effects

#### *6.4.3.1 Direct Effects*

##### 6.4.3.1.1 Potential Direct Effects on Designated Areas

The potential effects of the operation phase of the Project to designated sites is set out in the accompanying NIS. The NIS has concluded that given the absence of any element of the Project within the boundary of any European Sites, NHAs or pNHAs it will not have the potential to result in direct effects.

##### 6.4.3.1.2 Potential Direct Effects on Watercourses, Fisheries & Associated Aquatic Fauna During the Operation Phase of Proposed Wind Farm Site

There is limited potential for direct effects on receiving watercourses within or bounding the proposed wind farm Site during the operational phase as no instream works or loss of natural watercourse features are planned as part of the operational phase. However, in the event that a maintenance need arises for the 1 no. watercourse crossing of the Owengar River or the culvert crossings of artificial drainage channels within the wind farm site during the operation phase, instream works may be required, and such works could result in direct effects to these watercourses. Such a direct effect upon watercourses and downstream ecology during the operational phase are considered to have the potential to be significant at the local scale.

##### 6.4.3.1.3 Potential Direct Effects: Proposed Grid Connection Route

The operation phase of the grid connection route underground and overhead electrical cables will not result in activities that will have the potential to generate pollution to surface water or watercourses. As such there will be no potential for this phase of the Project, with respect to the grid connection route and underground and overhead electrical cables, to result in direct, negative effects to watercourses and associated freshwater habitats and species.

##### 6.4.3.1.4 Potential Direct Effects: Proposed Turbine Delivery Route Location

The operation phase of the Project will not result in activities at any of the 6 no. proposed turbine delivery route widening locations that will have the potential to generate pollution to

surface water or watercourses. As such there will be no potential for this phase of the project, with respect to the widening locations, to result in direct, negative effects to watercourses and associated freshwater habitats and species.



### *6.4.3.2 Indirect Effects*

#### 6.4.3.2.1 Potential Indirect Effects on Designated Areas

The designated conservation areas that have been identified as occurring within the zone of influence of the Project and representative of key biodiversity features are:

- Lough Gill SAC;
- Lough Forbes SAC; and
- Unshin River SAC

The potential for indirect impacts to these designated conservation areas during the operation phase have been examined within the Screening Report for Appropriate Assessment and the NIS prepared for the Project.

The Screening Report for Appropriate Assessment for the project concluded that it cannot be excluded, on the basis of objective information, that the project, individually or in combination with other plans or projects, will not have a significant effect on the following European Sites:

Lough Gill SAC;
Lough Forbes SAC; and
Unshin River SAC

As such, an Appropriate Assessment is required for the Project and an NIS has been prepared to assist the competent authority during the completion of its Appropriate Assessment.

The NIS for the Project has concluded that in light of the best scientific knowledge in the field, the Project, alone or in-combination with other plans or projects, will not result in adverse effects to relevant European Sites provided all mitigation measures set out in the NIS are implemented in full. These mitigation measures have been evaluated for their effectiveness to remove the potential for adverse effects to European Sites. These measures have been found to represent effective safeguards. These findings have been reached in the absence of reasonable scientific doubt and it is concluded that the Project will not adversely affect the integrity of the relevant European Sites examined.

#### 6.4.3.2.2 Potential Indirect on Watercourses, Fisheries & Associated Aquatic Fauna During the Operation Phase of The Proposed Wind Farm



There is potential for indirect effects on watercourses during the operational phase of the proposed wind farm due to the operation of permanent site drainage. As with the construction activities sediments and hydrocarbons represent the source of risk to water quality during operation phase maintenance works. These effects are already described for the Construction and Decommissioning Phase and are also a risk in the operational phase of the proposed wind farm.

Changes in hydraulic loading will represent a potential operation phase impact of the proposed wind farm Development. Once constructed the wind farm infrastructure will have the potential to result in increased volumes of runoff during the operational phases of the wind farm relative to baseline conditions. This is a function of the progressive excavation and removal of vegetation cover and replacement with hardstanding surfaces (effectively or assumed impermeable) associated with turbine hardstands and access tracks and the installation of constructed drainage around the wind farm footprint and thus removing the hydraulic absorption/buffer control from areas of hardstand within the Site.

Water balance calculations indicate that the worst-case net increase in surface water runoff volumes will be approximately 30.06l/s/ha, or 2.61% relative to the area of the Site. This is considered an imperceptible impact representative of a non-significant impact (see **Chapter 9: Hydrology and Hydrogeology**).

Notwithstanding this, it is noted that increased runoff, or an increased hydrological response to rainfall has the potential to exacerbate flooding events and exacerbate flooding and erosion within the boundary of the Site. This in turn will have the potential to generate increased rates of suspended solids within waters draining the Site and for their conveyance downstream to the upper Shannon catchment.

Taking this into account, unmitigated, the potential for indirect effects on watercourses resulting from the operational phase is considered to be significant at the local scale. This is due to the potential for wider surface water runoff given the larger areas of hardstanding required to accommodate the proposed wind farm infrastructure.

#### 6.4.3.2.3 Potential Indirect Effects Proposed Grid Connection Route

The operation phase of the grid connection route underground and overhead electrical cables will not result in activities that will have the potential to generate pollution to surface

water or watercourses. As such there will be no potential for this phase of the Project, with respect to the grid connection route and underground and overhead electrical cables, to result in indirect, negative effects to watercourses and associated freshwater habitats and species.



#### 6.4.3.2.4 Potential Indirect Effects Proposed Turbine Delivery Route

The operation phase of the Project will not result in activities at any of the 6 no. proposed turbine delivery route widening locations that will have the potential to generate pollution to surface water or watercourses. As such there will be no potential for this phase of the Project, with respect to the widening locations, to result in indirect, negative effects to watercourses and associated freshwater habitats and species.

## 6.5 MITIGATION MEASURES AND RESIDUAL EFFECTS

### 6.5.1 Construction Phase

#### *6.5.1.1 Mitigation by Avoidance*

##### 6.5.1.1.1 Protection of Watercourses

The Project has been designed to ensure that an adequate buffer zone is provided for between this infrastructure and watercourses. In addition, the design has sought to minimise the requirement for new watercourse crossings. This has been achieved by restricting the need for a total of one new crossing of the upper Owengar River within the proposed wind farm site, and no new crossings along the proposed grid connection route or at the proposed turbine delivery route widening locations. The buffer zone implemented between all large-scale infrastructure associated with the wind farm site, such as turbines, hardstand, and access tracks has provided for a set-back of a minimum distance of 50m from any watercourses, except for where the access track crosses the Owengar River. In addition, the best practice construction measures that are described above are designed to avoid impacts on areas that are outside the site including watercourses.

A Surface Water Management Plan (**Appendix 2.1**) has been prepared for the proposed wind farm and this plan ensures the implementation of a suite of measures that will avoid negative impacts to water quality and the hydrological regime of the Owengar River.

#### *6.5.1.2 Mitigation by Design & Reduction*

##### 6.5.1.2.1 Wind farm Site Earthworks

Mitigation measures to avoid the potential for adverse impacts arising from earthworks and management of spoil will comprise:

- Management of excavated material will adhere to the measures related to the management of temporary stockpiles as set out in **Section 6.5.1.2.2** below.
- No permanent or semi-permanent stockpiles will remain on the Site during the construction, operational, or decommissioning phase of the Development. Any surplus spoil remaining at the end of the construction phase will be taken off site and disposed of at a licenced waste facility.
- Construction activities will not be carried out during periods of sustained heavy rainfall events[3], or directly after such events. This will allow sufficient time for work areas to drain excessive surface water loading and discharge rates to be reduced.
- Following heavy rainfall events, and before construction works recommence, the Site will be inspected to confirm that conditions are suitable for construction activities to recommence.
- An emergency response plan (ERP) has been prepared as part of the CEMP and SWMP (**Appendix 2.1**) for the Project, both of which are provided under separate cover as part of the planning application documentation associated with the EIAR. All measures outlined in the ERP will be implemented throughout the construction phase of the project. This plan includes for 24-hour advance meteorological forecasting linked to a trigger-response system. When a pre-determined rainfall trigger level is exceeded such as a very heavy rainfall at >25mm/hr, planned responses will be undertaken. These responses will include cessation of construction until the storm event, including storm runoff has ceased.
- Sediment fencing will be erected along proximal and paralleling areas of watercourses, such as along the upper Owengar River drainage channels occurring within the proposed Site, channels and drains spanned by the works to reduce the potential for sediment laden run-off to reach sensitive receptors.
- No direct flow paths between stockpiles and watercourses will be permitted at the Site.
- Excavated material will be backfilled and transported to the spoil storage area as soon as is reasonably practicable to prevent long duration storage at the Site which increases the risk of adverse effects on aquatic environments.
- All mitigation measures related to surface water quality will be implemented before excavation works commence.

[3] As per the Met Office National Meteorological Library and Archive Fact Sheet 3 – Water in the atmosphere (Met Office, 2012) a heavy rainfall event for: rain (other than in showers) is assigned to an event where rates of accumulation are greater than 4mm/hour; and for rain showers is assigned to an event where rates of accumulation are >10mm/hour.

#### 6.5.1.2.2 Temporary Stockpile Management for Wind Farm Site Works



Whenever possible, soil and rock will be re-used on the Site immediately, thereby reducing the need for double handling, which will also reduce the requirement to stockpile soils. Generally excavated rock will be used immediately for Site Access Track construction. Whenever possible stockpiles will be avoided. Where stockpiling is required, it will be stored in the designated temporary spoil stockpile area. Temporary stockpile locations will be situated outside of Surface Water Buffer Zones. Silt fencing is to be erected around the base of the temporary mound. Soil will be reinstated on completion of drilling and jointing operations. Temporary storage areas will require bunding and management of runoff likely contaminated with suspended solids.

#### 6.5.1.2.3 Excavation Requirements for the Proposed Grid Connection Route

The following mitigation measures will be implemented during excavations for the proposed grid connection route:

- The timing of grid connection cable laying will be carried out during metrologically dry seasons/periods.
- An Ecological Clerk of Works (ECoW) will be onsite in order to lessen environmental disruption and confirm site integrity is maintained. The ECoW will also be responsible for routine environmental monitoring and report writing.
- Excavated material will be temporarily stockpiled adjacent to the section of trench, with appropriate material used as backfill.
- Excess/unsuitable material will be immediately removed and disposed of at a licenced waste disposal facility.
- Appropriate siltation measures, as per the measures set out in the subsequent sections below will be put in place prior to excavations.
- Stockpiles will be temporarily stored a minimum of 25m back from rivers/streams on level ground with a silt barrier installed at the base.

For all grid connection trenching along the local road, any unsuitable backfill material excavated will be immediately taken away from the works area in trucks and disposed of under license to an authorised waste disposal facility. This will prevent any contaminated run-off to roadside drains during heavy rainfall.

#### 6.5.1.2.4 Excavation Dewatering Requirements for the Wind Farm Site

The following mitigation measures will be implemented for dewatering activities at the Site:

- Areas of subsoils to be excavated will be drained ahead of excavation works. This will reduce the volumes of water encountered during excavation works and will therefore reduce the volume of water that is required to be dewatered whilst excavations are being carried out.
- Engineered drainage and attenuation features outlined in the Surface Water Management Plan (**Appendix 2.1**) will be established ahead of excavation works.
- Dewatering pumping rates will be controlled by an inline gate valve or similar infrastructure which will facilitate a reduction of loading on the receiving environment, thus enhancing the attenuation and settlement of suspended solids.
- The direct discharge of dewatered loads to surface waters will not be permitted under any circumstances.
- All dewatering will follow a strict procedure of pumping to a settlement tank and then to a dewatering bag, or settlement ponds prior to discharging to receiving environment for overland flow.
- Geofabric lined settlement ponds will buffer the run-off discharging from the drainage system which will reduce the hydraulic loading to watercourses. Settlement ponds will be designed to reduce flow velocity to 0.3 m/s at which velocity silt settlement generally occurs. In areas of the Site where the placement of settlement ponds is not feasible, other mitigation measures described below will be implemented.
- Check Dams will be constructed across drains and will reduce the velocity of run-off which will, in turn, promote settlement of solids upstream of potential surface water receivers. An additional benefit of check dams is that they will reduce the potential for erosion of drains. Rock filter bunds may be used for check dams, wood or hay bales can also be used if properly anchored. It is recommended that multiple check dams are installed, particularly in areas immediately down gradient of construction areas.
- Overland flow paths of the final dewatered discharge will be maximised to the greatest practical extent to avoid prematurely draining to drainage channels or surface waters. This approach will allow for enhanced settling out of suspended solids entrained in the run-off.
- All pumps, tanks, settlement ponds, dewatering bags and check dams used in the dewatering process will be regularly inspected and maintained as necessary to ensure surface water run-off is appropriately treated.
- Sediment fencing will be installed up gradient of water courses which may receive the final overland flow.
- The final treated dewatered discharge will be directed towards heavily vegetated areas to allow for further natural filtration of suspended solids.

- A programme of water quality monitoring will be implemented during the construction phase which is outlined in detail in CEMP (**Appendix 2.1**).
- No extracted or pumped water will be discharged directly to the surface water network associated with the Site (this is in accordance with Local Government (Water Pollution) Act 1977 as amended).
- Any discharges of sediment treated water will meet the requirements of the Surface Water Regulations 2009, as amended.



#### *6.5.1.3 Watercourse Crossings*

##### 6.5.1.3.1 Wind Farm Site

At the wind farm site, one new watercourse crossing will be constructed. The required crossing will be a crossing of a small stream that is representative of the headwater of the Owengar River. The following measures provide for the planning and consideration of this watercourse as part of the overall approach to watercourse crossing to ensure potential impacts are adequately mitigated.

- The design of the proposed crossing and a method statement for the proposed construction will be agreed in advance with Inland Fisheries Ireland (IFI).
- Crossings have been designed to minimise, in so far as practical, the disturbance or alteration of water flow, erosion and sedimentation patterns and rates.
- Vehicles and plant used in the construction of the proposed crossing will only be refuelled at the Site's bunded and designated refuelling area, no refuelling will be permitted within 50m of any watercourse at the Site.
- To mitigate against the potential risk of accidental leaks or spillages from plant and equipment, the following measures will be implemented: Multiple spill kits will be maintained on the Site at all times within the cabs of vehicles and placed strategically at environmentally sensitive locations across the Site. Spill kits will be routinely inspected to ensure that they are fully stocked with oil absorbent booms and pads at all times. Oil absorbent booms will be installed downstream of channel crossing work areas within 25m of the works location prior to the commencement of works.

#### *6.5.1.4 Proposed Grid Connection Route*

The proposed grid connection route includes the crossing of 7 no watercourses. The crossings will be via existing bridge formation with one short section of overhead line.

The following mitigation measures will be implemented during the installation of the grid connection route over the existing bridge formation:

- Excavated road and soil will be stored in an area at least 10m from the crossing structure and watercourse, and preferably down gradient of the watercourse crossing but up-gradient of the excavated trench so that, after rainfall, material in run-off is contained in the trench.
- Silt fencing and silt capture structures such as straw bales will be deployed along either side of a watercourse crossing beyond the full width of the pipe, culvert or bridge structure. Silt fencing will be installed so that the wooden posts and attached fence is buried at least 300mm below the surface of road-side vegetation.
- Gullies that lead directly to a watercourse either side of a structure are key pathways for run-off conveyance, and these will be blocked to ensure that the direction of potential run-off is conveyed to vegetated verges to allow for infiltration and trapping.
- A pre-emptive site drainage management plan will be applied to take account of predicted rainfall so that large excavations adjacent to watercourse crossing can be suspended or scaled back when heavy rain is forecast.



These measures will prevent the run-off of excess sediments via the key watercourses intersecting the cable route to key adjoining downstream watercourses that connect the crossing points to watercourse and sensitive rivers and lakes downstream such as the Greagh River, Diffagher River, Owengar River, Belhavel Lough, Lough Gill and Lough Allen. The mitigation measures also will apply to any small drains that represent a pathway for conveyance of sediment to watercourses to these waterbodies.

#### 6.5.1.4.1 Release & Transport of Suspended Solids

The following mitigation measures will be implemented at the wind farm site during the construction and decommissioning phase to prevent the release and transport of silt-laden surface water runoff:

- Collector drains and soil berms will be implemented to direct and divert surface water runoff from construction areas such as temporary stockpiles into established settlement ponds, buffered discharge points and other surface water runoff control infrastructure. This planning and placement of these control measures will be of fundamental importance, especially for the areas where works within the 50m buffer zone of surface waters and significant drainage features.
- Sediment control fences will be implemented significantly upgradient of potential receiving waters and as part of the drainage network. Sediment control fences will also be established upgradient of the Site's pre-existing natural and artificial drains in addition to degraded areas of peat that are likely to receive surface water runoff. This

practice will reduce the potential for elevated suspended solids entrained in surface water runoff to discharge to surface waters.



- Multiple silt fences will be used in drains discharging to the surface water network. This will be especially important for the areas where works occur within the 50m buffer zone of surface waters and significant drainage features.
- A dedicated silt fence will be established along all sections of the wind farm access track that are within the 50m buffer zone of the Owengar River and all other small streams or drainage channels occurring at the wind farm site.
- The drainage, attenuation and other surface water runoff management systems will be installed prior to the commencement of construction activities. Whenever possible, drainage and attenuation control measures will be installed during seasonally dry conditions to limit the potential for sediment laden run-off to discharge to surface waters during the installation of these measures.
- Surface water runoff will be discharged to land via buffered drainage outfalls that will contain hardcore material of similar composition to the geology of the bedrock at the Site. This mitigation measure will promote the capture and retention of suspended sediment.
- Buffered drainage outfalls also promote sediment percolation through vegetation in the buffer zone, reducing sediment loading to adjacent watercourses and avoiding direct discharge to the watercourse.
- Buffered drainage outfalls will be placed outside of the 50m buffer zone and will not be positioned in areas with extensive erosion and degradation.
- A high number of discharge points will be established to decrease the loading on any one particular outfall. Discharging at regular intervals mimics the natural hydrology by encouraging percolation and by decreasing individual hydraulic loadings from discharge points.
- A CEMP (**Appendix 2.1**) has been developed which will mandate regular inspections and maintenance of pollution control measures. Contingency measures outlining urgent protocols to repair or backup any breaches of designed mitigation measures are also incorporated into the CEMP.
- In the event that mitigation measures are failing to reduce suspended solids to acceptable levels, construction works will cease until remediation works are completed.
- Fine solids or colloidal particles are very slow to settle out of waters. Therefore, coagulant or flocculant will be used as appropriate to promote the settlement of finer solids prior to discharging to surface water networks. Flocculant gel blocks can be placed in drainage channels. These are passive systems that are self-dosing, self-

limiting and are environmentally friendly. Flocculant gel blocks bind elevated levels of silt and associated contaminants into masses that are easily separated, captured and then removed from the water.

- Surface water runoff controls will be checked and maintained on a daily basis. Check dams and settlement ponds will be maintained and emptied prior to the build-up of excessive sediment. The frequency of maintenance and emptying will be dictated by levels of sediment accumulation.



The adoption of precautionary principles and the implementation of mitigation measures listed above will ensure that the risk of elevated suspended solids to surface waters is low. This in turn will ensure that potential risks to sensitive receptors is also low. Nevertheless, should a significant discharge of suspended solids to surface waters occur, the absence of immediate proximity to designated sites and the assimilative capacity of the localised surface waters will act as a natural hydrological buffer in terms of suspended solids loading. Should such a discharge occur, the dilution and retention time of suspended solids in the localised surface water network will reduce potential impacts on highly sensitive downstream designated sites. It should be noted that this natural mitigation measure is not to be adopted as a first principle and will not be relied upon to prevent adverse impacts on designated sites.

A detailed design of required drainage, collector drainage, stilling ponds and other listed mitigation infrastructure is contained in the Surface Water Management Plan contained in the CEMP (**Appendix 2.1**).

#### 6.5.1.4.2 Release of Hydrocarbons

The following mitigation measures will be implemented during all construction and decommissioning phase works for the proposed development to prevent the release and transport of hydrocarbons to receiving surface waters:

- Refuelling of vehicles will be carried out off site to the greatest practical extent. This refuelling policy will mitigate the potential for impacts by avoidance. Due to the remote location nature of the Site, it is unlikely that implementation of this refuelling policy will be practical in all circumstances. In instances where refuelling of vehicles on Site is unavoidable, a designated and controlled refuelling area will be established at the Site. The designated refuelling area will enable low risk refuelling and storage practices to be carried out during the works. The designated refuelling area will contain the following attributes and mitigation measures as a minimum requirement:

- The designated refuelling area will be located a minimum distance of 50m from any surface waters or Site drainage features.
- The designated refuelling area will be bunded to 110% volume capacity of fuels stored at the Site.
- The bunded area will be drained by an oil interceptor that will be controlled by a pent stock valve that will be opened to discharge storm water from the bund.
- Management and maintenance of the oil interceptor and associated drainage will be carried out by a suitably licensed contractor on a regular basis.
- Any oil contaminated water will be disposed of at an appropriate oil recovery plant or licensed tip site.
- Any minor spillage during this process will be cleaned up immediately.
- Vehicles will not be left unattended whilst refuelling.
- All machinery will be checked regularly for any leaks or signs of wear and tear.
- Containers will be properly secured to prevent unauthorised access and misuse. An effective spillage procedure will be put in place with all staff properly briefed. Any waste oils or hydraulic fluids will be collected, stored in appropriate containers and disposed of offsite in an appropriate manner.

Notwithstanding the management of refuelling and fuel storage at the designated refuelling area, the potential risk of hydrocarbon spills from plant and equipment or other general chemical spills at other areas of the Site remains. To mitigate against potential spills at other areas of the Site, the following mitigation measures will be implemented:

- Oil absorbent booms and spill kits will be available adjacent to all surface water features associated with the Development. The controls will be positioned downstream of each construction area and at principal surface water drainage features. Oil booms deployed will have sufficient absorbency relative to the potential hazard.
- Spill kits will also be available at construction areas such as at turbine erection locations, the temporary site compound, on-site substation, spoils storage areas and met mast location etc.
- Spill kits will contain a minimum of oil absorbent pads, oil absorbent booms, oil absorbent granules, and heavy-duty refuse bags for collection and appropriate disposal of contaminated matter.
- Should an accidental spill occur during the construction or operational phase of the Development, such incidents will be addressed immediately. This will include the cessation of works in the area of the spillage until the issue has been resolved.

- Spill kits will be kept in each vehicle at the Site and will be readily available to all operators.
- No materials contaminated or otherwise will be left on the Site.
- Suitable receptacles for hydrocarbon contaminated materials will also be available at the Site.
- A detailed spill response plan is provided as part of the CEMP (**Appendix 2.1**).



Implementation of the above mitigation measures will significantly reduce the risk of hydrocarbon contamination being released to the surface water network. Nevertheless, the potential risk cannot be entirely eradicated. Therefore, precautionary measures and emergency response protocols have been prepared and are provided as part of the CEMP.

#### *6.5.1.5 Release of Cementitious Materials*

The following mitigation measures will be implemented during all construction and decommissioning phase works for the proposed Development to prevent the release and transport of cementitious material to receiving surface waters:

- The procurement, transport and use of any cement or concrete will be planned fully in advance and supervised by appropriately qualified personnel at all times.
- Vehicles transporting cement or concrete to the Site will be visually inspected for signs of excess cementitious material prior to being granted access to the Site. This will prevent the likelihood of cementitious material being accidentally deposited on the Site Access Tracks or elsewhere at the Site.
- Drivers of such vehicles will be instructed to ensure that all vehicles are washed down in a controlled environment prior to the departure of the source site, such as at concrete batching plants.
- Precast concrete will be used wherever possible. However, the use of pre-cast concrete is not viable option for large structures such as Turbine foundations and so concrete will be delivered to the Site.
- Concrete will not be poured during periods of rainfall or if any kind of precipitation is forecast. This policy will limit the potential for freshly poured concrete to adversely impact on surface water runoff.
- Raw or uncured waste concrete will be disposed of by removal from the Site.
- Washout of concrete trucks shall be strictly confined to the batching facility and shall not be located within the vicinity of watercourses or drainage channels. Only the chutes will be cleaned prior to departure from Site and this will take place at a designated area at the Temporary Site Compound.

- Spill kits will be readily available to Site personnel, and any spillages or deposits will be cleaned up as soon as possible and disposed of appropriately.
- Pouring of concrete into standing water within excavations will be avoided.
- Excavations will be prepared before pouring of concrete by pumping standing water out of excavations to the buffered surface water discharge systems in place.
- Any surplus concrete will not be stored or deposited anywhere on Site and will be returned to the source location or disposed of appropriately at a suitably licensed facility.
- Any required shuttering installed to contain the concrete during pouring will be fully secured around its perimeter to minimise any potential for leaks.



#### 6.5.1.5.1 Proposed Turbine Delivery Route Widening Locations

A drainage ditch has been identified as present adjacent to the proposed turbine delivery route widening location no. 3 along the R285 regional road. The drainage ditch is ephemeral in nature but is nonetheless connected to the Arigna River and could function as a pathway for the conveyance of contaminated surface water runoff, should it be generated at the widening location, downstream to the Arigna River.

All relevant mitigation measures set out above with respect to the control and treatment of surface water runoff for suspended solids, hydrocarbons and cementitious materials will be implemented in full, wherever applicable, during the construction works associated with the widening at the TDR widening location n. 3.

Management of spoil arising at the widening locations will be undertaken in accordance with the approach to spoil management measures set out above for the wind farm site and grid connection route, as applicable to the widening location.

### *6.5.1.6 Water Quality Monitoring*

The following water quality monitoring will be implemented to mitigate against potential impacts on the surface water receiving environment:

- A programme of water quality monitoring outlining the selected parameters and monitoring frequency will be agreed with Inland Fisheries Ireland and Leitrim County Council prior to the commencement of construction.
- In order to assist in the detection of any deviations from the baseline hydrochemistry conditions at the Site, regular periodic monitoring of the Site's surface waters will be carried out prior to and during construction.

- It is proposed that a programme of operational phase water quality monitoring is also implemented at a monitoring frequency agreed with Leitrim County Council in order to aid the detection of any potential operational phase impacts on surface water quality.
- As a minimum requirement, field measured parameters such as pH, conductivity, total dissolved solids (TDS), temperature, dissolved oxygen (DO) and turbidity will be included in the water quality monitoring programme. The results will be compared to the applicable EQS to determine if adverse impacts on water quality are occurring.
- Water quality will be monitored for trace metal concentrations prior to, during and after the construction phase.
- Water quality monitoring locations will include both upstream and downstream points relative to the works locations. The locations of the water quality monitoring points will be flexible and will be moved as the construction phase progresses so that monitoring points remain representative of the most likely construction impact receptor points.
- The watercourses within and adjacent to the proposed spoil storage area will be included within the water quality monitoring programme.
- The downstream monitoring locations will be positioned as close as possible downstream of the works location, and another positioned further downstream. This approach will allow for an assessment of the dilution of potential contaminations (if present) as the distance from the point of diffuse source location increases.
- Watercourses which do not have year-round flows such as artificial drains, ditches or ephemeral streams will be avoided as water quality monitoring locations.
- During the construction phase, daily visual inspections of excavations, dewatering procedure, settlement ponds, silt traps, buffered outfalls and drainage channels etc. will be carried out by a suitably qualified person. Any excess build-up of sediment at settlement ponds, drains or at any other drainage features that may decrease the effectiveness of the drainage feature will be promptly removed.
- During the construction phase of the Development, all development areas will be monitored on a daily basis for evidence of groundwater seepage, water ponding and wetting of previously dry spots.
- Following the completion of the construction phase, inspection of silt traps, buffered outfalls and drainage channels will be periodically inspected during maintenance visits to the Site when the operational phase water quality monitoring will also be carried out.
- The proposed watercourse crossings discussed above will be monitored daily during construction and during each Site visit during the operational phase. The watercourse

crossings will be monitored in terms of their impacts (if any) on the receiving watercourses and in terms of their structural integrity to identify any signs of erosion or potential for sediment release.

- It is proposed that a handheld turbidity meter is available at the Site to accurately measure the quality of water discharging from the Site. The meter will be maintained and calibrated frequently.
- A detailed inspection and monitoring regime to be agreed with Inland Fisheries Ireland and Leitrim County Council will be included in the CEMP (**Appendix 2.1**).
- Any discharges of sediment treated water will meet the requirements of the Surface Water Regulations 2009, as amended.



#### *6.5.1.7 Emergency Response*

Mitigation measures outlined in the previous sections of this chapter will significantly reduce the potential for contamination of surface water or groundwater associated with the Project. Nevertheless, as is the case with all construction projects, a risk of accidental chemical spillages, sediment overloading of control measures or leaks of contaminants from plant or equipment remains a possibility. Emergency response procedures to potential contamination incidents have been prepared as part of the CEMP and will be implemented at the Site prior to the commencement of the construction phase. The following is a non-exhaustive list of potential emergencies and respective emergency responses:

- Spill or leak of hazardous substances (less than 20 litres);
  - All spill incidents will be dealt with immediately as they arise.
  - Spill kits will be prepared and available in vehicles associated with the construction phase of the Project.
  - Spill kits will also be prepared and made available at primary work areas such as at proposed turbine, hardstand, substation, met mast and construction compound locations.
  - Disposal receptacles for hydrocarbon contaminated materials will also be available at the Site.

- Major spill of hazardous or toxic substance off Site or to environmentally sensitive areas:
  - Immediate escalation measures will be implemented for all major spill events.
  - Escalation measures may include installation of temporary sumps or drains to control the flow or migration of hydrocarbons or other chemicals.

- Attempts to be made to limit or contain the spill using sandbags to construct a bund wall, use of absorbent material, temporary sealing of cracks or leaks in containers, use of geotextile or silt fencing to contain the spill.
- Excavation and disposal of contaminated material will be immediately carried out following any such incidents.
- Evacuation procedures will be implemented to remove non-essential personnel from the area.
- Data gathering and an investigation will commence immediately after the emergency is contained.
- If a significant hydrocarbon spillage does occur, the contractor on behalf of the developer will have an approved and certified clean-up consultancy available on 24-hour notice to contain and clean-up the spill.
- All major spills of this nature will be reported to Leitrim County Council immediately following such instances.

- Flooding of low-lying areas of the Site:
  - Immediately remove all chemicals, fuels and other hazardous substances from low lying areas of the Site
  - Immediately remove plant and equipment from low lying areas
  - Recover materials washed from Site including sediment and other waste.
  - Review and address the potential for excess water entering the Site.
  - Review and maintain erosion and sedimentation controls.

- Spills of cementitious material:
  - Cement / concrete contamination incidents will be cleaned up immediately as they arise.
  - Spill kits will also be established at key construction areas, and they will also be readily available in the cabs of plant and equipment.
  - Suitable receptacles for cementitious materials will also be available at the Site.

### 6.5.2 Operational Phase

#### *6.5.2.1 Protection of Watercourses*

The following measures are required in order to ensure the ongoing protection of watercourses:

- Re-seeding / re-vegetation of all areas of bare ground or the placement of Geo-jute (or similar) matting will take place as practically possible at the start of the operational phase to prevent run-off.

- Silt traps erected during the construction phase within roadside and artificial drainage will be replaced with stone check dams for the lifetime of the Project. These stone check dams will only be placed within artificial drainage systems such as roadside drains and not natural streams or ditches.
- A full review of construction stage temporary drainage will be undertaken by the Developer (in conjunction with the Project Hydrologist/ Site Engineer and the Project Ecologist) following the completion of construction, and drainage removed or appropriately blocked where this will not interfere with infrastructure.
- The operational phase compound / office must house all chemicals within a secure bunded COSSH (Control of Substances Hazardous to Health) store for the operational phase of the project.



#### *6.5.2.2 Hydraulic Loading During the Operational Phase*

The proposed wind farm will lead to an increase in impermeable surface area through the construction of hard stand areas within the Site. This in turn will lead to an increase in hydraulic loading by surface water runoff. However, water balance calculations indicate that the worst-case net increase in surface water runoff volumes will be approximately 30.06l/s/ha, or 2.61% relative to the area of the Site. Therefore, this is considered an imperceptible impact representative of a non-significant impact.

As a consequence of the estimated low significance of the impact of hydraulic loading during the operational phase and in light of the issues relating to increases in hydraulic loading as set out in **Section 6.4.3.2.2** above, mitigation measures to facilitate a reduction in surface water runoff are limited to ensuring that pre-existing and newly established drainage infrastructure is sufficiently maintained for the discharge rates associated with all areas of the Site. Once identified, any and all blockages which may adversely impact upon the drainage regime at the Site will be immediately removed during the operational phase of the proposed Development. No other additional impacts are anticipated during the operational phase of the Development.

### 6.5.3 Decommissioning Phase

The decommissioning phase of the Project will result in the removal of Site infrastructure such as wind turbines and the Met Mast etc. No new additional mitigation measures, over and above those proposed for the construction phase, which will also be required to be implemented during decommissioning, are required for the decommissioning phase of the Development. The decommissioning phase and associated removal of major infrastructure

components is anticipated to result in similar potential risks to surface water as those that will be encountered during the construction phase of the Development.



The excavation of greenfield land is not expected to be required during the decommissioning phase. In addition, the movement of plant, vehicles and equipment is not expected to be required during the decommissioning phase since all of the Development's hardstand areas will be pre-existing by the time the decommissioning phase is being carried out. As a result, the risk of elevated suspended solids being discharged in surface water run-off to the downstream receiving environmental is expected to be low. However, the potential risk remains for spills of fuels hazardous chemicals which is a common risk to all developments. The mitigation measures outlined in this chapter will be implemented during the decommissioning phase to reduce the potential for such impacts to an insignificant level.

### 6.5.4 Cumulative Effects

#### *6.5.4.1 Interaction with Other Projects*

A search of Leitrim County Council planning portal was completed in October 2023 to identify any other projects in the area surrounding the proposed wind farm site, along the proposed grid connection route and in the vicinity of the proposed TDR widening locations. In terms of other projects in the vicinity of the proposed wind farm site, there are no other recently (i.e. within the last 5 years) consented or applied for planning applications for the wider area surrounding the wind farm site.

One recent planning application, Planning Reference No. 21152, has been identified along the proposed grid connection route. This planning application is located in the townland of Cloonagh, approximately 200m to the east of the Corderry Substation. This planning application relates to the development of a new slatted shed together with all associated site works. This project is representative of a small-scale project that is not located adjacent to an EPA mapped watercourse. In terms of environmental assessments, it is noted that a screening for Appropriate Assessment for this project was completed by the Planning Authority and it was determined that this project, alone or in-combination with other plans or projects, would not have the potential to result in likely significant effects to European Sites. It is considered that this determination was informed by an absence of potential impacts to surface waters and functional hydrological impact pathways between this project and European Sites. In light of this, the current project will not have the potential to combine with this project to result in cumulative negative effects to the aquatic environment.

A search the Roscommon County Council planning portal was completed in October 2023 to identify the presence of any other recent (i.e. within the last 5 years) planning applications for the wider area surrounding the TDR widening locations no. 1, 2 and 3. No planning applications were identified in the vicinity of these three locations.



A search the Leitrim County Council planning portal was completed in October 2023 to identify the presence of any other recent (i.e. within the last 5 years) planning applications for the wider area surrounding the TDR widening locations no. 4, 5 and 6. No planning applications were identified in the vicinity of these three locations.

#### *6.5.4.2 Interaction with Harvesting of Conifer Plantation*

The existing stands of conifers within and surrounding the site do not appear to be negatively affecting water quality through acidification or excessive nutrients. **Chapter 9: Hydrology and Hydrogeology** of the EIAR documents low nutrient levels in the watercourses surrounding the site, whilst good to high water quality for the receiving Owengar River has been documented in this Chapter.

Furthermore, there are no proposals in place to fell conifer plantation remaining within the project site during the construction phase of the Project. As such no overlap between the construction phase of the Project and felling operations associated with remaining and adjacent conifer plantation is expected to occur.

Given that the operation phase of the project is not predicted to pose a significant risk to the aquatic environment, there will be no potential for this phase of the project to interact with any future forestry felling works, likely to overlap with this phase, to result in cumulative negative effects.

## 6.6 RESIDUAL EFFECTS

The direct and indirect effects of the project to aquatic ecological receptors have been set out in **Section 6.4** above. In the absence of mitigation measures the Project will have the potential to result in significant negative effects to sensitive aquatic receptors that include instream habitats, water quality and fisheries. Such effects will have the potential to arise as a result of the construction of a new watercourse crossing at the proposed wind farm site and as a result of general construction works required for the construction of the wind farm, the installation of the proposed grid connection route and the provision of the proposed turbine delivery route widening locations. Appropriate safeguards are required to avoid effects of sediment loss or other contaminants entering receiving waterbodies.

The mitigation measures set out in this Chapter, **Chapter 8: Soils and Geology** and **Chapter 9: Hydrology and Hydrogeology**, as well as the CEMP and the SWMP (provided as **Appendix 2.1** to this EIAR) will provide the appropriate measures to safeguard against a deterioration in water quality during the construction, operation, and decommissioning phase of the Project. Subject to the full implementation of these measures, which will be a requirement for each of the above phases of the Project, the potential for a significant risk of a deterioration in water quality, aquatic habitats and fisheries will be avoided.

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