

## 6 FLORA AND FAUNA. BIODIVERSITY

### 6.1 Introduction

This chapter assesses the likely significant effects that the proposed wind farm development (the 'Proposed Development') may have on Flora and Fauna (and biodiversity) and mitigates any potential effects that are identified. Particular attention has been paid to species and habitats of ecological importance. These include species and habitats with national and international protection under the Wildlife Acts 1976-2012 the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) and the EU Birds Directive 2009/147/EC and EU Habitats Directive 2009/147/EC, 92/43/EC Habitats Directive among other relevant legislation. Impacts on bird species are assessed in the Ornithology chapter of this EIAR. Where potential effects are identified, mitigation is prescribed and residual impacts on flora and fauna are assessed.

Between 2013 and 2017, a range of specialist ecological survey work has been undertaken to provide comprehensive information on all ecological aspects of the location of the Proposed Development and the surrounding area. These surveys included detailed assessment of the site in terms of protected habitats and species. Aquatic assessments, bat surveys, mammal surveys (including Otter and Badger) and protected flora surveys were all undertaken. The studies and survey work undertaken provide a comprehensive inventory of the flora and fauna of the study area.

The chapter is structured as follows:

- The Introduction provides a description of the legislation, guidance and policy context regarding Flora and Fauna.
- This is followed by a comprehensive description of ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
- A description of the Baseline Ecological Conditions and Receptor Evaluation is then provided.
- This is followed by an assessment of effects which are described with regard to each phase of the development: construction phase, operational phase and decommissioning. Potential Cumulative effects in combination with other plans and projects is fully assessed.
- Proposed mitigation and best practice measures to ameliorate the identified effects are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- The conclusion provides a summary statement on the overall significance of predicted effects on Ecology.

Potential for likely significant effects on birds is addressed separately, in Chapter 7 of this EIAR. A full description of the proposed project and all proposed works is presented in Chapter 4 of this EIAR.

The following is a glossary to the technical terms used in this chapter:

- For the purposes of this EIAR, where the 'Proposed Development site' or 'the site' is referred to, this relates to the primary study area for the Proposed

Development, as delineated in green on the EIAR figures (maps). 'Development Footprint' refers to the narrower construction envelope surrounding the final design of the development.

- 'Key Ecological Receptor' (KER) is defined as a species or habitat occurring within the zone of influence of the development upon which likely significant effects are anticipated.
- "Zones of Influence" (ZOI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZOIs differ depending on the sensitivities of particular habitats and species and were assigned following best available guidance and adopting a precautionary approach

### 6.1.1 Legislation, Guidance and Policy Context

This /EIAR is prepared in accordance with the requirements of the 2011 EIA Directive as amended by EIA Directive 2014/52/EU.

The following is the key legislation applicable in respect of habitats and fauna in Ireland:

- Irish Wildlife Act 1976 to 2012
- The European Communities (Birds and Natural Habitats) Regulations 2011 (transposes EU Birds Directive 2009/147/EC and EU Habitats Directive 2009/147/EC, 92/43/EC)
- The EU Water Framework Directive (2000/60/EC)

The following legislation applies with respect to Invasive alien species:

- Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011) (as amended).

The guidelines listed below were consulted in the preparation of this document to provide the scope, structure and content of the assessment. They are among the recognised guidance in Environmental Impact Assessment and National Road Scheme assessments.

- *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal* (CIEEM, 2016).
- *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009a).
- EPA (2017). *Draft revised guidelines on the information to be contained in Environmental Impact Statements*. Environmental Protection Agency
- *Advice Notes on Current Practice (in preparation of Environmental Impact Statements)* (Environmental Protection Agency (EPA), 2003) (where relevant).
- *Guidelines on the information to be contained in Environmental Impact Statements* (EPA, 2002) (where relevant).
- *Draft Revised guidelines on the information to be contained in Environmental Impact Statements* (EPA, 2015) (where relevant).
- *Environmental Impact Assessment of National Road Schemes –A Practical Guide* (NRA, 2009b).
- *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009c). (referred to hereafter as the NRA Ecological Impact Assessment Guidelines)
- *Environmental Assessment and Construction Guidelines* (NRA, 2006).

This assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

- Planning and Development Acts 2000 - 2017
- Donegal County Council (2014). Donegal County Development Plan 2012 – 2018. Natura Impact Report, Donegal County Council, (2012).
- DoEHLG (2013). *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment*. Department of the Environment, Community and Local Government (where relevant).
- European Commission (2011). *Wind energy development and Natura 2000*. Guidance document.
- European Commission (2002). *Assessment of plans and projects significantly affecting Natura 2000 sites*.

### **6.1.2 Statement of Authority and Competence**

The survey work was carried out by the following ecologists:

- Habitats, botany, terrestrial mammals: Dr. Chris Peppiatt, Mr. John Hynes, Ms. Laoise Kelly, Ms Kim O’Meara, Dr. John Staunton and Mr. Nick Duff.
- Freshwater ecology, invertebrates: Mr. John Hynes, Dr. Chris Peppiatt, Ms. Danielle Aherne B.Sc. (Hons), MRes.
- Electrofishing, fisheries assessment: Paul Johnston Associates.

Bats: Mr. John Curtin, Mr. John Hynes, Ms. Laoise Kelly & Dr. Una Nealon. All the above surveyors are competent experts for the purposes of the conduct of survey used in the preparation of this EIAR

This EIAR chapter has been prepared by John Hynes (B.Sc.) and David McNicholas (BSc, MSc, MCIEEM) who each have over six years’ experience in ecological assessment and the preparation of EIAR Flora & Fauna chapters and reviewed by Pat Roberts (B.Sc. Environmental Science, MCIEEM) who has over 12 years’ experience in management and ecological assessment and are competent experts for the purposes of the preparation of this EIAR.

## **6.2 Methodology**

### **6.2.1 Desk Study**

The desk study undertaken for this assessment included a thorough review of available ecological data including the following:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Teagasc, EPA (Envision), Water Framework Directive (WFD), Geological Survey of Ireland (GSI) & Inland Fisheries Ireland (IFI).
- Review of the Bat Conservation Ireland (BCI) Private Database
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper
- Inland Fisheries Ireland (IFI) Reports
- Records from the National Parks and Wildlife Services (‘NPWS’) WS web-mapper and review of specially requested records from the NPWS Rare and Protected Species Database for the hectads in which the Proposed Development is located.

## 6.2.2 Scoping and Consultation

MKO undertook a scoping and consultation exercise during preparation of this EIAR, as described in Section 2.6 of this EIAR. Table 6.1 provides a list of the organisations consulted with regard to Flora and Fauna during the scoping process, and notes where responses have been received.

**Table 6.1 Scoping Response Summary**

No.	Consultee	Response (to Scoping Document issued )
1	Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs	Email received 03/02/2017
2	Inland Fisheries Ireland	Letter received 07/12/16
3	Irish Peatland Conservation Council	Letter received 15/12/16
4	Irish Raptor Study Group	No response as of 04/10/2017
5	Irish Red Grouse Association	No response as of 04/10/2017
6	Irish Water	Letter received 16/01/17
7	Irish Wildlife Trust	No response as of 04/10/2017
8	North Western IRBD Project	No response as of 04/10/2017
9	Northern Ireland Department of Agriculture, Environment and Rural Affairs	No response as of 04/10/2017
10	Northern Ireland Environment Agency	No response as of 04/10/2017
11	Northern Ireland Geological Survey	No response as of 04/10/2017
12	Northern Ireland Loughs Agency	No response as of 04/10/2017
13	Office of Public Works	Letter received 11/01/17

In addition to the above, a meeting was held with the NPWS regarding the project on the 14<sup>th</sup> February 2017. Present were the Divisional Ecologist (Louise Mc Alavey), District Conservation Officer (Tim Roderick), Local Ranger (Carl Byrne) from the NPWS and Pat Roberts, John Hynes, Alex Ash and Neil O'Brien representing the applicant. Copies of all scoping responses are included in Appendix 2.1 and 2.2 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this Flora and Fauna Chapter. Table 2.2 in Chapter 2 of this EIAR notes where the comments raised in the scoping responses received have been addressed in this EIAR.

## 6.2.3 Identification of Target Receptors and Key Ecological Receptors

The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ecological Receptors (KERs). Following a comprehensive desk study, initial site visits and stakeholder consultation; "Target receptors" likely to occur in the zone of influence of the development were identified. The target receptors included habitats and species that were protected under the following legislation:

- Annexes of the EU Habitats Directive
- Qualifying Interests (QI) of Special Areas of Conservation (SAC) within the Zone of Influence.
- Species protected under the Wildlife Acts 1976-2012
- Species protected under the Flora Protection Order 2015

## 6.2.4 Field Surveys

A comprehensive survey of the non-avian fauna and flora of the site of the Proposed Development has been undertaken over a period of five years between 2013 and 2017.

The following paragraphs fully describe the ecological surveys that have been undertaken and provide details of the methodologies, dates of survey and guidance followed. Table 6.2 provides a list of all survey dates undertaken at the site. Ornithological surveys are described in Chapter 7 of this EIAR.

**Table 6.2 Summary of ecological surveys undertaken at Meenbog**

Survey type	Date	
<b>Multidisciplinary walkover survey</b>	05 <sup>th</sup> May 2014	
	10 <sup>th</sup> July 2014	
	16 <sup>th</sup> September 2014	
	06 <sup>th</sup> October 2014	
	27 <sup>th</sup> October 2014	
	30 <sup>th</sup> October 2014	
	31 <sup>st</sup> October 2014	
	12 <sup>th</sup> November 2014	
	27 <sup>th</sup> November 2014	
	April 2016	
	July 29 <sup>th</sup> - 30 <sup>th</sup> August	
	September 2016	
23 <sup>rd</sup> September 2017		
<b>Freshwater pearl mussel survey</b>	2 <sup>nd</sup> - 9 <sup>th</sup> September 2015	
<b>Bat survey</b>	<b>Static detector surveys 2016</b>	
	29 <sup>th</sup> August – 9 <sup>th</sup> September 2016	
	29 <sup>th</sup> August – 9 <sup>th</sup> September 2016	
	29 <sup>th</sup> August – 26 <sup>th</sup> September 2016	
	27 <sup>th</sup> September – 23 <sup>rd</sup> October 2016	
	<b>Static Bat Detector Locations at Met Mast</b>	
	<b>ID</b>	<b>Survey Period</b>
	Mast-03-High	8 <sup>th</sup> – 16 <sup>th</sup> March 2017
	Mast-03-Low	8 <sup>th</sup> – 16 <sup>th</sup> March 2017
	Mast-04-High	24 <sup>th</sup> April – 5 <sup>th</sup> May 2017
	Mast-04-Low	24 <sup>th</sup> April – 5 <sup>th</sup> May 2017
	Mast-05-High	25 <sup>th</sup> May – 8 <sup>th</sup> June 2017
	Mast-05-Low	25 <sup>th</sup> May – 8 <sup>th</sup> June 2017
	Mast-06-High	23 <sup>rd</sup> June – 8 <sup>th</sup> July 2017
	Mast-06-Low	23 <sup>rd</sup> June – 8 <sup>th</sup> July 2017
	Mast-07-High	25 <sup>th</sup> July – 6 <sup>th</sup> August 2017
	Mast-07-Low	25 <sup>th</sup> July – 6 <sup>th</sup> August 2017
Mast-08-High	27 <sup>th</sup> August – 6 <sup>th</sup> September 2017	

Survey type	Date
	<b>Bat Transects 2016</b> 26 <sup>th</sup> – 27 <sup>th</sup> April 2016 28 <sup>th</sup> – 29 <sup>th</sup> May 2016 29 <sup>th</sup> – 30 <sup>th</sup> May 2016 28 <sup>th</sup> – 29 <sup>th</sup> June 2016 25 <sup>th</sup> – 26 <sup>th</sup> July 2016 28 <sup>th</sup> – 29 <sup>th</sup> July 2016 28 <sup>th</sup> – 29 <sup>th</sup> August 2016 31 <sup>st</sup> August – 1 <sup>st</sup> September 2016 26 <sup>th</sup> -27 <sup>th</sup> September 2016 29 <sup>th</sup> – 30 <sup>th</sup> September 2016 24 <sup>th</sup> – 25 <sup>th</sup> October 2016 26 <sup>th</sup> – 27 <sup>th</sup> October 2016 27 <sup>th</sup> – 28 <sup>th</sup> October 2016
<b>Aquatic invertebrate survey</b>	16 <sup>th</sup> -18 <sup>th</sup> September 2014
<b>Irish Ladies Tresses and Globeflower Survey</b>	30 <sup>th</sup> July 2016
<b>Turbine base assessment</b>	T19 – 17 <sup>th</sup> September 2014 & 30 <sup>th</sup> October 2016 T16 – 09 <sup>th</sup> May 2014 & 30 <sup>th</sup> August 2016

#### 6.2.4.1 Ecological Field Survey

##### 6.2.4.1.1 Multi-disciplinary Walkover Surveys (as per NRA Guidelines, 2009c)

The original walkover surveys were undertaken throughout 2013 and 2014. The area was then resurveyed in April, July, August and September 2016 and in September 2017. The survey timing falls within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). Additional visits were also conducted in October 2016 and in March 2017 for tracks and signs of terrestrial mammals within the site.

The habitat surveys that were completed in 2013 and 2014 were ground-truthed in 2016 and 2017 and habitats were classified in accordance with the Heritage Council's 'Guide to Habitats in Ireland' (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in 'Best Practice Guidance for Habitat Survey and Mapping' (Smith *et al.*, 2011).

Plant nomenclature for vascular plants follows 'New Flora of the British Isles' (Stace, 2010), while mosses and liverworts nomenclature follows 'Mosses and Liverworts of Britain and Ireland - a field guide' (British Bryological Society, 2010).

The walkover surveys were also designed to detect the presence, or likely presence, of a range of protected faunal species. The survey assessed the significance of the site for any protected species that are likely to occur in the vicinity of the Proposed Development (e.g. Otter, Badger, Bats, Pine Marten etc.). The findings of the multi-disciplinary walkover surveys identified the requirement for more detailed and species specific floral and faunal surveys where necessary.

Habitats considered to be of ecological significance and in particular having the potential to correspond to those listed in Annex I of the EU Habitats Directive 92/43/EEC were identified and classified as KERs. Dedicated habitats surveys were undertaken at the locations of infrastructure that was located in peatland habitats (Bog and Heath). In these areas, the general habitat type was described in the walkover surveys but

additional 2m x 2m quadrats describing the vegetative composition and condition of the habitat were undertaken following a methodology set out in the National Survey of Upland Habitats (Perrin, 2014)

The multi-disciplinary walkover surveys comprehensively covered the entire study area (i.e. windfarms site, delivery route, grid connection and borrow pits). Where more detailed targeted surveys were carried out for habitats, species, features and locations of ecological significance, these surveys were carried out in accordance with NRA Guidelines *Ecological Surveying Techniques for Protected Flora and Fauna* on National Road Schemes (NRA, 2009c).

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

#### **6.2.4.1.2 Botanical Survey of Turbine Base and Infrastructure Locations**

The locations of turbine bases, hard standing areas, the substation, the site compound, internal roads and the borrow pit were visited during the multidisciplinary walkover surveys. In areas where the infrastructure was located in peatland habitats, a more detailed botanical assessment was undertaken.

#### **6.2.4.1.3 Invasive Alien Species**

During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was undertaken. Regulations 49 and 50 of these Regulations include legislative measures to deal with the dispersal and introduction of invasive alien species. Regulation 50 has not yet been commenced. IAS are also addressed by EU Regulation 1143/2014, which seeks to address the problem of invasive alien species in a comprehensive manner so as to protect native biodiversity and ecosystem services, as well as to minimise and mitigate the human health or economic impacts that these species can have.

#### **6.2.4.2 Terrestrial Faunal Surveys**

The results of the desk study, scoping replies and multidisciplinary walkover survey informed the scope of targeted ecological surveys required. The non-volant mammal surveys covered the entire study area (i.e. windfarm site, component delivery route, grid route connection, borrow pits).

##### **6.2.4.2.1 Otter Survey**

Following a review of the previously completed ecological surveys and the results of the multi-disciplinary walkover survey; areas identified as providing potentially suitable habitat for Otter were subject to specialist targeted survey. The Otter survey of watercourses was conducted in 2014 and re-surveyed in March, April and September 2016, and 22 September 2017. The survey work was completed by John Hynes, in 2016 and by David McNicholas in 2017.

The Otter survey was conducted as per NRA (2009c) guidelines (*Ecological Surveying Techniques for Protected Flora and Fauna* during the Planning of National Road Schemes). This involved a search for all Otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the width of the rivers/watercourses, a 10m riparian buffer (both banks) was considered to comprise part of the Otter habitat (NPWS 2009. Threat Response Plan: Otter (2009-2011). The dedicated Otter survey also followed the guidance as set out in NRA (2008) '*Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes*'.

#### **6.2.4.2.2 Badger Survey**

Following a review of the previously completed ecological surveys, it was noted that whilst the 2013 and 2014 surveys had not recorded Badger on the site, it was considered likely that they were present and thus a specialist targeted survey was undertaken. The best time for undertaking Badger surveys is between November and April, when vegetation cover is reduced, the Badger surveys conducted were not constrained by vegetation (NRA 2006a). Dedicated Badger surveys were conducted in March, April and September 2016. The survey work was completed by John Hynes and Laoise Kelly.

The Badger survey was conducted in order to determine the presence or absence of Badger signs within and outside (areas of identified suitable habitat) the development footprint and study area. This involved a search for all potential Badger signs as per NRA (2009c) (latrines, badger paths and setts).

The Badger survey was conducted adhering to best practice guidance (NRA, 2009c) and was cognisant of '*Guidelines for the Treatment of Badger Prior to the Construction of National Roads Schemes*' (NRA, 2006a).

#### **6.2.4.2.3 Bat Surveys**

Bat Surveys were designed in accordance with Bat Conservation Ireland's "*Wind Turbine/Wind Farm Development: Bat Survey Guidelines*". The bat surveys were undertaken between 2014 and 2017 and cover all seasons. The full bat survey report with the full details of the methodology followed is provided in Appendix 6.1.

#### **6.2.4.2.4 Marsh Fritillary**

There are historic records for the species in the locality of the Meenbog site. Therefore, it was deemed necessary to identify if any suitable habitat for the species was present within the study area and development footprint.

On the 18<sup>th</sup> and 19<sup>th</sup> of September 2014 the habitats within the study area were assessed for their potential to support Marsh Fritillary Butterfly. No suitable habitat or evidence of breeding (larval webs) was recorded within the development footprint or study area during the survey. As the majority of the development boundary comprises coniferous plantation forestry, there is limited suitable habitat within the site for this species. Consequently, further targeted surveys were not required for this species.

### **6.2.4.3 Aquatic Surveys**

#### **6.2.4.3.1 Aquatic macroinvertebrate survey**

Sampling was carried out downstream of the study area at 15 sites on the 16-18<sup>th</sup> of September 2014. Five of these locations are located within watercourses draining the proposal. The remainder provide an overview and baseline of the wider catchment. A detailed report of the aquatic survey including a methodology and map showing the location of the survey locations is provided in Appendix 6.2.

#### **6.2.4.3.2 Fisheries Assessment**

A fisheries survey of 5 waterbodies in the vicinity of the wind farm site was carried out in September 2014 at six selected sites. The six locations represent watercourses that drain the site. The fisheries assessment report containing the details of this electrofishing work is included as Appendix 6.3 to this report.



### **6.2.4.3.3 Freshwater pearl mussel**

A survey for freshwater pearl mussel (FPM) was conducted of the Lowerymore River. A section of the grid connection route is located within the Lowerymore River catchment. None of the wind farm infrastructure is within any other freshwater pearl mussel catchment. The survey was conducted in accordance with the *Margaritifera margaritifera* Stage 1 and Stage 2 Survey Guidelines produced by the NPWS (Irish Wildlife Manual No. 12), by ecologists from McCarthy Keville O'Sullivan Ltd: Dr. Chris Peppiatt B.Sc., M.Sc. PhD MCIEEM & Ms. Danielle Aherne B.Sc. (Hons), MRes. The survey was conducted under licence numbers C014/2014 and C127/2015 from the NPWS. The survey was conducted by from the 2<sup>nd</sup> to the 10<sup>th</sup> of September 2015. Surveys were conducted during optimal conditions using bathyscopes.

## **6.2.5 Methodology for Assessment of Effects**

### **6.2.5.1 Geographical Framework**

Guidance on Ecological Impact Assessment (CIEEM 2016) recommends categories of ornithological or nature conservation value that relate to a geographical framework (e.g. international, through to local). This assessment utilises the geographical framework described in *Guidelines for Assessment of Ecological Impact of National Road Schemes* (NRA 2009a). The guidelines provide a basis for determination of whether any particular site is of importance on the following scales:

- International
- National
- County
- Local Importance (Higher Value)
- Local Importance (Lower Value)

Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significant and of any importance only in the local area. Internationally Important sites are designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

### **6.2.5.2 Impact Assessment –EPA Criteria (2002)**

Effects identified have been described in accordance with EPA impact assessment criteria presented below (table 6.3).

The following terms were utilised when quantifying duration:

- Temporary – up to 1 year
- Short-term – 1 to 7 years
- Medium term – 7 to 15 years
- Long term – 15 to 60 years
- Permanent – over 60 years

**Table 6.3 Criteria for assessing impact significance based on (EPA, 2002)**

Impact Magnitude	Definition
No change	No discernible change in the ecology of the affected feature
Imperceptible Impact	An impact capable of measurement but without noticeable consequences
Slight Impact	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Impact	An impact that alters the character of the environment that is consistent with existing and emerging trends
Significant Impact	An impact which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment
Profound Impact	An impact which obliterates sensitive characteristics

Once the potential effects are characterised, the significance of any such effects on the identified KERs will be determined following the NRA Guidelines (2009a). The *'Guidelines on the information to be contained in Environmental Impact Statements'* (EPA, 2002, as revised 2017 and currently in Draft form as of 29/11/2017).

Table 6.4 outlines the levels of impact significance to be used during the assessment of impacts, however this only provides a guideline and impact is further evaluated in descriptive text. The probability of occurrence as outlined above, was also used when defining the significance of impacts. Table 6.5 provides the criteria for assessing impact quality.

**Table 6.4 Matrix to guide determination of impact significance**

		Magnitude of Potential Impact			
		High	Moderate	Low	Imperceptible
Nature Conservation Value	International	Severe	Major	Moderate	Minor
	National	Severe	Major	Moderate	Minor
	Regional	Major	Moderate	Minor	Minor
	Local	Moderate	Minor	Minor	Negligible
	Low	Minor	Negligible	Negligible	Negligible

**Table 6.5 Criteria for assessing impact quality based on (EPA, 2002)**

Impact Type	Criteria
Positive	A change which improves the quality of the environment e.g. increasing species diversity, improving reproductive capacity of an ecosystem or removing nuisances
Neutral	A change which does not affect the quality of the environment
Negative	A change which reduces the quality of the environment e.g. lessening species diversity or reducing the reproductive capacity of an ecosystem

### 6.2.5.3 Mitigation

The development has been designed to specifically avoid, reduce and minimise effects on all KERs. Where potential effects on KERs are predicted, mitigation has been prescribed to avoid, reduce and abate such effects.

Proposed best practice design and mitigation measures are specifically set out and are realistic in terms of cost and practicality. They have been subject to detailed design and will effectively address the effects on the identified KERs.

The potential effects of the Proposed Development were considered and assessed to ensure that all effects on KERs are adequately addressed and no significant residual effects are likely to remain following the implementation of mitigation measures / best practice.

### 6.2.5.4 Limitations

The information provided in this EIAR chapter accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the Proposed Development; prescribes mitigation as necessary; and, describes the residual ecological impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

No significant limitations in the scope, scale or context of the assessment have been identified.

## 6.3 Baseline Conditions and Receptor Evaluation

### 6.3.1 Desk Study Results






#### 6.3.1.1 Identification of Designated Sites within the Zone of Influence of the Development

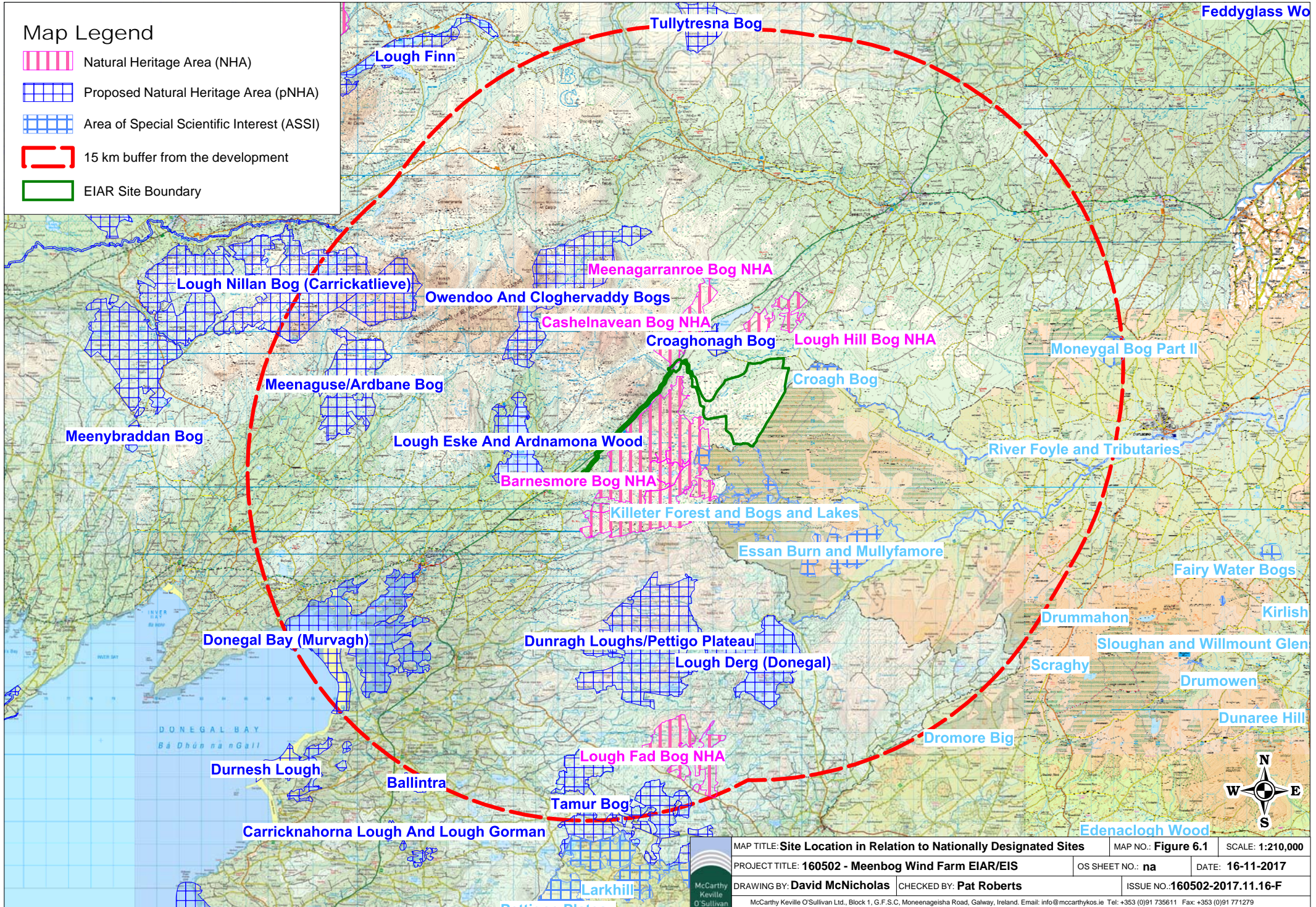
Using GIS software, sites designated for nature conservation within the potential zone of influence of the Proposed Development were identified. The ZOI was derived following a precautionary approach. Initially, sites within a 15 kilometre radius of the proposed works were identified. Then designated sites located outside the 15km buffer zone were taken into account and assessed. In this case, no potential for impacts outside the 15km buffer was identified. The 15km buffer distance was extrapolated from DoEHLG Guidance on Appropriate Assessment (2010). The Nationally designated sites (NHAs and pNHAs) are listed in Table 6.6 and displayed in Figure 6.1.

**Table 6.6 Nationally Designated sites in the Zone of Likely significant effect**

Designated site and code	Distance from proposed works (Km)	Pathway for Effect
<b>Natural Heritage Area (NHA)</b>		
Cashelnavean Bog NHA (000122) Feature of Interest: Peatlands	Located adjacent (and partially within) the proposed grid connection route for a distance of approximately 500m	Proposed works unlikely to result in significant effects on this peatland designated site as all works associated with the grid connection route will be located within scrub habitat between a conifer plantation and the existing N15 road. No peatland habitats are present in this area.

# Map Legend

-  Natural Heritage Area (NHA)
-  Proposed Natural Heritage Area (pNHA)
-  Area of Special Scientific Interest (ASSI)
-  15 km buffer from the development
-  EIAR Site Boundary



MAP TITLE: <b>Site Location in Relation to Nationally Designated Sites</b>		MAP NO.: <b>Figure 6.1</b>	SCALE: <b>1:210,000</b>
PROJECT TITLE: <b>160502 - Meenbog Wind Farm EIAR/EIS</b>		OS SHEET NO.: <b>na</b>	DATE: <b>16-11-2017</b>
DRAWING BY: <b>David McNicholas</b>	CHECKED BY: <b>Pat Roberts</b>	ISSUE NO.: <b>160502-2017.11.16-F</b>	
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Barnesmore Bog Complex NHA (002375) Feature of Interest: Peatlands	Adjoins the southwestern boundary of the study area	Proposed works unlikely to result in significant effects on this peatland designated site as the closest wind farm infrastructure is located over one km from the NHA and is at a lower elevation
Lough Hill Bog NHA (002452) Feature of Interest: Peatlands	1.3km N	Proposed works unlikely to result in significant effects on this peatland designated site as it is located over a kilometre from the site and in a separate surface water catchment
Meenagarranroe Bog NHA (002437) Feature of Interest: Peatlands	1.6km N	Proposed works unlikely to result in significant effects on this peatland designated site as it is located over a kilometre from the site and in a separate surface water catchment
Lough Fad Bog Complex NHA (001159) Feature of Interest: Peatlands	11.0 km S	Proposed works unlikely to result in significant effects on this peatland designated site as it is located over 11 kilometres from the site and in a separate surface water catchment
<b>Proposed Natural Heritage Area (pNHA)</b>		
Croaghonagh Bog pNHA (000129)	0.8km N	This designated site overlaps with Croaghonagh Bog SAC. Potential for impacts on the pNHA are considered under the SAC designation
Lough Eske and Ardnamona Wood pNHA (000163)	1.7 km W	This designated site overlaps with Lough Eske and Ardnamona Wood SAC. Potential for impacts on the pNHA are considered under the SAC designation
Owendoo and Cloghervaddy Bogs pNHA (002046)	4.8 km NW	No pathways by which the Proposed Development could affect this pNHA were identified during the assessment.
Dunragh Loughs/Pettigo Plateau pNHA (001125)	4.9 km SW	This designated site overlaps with Lough Dunragh Loughs/Pettigo Plateau SAC. Potential for impacts on the pNHA are considered under the SAC designation.
Lough Derg (Donegal) pNHA (001992)	7.6 km S	No pathways by which the Proposed Development could effect this pNHA were identified during the assessment.
Donegal Bay (Murvagh) pNHA (004151)	8.2 km SW	This designated site overlaps with Lough Donegal Bay (Murvagh) SAC. Potential for impacts on the pNHA are considered under the SAC designation.

Meenaguse/Ardbane Bog pNHA (000172)	9.7 km W	This designated site overlaps with Meenaguse/Ardbane Bog SAC. Potential for impacts on the pNHA are considered under the SAC designation.
Meenaguse Scragh pNHA (0018800)	10.2 km W	This designated site overlaps with Meenaguse Scragh SAC. Potential for impacts on the pNHA are considered under the SAC designation.
Tamur Bog pNHA (001992)	11.8 km SW	This designated site overlaps with Tamur Bog) SAC. Potential for impacts on the pNHA are considered under the SAC designation.
Lough Nillan Bog (Carrickatlieve) 004110	12.6 km W	This designated site overlaps with Lough Nillan Bog (Carrickatlieve) SAC. Potential for impacts on the pNHA are considered under the SAC designation.
Tullytresna Bog pNHA (001870)	13.8 km N	No pathways by which the Proposed Development could affect this pNHA were identified during the assessment.
Ballintra pNHA (000115)	14.9 km SW	This designated site overlaps with Ballintra SAC. Potential for impacts on the pNHA are considered under the SAC designation.

None of the NHAs or pNHAs within the ZOI were considered as KERs in their own right for the following reasons:

- Distance/intervening buffer from the Proposed Development
- Nature of the conservation sites (e.g. terrestrial nature of habitats)
- There are no sites with hydrological connectivity which could potentially be affected (See Chapter 9 of the EIA).
- Where a nationally designated site overlaps with the boundary of a European Designated site the potential for impacts has been considered under the European designation.

#### **6.3.1.1.1 Areas of Special Scientific Interest (UK)**

The locations of Areas of Species Scientific Interest (ASSI) within the identified ZOI are displayed on Figure 6.1. The potential for the Proposed Development to results in adverse effects on these NHAs and pNHAs was considered and is presented in Table 6.7.

**Table 6.7 NI Designated sites in the Zone of Influence**

Areas of Special Scientific Interest (ASSI)		
River Foyle and Tributaries (ASSI229)	Adjoins southern boundary of the study area	This designated site overlaps with River Foyle and Tributaries SAC. Potential for impacts on the ASSI are considered under the SAC designation
Croagh Bog (ASSI378)	550m E	No pathways by which the Proposed Development could affect this peatland ASSI were identified during the assessment. The

Areas of Special Scientific Interest (ASSI)		
		Mourne Beg River and the Sruhanganrve stream flow towards this site but no pathway for impact on the peatland habitats of interest were identified.
Killeter Forest and Bogs and Lakes (ASSI357)	550m S	No pathways by which the Proposed Development could affect this terrestrial SAC were identified during the assessment.
Essan Burn and Mullyfamore (ASSI134)	4.8 km S	No pathways by which the Proposed Development could affect this ASSI were identified during the assessment.
Monegal Bog (ASSI005)	13.6 km E	This designated site overlaps with Monegal Bog SAC. Potential for impacts on the ASSI are considered under the SAC designation
Monegal Bog Part II (ASSI209)	14.5 km E	

Where nationally designated sites occur within the boundary of European Sites (e.g. Monegal Bog etc.) potential for effects is considered under the SAC/SPA designation.

None of the remaining ASSIs within the zone of likely significant effect were considered as KERs in their own right for the following reasons:

- Distance from the Proposed Development
- Nature of the conservation sites (e.g. terrestrial nature of habitats)
- Lack of identifiable pathways for effects





### 6.3.1.1.2 European Sites

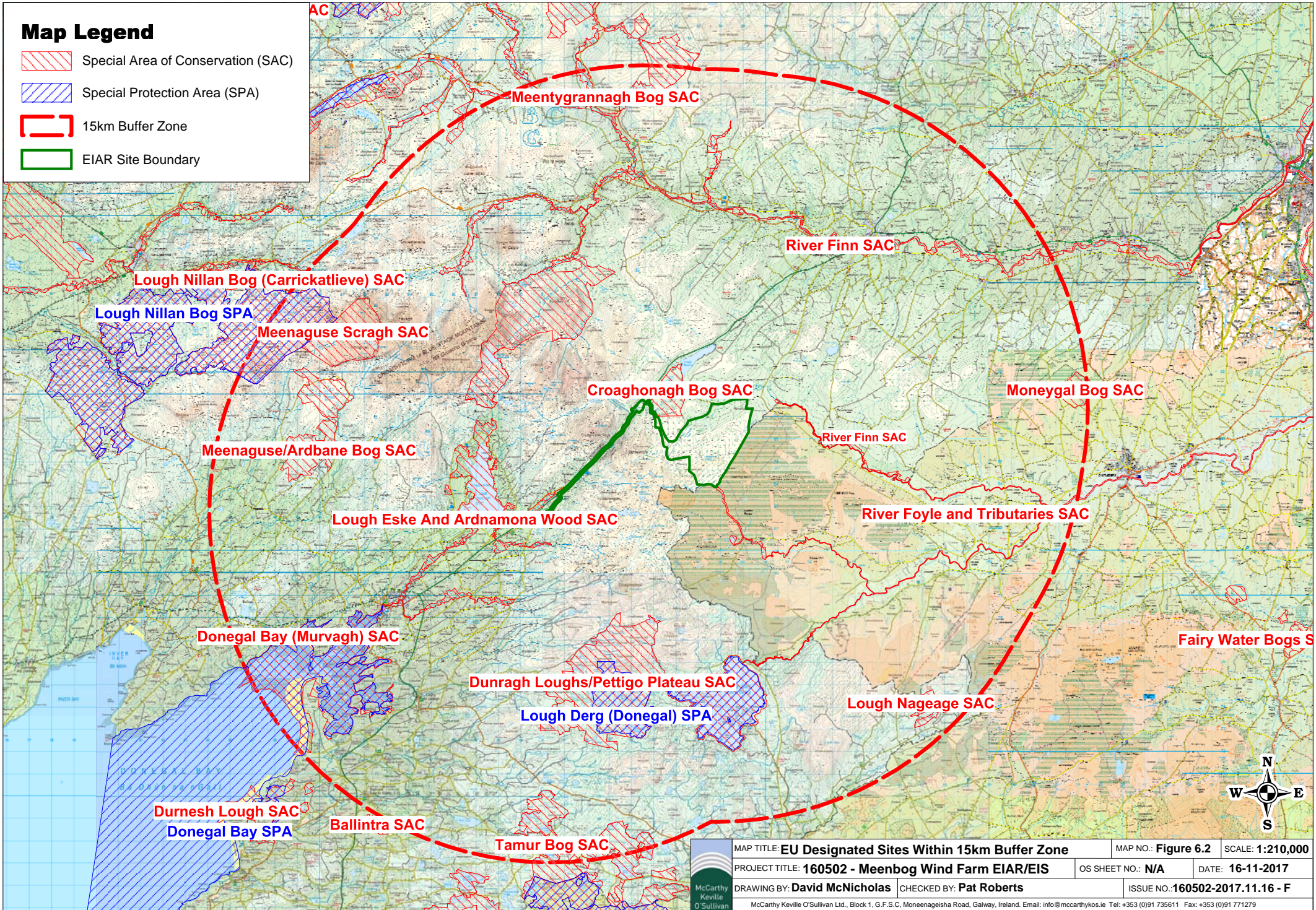
The locations of the European designated sites within the identified ZOI of the development are displayed on Figure 6.2. The potential for the Proposed Development to have an effect on these European Sites was considered and is presented in Table 6.8.


**Table 6.8 Designated sites in the Zone of Influence**

Designated site and code	Distance from proposed works (Km)	Effect Pathway
<b>Special Area of Conservation (SAC)</b>		
Croaghonagh Bog SAC (000129)	Adjoins north-western boundary of the proposed access road to the windfarm site.	There is no potential for direct impacts as the development footprint is located entirely outside the SAC boundary. Taking a precautionary approach and due to the proximal nature of the SAC, drainage related indirect effects on the Qualifying Interest Blanket bogs (* if active bog) [7130] were identified with regard to the construction and operational phase of the development.
River Foyle and Tributaries SAC (UK0030320)	Adjoins southern boundary of the windfarm site. Located 3.8km from the nearest off site works location	There will be no direct effects as the Proposed Development footprint is located entirely outside the designated site. Potential pathways for indirect effects on the Qualifying Interests Atlantic salmon ( <i>Salmo salar</i> ), otter ( <i>Lutra lutra</i> ) and Water courses of plain to

# Map Legend

-  Special Area of Conservation (SAC)
-  Special Protection Area (SPA)
-  15km Buffer Zone
-  EIAR Site Boundary



	MAP TITLE: <b>EU Designated Sites Within 15km Buffer Zone</b>	MAP NO.: <b>Figure 6.2</b>	SCALE: <b>1:210,000</b>
	PROJECT TITLE: <b>160502 - Meenbog Wind Farm EIAR/EIS</b>	OS SHEET NO.: <b>N/A</b>	DATE: <b>16-11-2017</b>
	DRAWING BY: <b>David McNicholas</b>	CHECKED BY: <b>Pat Roberts</b>	ISSUE NO.: <b>160502-2017.11.16 - F</b>
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		<p>montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation were identified, in the form of deterioration of surface water quality resulting from pollution, associated with construction, operation and decommissioning. In addition, there is potential for disturbance and related impacts to the QI species otter. Consequently, this SAC has been identified as a Key Ecological Receptor (KER) and further assessment is required to ensure impacts are avoided. Such measures are detailed further in this report.</p>
<p>Lough Eske and Ardnamona Wood SAC (000163)</p>	<p>4.6km from the windfarm site. Adjoins south-western boundary of the Grid Connection Route</p>	<p>There will be no direct effects as the Proposed Development footprint is located entirely outside the designated site.</p> <p>No pathway for impact on the terrestrial habitats or species for which the SAC is designated exist.</p> <p>The works in which this catchment is located are associated only with the cable route which will be restricted to the road or agricultural land and will not affect groundwater habitats within the SAC. Therefore, no potential pathway for impact on the Annex I groundwater habitat Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] exist.</p> <p>The SAC and proposed grid connection occur within the Donegal Bay North catchment while the proposed windfarm site lies within the Foyle Catchment (EPA Envision 2017). Potential pathways for indirect effects on the Qualifying Interests Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110], <i>Margaritifera margaritifera</i> (freshwater pearl mussel) [1029] and <i>Salmo salar</i> (salmon) [1106] were identified, in the form of deterioration of surface water quality resulting from pollution, associated with the grid connection works. Consequently, this SAC has been identified as a Key Ecological Receptor (KER) and further assessment is required to ensure</p>

		impacts are avoided. Such measures are detailed further in this report.
River Finn SAC (002301)	1.km North-east of windfarm and 4km from nearest off site works location	<p>There will be no direct effects as the Proposed Development footprint is located entirely outside the designated site.</p> <p>There are no lacustrine habitats located downstream of the development site within the SAC, therefore, no potential pathway for impact on the Annex I aquatic habitat Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] exists.</p> <p>No pathway for disturbance to QI species was identified given the distance and intervening buffer between the development site and the SAC.</p> <p>No pathway for impact on the terrestrial habitats for which the SAC is designated exist.</p> <p>Potential pathways for indirect effects on the Qualifying Interests <i>Salmo salar</i> (salmon) [1106] <i>Lutra lutra</i> (otter) [1355] were identified, in the form of deterioration of surface water quality resulting from pollution, associated with construction, operation and decommissioning.</p>
Dunragh Loughs/Pettigo Plateau SAC (001125)	6.2km South of wind farm site and 4.8km from nearest off site works location	Due to the lack of connectivity and distance between the European Site and the Proposed Development, the nature of the Qualifying Interests and the extent and nature of the proposed works, no complete direct/indirect impact source-pathway-receptor chain could be identified. Potential impacts on this European Site are not anticipated.
Donegal Bay (Murvagh) SAC (000133)	14.3km South-west of wind farm site and 8.2km from nearest off site works location	There will be no direct effects on the SAC. The grid connection for the Proposed Development is located within the Donegal Bay North catchment which drains to Donegal Bay. The straight line distance between the SPA and the study area is 7.2km. The hydrological distance, via surface waters, is in excess of 10km. The extent of the proposed works

		within the Donegal Bay North catchment are minor (grid connection cable will be laid primarily in the existing road carriageway) Due to the nature of Qualifying Interests (coastal/marine habitats and species), the small scale nature of the works in the Donegal Bay North catchment, the hydrological distance from the proposed works to Donegal Bay and the dilution factor involved (including buffer of Lough Eske), significant impacts on the SAC due to reduction in water quality are not anticipated.
Meenaguse Scragh SAC (001880)	12.7 km West of wind farm site and 10.2 km from nearest off site works location	Due to the lack of identifiable connectivity between the European Sites and the Proposed Development, the nature of the Qualifying Interests and the extent and nature of the proposed works, no complete direct/indirect impact source-pathway-receptor chain could be identified. Potential impacts on these European Sites are not anticipated.
Lough Nageage SAC (002135)	12.9 km South-east of wind farm site and 16.8km from nearest off site works location	
Meenaguse/Ardbane Bog SAC (000172)	13.4km West of wind farm site and 9.6 km from nearest off site works location	
Monegal Bog SAC (UK0030211)	13.6km east of windfarm site and 17.8km from nearest off site works location	
Lough Nillan Bog (Carrickatlieve) SAC (000165)	14.9km West of wind farm site and 12.6km from nearest off site works location	
Tamur Bog SAC (001992)	15.2km South of wind farm site and 11.7km from nearest off site works location	
Ballintra SAC (000115)	20.5km South of windfarm site and 15km from nearest off site works location	

### 6.3.1.2 Habitats Flora and Fauna

The following sections describe the desk study sources consulted and results obtained during the assessment.

#### 6.3.1.2.1 NPWS Article 17 Datasets and Additional Habitat Databases

A review of the NPWS Habitat Directive - Article 17 datasets, Irish Semi-Natural Grassland Survey datasets, National Survey of Native Woodland datasets along with Long Established Woodland dataset was conducted on the 8th of June 2016, prior to undertaking the multi-disciplinary walkover survey and reviewed/updated in October 2017. The datasets were downloaded and overlain on the Proposed Development study area.

The Article 17 GIS polygon dataset for Wet Heath [4010] and Blanket Bog [7130] contains records for the area but none for the site itself. Some areas of peatland and grassland habitats are shown along the grid connection route but this route is associated with the N15 road and will not impact on any of the identified peatland or grassland habitat. The dataset did not contain polygon or point records for Dry Heath [4030] within the site, however it does contain region data.

The Long Established Woodland dataset contains no records for the study area but has a record for Lough Easke Demesne 3.4km south-west of the Meenbog site.

#### 6.3.1.2.2 National Parks and Wildlife Service Protected Species Records

NPWS online records were searched to see if any rare or protected species of flora or fauna have been recorded from hectad H08. An information request was also sent to the NPWS requesting records from the Rare and Protected Species Database. Tables 6.9 and 6.10 list rare and protected species records obtained from NPWS.

**Table 6.9 Records of European protected species from the NPWS for H08**

Common Name	Scientific Name	Status
Common frog	<i>Rana temporaria</i>	Annex V, WA 1976-2012
Marsh fritillary	<i>Eurodryas aurinia</i>	Annex V, WA 1976-2012
Irish hare	<i>Lepus timidus hibernicus</i>	Annex V, WA 1976-2012
Pine marten	<i>Martes martes</i>	Annex V, WA 1976-2012

**Table 6.10 Species protected under the Wildlife Acts 1976-2012], NPWS**

Common Name	Scientific Name	Status
Badger	<i>Meles meles</i>	WA 1976/2012
Red deer	<i>Cervus elaphus</i>	WA 1976/2012
Hedgehog	<i>Erinaceus europaeus</i>	WA 1976/2012




#### 6.3.1.2.3 Freshwater pearl mussel (*Margaritifera margaritifera*)

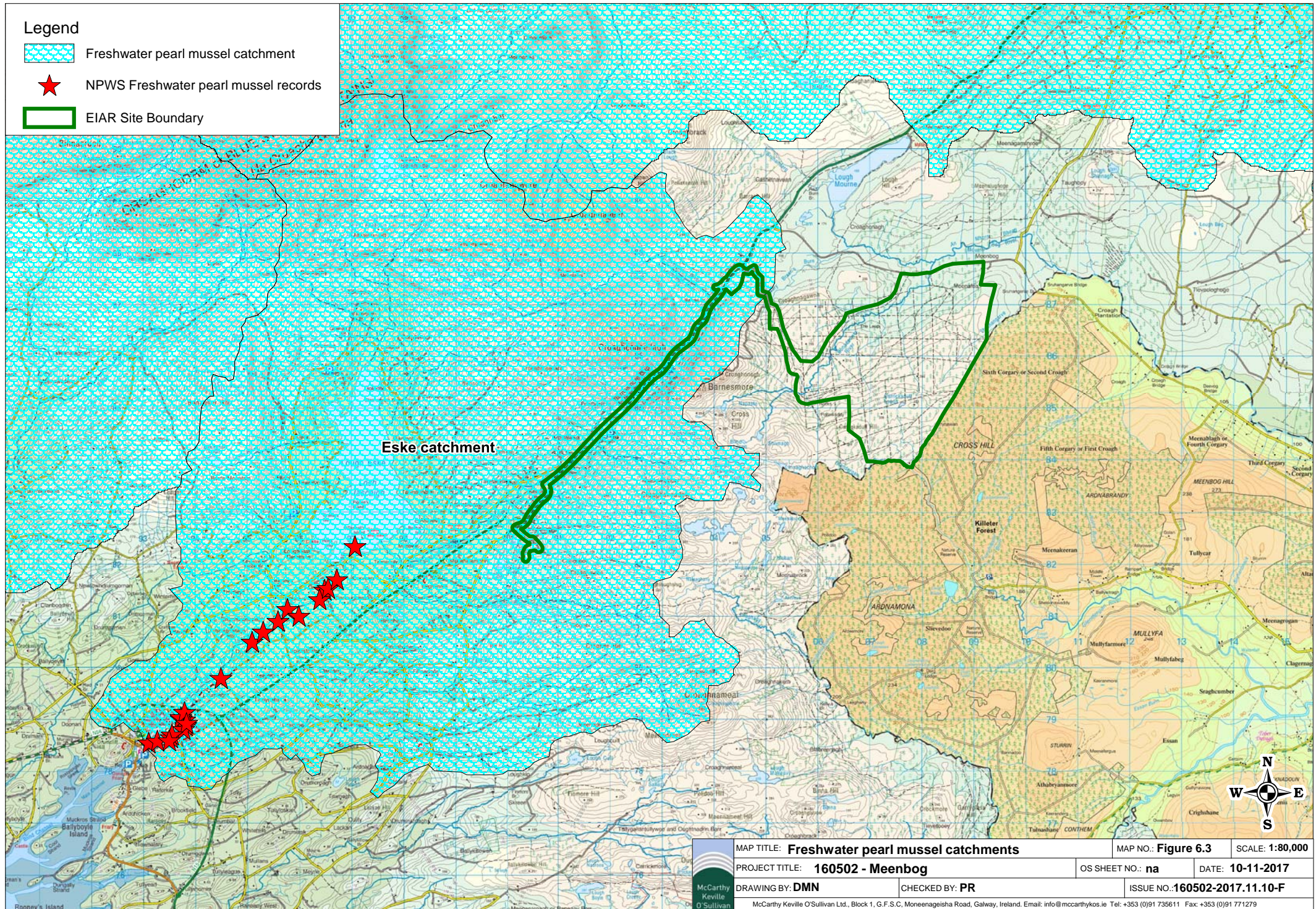
A section of the proposed cable route is located within the *Eske Margaritifera* Sensitive Area as shown in Figure 6.3. The *Eske* is categorized as *catchments of SAC populations listed in S.I. 296 of 2009*. Only the proposed cable route is situated within the *Eske* catchment with all proposed turbines and infrastructure located within the Foyle catchment. A population of freshwater pearl mussels is known to occur within the River *Eske*. This is more than five kilometres downstream of Keadew Bridge; the River *Eske* flows out from Lough *Eske* to reach the sea at Donegal town. Thus, Lough *Eske* lies between the section of proposed cable route at Keadew Bridge and the SAC mussel population. An information request was sent to the NPWS regarding the current distribution of *Margaritifera* Species within this catchment. The information provided by NPWS from the *Margaritifera records dataset 2014\_v11* indicated that the nearest record for pearl mussel is located approximately 4.4km (hydraulic distance) from the site boundary at its nearest point. The records are also provided in Figure 6.3.

#### 6.3.1.2.4 National Biodiversity Data Centre Data

A search of the National Biodiversity Data Centre (NBDC) website was conducted with a focus on records of protected fauna recorded from hectad H08. The results of the database search are provided in Table 6.11. Table 6.12 includes records of non-native invasive species listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015).

**Legend**

-  Freshwater pearl mussel catchment
-  NPWS Freshwater pearl mussel records
-  EIAR Site Boundary



MAP TITLE: <b>Freshwater pearl mussel catchments</b>		MAP NO.: <b>Figure 6.3</b>	SCALE: <b>1:80,000</b>
PROJECT TITLE: <b>160502 - Meenbog</b>		OS SHEET NO.: <b>na</b>	DATE: <b>10-11-2017</b>
DRAWING BY: <b>DMN</b>	CHECKED BY: <b>PR</b>	ISSUE NO.: <b>160502-2017.11.10-F</b>	

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**Table 6.11 NBDC records for protected species records in hectad H08**

Common Name	Scientific Name	Conservation Status
Marsh fritillary	<i>Euphydrya aurinia</i>	HD Annex II
Common frog	<i>Rana temporaria</i>	HD Annex V, WA
Large white-moss	<i>Leucobryum glaucum</i>	HD Annex IV
Irish hare	<i>Lepus timidus subsp. hibernicus</i>	HD Annex V, WA
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	HD Annex IV, WA
Badger	<i>Meles meles</i>	WA
Hedgehog	<i>Erinaceus europaeus</i>	WA
Red deer	<i>Cervus elaphus</i>	WA
Sika deer	<i>Cervus nippon</i>	WA

Annex II, Annex IV, Annex V – Of EU Habitats Directive, Wildlife Acts – Irish Wildlife Acts (1976, 2000).

**Table 6.12 Non-native invasive species records for hectad H08**

Common Name	Scientific Name
Japnese knotweed	<i>Fallopia japonica</i>
Rhododendron	<i>Rhododendron ponticum</i>
Feral goat	<i>Capra hircus</i>
Sika deer	<i>Cervus nippon</i>
Grey squirrel	<i>Sciurus carolinensis</i>

### 6.3.1.2.5 New Flora Atlas

A search was made in the *New Atlas of the British & Irish Flora* (Preston *et al.* 2002) to identify if any rare or protected plant species have been previously recorded from the hectad in which the Proposed Development is located i.e. H08. The search targeted vascular plants that are listed in Annex II of the EU Habitats Directive, the Flora (Protection) Order (FPO) of 2015, and those listed in *The Irish Red Data Book* (Jackson *et. al* 2016). The results of the search found that no rare or protected plants have been recorded in the hectad.

### 6.3.1.2.6 Bat Conservation Ireland Database

The National Bat Database of Ireland was searched for records of bat activity and roosts within a 10km radius of the central point of the Study Area (IG Ref: E202166, N384898). A number of observations have been recorded including roosts (n=2), transects (n=3) and ad-hoc observations (n=8). At least four of Ireland’s nine resident bat species were recorded within 10 km of the proposed works including common pipistrelle, soprano pipistrelle, Leisler’s bat and Daubenton’s bat. The results of the database search are provided in Table 6.13.

**Table 6.13: BCI data within 10km radius of Study Area (Grid Ref: E202166, N384898)**

Survey Type	Location	Species	Survey	Designation
Roost	Donegal Town, Co. Donegal	<b>Roost type:</b> Bridge <b>Species:</b> Daubenton’s bat	Unknown	Annex IV
	Donegal Town, Co. Donegal	<b>Roost type:</b> Tree <b>Species:</b> Leisler’s bat	Unknown	Annex IV
Transect	Donegal Town, Co. Donegal	Daubenton’s bat	Waterways Survey	Annex IV
	Belcoo, Co. Fermanagh	<i>Myotis</i> spp., common pipistrelle, soprano pipistrelle	Car-based Bat Monitoring	Annex IV

Survey Type	Location	Species	Survey	Designation
Ad-hoc Observation	Lough Mourne, Co. Donegal	<i>Myotis</i> spp.	BATLAS 2010	Annex IV
	Lough Eske, Co. Donegal	Daubenton's bat, <i>Myotis</i> spp., Leisler's bat, soprano pipistrelle	BATLAS 2010	Annex IV
	Clogheravaddy, Co. Donegal	Leisler's bat, common pipistrelle, soprano pipistrelle	EIA Survey	Annex IV
	Co. Donegal	Common pipistrelle, soprano pipistrelle	Visiting bat specialist	Annex IV
	Co. Donegal	Common pipistrelle	Visiting bat specialist	Annex IV
	Co. Donegal	<i>Myotis</i> spp., common pipistrelle, soprano pipistrelle	Visiting bat specialist	Annex IV
	Co. Donegal	Common pipistrelle, soprano pipistrelle	Visiting bat specialist	Annex IV
	Co. Donegal	Soprano pipistrelle	Visiting bat specialist	Annex IV

#### 6.3.1.2.7 Fisheries

Three species of bony fish have been recorded in H08 on the NBDC Lake Browser. These included the European Eel (*Anguilla Anguilla*), a species classified as 'critically endangered' in 'Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish' (King *et al.*, 2011). These records were obtained in Lough Golagh, approximately 2.1 kilometres west of the study area in the Mourne (Mourne Beg/Derg) catchment. The Foyle River catchment (which includes the River Derg catchment in which the study site is located) is known to contain an internationally important population of spawning Atlantic Salmon (*Salmo salar*), a species classified as 'vulnerable' in 'Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish' (King *et al.*, 2011) and listed in Annex II of the EU Habitats Directive. Research has indicated that sub-catchments within the River Foyle system can have genetically distinct salmon populations, and it is estimated that the annual number of salmon returning to the river was recently in excess of 40,000, making it one of the most important salmon rivers in the British Isles. The majority of salmon returning are Grilse (single wintering salmon), while a smaller but important number of spring salmon (multi-wintering) also return. In 2011, the River Derg and River Finn were known to have 269 and 107 salmon spawning redds respectively. Angling is permitted in the rivers only on a catch and release basis. The river system (including the River Derg and River Finn) is also known to contain the European Eel, Brook Lamprey (*Lampetra planeri*), and spawning River Lamprey (*Lampetra fluviatilis*), with the latter two being listed in Annex II of the EU Habitats Directive

#### 6.3.1.2.8 EPA Water Quality Data

There are a number Environmental Protection Agency (EPA) Q-value monitoring sites situated outside of the proposal boundary. The dataset contains results for Q-value monitoring of surface waterbodies for the period 2004-2016. The most relevant sites/sampling station, located downstream of the proposal are as follows:

1. Sampling station "Br. u/s Mourne Beg Confluence" (Grid reference E 208141 N 387605), is located downstream of the proposal and indicates a Q-Value of "Q2 - Bad".

2. Sampling station "Bridge SW of Tonreagh" (Grid Ref. E209903 N388300), is located downstream of the confluence between the Bunadaowen River (which drains the site) and the Mourne Beg River. This watercourse, the Mourne Beg River, has a Q-Value of "Q3 Poor".
3. Sampling station "Barnes Bridge" (E 203980 N 387009) is located downstream of the proposed cable route and indicates a Q-Value of "Q3 Poor Status".
4. Sampling station "Lowerymore - Keadew or New Br (nr Barnsmore Halt)" (Grid reference E 201132 N 383834), is located downstream of the proposed cable route, indicates a Q-Value of "Q5 - High Status".
5. Sampling station "Bridge u/s Lough Eske" (Grid reference: E 197961 N 381943), is located downstream of the proposed cable route and indicates a Q-Value of "Q4 - Good Status".

These EPA sampling station results, along with the macroinvertebrate surveys undertaken by McCarthy Keville O'Sullivan (see Appendix 6.2), provide a baseline against which any water quality changes occurring in the future can be measured.

River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The online EPA Envision map viewer provides access to water quality information at individual waterbody status for all the River Basin Districts in Ireland. This was accessed on the 11/10/2017 and the following surface water quality status results were determined:

- The Water Framework Directive (WFD) River Waterbody Status for the Lowerymore River is assessed as "Good" to "High" quality status and is located along part of the proposed cable route. This watercourse is also partially designated under Lough Eske and Ardnamona Wood SAC.
- The WFD River Waterbody Status for both the Bunadaowen River and Mournebeg River which drains the site, are assessed as "Poor" quality status. The Mournebeg River flows into River Finn SAC (within the Republic of Ireland) and into the River Foyle and Tributaries SAC (within Northern Ireland).

### 6.3.1.3 Conclusions of the Desk Study

The desk study revealed that the site of the Proposed Development is located within an area that is dominated by upland forestry with some peatland and woodland habitats in the area also. The watercourses that arise in or pass through the site flow into sensitive watercourses that are designated for conservation as the Lough Foyle and tributaries SAC and the River Finn SAC. These European Sites are designated for the protection of habitats and species including [3260] *Water courses of plain to montane levels with the Ranunculus fluitantis and Callitriche-Batrachion vegetation*, Salmon and Otter that are known to occur downstream of the site of the Proposed Development.

In addition, the cable route is located adjacent to the Lough Eske and Ardnamona Wood SAC. The SAC is situated downstream of the proposed works via the Lowerymore River. Freshwater pearl mussel are listed as a species of Qualifying Interests of the SAC. However, the population of freshwater pearl mussels is known to occur within the River Eske. The nearest record for pearl mussel is 4.4 km downstream (hydrological distance) of the Proposed Development at its closest point.

A number of rare and protected habitats, flora and fauna have been recorded from the hectad in which the Proposed Development is located. The field survey will identify if any of the identified habitats, flora or fauna or additional ecological receptors occur within the study area.



## 6.3.2 Field Assessment

### 6.3.2.1 Habitats and Flora in the Existing Environment

#### Overview of Site

The application site of the Proposed Development covers approximately 845 hectares and is situated five kilometres south east of the towns of Ballybofey and Stranorlar, Co. Donegal. Parts of the study area boundary (i.e. in both the south and east) follow the border with Co. Tyrone (Northern Ireland). Much of the study area is forested, with a network of existing forestry access tracks. The site as a whole is connected via tertiary and other local roads to the N15 national primary road that runs from Sligo to Lifford (passing through Ballybofey and Stranorlar). This upland site is mostly used for forestry, with remaining un-forested peatland areas, being exploited for turbarry or comprising upland blanket bog. In the wider area the lands at lower altitudes have been converted into pasture, dwellings and gardens.

Habitats present within the study area are listed in Table 6.14. The habitat names are followed by their corresponding habitat reference code (Fossitt, 2000). Habitat mapping followed the Heritage Council Guidelines (Smith *et al* 2011) and a habitat map of the study area is provided as Figure 6.4. The habitat map does not show habitats along the potential grid connection route to the Clogher substation where it will be located within the N15 public road.












**Table 6.14: Habitats within the planning application site boundary at Meenbog, Co. Donegal.**

Habitat	Area (ha)	% of Study Area
Conifer plantation <b>(WD4)</b>	823.5	91.9%
Upland blanket bog <b>(PB2)</b> / Wet Heath <b>(HH3)</b>	54.9	6.1%
Active quarries and mines <b>(ED4)</b>	1.6	0.1%
Cutover blanket bog <b>(PB4)</b>	4.6	0.5%
Wet Heath <b>(HH3)</b>	4.2	0.4%
Scrub <b>(WS1)</b>	2.7	0.3%
Wet grassland <b>(GS4)</b>	0.7	0.1%
Dystrophic lakes <b>(FL1)</b>	0.5	0.05%
Other artificial lakes and ponds <b>(FL8)</b>	0.05	0.005
Eroding/upland rivers <b>(FW1)</b>	13.3 km	NA





#### Conifer plantation/recently-felled woodland **(WD4/WS5)**

In total, approximately 91.9% of the study area (823.5 ha) comprises of forestry land. Included in this total is existing coniferous forestry (WD4) of various ages (including semi-mature and mature stands, along with immature pre-canopy areas of both first and second rotation) and areas of recently-felled woodland (WD5) that are quickly replanted to become young forestry plantations again. Sitka spruce (*Picea sitchensis*) was the dominant species, with smaller areas of lodgepole pine (*Pinus contorta*), Japanese larch (*Larix kaempferi*) and noble fir (*Abies procera*). Typical conifer plantation habitat from within the site is shown in Plate 6.1.












### Map Legend

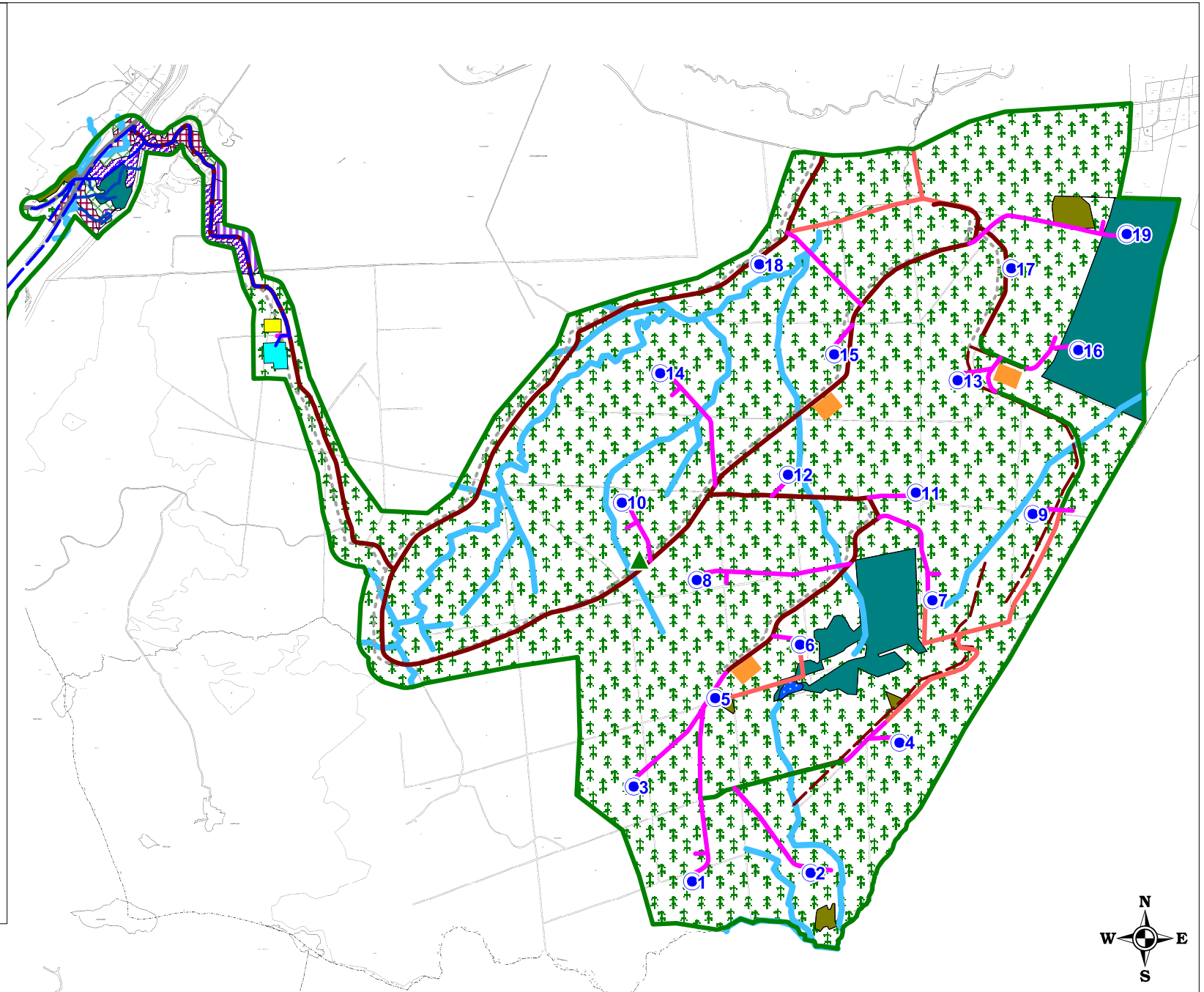
-  Proposed Grid Connection Route
-  Proposed Turbine Location
-  Existing Track Upgrade Proposed
-  Proposed Amenity Walkway
-  Proposed Temporary Construction Compound
-  Proposed Borrow Pit Areas
-  EIAR Study Area
-  Proposed New Roads
-  Existing Roads - Upgrade Proposed
-  Proposed Met Mast Location
-  Proposed Substation Compound


### Linear habitats

-  Buildings and Artificial Surfaces (BL3)
-  Spoil and Bare Ground (ED2)
-  Recolonising Bare Ground (ED3)
-  Eroding/Upland Rivers (FW1)

### Habitat type

-  Buildings and Artificial Surfaces (BL3)
-  Active Quarries and Mines (ED4)
-  Dystrophic Lakes (FL1)
-  Other Artificial Lakes and Ponds (FL8)
-  Wet Grassland (GS4)
-  Wet Heath (HH3)
-  Upland Blanket Bog (PB2)
-  Upland Blanket Bog/Wet Heath (PB2/HH3)
-  Cutover Bog (PB4)
-  Conifer Plantation (WD4)
-  Scrub (WS1)



	MAP TITLE: <b>Habitat Map</b>	MAP NO.: <b>Figure 6.4</b>	SCALE: <b>1:26,000</b>
	PROJECT TITLE: <b>160502 - Meenbog Wind Farm EIAR/EIS</b>	OS SHEET NO.: <b>N/A</b>	DATE: <b>16-11-2017</b>
	DRAWING BY: <b>David McNicholas</b>	CHECKED BY: <b>Pat Roberts</b>	ISSUE NO.: <b>160502-2017.11.16-F</b>
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**Plate 6.1. Typical Conifer Plantation at the site of the Proposed Development**

#### **Upland blanket bog (PB2)/Wet Heath (HH3) mosaic**

This peatland habitat includes an intimate mosaic of Upland blanket bog (PB2) and Wet Heath (HH3). The Blanket Bog is present on the flatter sections with heath habitat occurring where the ground is more sloping or where there are rock outcrops. This habitat type is shown in Plate 6.2. The north east corner of the study area forms part of a larger peatland area that stretches further to the north and east in the townland of Carrickaduff. The other section of the study area where this habitat exists is located amongst forestry plantations to the north east of Carrickaduff Lough.

In total this mosaic of peatland habitat occupies 54.9 ha (6.4%) of the study area. As per the Fossitt classification system, this Upland Blanket Bog is found at altitudes of 150 metres or more, with more than 50 cm depth of peat, less than 25% heath cover and with Black Bog-rush (*Schoenus nigricans*) absent or infrequent. Upland blanket bog was often recorded as an intimate mosaic with Wet heath (HH3) where peat depth reduces.

In this habitat type purple moor-grass (*Molinia caerulea*) and Ling were often either abundant or frequent, while deergrass (*Trichophorum germanicum*) and common cottongrass (*Eriophorum angustifolium*) could be frequent. Other vascular plants that were regularly encountered were haretail cottongrass (*Eriophorum vaginatum*), cross-leaved heath (*Erica tetralix*), bog asphodel (*Narthecium ossifragum*), Round-leaved Sundew (*Drosera rotundifolia*), white-beaked sedge (*Rhynchospora alba*) and tormentil (*Potentilla erecta*). The bryophyte flora of these areas included a number of *Sphagnum* species, with *S. capillifolium* being the commonest, followed by *S. papillosum*, with *S. magellanicum* and *S. cuspidatum* also regularly recorded. Other frequently-encountered bryophytes were the moss *Racomitrium lanuginosum* and the liverwort *Pleurozia purpurea*. The lichens *Cladonia portentosa* and *C. uncialis* were regularly encountered also. These communities correspond best to the National Survey of Upland Habitats (NSUH) type BB4 *Trichophorum germanicum* – *Eriophorum angustifolium* blanket bog.

The major components of the Wet heath vegetation type were: ling, deergass and purple moor grass. Other plants present included cross-leaved heath, tormentil, haretail cottongrass, common cottongrass, heath rush (*Juncus squarrosus*), heath bedstraw (*Galium saxatile*), tormentil, heath milkwort (*Polygala serpyllifolia*), green-ribbed sedge (*Carex binervis*) and bilberry (*Vaccinium myrtillus*). Bryophytes present included *Sphagnum capillifolium*, *Racomitrium lanuginosum* and *Hypnum jutlandicum*. Overall heath cover in these areas exceeded 25% and the depth of peat was less than in the blanket bog areas (often 50 cm or less). This type of vegetation is best described by the NSUH type WH4b, *Trichophorum germanicum* – *Eriophorum angustifolium* wet heath (with *Calluna vulgaris* frequent).



**Plate 6.2: Upland blanket bog (PB2) with Wet Heath (HH3) in the background**

#### **Cutover blanket bog (PB4)**

A small area of cutover blanket bog occurs adjacent to the proposed cable route in the north western section of the site. This area has been recently cut-over and peat extraction is likely to continue there. This area was characterised by a high occurrence of bare peat. There was a mosaic of revegetating/revegetated BB4 blanket bog (PB2) and more recently cutover wet areas with a high percentage of bare ground, but also frequent/abundant common cottongrass. The latter community is best described the NSUH type HW2i, *Eriophorum angustifolium* – *Sphagnum fallax* hollows (PB2). This habitat is shown in Plate 6.3.



**Plate 6.3: Cutover bog (PB4) with areas in the background already showing partial revegetation to *Eriophorum angustifolium* – *Sphagnum fallax* hollows (PB2/HW2i)**

#### **Wet grassland (GS4)**

Wet grassland (GS4) was recorded within the study area adjacent to the proposed cable route within the northwest of the site. This type of grassland also occurs naturally, e.g. along river valleys, but most of the grassland classified as this habitat type in the wider area is the result of the modification of peatlands and is associated with agricultural activities, notably sheep grazing.

The species recorded in these areas of wet grassland included abundant/frequent soft rush (*Juncus effusus*), sharp-flowered rush (*Juncus acutiflorus*) and grasses such as Yorkshire fog (*Holcus lanatus*), rough meadow-grass (*Poa trivialis*), sweet vernal-grass (*Anthoxanthum odoratum*), creeping bent (*Agrostis stolonifera*), common bent (*Agrostis capillaris*) and occasional purple moor-grass. Herbs present included common mouse-ear (*Cerastium fontanum*), white clover (*Trifolium repens*), creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*) and marsh thistle (*Cirsium palustre*). This habitat is shown in Plate 6.4.



**Plate 6.4 Wet grassland within the site (GS4)**

**Spoil and bare ground (ED2)**

The unsealed network of forestry tracks have been classified as spoil and bare ground (ED2). Most of these are regularly resurfaced with limestone chips and are relatively unvegetated (i.e. less than 50% cover). This habitat has not been shown on the habitat map but is shown in Plate 6.5.



**Plate 6.5: Unmade forestry track (Spoil and Bare Ground, ED2).**

### Scrub (WS1)

A number of small areas of scrub (WS1) were identified within the study area. Most of the larger areas are associated with young forestry, along tracks, roads and forestry edges. Such areas were too small to map and are not considered to be an important habitat in terms of ecological constraints. Types of scrub encountered included areas with tangled Bramble (*Rubus fruticosus* agg.), as well as gorse (*Ulex europaeus*) and rusty willow (*Salix cinerea* ssp. *oleifolia*) scrub patches. These areas can be characterised as areas of habitat dominated by (i.e. at least 50% cover) vigorous shrubs like bramble and gorse, or by small sub-mature trees less than 4-5 metres in height (Plate 6.6). Other plants present in some of these areas of scrub included Ivy (*Hedera helix*), honeysuckle (*Lonicera periclymenum*), holly (*Ilex aquifolium*) and hazel (*Corylus avellana*).



Plate 6.6: Willow scrub (WS1) habitat amongst forestry plantation (WD4) on the site

### Dystrophic lake

Carrickaduff Lough is classified as a dystrophic lake. It is located within a peatland section of the site and has steep banks that comprise of peat rather than stone or mineral soil. Yellow water lily (*Nuphar lutea*) and broadleaved pondweed (*Potamogeton natans*) were recorded from the lake and the Wet Heath/Bog habitat continued right up to the water's edge. This habitat is shown on Plate 6.7.



**Plate 6.7: Carrickaduff Lough, a dystrophic lake (FL1), with wet heath (HH3) and conifer plantation (WD4) in the background.**

#### **Eroding/upland rivers (FW1)**

A number of small rivers or streams arise or flow through the site. The largest of these is the Bunadaowen River, a tributary of the Mournebeg River (Mourne catchment), while others waterbodies that flow through or border the study area comprise smaller eroding rivers or streams. The Sruhingarve River also drains north to the Mournebeg River. This river arises in the eastern section of the site. A tributary of the Glendergan River flows out of Carrickaduff Lough to the south and joins the Glendergan River at the site boundary.

All the rivers and streams were classified as Eroding Rivers with sparse growth of aquatic macrophytes. Most were fast flowing and peaty with only small patches of vegetation including floating sweet-grass, bur-reed (*Sparganium*), the moss *Fontinalis antipyretica* and emergent reed canary-grass (*Phalaris arundinacea*) at the edges. Many of the rivers and streams within the site were small and had rocky substrates. Aquatic macrophytes were generically sparse and lacking in diversity; often *Fontinalis antipyretica* was the only species present.

The Bunadaowen River is the largest of the watercourses on the site and was surveyed close to where it exits the site to the north. At this location it was shallow and approximately 10-15 metres wide, with a loose boulder, cobble and gravel substrate. There were also deposited banks of pebbles and cobbles in the river, indicating that flow could be much greater when the river is in spate than was the case at the time of the survey visit. However, there was no evidence of significant deposition of fine sediment within the river in this area. There was evidence of growth of green filamentous algae, indicating that there may be eutrophication of the river. This river is shown in Plate 6.8.





**Plate 6.8: The Bunadaowen River, an upland/eroding river (FW1).**

**Active Quarry (ED4)/Spoil and Bare Ground (ED2)**

The proposed access route passes adjacent to a quarried area which had been inactive for some time; however, there was evidence of activity on the date of the site visit in November 2014. The majority of the quarry area was disused and was classified as Spoil and Bare ground (ED2). Within the quarry there were several stands of Scrub (WS1) dominated by willow (*Salix sp.*) and mountain ash (*Sorbus aucuparia*). Stands of semi-mature spruce and lodgepole pine were also recorded. Additional species recorded from the quarry area include: eyebrights (*Euphrasia sp.*), ling, lesser spearwort (*Ranunculus flammula*), gorse, compact rush (*Juncus conglomeratus*), soft rush, heath bedstraw, heath speedwell (*Veronica officinalis*), jointed rush (*Juncus articulatus*), viviparous fescue (*Festuca vivipara*), bramble, red clover (*Trifolium pratense*), and fox glove (*Digitalis purpurea*).



**Plate 6.9: Active Quarry (ED4)/Spoil and Bare Ground (ED2)**

### Other Artificial Lakes and Ponds (FL8)

An artificial pond (FL8) was recorded in the vicinity of the quarry on the southern side of the existing trackway. Floating bur-reed (*Sparganium angustifolium*) was the only aquatic vegetation observed and emergent vegetation was absent. A small artificial pond was also recorded within an old borrow pit within the site (grid reference E 207223 N 385999) with vegetation comprising of soft rush and broad-leaved pondweed (*Potamogeton natans*). The shallow water level is maintained by a drain entering the borrow pit from the southeast. This pond is shown in Plate 6.10.



Plate 6.10: Artificial pond (FL8) within old borrow pit

### Habitats on the Grid Connection Route:

The grid connection route will follow site roads as it exits the wind farm but will then veer to the south through degraded and cut over bog, wet heath and wet grassland habitats before reaching the N15. The route will pass under a stream that is a tributary of the Lowerymore River and under the N15. On the western side of the N15, the route will either connect into electrical grid cables in scrub habitats between the N15 and existing forestry or will follow the N15 road to the 'Clogher' substation. If the route along the N15 to the Clogher substation is followed, the dominant road verge habitat, which will be immediately adjacent to the majority of the works area is Dry meadows and grassy verges (GS2). This grassy verge varies in width from 0.50 metres to seven metres and comprises various rank grass species such as cocksfoot (*Dactylis glomerata*) and false oat grass (*Arrhenatherum elatius*) and Yorkshire fog (*Holcus lanatus*) along with common knapweed (*Centaurea nigra*), thistles (*Cirsium spp*) and rosebay willowherb (*Epilobium angustifolium*). This habitat has largely developed on the loose stone edge of the tarmac road surface. Scrub (WS1) has developed along the grass verges and immediately adjacent to the road side verges. The dominant species are willow (*Salix spp*), bramble (*Rubus fruticosus agg.*), Purple moor grass (*Molinia caerulea*), gorse (*Ulex europaeus*). Occasional lodgepole pine (*Pinus contorta*) were also observed. This habitat occurs on both flat landscapes in and steep slopes. The Lowerymore River, varies from a narrow slow flowing river (FW2) to large fast flowing river along this route and will be crossed by the grid connection route (via directional/horizontal drilling). Wet heath occurs behind areas of scrub and is dominated by ling (*Calluna vulgaris*) and purple moor-grass. Several houses are also

present with gardens (Amenity grassland, GA2), often surrounded by small fields of improved agricultural grassland (GA1). Some dwellings have associated hedgerows (WL1). The habitats immediately adjacent to the local road off the N15 as far as the 'Clogher' substation site included Hedgerows (WL1) with gorse and downy birch (*Betula pubescens*), Dry meadows and grassy verges (GS2), Improved agricultural grassland (GA1) and Wet grassland (GS4).

#### **6.3.2.1.1 Botanical Species Present and targeted surveys for FPO or Red List Species**

None of the species recorded are listed in Annex II of the EU Habitats Directive or the Flora (Protection) Order (2015).

The results of botanical surveys to characterise the species and habitats present at the sites of the proposed turbine bases, T16 and T19, in areas of blanket bog and wet heath habitat (5 metre square study plots) are shown in Appendix 6.4.

Dedicated surveys for Irish lady's tresses and globeflower were conducted in areas of suitable habitat throughout the site. Surveys were undertaken during the flowering period for the species (30 July 2016). Figure 6.5 provides an overview of the survey area covered. No FPO species were recorded within the EIAR study area. The survey also included a verification of desk study records from outside the site in the area around Trusk Lough. Irish lady's tresses was recorded around Trusk Lough, outside the northeast of the site, during a survey of the wider area. This verified the timing of the survey as being appropriate.

#### **6.3.2.1.2 Invasive Alien Species**

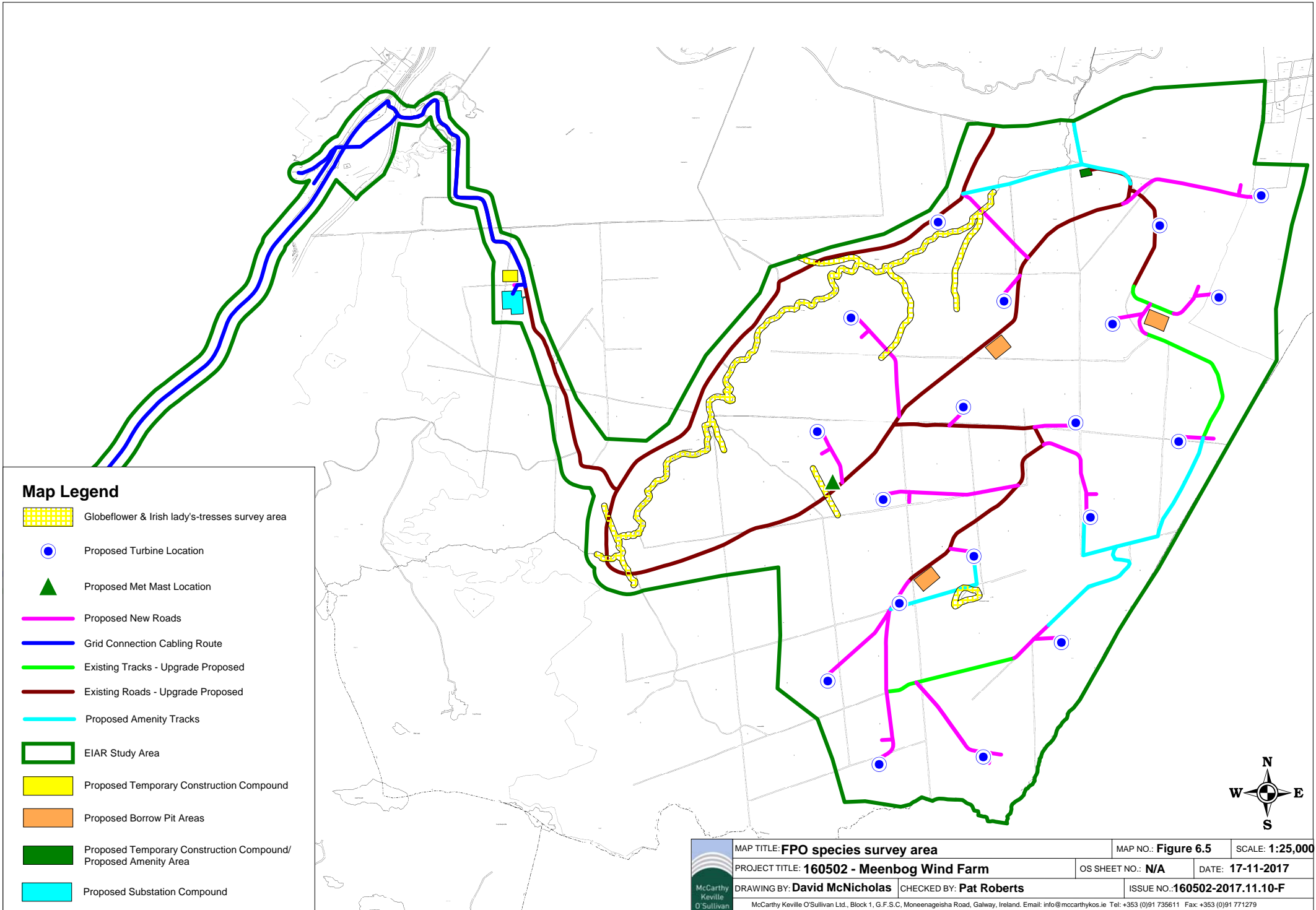
During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted. Two established invasive non-native terrestrial plant species were noted during the surveys: Rhododendron (*Rhododendron ponticum*), and Himalayan knotweed (*Persicaria wallichii*). Rhododendron was found occasionally within the site, but there were no large patches, just single bushes or very small clumps. A stand of Himalayan knotweed was recorded at one location outside the site, along a public road in Carrickaduff (E208630, N387790).

#### **6.3.2.1.3 Significance of Flora**














Ecological evaluation within this section follows a methodology that is set out in Chapter 3 of the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009a). Figure 6.6 displays the ecological significance of the habitats identified within the EIAR study area.

Active areas of Upland blanket bog (PB2)/Wet Heath (HH3) mosaic were found to correspond to the E.U. Habitats Directive Annex I habitats Active Blanket Bog [7130\* priority) and Atlantic Wet Heaths with *Erica tetralix* (Natura 2000 code 4010). Areas of cutover and degraded blanket peats (PB4) correspond to the E.U. Habitats Directive Annex I habitat Blanket Bog [7130). These habitats have been assigned **National Importance** on the basis of supporting a 'viable area' of habitats listed in Annex I of the EU Habitats Directive. These habitats have been included as a KER.


The Dystrophic lake (FW1) recorded within the study area corresponds to the E.U. Habitats Directive Annex I habitat Natural dystrophic lakes and ponds (Natura 2000 Code 3160). This habitat has been assigned **National Importance** on the basis of supporting a 'viable area' of a habitat listed in Annex I of the EU Habitats Directive. This habitat has been included as a KER for further assessment. In addition, the study in relation to European Sites and the AA Screening identified a pathway for effect on the



**Map Legend**

-  Globeflower & Irish lady's-tresses survey area
-  Proposed Turbine Location
-  Proposed Met Mast Location
-  Proposed New Roads
-  Grid Connection Cabling Route
-  Existing Tracks - Upgrade Proposed
-  Existing Roads - Upgrade Proposed
-  Proposed Amenity Tracks
-  EIAR Study Area
-  Proposed Temporary Construction Compound
-  Proposed Borrow Pit Areas
-  Proposed Temporary Construction Compound/  
Proposed Amenity Area
-  Proposed Substation Compound



	MAP TITLE: <b>FPO species survey area</b>		MAP NO.: <b>Figure 6.5</b>	SCALE: <b>1:25,000</b>
	PROJECT TITLE: <b>160502 - Meenbog Wind Farm</b>		OS SHEET NO.: <b>N/A</b>	DATE: <b>17-11-2017</b>
	DRAWING BY: <b>David McNicholas</b>	CHECKED BY: <b>Pat Roberts</b>	ISSUE NO.: <b>160502-2017.11.10-F</b>	
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Annex I lacustrine habitat Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] that is located downstream of the site in Lough Eske within the Lough Eske & Ardnamona Wood SAC. This habitat has been assigned **International Significance**.

The Upland Eroding Rivers (FW1) that flow through the site are assigned **Local Importance (higher value)** on the basis of supporting semi-natural habitat types with high biodiversity and high degree of naturalness in a local context. In addition, the study in relation to European Sites and the AA Screening identified a pathway for effect on the Annex I riverine habitat *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation that is located downstream of the site in the Lough Foyle & Tributaries SAC. This habitat has been assigned **International Significance**.

The watercourses also have potential as a habitat for a number of species that are listed on Annex II of the EU Habitats Directive (e.g. otter, salmon, freshwater pearl mussel etc.).

Although there are habitats of ecological significance within the study area, the development footprint is dominated by habitats considered to be of low ecological value. 92.5% of the development footprint is dominated by habitat classified as **Local importance (lower value)**. Such habitats include Conifer Plantation (WD4), Wet grassland (GS4), Scrub (WS1) and Spoil and bare ground (ED2).

Table 6.15 provides a summary of the habitat importance valuation and identifies the habitats classified as Key Ecological Receptors (KER).

**Table 6.15 Summary of Habitat Significance**

Habitat	Receptor Importance/Ecological Valuation (NRA Ecological Impact Assessment Guidelines, 2009)	KER Y/N
Upland blanket bog (PB2)/ Wet heath (HH3) mosaic & Cutover blanket bog (PB4)	National Importance	Yes
Dystrophic lakes (FL1)	National Importance	Yes
Oligotrophic Lakes (FL2) Within SAC	International Importance	Yes
Watercourses including rivers and streams within the study area.	Local importance (Higher value)	Yes
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation Within SAC	International Importance	Yes
Additional habitats within the study area including transport route and grid connection route.	Local importance (Lower value)	No
Plantation Forestry	Local importance (Lower value)	No

### 6.3.2.2 Fauna in the Existing Environment

#### 6.3.2.2.1 Bats

The full report of the bat surveys that were undertaken on the site is provided in Appendix 6.1. A summary of the main findings is provided below. Bat surveys were designed in accordance with Bat Conservation Ireland's (BCI) guidelines for wind

turbine developments (BCI, 2012a). Surveys adopted a four-season approach and employed a combination of methods between 2014 and 2017, including desktop study, habitat and landscape assessments, roost inspections, manual activity surveys and static detector surveys at ground level and at height.

Results of the desktop study revealed just two previous roost records. These roosts were recorded somewhere in the environs of Donegal Town (approx. 14km away). Bat surveys undertaken in the wider area surrounding the study area in 2014, also revealed two confirmed roosts supporting small numbers of *Myotis* bats. All-season habitat assessments in 2014, 2016 and 2017 did not find roosts in any structures or trees within 200 m of the site boundary. In addition, no sites suitable for maternity colonies, swarming activity or hibernacula were identified. Structures and trees within the Study Area were assessed as *Negligible – Low Suitability* in relation to their potential to support roosting bats.

Habitats within the Study Area are dominated by commercial forestry. The remainder of the site comprises peatland, grassland and freshwater habitats. Forestry edge habitats, created by commercial forestry and roadways/watercourses, show potential for foraging and commuting bats and were assessed as *Moderate* suitability. All other habitats were assigned a *Negligible-Low* value.

Overall, recorded bat activity levels were low. In 2014, manual transects results demonstrated that bat activity within the Study Area was significantly lower compared to the wider area, particularly lowland agricultural areas. Around the Study Area, activity was greatest along conifer edge bordering the main road to the north. 2016 results were consistent with these findings (0.6 bat passes/km in 2014 within the Study Area compared to 0.54 bat passes/km in 2016). In 2016, bats were again recorded more frequently within habitats outside the Study Area (wet grassland, hedgerows, treelines, etc.) along the main road to the north.

Static detector surveys also recorded low levels of activity. In 2014, one bat detector deployed within the Study Area recorded no bats in 27.5 survey hours. In 2016, 0.57 bat passes per hour were recorded. In comparison, a BCI pilot monitoring scheme for woodland bats in the Republic of Ireland recorded averages of 10.83, 14.27 and 47.52 bat passes per hour in three more favourable broadleaved woodlands studied (Roche and Aughney 2007)

No clear seasonal peak in activity was observed. Rather, minor peaks in activity were recorded throughout the season but differed between survey methods and years. Throughout all surveys, pipistrelle species (including common, soprano and unidentified pipistrelles) were encountered most frequently, followed by *Myotis* sp. and Leisler's bat. Other species encountered included brown long-eared bat and a single *Nathusius* pipistrelle.

Simultaneous monitoring at ground level and at height was carried out throughout 2017. Low levels of bat activity (n=41) were recorded across 70 nights of monitoring and bat activity was significantly higher on the lower microphone. Species recorded at height included Leisler's bat (n=8) and common pipistrelle (n=1).

#### **6.3.2.2.2 Non-volant mammals**

The following paragraphs describe the results of the mammal surveys that were undertaken both as dedicated surveys and during the ecological walkover surveys.

No badger (*Meles meles*) setts or evidence of the species was recorded during the surveys undertaken within the study area. Given that the study area provides good quality habitat for the species and that it is known from the wider area, it is highly likely that it occurs within the site, at least on occasion.

Dedicated surveys of the watercourses within the study area were undertaken for Otter. No otter breeding or resting sites or other signs of the species were recorded within the site. However, it is likely that the species uses the watercourses that cross the study area and the lakes within and nearby. In addition, the species is known from the downstream catchments where it is among the Qualifying Interests of the River Finn SAC and the Qualifying features (non-primary) of the River Foyle & Tributaries SAC.

The scats of red fox (*Vulpes vulpes*), were regularly observed in all areas of the site. Irish hare (*Lepus timidus* ssp. *hibernicus*) was observed on several occasions (e.g. crossing over forestry tracks and in the open areas of the site). A single red squirrel was observed crossing open bog between two conifer plantations in 2014.

A single pine marten (*Martes martes*) was recorded within the study area boundaries in April 2015. Presumed pine marten scats were also observed and it is apparent that this species is resident in the area. Red deer (*Cervus elaphus*) and sika deer (*Cervus nippon*) were observed, along with their droppings and a deer wallowing site.

Given the size and variety of habitats in the study area, other mammals such as pygmy shrew (*Sorex minutus*), hedgehog (*Erinaceus europaeus*), and stoat (*Mustela erminea*) are also likely to be present, at least on occasion. The recorded evidence does not suggest that the study area is utilised by populations of higher than local significance.

#### **6.3.2.2.3 Reptiles and amphibians**

Common frog (*Rana temporaria*) was recorded in wet areas within the site (including in drains and pools and in bog habitats). The species is likely to breed within the study area. Smooth newt (*Lissotriton vulgaris*), was recorded on the 17<sup>th</sup> April 2014 within a bog pool on Upland blanket bog to the south east of T16. No other records of the species were recorded and limited suitable habitat occurs for the species within coniferous plantation forestry. Common lizard (*Zootoca vivipara*), while not recorded during the site visits, is likely to occur within the study area.

It is considered that the Proposed Development will not result in a significant loss of suitable habitat for reptiles and amphibians. It is considered that suitable habitat is extremely widespread in the study area and beyond. No likely significant effects on these species are anticipated and therefore further survey/ assessment was not deemed necessary.

#### **6.3.2.2.4 Fisheries**

The parr of brown trout (*Salmo trutta*) were recorded in streams within the study area during kick sampling work for Q-Value assignment. Extensive electrofishing studies were carried out during September 2014 at multiple sites that drain the study area. While a number of these survey sites were within the site boundary (sample sites 17, 18 and 19), the majority were either on its border or downstream of the study area. No salmonids were recorded in watercourses within the site boundary. The location of all survey sites are provided in Figure 11 of Appendix 6.3. The surveys undertaken in the wider area provide a good context to the likely extent and populations within the upper reaches of the catchments. These electrofishing studies recorded brown trout, Atlantic salmon (*Salmo salar*), stone loach (*Barbatula barbatula*) and European eel (*Anguilla*

*anguilla*) in streams in both catchments in which the study area lies. The fisheries assessment report containing the details of this electrofishing work is included as Appendix 6-3 to this report.

#### 6.3.2.2.5 Aquatic fauna (Invertebrates)

Sampling was carried out downstream of the study area at 5 sites on the 16-18<sup>th</sup> of September 2014. The data from the 5 sampling sites provide a baseline of the invertebrate fauna of the watercourses both within and downstream of the proposal. Such a baseline can be used as a long-term benchmark against which any water quality changes occurring in the future can be measured. Survey results are provided in Appendix 6-2. Summary results for the Q value assessment are provided in table 6.16. The locations of these sampling stations are shown in Figure 1 of Appendix 6.2.

**Table 6.16 Aquatic Sampling Summary of Results**

Sample Station	Grid Ref	Q Value assessment
Sample Station 1: Bunadaowen Stream	E 205677 N 385281	Q3-4
Sample Station 2: Mary Breen's Burn	E205062 N387033	Q3-4
Sample Station 3: Unnamed stream adjacent to N15	E 204505 N 387675	Q3-4
Sample Station 4: Mary Breen's Burn	E 206437 N 388014	Q3-4
Sample Station 5: Mourne Beg River	E 209917 N 388319	Q3-4

**Q-Value of 2-3 (Fish usually absent - poor), Q-Value of 3 (Slight pollution - poor), Q-Value of 4 (Unpolluted - good)**

#### 6.3.2.2.6 Freshwater pearl mussel (*Margaritifera margaritifera*)

The wind farm site is not located within a freshwater pearl mussel catchment but a section of the cable route is located within the Eske catchment which holds a known population of pearl mussel that is among the Qualifying Interests of the Lough Eske & Ardnamona Woods SAC. A survey for freshwater pearl mussel (FPM) was conducted the Lowerymore River, Co. Donegal, which flows into Lough Eske. The survey was conducted in accordance with the *Margaritifera margaritifera* Stage 1 and Stage 2 Survey Guidelines produced by the NPWS (Irish Wildlife Manual No. 12). This was undertaken in the section of the Lowerymore River upstream of Lough Eske and in the vicinity of the proposed cable route where it is located within the public road in this catchment. Full details of this survey are provided in Appendix 6.5.

Approximately 4.5 kilometres of the Lowerymore River were surveyed between. Nine sections (each approximately 500 metres long) were surveyed for pearl mussels in the Lowerymore River in the section that flows westwards through Barnesmore Gap in the direction of Lough Eske (into which the river discharges).

No sign of mussels, living or dead was recorded during this survey in September 2015. Weather conditions throughout the survey period were acceptable for this type of survey.



### 6.3.2.2.7 Terrestrial Invertebrates

#### Marsh fritillary (*Euphydryas aurinia*)

On the 18<sup>th</sup> and 19<sup>th</sup> of September 2014 the habitats within the study area were assessed for their potential as suitable marsh fritillary breeding sites. Good quality marsh fritillary habitat is defined generally as having a moderate to high coverage of *Succisa pratensis* (more than 3 plants per m<sup>2</sup>) growing in a low-growing unintensified sward with a height range of 10-25cm and low cover of invasive scrub (NPWS, 2013). Shorter and taller sward may also be occupied but these are considered to be less suitable and perhaps indicators of over and under grazing. No suitable habitat for this species was recorded within the survey area given the extent of forestry cover and lack of open heath or wet grassland habitat in which the species is recorded.

### 6.3.2.3 Significance of Fauna

Having outlined the baseline ecological receptors occurring at the site, in terms of species, habitats, extent and character, it is necessary to evaluate the features to facilitate an objective assessment of potential impacts. The ecological evaluation within this section follows a methodology that is set out in Chapter 3 of the *Guidelines for Assessment of Ecological Impacts of National Roads Schemes* (NRA, 2009a). These NRA guidelines provide a transparent means of feature evaluation, however additional sources are also considered, including CIEEM 2006 "Guidelines for Ecological Impact Assessment in the United Kingdom" and CIEEM 2016 "Guidelines for Ecological Impact Assessment in the UK and Ireland terrestrial, freshwater and coastal". In some cases, professional judgement may also be required.

#### Otter

Otter is listed under Annex II and Annex IV of the EU Habitats Directive and is also protected under the Irish Wildlife Acts 1976-2012 and is evaluated as being Near Threatened in the most recent Red Data list for mammals (Kingston, 2012).

No otter breeding sites or holts were observed. The watercourses in the study area offer potential foraging and commuting habitat for the species. While no otter holts were identified in the study area it is likely that there are breeding holts located in the wider area. Whilst not providing optimum habitat for otter it is considered likely that the smaller land drains located within the study area may be utilised, on occasion, as commuting corridors between larger watercourses. Otter as an Ecological Receptor has been assigned **International Importance** given that any specimens occurring within study area are likely to be associated with the populations for which River Finn SAC and River Foyle & Tributaries SAC designated. This species is classified as a KER.

#### Bats

Low levels of bat foraging activity were recorded at the site of the Proposed Development during the surveys that were undertaken. However, they were regularly recorded within the site during the extensive survey work that was undertaken. No bat roosts were identified within the Study Area.

Bats as an Ecological Receptor have been assigned **Local Importance (higher value)** on the basis of resident and/or locally occurring populations of Annex IV species under the EU Habitats Directive and protected under the Wildlife Acts, 1976-2012.

#### Atlantic Salmon

Atlantic salmon is listed in Annex II of the EU Habitats Directive and is among the Qualifying Interests of the River Finn SAC, River Foyle & Tributaries SAC & Lough Eske and the Lough Eske & Ardnamona Wood SAC, all of which are located downstream of the Proposed Development and cable route. The watercourses within and downstream

of the study area provide suitable habitat for Atlantic salmon. As an ecological receptor, Atlantic Salmon has been assigned **International Importance** given that any specimens occurring within/downstream of the study area are likely to be associated with the population for which the SACs were designated and that there is a direct link via surface water to populations within the SACs. Additional aquatic species of conservation interest are assigned **Local Importance (Higher value)** on the basis of high biodiversity value. Atlantic salmon and additional aquatic fauna have been included for assessment as a KER.

#### **Freshwater pearl mussel**

Freshwater pearl mussel was not recorded during the surveys that were undertaken in the Lowerymore River but are known from downstream in the Eske catchment. They are among the qualifying interests of the Lough Eske & Ardnamona Wood SAC and as such are assigned **International Importance** as downstream receptors. This species is included as a KER.

#### **Additional Fauna**

The recorded faunal evidence does not suggest that the study area is utilised by populations of higher than local significance of badger, pine marten or red deer or any additional species protected under the Wildlife Act 1976-2012. Consequently, such species were not considered as KERS and further assessment was not deemed necessary. Red fox (*Vulpes vulpes*) is not protected under the Wildlife Act 1976-2012 and is not classified as a KER. No evidence of marsh fritillary or suitable habitat was recorded within study during targeted surveys undertaken. This species is not classified as a KER and is not considered further in this assessment

Table 6.17 provides a summary of the faunal importance valuation and identifies the fauna classified as Key Ecological Receptors.

**Table 6.17 Summary of Faunal Significance**

Common Name	Receptor Importance/Ecological Valuation (NRA Ecological Impact Assessment Guidelines, 2009)	KER Y/N
Otter	International Importance	Yes
Atlantic salmon	International Importance	Yes
Freshwater pearl mussel	International Importance	Yes
Bats	Local importance (Higher value)	Yes
Additional aquatic species	Local Importance (Higher Value)	Yes
Additional fauna within the study area including and grid connection route.	Local importance (Lower value)	No

## **6.4 Likely and Significant Effects on Flora and Fauna**

Ecological evaluation and assessment of effects within this chapter follows a methodology that is set out in Chapter 3 of the *'Guidelines for Assessment of Ecological Impacts of National Roads Schemes'* (NRA, 2009a). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The assessment of effects also follows the guidance outlined in EPA 2002.

This assessment of effects is structured as follows:

- Assessment of 'Do nothing' Effect

- Assessment of effects relation to sites designated for nature conservation
- Assessment of effects in relation to receptors of Local Importance Lower Value
- Assessment of effects in relation to Key Ecological Receptors
- Summary of potential effects associated with Proposed Development infrastructure

All elements of the Proposed Development have been considered in assessing effects on ecological receptors:

- Construction of turbines (including Hardstanding areas), which will include construction activity, tree felling, large scale earthworks, drainage and pouring of concrete.
- Operation of the borrow pit, which will involve construction activity, large scale earthworks and drainage.
- On-site substation and grid connection, which will involve construction activity, small-scale excavation and concrete works.
- Other Infrastructure (roads, turbine delivery route, construction compound,)
- Drainage and disturbance effects associated with the operation of the wind farm
- Disturbance and smaller scale construction impacts associated with the decommissioning of the wind farm.

#### **6.4.1 Do-Nothing Effect**

If the wind energy development for which this EIAR has been prepared does not go ahead, it is likely that the character of the landscape and its uses will remain much as they are today, i.e. most of the land will continue as conifer plantation until such a time as it is harvested. It will likely then be replanted on a continuous basis.

#### **6.4.2 Effects on Designated Areas**

The footprint of the proposed wind farm itself avoids any Republic of Ireland or Northern Irish nationally designated sites (Nationally designated sites that overlap with European Sites are considered as part of the corresponding European Site). The grid connection is located adjacent to the Barnesmore Bog NHA and at the edge of the Cashelnavean Bog NHA. Should the grid connection route connect to the Clogher Substation via the N15, it will be located within the existing road network and no pathway for effects on the peatland habitats of Barnesmore Bog NHA were identified. Should the grid connection route connect with cables to the west of the N15, all works will be located in scrub, forestry roads and conifer plantation and no pathway for effects on the peatland habitats of Cashelnavean Bog NHA were identified. Pathways for impacts on no other nationally designated sites were identified.

With regard to European Sites, a separate AA Screening Report was undertaken to provide An Bord Pleanála with the information necessary to complete a Screening for Appropriate Assessment for the Proposed Development in compliance with Article 6(3) of the Habitats Directive. As part of this assessment, the potential for the Proposed Development to have a significant effect on any European sites was considered. The Screening for Appropriate Assessment concluded as follows:

*“In view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, it is concluded that the Proposed Development, whether individually or in combination with other plans or projects, beyond reasonable scientific doubt will not have significant effects on the following European Sites. They have therefore been screened out.*

- *Dunragh Loughs/Pettigo Plateau SAC (001125)*
- *Donegal Bay (Murvagh) SAC (000133)*
- *Meenaguse Scragh SAC (001880)*
- *Lough Nageage SAC (002135)*
- *Meenaguse/Ardbane Bog SAC (000172)*
- *Monegal Bog SAC (UK0030211)*
- *Lough Nillan Bog (Carrickatlieve) SAC (000165)*
- *Tamur Bog SAC (001992)*
- *Ballintra SAC (000115)*
- *Lough Derg (Donegal) SPA (004057)*
- *Pettigo Plateau Nature Reserve SPA (004099)*
- *Donegal Bay SPA (004151)*
- *Lough Nillan Bog (Carrickatlieve) SPA (004110)*

*It cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the Proposed Development, individually or in combination with other plans and projects, would have a significant effect on the following European Sites:*

- *Croaghonagh Bog SAC (000129)*
- *River Finn SAC (002301)*
- *Lough Eske and Ardnamona Wood SAC (000163)*
- *River Foyle and Tributaries SAC (UK0030320)*

*As a result, an Appropriate Assessment of the Proposed Development is required and a Natura Impact Statement shall be prepared in respect of the Proposed Development”.*

The predicted indirect and residual effects on these European Sites are fully described in the NIS which will be submitted to the Planning Authority as part of the planning application. The conclusions of that NIS are provided below:

*It can be excluded, on the basis of objective scientific information, that the project, individually or in combination with other plans or projects, will not affect the integrity of any European Site.*

### **6.4.3 Effects on Receptors of Local Importance (Lower Value)**

General effects on flora and fauna associated with the wind farm development are described in this section where they occur in areas that have not been identified as KERs. The majority of the EIAR study area has been identified as being of **Local Importance (Lower Value)** from an ecological perspective given the extensive area of coniferous plantation within the site (Table 6.14).

#### **6.4.3.1 Construction Phase**

##### **6.4.3.1.1 Habitat Loss (Direct Effect)**

The habitat loss will result from the construction of turbine bases and hardstands for the 19 wind turbines, the construction of the electrical substation/grid connection, borrow pits and construction of new site access tracks.

The areas of habitats of local importance (lower value) that will be affected by the construction of the Proposed Development are shown in Table 6.18.

**Table 6.18: Habitats of Local Importance (Lower Value) affected by the total footprint of the Proposed Development**

Habitat	Area within site, ha	% habitat affected by the Proposed Development within study area	Total Area Affected (ha)
Conifer plantation (WD4)	823.5	5.2	43
Upland blanket bog (PB2)/ Wet Heath (HH3)	54.9	0.5	0.5
Active quarries and mines (ED4)	1.6	0.07	0.07
Cutover blanket bog (PB4)	4.6	0.27	0.27
Wet Heath (HH3)	4.2	0.07	0.07
Scrub (WS1)	2.7	0.01	0.01
Wet grassland (GS4)	0.7	0.02	0.02
Dystrophic lakes (FL1)	0.5	0	0
Other artificial lakes and ponds (FL8)	0.05	0	0
Eroding/upland rivers (FW1)	13.3 km	NA	0
		<b>Total area of habitat affected</b>	<b>22.7 ha</b>

The degree of effect in relation to habitat loss, in the absence of best practice, is assessed as **Long Term Slight Negative Effect**. This is because the loss of these habitats will not represent any significant loss of biodiversity. In addition, all these habitats are highly modified from their natural state, subject to high levels of management and widespread in the local area.

The Proposed Development will inevitably result in some fragmentation as it bisects certain areas of habitat, primarily conifer plantation (WD4).

#### **6.4.3.1.2 Habitat fragmentation**

The degree of effect in relation to habitat fragmentation is assessed as **Permanent Slight Negative Effect**, given the non-native composition of the existing plantation forestry. The effect is classified as *slight* as the construction corridor has been designed to utilise existing site tracks, thereby minimising an increase in new access tracks. This will minimise fragmentation for species such as pine marten or red squirrel. The proposed works will not result in any significant habitat fragmentation within the Proposed Development site during the construction phase and consequently no significant residual effects are anticipated.

#### **6.4.3.1.3 Disturbance of Fauna**

Effects on species such as pine marten, Irish hare, common frog and deer species are not considered likely to be of significance given that the surveys undertaken did not indicate that the EIAR study area provides important habitat for populations of local, county or national significance for these species. Consequently, these species are considered to be receptors of Local Importance (Lower Value) and are not included as KERs.

The degree of effect, in the absence of best practice, on faunal species is assessed as **Short-term Slight Negative Effect**.

#### **6.4.3.2 Operational Phase**

Significant effects are not anticipated during the operational phase of the Proposed Development as there will be no additional loss or fragmentation of habitats associated

with the operation of the wind farm. In addition, the predicted human activity on the site associated with the wind farm is anticipated to be low

#### **6.4.3.3 Decommissioning Phase**

Significant effects are not anticipated during the decommissioning phase of the Proposed Development as there will be no additional loss of habitats associated with the decommissioning of the wind farm. Impacts during the decommissioning phase of the wind farm are likely to be similar to those associated with the construction phase, as there is likely to be some requirement for earthworks when reinstating areas around turbine bases or removing site access tracks.

#### **6.4.4 Effects on Key Ecological Receptors**

##### **6.4.4.1 Effects Identified in the Absence of Mitigation Measures**

The following habitats and species have been identified as Key Ecological Receptors (KERs):

- Upland blanket bog (PB2)/ Wet heath (HH3) mosaic & Cutover blanket bog (PB4)
- Dystrophic lakes (FL1)
- Oligotrophic lakes (FL2) Within Lough Eske & Ardnamona Woods SAC
- Watercourses including rivers and stream within the study area.
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation, within River Foyle & Tributaries SAC
- Otter
- Atlantic salmon
- Freshwater pearl mussel
- Bats
- Additional aquatic species

Effects on these key ecological receptors as defined in the preceding sections are described in tables 5.19 to 5.25.

Although there are habitats of ecological significance within the study area, the development footprint is dominated by habitats considered to be of low ecological value. Much of the development site consists of Conifer Plantation (WD4).

The following sub sections detail the significance of potential effect during construction, operation and decommissioning phases of the Proposed Development.

**6.4.4.1.1 Dystrophic lakes (FL1) National Importance**

**Table 6.19 Impact Characterisation for Ecological Receptor based on EPA (2002) guidelines**

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development		Significance of potential effect (EPA 2002)
<b>Construction Phase</b>		
<b>Habitat Loss/ degradation</b>	The Proposed Development has been designed to avoid any direct habitat loss. The dystrophic lake is located hydraulically up gradient of the proposed construction area therefore no potential pathway for emissions to impacts the lacustrine habitat exist. Given the extent of existing drainage and the separation (100m) from the sensitive habitats, indirect effects during construction are not anticipated.	<b>No effect</b> identified with regard to direct habitat loss or degradation.
<b>Operational Phase</b>		
<b>Habitat Loss/ degradation</b>	The dystrophic lake is located hydraulically up gradient of the Proposed Development therefore no potential pathway for emissions to impact on the lacustrine habitat exist. Given the extent of existing drainage and separation (100m) from the sensitive habitats, indirect effects during operation are not anticipated.	<b>No effect</b> identified with regard to direct habitat loss or degradation.
<b>Decommissioning Phase</b>		
<b>Habitat Loss/ degradation</b>	For the same reasons as discussed in relation to construction, no effects are anticipated on this receptor during decommissioning	<b>No Effect</b>

**6.4.4.1.2 Watercourses including rivers and streams within the study area. Local Importance (Higher Value)**

**Table 6.20 Impact Characterisation for Ecological Receptor based on EPA (2002) guidelines**

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development		Significance of potential effect (EPA 2002)
<b>Construction Phase</b>		
<b>Habitat Loss/ degradation</b>	<p>The Proposed Development has been specifically designed to avoid all instream works and the requirement for direct impacts on any watercourses. The turbine bases and all other major infrastructure will be located over 50 metres from any watercourse.</p> <p>The felling of forestry to facilitate construction and the construction activity itself has the potential to result in the run off of silt, nutrients and other pollutants into these watercourses.</p> <p>This would represent an indirect impact on water quality. The significance of any potential impacts is limited by the design of the scheme, which avoids all major infrastructure within 50m of any watercourse.</p>	In the absence of the implementation of best practice and mitigation, indirect habitat degradation is assessed as a <b>Potential Short-Term Moderate Negative Impact.</b>
<b>Operational Phase</b>		
<b>Habitat Loss/ degradation</b>	<p>The operation of the Proposed Development will not result in any habitat loss and therefore no direct impact is predicted</p> <p>The increased hard standing and tracks on the site have the potential to increase the volume and speed of run off from the site. This is not anticipated to be a significant impact as the project has been designed to avoid all major infrastructure within 50 metres of any watercourse</p>	In the absence of the implementation of best practice and mitigation indirect habitat degradation is assessed as a <b>Potential Long-term Slight Negative Impact.</b>
<b>Decommissioning Phase</b>		
<b>Habitat Loss/ degradation</b>	<p>There is some potential for the increased activity on the site that would be associated with the decommissioning of a wind farm to impact on water quality within the streams on the site. The potential effects would be similar in nature to those predicted in the construction phase but there would be far lower levels of activity and new road construction or concrete pouring etc.</p>	In the absence of the implementation of best practice and mitigation, indirect habitat degradation is assessed as a <b>Potential Short-Term Slight Negative Impact.</b>



**6.4.4.1.3 Water courses of plain to montane levels with the *Ranuncion fluitantis* and *Callitricho-Batrachion* vegetation, within River Foyle & Tributaries SAC & Oligotrophic Lakes (FL2) Within Lough Eske & Ardnamona Woods SAC. (International Importance)**

**Table 6.21 Impact Characterisation for Ecological Receptor based on EPA (2002) guidelines**

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development		Significance of potential effect (EPA 2002)
<b>Construction Phase</b>		
<b>Habitat Loss/ degradation</b>	<p>The potential pathway for impact on these two habitats that are located outside the site downstream of the Proposed Development is via deterioration of surface water quality. There is therefore no potential for direct impacts on these habitats</p> <p>The potential for indirect impacts on water quality during the construction phase is described above in the preceding tables.</p> <p>However, the potential for the proposed wind farm to result in significant effects on either of these two habitats is much reduced as they are not recorded from the site. The Oligotrophic lake is located downstream of the cable route and these minor works will be undertaken entirely within the road carriageway. Similarly, the <i>Ranunculus</i> habitat is not found within the watercourses on the site itself. Any impacts on the watercourses as a result of the Proposed Development are not likely to result in anything other than a slight impact on the watercourses downstream of the site.</p>	<p>In the absence of the implementation of best practice and mitigation, indirect habitat degradation is assessed as a <b>Potential Short-Term Slight Negative Impact.</b></p>
<b>Operational Phase</b>		
<b>Habitat Loss/ degradation</b>	<p>As with the construction phase, whilst there is a pathway for impact during the operational phase, it is much reduced in the case of the <i>Ranunculus</i> habitat due to it not being present on the site. In respect of the Oligotrophic Lake, this is located on the cable route and there is no potential for effects during the operation phase.</p>	<p>In the absence of the implementation of best practice and mitigation indirect habitat degradation on the <i>Ranunculus</i> habitat is assessed as a <b>Potential Long-term Slight Negative Impact.</b></p> <p><b>There is no potential for effects</b> on the Oligotrophic Lake</p>
<b>Decommissioning Phase</b>		
<b>Habitat Loss/ degradation</b>	<p>There is some potential for the increased activity on the site that would be associated with the decommissioning of a wind farm to impact on water quality within the streams on the site and therefore potentially on the <i>Ranunculus</i> habitat. The potential effects would be</p>	<p>In the absence of the implementation of best practice and mitigation indirect habitat degradation on</p>

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development	Significance of potential effect (EPA 2002)
<p>similar in nature to those predicted in the construction phase but there would be far lower levels of activity and now road construction or concrete pouring etc.</p> <p>There would be no decommissioning works associated with the cable route and therefore no potential pathway for impact on the Oligotrophic Lake</p>	<p>the <i>Ranunculus</i> habitat is assessed as a <b>Potential Short-term Slight Negative Impact.</b></p> <p><b>There is no potential for effects</b> on the Oligotrophic Lake.</p>

**6.4.4.1.4 Otter & Atlantic Salmon (International Importance). Additional Fish Species (Local Importance (Higher value)**

**Table 6.22 Impact Characterisation for Ecological Receptor based on EPA (2002) guidelines**

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development	Significance of potential effect (EPA 2002)
<b>Construction Phase</b>	
<b>Habitat Loss/ degradation</b>	<p>Direct impacts on otter and Atlantic salmon are not anticipated. There will be no loss of resting or breeding places associated with the development as there will be no instream works and all major infrastructure is located over 50 metres from any watercourse.</p> <p>In addition, the site surveys did not indicate that the study area held a significant population of otter with no signs of the species recorded.</p> <p>Potential indirect effects may include deterioration of habitat resulting from surface water pollution associated with construction activity as discussed in the previous tables. This potential effect has added significance as the downstream catchments are designated as European Sites for the protection of otter and salmon (River Finn SAC, Lough Eske &amp; Ardnamona Woods SAC and River Foyle &amp; Tributaries SAC). However, there is low potential for the wind farm to affect freshwater habitat outside the site to the extent that they would result in significant effects on otter and salmon within the SACs. This is due to the design of the scheme (major infrastructure over 50m from any watercourse) and the low percentage of the catchment associated with the proposed wind farm</p> <p>The development has been designed to ensure no net loss of otter and salmon habitat or reduction in the ability or potential for otter and aquatic habitat to maintain fish stocks or the prey of otter. Existing forestry access tracks and watercourse crossings will be utilised to minimise the requirement for in stream works. There will be no impediment to otter</p>

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development		Significance of potential effect (EPA 2002)
	passage on any watercourse. A potential for a moderate impact on water quality is only likely to result in a slight impact on these mobile species.	
<b>Displacement</b>	Significant displacement is not anticipated given the low levels of activity recorded on the site. Potential effects may include habitat fragmentation and disturbance during daytime construction operations. However, given the design of the development (major infrastructure over 50m from any watercourse and the short-term nature of the works, there is not considered to be potential for significant impacts on the species in terms of displacement.	In the absence of the implementation of best practice and mitigation, displacement is assessed as a <b>Potential Short-Term Slight Negative Impact</b>
Operational Phase		
<b>Habitat Loss/ degradation</b>	There will be no habitat loss or fragmentation associated with the operational phase of the Proposed Development.  The increased hard standing and tracks on the site have the potential to increase the volume and speed of run off from the site. This is not anticipated to be a significant impact as the project has been designed to avoid all major infrastructure within 50 metres of any watercourse but is a potential pathway for impact.	In the absence of the implementation of best practice and mitigation, habitat loss and degradation is assessed as a <b>Potential Long-Term Slight Negative Impact</b>
<b>Displacement</b>	It is unlikely that there will be any significant displacement of these species during the operational phase of the development given that the majority of the proposed works are located in areas of unsuitable habitat away from watercourses.	<b>Long-term Imperceptible Negative Effect</b>
Decommissioning Phase		
<b>Habitat Loss/ degradation</b>	It is likely that the works during the decommissioning phase of the proposal will be similar to those during the construction phase. However, works during the decommissioning phase will be reduced, as the newly constructed site access tracks will be retained to facilitate forestry activity in the area. Significant direct or indirect effects are not anticipated.	In the absence of the implementation of best practice and mitigation, habitat loss and degradation is assessed as a <b>Potential Short-Term Slight Negative Impact</b>
<b>Displacement</b>	The nature and scale of the works associated with the decommissioning phase are likely to be similar to those during the construction phase, however, reduced in scale as site access tracks are likely to be left in situ. Significant effects are not anticipated.	<b>Short-term Imperceptible Negative Effect</b>

#### 6.4.4.1.5 Bats

**Table 6.23 Impact Characterisation for Ecological Receptor based on EPA (2002) Guidelines**

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development		Unmitigated significance of potential effect (EPA 2002)
<b>Construction Phase</b>		
<b>Habitat loss/ degradation</b>	Loss or degradation of commuting/foraging habitat has potential to reduce feeding opportunities and/or displace bat populations. Construction will result in a loss of forestry habitat within the Study Area. However, linear connectivity will be maintained throughout the site and there will be an overall gain in forestry edge habitat available to foraging and commuting bats.	<b>Long-term Slight Positive Effect</b>
	Loss or degradation of roosting habitat has potential to displace bat populations and/ or impact breeding success. No roosts were identified or sites with potential for maternity colonies, swarming or hibernation.	<b>No Effect</b>
<b>Disturbance/ Displacement</b>	Bats may be disturbed by increased human presence and increased noise during construction, leading to avoidance of the area. However, the Study Area is not utilised by a large populations of bats. No sites suitable for maternity colonies, swarming or hibernation were identified. In addition, construction works will be temporary.	<b>Short-term Slight Negative Effect</b>
<b>Mortality</b>	The potential for bats to be killed during removal of trees or structures was considered in this assessment. All built structures were assessed for roosting potential and no roosts were identified within Study Area. No trees with potential to support significant bat roosts were identified. The development is located within conifer forestry with no large mature broadleaved trees to be affected.	<b>No Effect</b>
<b>Operational Phase</b>		
<b>Disturbance/ Displacement</b>	Bats may be disturbed by noise and/or movement of operational wind turbines, leading to avoidance of the area. However, the Study Area is not utilised by large populations of bats. It is unlikely there will be any significant disturbance or displacement during the operational phase.	<b>Long-term Imperceptible Negative Effect</b>
<b>Mortality</b>	Death may occur through collision with turbine blades or as a result of barotrauma. Significant fatalities may negatively affect local and national bat populations.	<b>Long-term Slight Negative Effect</b>

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development		Unmitigated significance of potential effect (EPA 2002)
	<p>To date, no studies have conclusively linked pre-construction activity surveys to post-construction fatality rates (Hein et al. 2013). However, there is a strong positive correlation between post-construction activity and fatality at wind farms (Kunz et al. 2007, Baerwald and Barclay 2009, Amorim et al. 2012, Korner-Nievergelt et al. 2013).</p> <p>Activity levels for all species was assessed as low. Therefore, provided there is no significant change in activity as a result of the Proposed Development, a significant negative effect is not predicted. Post-construction activity monitoring and fatality searches will be undertaken to monitor for any changes.</p>	
Decommissioning Phase		
<b>Habitat loss/ degradation</b>	Activities during the decommissioning phase are similar to those during the construction phase. No significant negative effects are predicted during the decommissioning phase.	<b>No Effect</b>
<b>Disturbance/ Displacement</b>	Activities during the decommissioning phase are similar to those during the construction phase. No significant negative effects are predicted during the decommissioning phase.	<b>Short-term Slight Negative Effect</b>
<b>Mortality</b>	Activities during the decommissioning phase are similar to those during the construction phase. No significant negative effects are predicted during the decommissioning phase.	<b>No Effect</b>

#### 6.4.4.1.6 Freshwater pearl mussel (international Importance)

**Table 6.24 Impact Characterisation for Ecological Receptor based on EPA (2002) guidelines**

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development		Significance of potential effect (EPA 2002)
Construction Phase		
<b>Habitat Loss/ degradation</b>	There will be no direct effect on this species as a result of the Proposed Development as no instream works at any stage of the development. In addition, the windfarm site itself is not located in a freshwater pearl mussel catchment. Only a section of the grid connection route is located in the Eske catchment and this is over four kilometres from known freshwater pearl mussel populations in the River Eske. The dedicated survey that was undertaken for the species did not record any pearl mussels upstream of Lough Eske.	In the absence of the implementation of best practice and mitigation, habitat loss and degradation is assessed as a <b>Potential Short-Term Slight Negative Impact</b>

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development		Significance of potential effect (EPA 2002)
	The small scale nature of the proposed works, which are primarily within the road infrastructure within this catchment and the buffering effect of Lough Eske, significantly limit the potential for the proposed works to impact on this species and a precautionary approach has been taken to assigning impact significance as slight.	
Operational Phase		
<b>Any Impact</b>	No works are proposed within this catchment during the operational phase and the grid connection will be underground with no potential to result in effects on this species	<b>No Effect</b>
Decommissioning Phase		
<b>Habitat Loss/ degradation</b>	It is not anticipated that the grid connection will be removed at the end of its use and therefore no works are proposed within the Eske catchment during decommissioning and no potential to effect this species.	<b>No Effect</b>

#### 6.4.4.1.7 Upland blanket bog (PB2)/ Wet heath (HH3) mosaic & Cutover blanket bog (PB4) (National Importance)

Table 6.25 Impact Characterisation for Ecological Receptor based on EPA (2002) guidelines

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development		Significance of potential effect (EPA 2002)
Construction Phase		
<b>Habitat Loss/ degradation</b>	<p>The Proposed Development has been designed to minimise the effects on peatland habitats. The vast majority of the proposed wind farm is located within existing conifer plantation habitats with the cable route located entirely in existing roads and tracks.</p> <p>The optimal design layout for the development requires that two of the turbines and related infrastructure are located in the peatland habitats at the edge of conifer plantation. These habitats have been the subject of detailed habitat classification and assessment and correspond to the Annex I habitats Active Blanket Bog [7130* priority] and Atlantic Wet Heaths with <i>Erica tetralix</i> (Natura 2000 code 4010) and thus have been assigned National Importance</p> <p>The effect on this habitat mosaic will be the direct loss of 0.89 ha. This is not considered to be significant in the context of the amount of the habitat that will be retained within the site and the size of the overall peatland from which this small area will be lost.</p>	In the absence of the implementation of best practice and mitigation, habitat loss and degradation is assessed as a <b>Potential Permanent Moderate Negative Impact</b>

Analysis of potential effects during construction, operation and decommissioning phases of the Proposed Development		Significance of potential effect (EPA 2002)
	<p>In addition to the direct habitat loss, there will be an indirect drainage effect surrounding the footprint. Given the topography of the site nature of the peatland habitats and lack of watercourses in the area, this effect is unlikely to be significant. Chapter 9, hydrology, states that "<i>due to the shallow depth of peat overlying competent, low permeability bedrock, hydrological impacts on blanket bog are only expected to be localised to the works area and temporary in nature (i.e. construction phase)</i>".</p> <p>It should also be noted that the proposed turbines are located adjacent to existing conifer plantation and are accessed through that forestry thus fragmentation of the peatland habitat is avoided.</p>	
Operational Phase		
<b>Habitat Loss/ degradation</b>	There will be no additional loss or degradation of the peatland habitats during the operation of the wind farm	<b>No effect</b>
Decommissioning Phase		
<b>Habitat Loss/ degradation</b>	The decommissioning of the wind farm will not require any further habitat loss or degradation	<b>No Effect</b>

## 6.5 Mitigation Measures

This section describes the measures that are in place to mitigate any potentially harmful or negative effects associated with the Proposed Development and the identified KERs as described in the preceding sections. General mitigation measures included within the design of the scheme of the Proposed Development are described first, with more specific measures to prevent or minimise effects on the individual receptors provided subsequently.

### 6.5.1 Mitigation by Avoidance

The Proposed Development has been designed to avoid ecologically sensitive areas where possible and has been constraint led from the initial design phase. As such, the development is located primarily within coniferous forestry and follows existing tracks as much as possible. All major infrastructure such as turbine bases, borrow pits, sub stations and construction compounds will be located at a distance of over 50 metres from any watercourse. The requirement for any in-stream works in relation to any element of the Proposed Development has been entirely avoided.

The project design has followed the basic principles outlined below to eliminate the potential for ecological effects on KERs where possible and to minimise such effects where total elimination is not possible.

The Proposed Development has been designed to avoid any direct impacts on European or Nationally Designated Sites by firstly ensuring that they are outside the boundary of the Proposed Development area and secondly ensuring that all major infrastructure is located at a distance where there is no potential for such effects.

The Proposed Development has been specifically designed to minimise the potential for impacts on watercourses in any form as these provide a direct pathway for effect to downstream European Sites and other sensitive aquatic receptors.

The Proposed Development has been designed to minimise effects on habitats that correspond to those that are listed on Annex I of the EU Habitats Directive outside of the European and nationally designated sites. The proposed design will result in the loss of 0.891 hectares of Annex I habitat but, the effect has been minimised in the design by ensuring that the turbines are located at the edge of the peatland habitat and are accessed through forestry plantation habitat.

The development has been specifically designed to avoid instream works ensure no net loss of fish habitat or reduction in the ability or potential for fisheries and aquatic habitat to maintain fish stocks or the food of fish. There will be no impediment to fish passage in any watercourse. The watercourse crossings proposed will allow fish movement upstream of the works. Any watercourse crossings required will be installed outside of the salmonid spawning season, October to June in any year, in accordance with Inland Fisheries Ireland best practice ([IFI, 2016](#)). This will ensure no there is no potential for impacts on salmonid spawning habitat.

Whilst all major infrastructure is located over 50 metres from any watercourse, there will be the requirement for bankside works and the crossing of some watercourses with the site roads and the grid connection. When working in close proximity to any watercourses, the methods that will be followed will prevent any disturbance to the bankside habitats or the potential for any silt laden run off or other pollutants to enter any watercourse. The design of all infrastructure in areas close to watercourses



provides for the continued passage of wildlife along the river corridors and thus avoids habitat fragmentation.

### **6.5.2 Mitigation through Best Practice**

The project design of the Proposed Development as described in Chapter of this EIAR and related appendices sets out very clearly how the wind farm including the grid connection will be constructed and operated in accordance with best industry practice to avoid any significant effects outside the site including the prevention of impacts on watercourses. Some of the key features of the environmental management strategy are provided below:

- A Construction and Environmental Management Plan (CEMP) has been prepared, and is included as Appendix 4.4 of this EIAR. The CEMP will be in place prior to the start of the construction phase. Best practice measures which form part of the design of the project are included in Chapter 4 of the EIAR.
- Machinery and materials will either be parked/stored in the specified compound areas. Wherever possible, vehicles will be refuelled off-site in designated areas. This will be the case for regular, road-going vehicles.
- On-site refuelling of machinery will be carried out using a mobile double skinned fuel bowser at dedicated locations away from watercourses.
- The fuel bowser, a double-axle custom-built refuelling trailer will be towed around the site by a four-wheel drive jeep to where machinery is located. It is not practical for all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the proposed wind farm. The jeep will also carry fuel absorbent material and pads in the event of any accidental spillages.
- The fuel bowser will be parked on a level area in the construction compound when not in use.
- Refuelling operations will be carried out only by designated trained and competent operatives.
- Mobile anti-pollution measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.
- Materials excavated (e.g. peat, soil, gravel or rock) during construction of the turbine bases, electrical sub-station, or during construction of new roadways or the upgrading works on existing roadways will be reused within the site.
- Re-use of these materials within the site will occur under conditions where there is no possibility of the material becoming mobile in the environment and entering into either surface or ground waters.
- The CEMP also provides for the appointment of a Site Supervisor/Construction Manager and/or Environmental Manager to maintain responsibility for monitoring the works and Contractors/Sub-contractors from an environmental perspective. In addition, an Environmental Clerk of Works or Project Ecologist, Project Hydrologist, Project Geotechnical engineer will visit the site regularly and report to the Site Environmental Office. This structure will provide a "triple lock" review/interaction by external specialists during the construction phase.

### **6.5.3 Flora and Fauna Mitigation Strategy**

The site specific mitigation strategy described in the sections below ensure compliance with legislation and national guidance as set in Section 6.1.1. The study area is dominated by plantation forestry and mammal activity was generally low, with red deer the most commonly recorded mammal species during site visits.

### 6.5.3.1 Removal of Vegetation

In accordance with Section 40 of the Wildlife Acts 1976-2012, woody vegetation removal will be conducted outside the bird breeding season which runs from the 1<sup>st</sup> of March to the 31<sup>st</sup> of August inclusive. It should be noted that the provisions of Section 40 do not relate solely to birds, but a range of biodiversity that contributes to food chains and wider ecosystems. Where sections of hedgerow/ treeline are removed for the purposes of the junction and road upgrades, these will be reinstated with native hedge/ tree species which are indigenous to the local area.

### 6.5.3.2 Replacement of Annex I Habitat to be Lost

The proposed wind farm will result in the loss of approximately 0.891 hectares of peatland habitat that has been classified as a mosaic of the Annex I habitats Active Blanket Bog [7130\* priority) and Atlantic Wet Heaths with *Erica tetralix* (Natura 2000 code 4010). The drainage plan for the site has been specifically designed to limit the extent of impacts outside the immediate footprint as much as possible. The area that is lost or degraded through drainage to facilitate turbines 16 and 19 will be compensated for in full by felling and equivalent area of land where conifers have been planted on blanket bog and heath habitat and have failed or struggled to grow and implementing a bog restoration programme in accordance with the published guidelines and best practice such as the guidelines arising from the EU-LIFE/Coillte '*Irish Blanket Bog Restoration Project*' (2002-2007), Scottish Natural Heritage (SNH)'s guidance note *Planning for development: What to consider and include in Habitat Management Plans* (Version 2, January 2014). The areas to be restored will be located where forestry is to be felled to facilitate the turbines and will be equal to or greater than the area lost to facilitate the turbines.

The habitat enhancement measures will be finalised following the felling of the forestry necessary to facilitate the turbines and turbulence areas, to allow a full appraisal of the enhancement potential of the sites. A detailed habitat enhancement management plan (HEMP) will be prepared for all areas that are subject to restoration.

The main management techniques to be undertaken within these replacement areas are as follows:

- All coniferous forestry will be felled within the replacement areas.
- Drains will be blocked, where appropriate, using peat dams or plastic dams, as appropriate. The drains to be blocked will be selected prior to the finalisation of the HEMP and a methodology will be included in the final plan.
- Any grazing (if necessary) will be strictly controlled and undertaken strictly for the purpose of peatland restoration.
- Peat extraction within the proposed enhancement area will not be permitted.
- Burning and dumping will not be permitted.
- The planting of forestry will not be permitted during the lifetime of the proposed wind farm.
- No vehicular access will be permitted to or within the dedicated enhancement areas once all initial works are completed.
- Self-seeded conifers from adjacent conifer plantation areas will be cleared and removed (by hand or brushcutter) from the enhancement areas on an ongoing basis, following the felling of the existing forestry.
- In the event of any invasive species being recorded within the enhancement areas, an invasive species management plan will be put in place to eradicate any stands of such species. A survey for invasive species will be undertaken as part of preparatory work for the final HEMP and any actions required in this regard will be included in the finalised HEMP.

The plan will be the subject of ongoing monitoring to assess the effectiveness of the measures proposed and employed and to contribute to advances in habitat management methods, which can be applied to future similar projects. The monitoring measures will include:

- **Vegetation sampling:** A number of fixed relevé sites (i.e. permanent quadrats) will be set up in areas where active management is proposed of previously forested areas. Baseline data will be recorded prior to the commencement of habitat management activities set out in this outline plan. The character of each relevé will be recorded (e.g. species proportions present using Domin scale, vegetation structure) and photographs will be taken of each relevé from a fixed point. These relevés will then be re-examined during years 1, 2, 3, 5, 10, 15 and 25 following commencement of the plan in place in order to establish the extent of habitat improvement resulting from management practices. The finalised HEMP will contain the locations of the relevés.
- **Hydrological monitoring:** Water levels within areas where drains are blocked will be recorded quarterly for two years. A number of phreatic stand pipes will be installed (prior to restoration) to allow monitoring of water levels within the restoration area and outside the restoration area in. In this way, any positive impacts on the local hydrology can be verified and quantified.

The efficacy of the habitat rehabilitation and enhancement measures employed will be reviewed in years 1, 2, 3, 5, 10, 15 and 25 following commencement of the plan on the basis of the results of vegetation sampling and water level readings from the managed areas. Analysis of the data collected will be the basis for a review of the measures and techniques employed. Should any adjustments to the plan will deemed necessary or advisable, these will be the subject of consultation with the NPWS prior to any alterations to the plan.

Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the plan will be prepared and submitted to the planning authority in years 1, 2, 3, 5, 10, 15 and 25 following commencement of the plan's implementation.

### **6.5.3.3 Pre-construction Mammal Surveys**

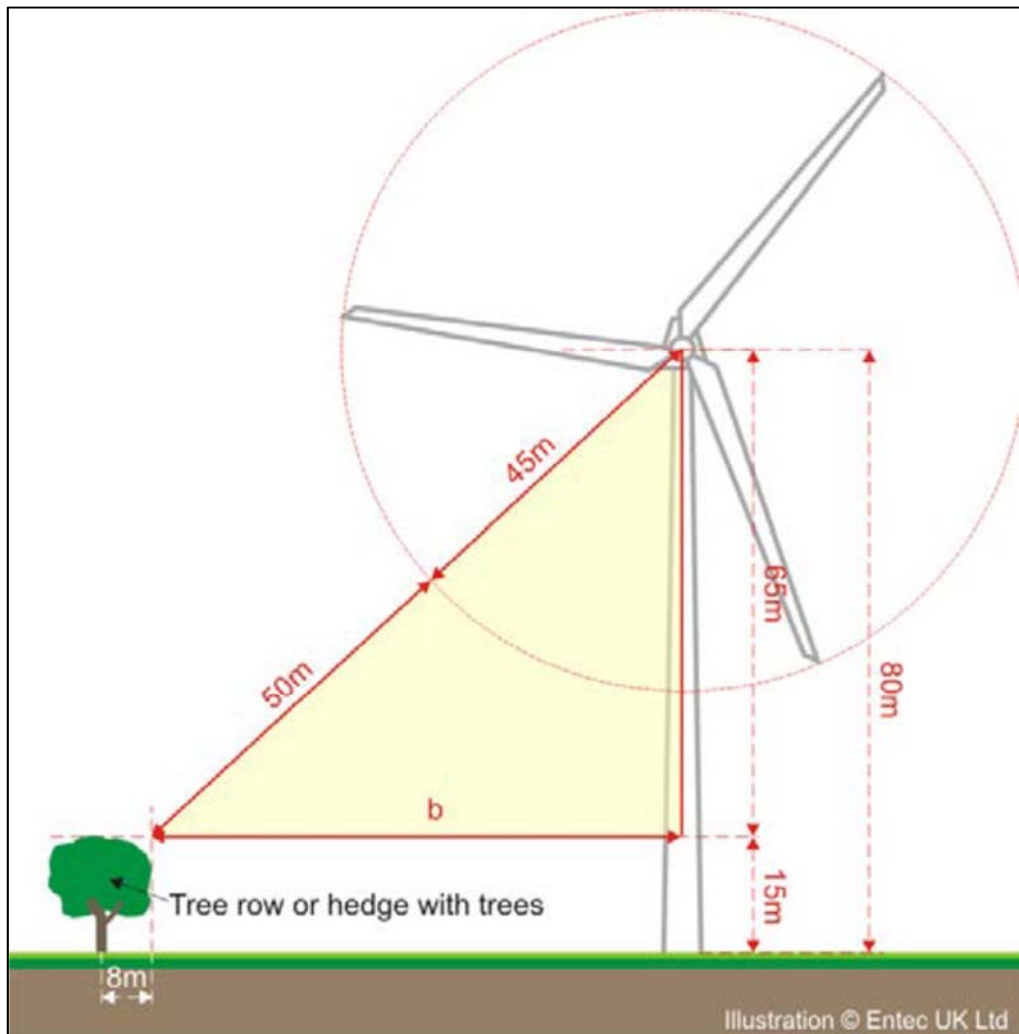
In accordance with NRA Guidance, pre-construction mammal surveys will be undertaken to identify evidence of protected mammals (e.g. in particular Otter holts and Badger setts) within the works areas associated with the Proposed Development. The survey will be undertaken to ensure that such protected species have not taken up residence within or close to the development footprint. Should breeding or resting places be recorded in the pre-construction surveys a site-specific mitigation plan shall be prepared and agreed with the NPWS prior to the commencement of works. It is not anticipated that any protected mammal breeding/resting places will be encountered or require to be excluded as part of the proposed project based on the findings of the extensive surveys undertaken. However, should any breeding/ resting places be encountered during the pre-construction surveys, it will be subject to exclusion procedures as outlined in the TII/ NRA guidelines (2006B).

### **6.5.3.4 Bats**

#### **6.5.3.4.1 Buffer Distances**

Habitats within the Study Area have limited value for bats at present. However, wind farm construction creates linear features and spaces around each turbine, which may

provide favourable conditions for flying insects and foraging bats. Forest clearing will, at a minimum, observe a 50m buffer distance as recommended by Natural England (2014). These vegetation-free areas will be maintained during the operational life of the development.



**Figure 6.7: Calculation of buffer distances (from Natural England, 2014)**

*To minimise risk to bat populations our advice is to maintain a 50m buffer around any feature (trees, hedges) into which no part of the turbine intrudes. This means the edge of the rotor-swept area needs to be at least 50 m from the nearest part of the habitat feature. Therefore, 50m should be the minimum stand-off distance from blade tip to the nearest feature.*

*It is incorrect to measure 50 m from the turbine base to habitat feature at ground level as this would bring the blade tips very close to the canopy of a tall hedgerow tree and potentially put bat populations at risk. Instead, it is necessary to calculate the distance between the edge of the feature and the center of the tower (b) using the formula:*

$$b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$$

*where: bl = blade length, hh = hub height, fh = feature height (all in metres). For the example above, b = 69.3 m (Figure 6.7).*

#### **6.5.3.4.2 Noise Restrictions**

During the construction phase, noise limits, noise control measures, hours of operation and selection of plant items will be considered in relation to disturbance of bats. In addition, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).

#### **6.5.3.4.3 Lighting Restrictions**

Lighting will be avoided wherever possible. Where lighting is required, directional lighting will be used to prevent overspill on to forestry edges. This will be achieved through the use of lighting accessories, such as hoods, cowls, louvers and shields, to direct the light to the intended area only.

#### **6.5.3.4.4 Post-construction Monitoring & Fatality Searches**

Post-construction monitoring and fatality searches will be undertaken during the operational phase of the development. The aim of these surveys is to monitor changes in foraging, commuting and roosting behaviour within the site, the effectiveness of prescribed buffer distances and to record any fatalities.

In accordance with consultation recommendations and best practice guidelines, a minimum of three years post-construction monitoring will be undertaken (BCI 2012, Rodrigues et al. 2015). Late summer and autumn has been previously identified as the highest collision risk period for bats (Mathews et al. 2016). Therefore, 4 searches will be undertaken at monthly intervals between June and September in Years 1, 2 and 3 of the lifetime of the wind farm. Bat corpse searches can be conducted in conjunction with any bird corpse searches and will follow methods outlined by Rodrigues et al. (2015).

Bat corpses, due to their small size and dark colouring, are exceptionally difficult for humans to detect in the field (Mathews et al 2013, Arnett 2006). Therefore, trained sniffer dogs will be employed in fatality searches. In keeping with consultation recommendations best practice guidance, all fatality estimates will incorporate searcher efficiency and scavenger removal trials, specific to the site, as well as the impact of search plot size (BCI 2012a, Hundt 2012, Rodrigues 2015).

In accordance with best practice, post-construction activity surveys will be carried out in conjunction with fatality searches (BCI 2012, Hundt 2012, Rodrigues 2015). A dusk and a dawn survey will be carried out on the night preceding any bat fatality search. Activity surveys will comprise walked transects and static detector surveys at ground level. The aim of post-construction activity surveys is to assess any changes in bat activity and habitat use on site, monitor the effectiveness of prescribed buffer distances and to provide context to fatality search results.

Results from post-construction monitoring, fatality searches and efficiency trials will be compiled for each year and reported to NPWS and copied to the Department of Culture, Heritage, and the Gaeltacht (as per consultation recommendations). Reporting will provide an estimate of overall fatality rates for all turbines, taking into consideration any identified search biases. In addition, fatality estimates will consider any cumulative effects that may arise from adjacent wind farm developments. If a negative effect on bats is observed, a plan of action will be determined with the NPWS without delay.

#### 6.5.4 Mitigation to Protect Water Quality

It is noted that many of the identified KERs are aquatic in nature and the only pathway for effects that exists is via the potential for the Proposed Development to result in effects on surface water. As such, the Proposed Development has been designed to avoid such effects. All large-scale infrastructure such as turbines, site compound and borrow pit are located as far from watercourses as possible (minimum of 50 m). The proposed site track layout has also been designed to use existing forestry access tracks, thereby minimising the need for new watercourse crossings through the use of existing bridges. The best practice construction measures are designed to avoid impacts on watercourses both within the site and downstream. The development has been designed to maintain a drainage neutral situation to avoid drainage related impacts. The drainage management plan and all associated measures to minimise and prevent impacts on aquatic habitats are provided in Chapter 9 of this EIAR - Hydrology and Hydrogeology and also in the CEMP.

The Proposed Development includes a detailed drainage plan that is included in full in Chapter 9 of the EIAR. This plan and all the associated measures have been taken into account in this assessment but are not included in full (to avoid repetition). The drainage design philosophy overall is to minimise surface water runoff arising on site, to adequately control and manage surface water runoff containing suspended solids and to ensure that the hydrological function of the watercourses on the site and wider catchment is not affected by the proposed works. This philosophy including all associated mitigation measures to protect local surface water quality are fully described in Section 4.7 of Chapter 4 (Description of the Proposed Development) and Chapter 9 (Hydrology & Hydrogeology) of this EIAR. The plan is followed in the detailed methods that are described in the CEMP in Appendix 4.4 of the EIAR. The detailed drainage plan covers all aspects of the Proposed Development including the cable route and all stages of development from site clearance and tree felling through to decommissioning. A detailed surface water monitoring programme is included in the CEMP. The monitoring programme that is set out within the CEMP is designed to act as an early warning system to safeguard against failure of the mitigation to operate as anticipated. It is therefore designed to prevent any impacts occurring as a result of failure of the prescribed mitigation.

The NRA *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes* and the Scottish Natural Heritage (SNH) *Good Practice During Wind Farm Construction* will be implemented in the construction phase of the development.

The following measures will be put in place to prevent the transportation of silt laden water or pollutants from entering the wider environments including downstream watercourses.

- Short sections of trench will be excavated at any one time and backfilled at the end of each day to avoid large areas of unconsolidated soil around the works area at any one time. The works area will be reinstated in sections as the development moves along.
- Excavated material will either be stored in a neat pile adjacent to the trench or removed using a trailer to a suitable stockpile site that is located where there is no potential for run off to a watercourse.
- Upon filling the trench, the surface will be reinstated either with a road surface or grass verges will be sown with grass seed to consolidate the soil and prevent run off.

- When working in any area where there is the potential for run off of pollutants/silt to an adjacent watercourse, a silt fence will be constructed in order to prevent the pathway for any such run off.
- There will be no release of suspended solids to any watercourse as a direct or indirect result of the proposed works.
- No watercourse will be interfered with as part of the proposed works. No temporary instream crossings or temporary culverting shall take place. Instream works will not take place.
- During periods of heavy precipitation and run-off, works will be halted or working surfaces/pads will be provided to minimise soil disturbance.
- Any requirement for temporary fills or stockpiles will be covered with polyethylene sheeting to avoid sediment release associated with heavy rainfall.
- Directional/horizontal drilling will only be necessary at four locations. Turbidity will be monitored upstream and downstream of the crossing points and all drilling works will cease if there is a 20% variance between the upstream and downstream readings.

### **6.5.5 Mitigation to Prevent the Spread of Invasive Species**

Rhododendron was recorded within the survey area. Due to the legislative requirements to control the spread of noxious weeds and non-native invasive plant species, it is important that any activities associated with the planning, construction and operation of wind farm developments comply with the requirements of the Wildlife Acts, 1976-2012. Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) (S.I. 477 of 2015) include legislative measures to deal with the dispersal and introduction of Invasive Alien Species (IAS), which are listed in the Third Schedule of the regulations.

Regulation 49 deals with the prohibition on introduction and dispersal of certain species while Regulation 50 relates to prohibition on dealing in and keeping certain species (Regulation 50 has not yet been commenced). Invasive species are listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) (S.I. 477 of 2015).

The introduction and/or spread of invasive species such as Himalayan Balsam, Giant Rhubarb or Rhododendron for example, could result in the establishment of invasive alien species and this may have negative effects on the surrounding environs. Appropriate spread prevention measures have been incorporated into the design of the project and are described in the following subsections.

#### ***Control Measures for the Management of Invasive Species***

The following measures address potential effects associated with the construction phase of the project:

- An outline Invasive Species Management Plan is presented in Section 4 of the CEMP (Appendix 4.4 of this EIAR). This will be further developed following a preconstruction invasive species survey of the construction footprint. This report will describe the best practice measures to be adhered to during the laying of the cable route in proximity to identified stands of invasive species. Good construction site hygiene will be employed to prevent the introduction and spread of invasive alien plant species (e.g. Himalayan balsam, Japanese knotweed etc.) by thoroughly washing vehicles prior to leaving any site.
- All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of invasive plant species

- All washing must be undertaken in areas with no potential to result in the spread of invasive species. This process will be detailed in the contractor's method statement.
- Any soil and topsoil required on the site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present.
- All planting and landscaping associated with the Proposed Development shall avoid the use on invasive shrubs such as Rhododendron.

## 6.6 Residual Effects

This section of the report assesses the effects of the Proposed Development on the identified KERs following the implementation of mitigation. As per EPA 2002 criteria, effect significance of greater than *Slight* was not identified for any KER.

### 6.6.1 Upland blanket bog (PB2)/ Wet heath (HH3) mosaic & Cutover blanket bog (PB4)

The impact of the development on these peatland habitats of National Importance will be fully compensated with the restoration of an equal area of suitable conifer forestry to a bog/heath habitat. The restoration will be artificial in nature and will take time to establish and thus the residual impact on these habitats will be a **Long Term Slight Negative Effect**. There is a high likelihood of successful restoration of bog and heath habitat at this location. There are numerous examples of similar successful projects, some of which are described in the EU-LIFE/Coillte 'Irish Blanket Bog Restoration Project' (2002-2007). Similar techniques will be followed in relation to the restoration of peatland habitats in areas surrounding the turbines.

### 6.6.2 Dystrophic lakes (FL1)

There will be no effect on this habitat type and therefore **no residual effect** during any phase of the development.

### 6.6.3 Aquatic Receptors

The aquatic KERs that have the potential to be affected by the Proposed Development have been grouped together for the assessment of residual impacts as the pathway for impact on each is the same – effects on surface water. The relevant receptors are listed below:

- Oligotrophic Lakes (FL2) Within Lough Eske & Ardnamona Woods SAC
- Watercourses including rivers and stream within the study area.
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation, within River Foyle & Tributaries SAC
- Atlantic salmon
- Freshwater pearl mussel
- Additional Aquatic Species

The drainage plan, construction and operational method statements and best practice that is proposed has effectively blocked the pathway for effect on these habitats and species during all operations and phases of the development. The monitoring and failsafe procedures that are in place will ensure that the proposed measures are effective and that works proceed without the occurrence of any pollution incident. The potential for effects on these aquatic receptors is universally reduced to a **Potential Short Term Imperceptible Negative Effect**.



#### **6.6.4 Otter**

As with the other aquatic species above, the impact on Otter as a result of water pollution is classified as a **Potential Short Term Imperceptible Negative Effect**. In addition, there is also the potential for disturbance to the species. Given the design of the development and the construction methodologies and best practice, disturbance/displacement related impacts are also considered to be **Imperceptible**.

#### **6.6.5 Bats**

Taking into consideration the proposed mitigation measures; significant residual effects on bats with regard to habitat loss/degradation, disturbance/displacement or mortality are not anticipated during any phase of the development. The impacts are classified as a **Long Term Slight Negative Effect**.

### **6.7 Cumulative Impacts**

Material for this assessment of cumulative effects was compiled on the relevant developments and land uses near the proposed study area. This included a review of online Planning Registers and served to identify past and future projects, their activities and their predicted environmental effects. The assessment focuses on the potential for cumulative effects on the KERs identified as part of the current assessment. Planning details on projects considered in this assessment are provided in Section 2.7 of the EIAR.

#### **6.7.1 Plans**

The following development plans been reviewed and taken into consideration as part of this assessment:

- Donegal County Development Plan 2012-2018

The review focused on policies and objectives that relate to Natura 2000 sites. Policies and objectives relating to the conservation of peatlands, sustainable land use (including industrial peatlands) were also reviewed, particularly where the policies relate to the preservation of surface water quality.

An overview of the search results with regard to plans is provided in Table 6.1

**Table 6.1 Assessment of Plans**

Plans	Key Policies/Issues/Objectives Directly Related To European Sites In The Zone of Influence	Assessment of Potential Impact on European Sites
	<b>Land Use and Spatial Plans</b>	
<p><b>Donegal County Development Plan 2012-2018</b></p>	<p><b>NATURA 2000 SITES: POLICIES &amp; OBJECTIVE</b></p> <p><b><u>NH-O-2</u></b> To comply with Article 6 of the Habitats Directive (92/43/EEC) and have regard to the relevant conservation objectives, management plans, qualifying interests and threats to the integrity of Natura 2000 sites.</p> <p><b><u>NH-O-3</u></b> To maintain the conservation value of all existing and/or proposed SAC's, SPA's and NHA's and RAMSAR sites including those plant and animal species that have been identified for protection.</p> <p><b><u>NH-P-1</u></b> It is a policy of the Council to ensure development proposals do not damage or destroy any sites of international or national importance, designated for their wildlife/habitat significance.</p> <p><b><u>NH-P-2</u></b> It is a policy of the Council to ensure the protection of Natura 2000 sites in accordance with the EU Habitats Directive (92/43/EEC) and have regard to the relevant conservation objectives, qualifying interests and threats to the integrity of these Natura 2000 sites.</p> <p><b><u>NH-P-4</u></b> It is a policy of the Council to require the consideration of freshwater pearl mussel and any relevant freshwater pearl mussel sub-basin plans in all development proposals that fall within their basin of catchment.</p> <p><b><u>Natural Heritage Policies</u></b></p> <p><b><u>NH-O-6</u></b></p>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network. No potential for cumulative impacts when considered in conjunction with the current proposal were identified.</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites In The Zone of Influence	Assessment of Potential Impact on European Sites
	<b>Land Use and Spatial Plans</b>	
	<p>To ensure where appropriate the protection and conservation of hedgerows, stone walls and traditional field boundaries as natural heritage corridors and migration routes for wildlife where they are shown to play a significant heritage role.</p> <p><u>NH-P-5</u> It is a policy of the Council to require consideration of the impact of potential development on habitats of natural value that are key features of the County’s ecological network and to incorporate appropriate mitigating biodiversity measures into development proposals.</p> <p><u>NH-P-7</u> It is a policy of the Council to retain and protect significant stands of existing trees/hedgerows/woodlands, and seek increased planting of native trees where appropriate in new developments.</p> <p><b><u>Wind Energy Policies and Objectives</u></b></p> <p><u>E-P-18</u> It is a policy of the Council to permit proposals to extend existing or permitted wind farms. Where such proposals can satisfy the Planning Authority that they are in accordance with the Wind Energy Guidelines 2006 (DoEHLG) and the potential cumulative impacts of further on-site construction upon, landscapes, habitats, soil stability and environmental habitats do not result in significant environmental damage.</p> <p><u>E-P-20</u> It is a policy of the Council that potential impacts on natural, built and cultural heritage including impacts on archaeological monuments and watercourses are assessed as part of Windfarm development proposals. Where such impacts are identified, mitigation measures such as buffer zones, separation distances and access arrangements should be employed as appropriate.</p>	

## 6.7.2 Other Plans & Projects

Assessment material for this in combination impact assessment was compiled on the relevant developments within the vicinity of the proposed project and was verified on the 12/10/2017. The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIS documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. The projects considered in relation to the potential for in combination effects and for which all relevant data was reviewed (e.g. individual EISs, layouts, drawings etc.) include those listed below.

### ▪ **Ballybofey Stranorlor N15 Bypass**

The Ballybofey/Stranorlor Bypass comprises of approximately 15 kilometres of type two dual carriageway and will provide a bypass for the twin towns of Ballybofey and Stranorlor. The scheme includes a 1.2 kilometre road to link the bypass to the existing N15 at Ballybofey and a major bridge crossing of the River Finn. In October 2009, An Bord Pleanála made a decision to refuse to approve the proposed scheme. From discussion with Donegal County Council, it is intended that the scheme will be amended by Donegal County Council to accommodate the reasons for refusal notified by An Bord Pleanála. The previously proposed bypass is located approximately 3.5 kilometres from the proposed wind farm. Progression of this scheme through the planning phases has currently been suspended with no current plans to re-submit an application. Therefore, the by-pass could not be included in the Cumulative Impact Assessment as there are no new proposals available at this time.

### ▪ **N15 Blackburn Bridge Re-alignment Scheme**

The N15 Blackburn bridge road scheme involves the construction of 2.4 kilometres of standard single carriageway on the N15 national primary route in County Donegal, between Ballybofey and Donegal town, commencing at the bottom of McGroary's Brae.

The route traverses predominantly rural countryside in County Donegal and shall, generally be of online construction with some greenfield locations to improve existing alignment. The scheme will comprise localised realignment of single carriageway local roads, a principal bridge structure, together with all other structures necessary as part of the works and various direct accesses and access tracks. The scheme is located approximately 4.5 kilometres from the Proposed Development. This application has been approved and Phase One of the project was completed in May 2017.

### ▪ **Clogher Substation**

Clogher 110kV Substation comprises a compound area measuring 1640m.sq, surrounded by a 2.6m high palisade fence, four end masts, associated site works and and site roads at Cullionboy, Barnesmore, Co. Donegal. The permitted substation will be located in a rural location east of the Barnesmore Gap and is required to connect permitted wind farms to the electricity grid. Permission was granted by Donegal County Council in April 2011.

### ▪ **Stone Quarry**

The quarry consists of stone extraction, washing screening and crushing facility, settling ponds, open storage of crushed stone, store buildings, site shelter and ancillary site works at Croaghonagh, Ballybofey, Co. Donegal. The site is located off the local road from which access to the current proposal is achieved from the N15 in close proximity to Barnesmore Gap. The Quarry is also located within the study area boundary. The Quarry was subject to an application for substitute consent in April 2013 which was granted in November 2014 and is currently operational.

### 6.7.3 Other Wind Farm Developments

The wind farm projects have been categorised into eight groups based on two considerations:

1. Their proximity to the proposed wind farm.
2. Whether the project is permitted/operational or pending/under appeal

The wind farm groups are divided as follows:

- Operational and Permitted Wind Farm Projects within 5 kilometres
  - Lough Golagh Windfarm (25 Turbines Operational)
  - Straness Windfarm (28 Turbines Permitted)
  - Meenakeeran Windfarm (4 Turbines Proposed)
  - Total: 57 Turbines Operational and Permitted**
- Proposed and Appealed Wind Farm Projects within 5 kilometres.
  - Meenablagh Wind farm (11 Turbines Appealed)
  - Total: 11 Turbines Proposed and Under Appeal**
- Operational and Permitted Wind Farm Projects within 5-10 kilometres
  - Tullywhisker (1 Turbine Permitted)
  - Lough Cuil Windfarm (8 Turbines Permitted)
  - Meenadreen Windfarm and Extension (4 Turbines Operational 5 Permitted)
  - Crighshane Windfarm and Extension (14 Turbines Permitted).
  - Craoghnameal Windfarm (7 Turbines Permitted)
  - Church Hill Windfarm (8 Turbines Operational)
  - Tievenamenta Windfarm (15 Turbines Permitted)
  - Seegronan Windfarm (6 Turbines Permitted)
  - Seegronan Windfarm Extension (3 Turbines Permitted)
  - Meenagrauv Windfarm (4 Turbines Operating)
  - Meenagrauv Extension (1 Turbine Permitted)
  - Total: 76 Turbines Operational and Permitted**
- Proposed and Appealed Wind Farm Projects within 5-10 kilometres
  - Church Hill Windfarm (1 Turbine Proposed)
  - Gronan Windfarm (4 Turbines Proposed)
  - Crighshane Windfarm (5 Turbines Proposed)
  - Meenamullan Windfarm (5 Turbines Proposed)
  - Total: 15 Turbines Proposed and Under Appeal**
- Operational and Permitted Wind Farm Projects within 10-15 kilometres
  - Lough Hill Windfarm (6 turbines Operational)
  - Meenhorna Windfarm (7 Turbines Operating)
  - Slieveglass Windfarm (3 Turbines Permitted)
  - Meenailta Windfarm (6 turbines Operating)
  - Culliagh Windfarm and Extension. (21 Turbines Operating)
  - Meentycat Windfarm (9 Turbines Operating)
  - Ballystrang Windfarm (6 Turbines Operating)
  - Castlecraig Windfarm (10 Turbines Permitted)
  - Meenalaban Windfarm (7 Turbines Operating)
  - Altalow Windfarm (1 Turbine Permitted)
  - Total: 76 Turbines Operational and Permitted**

- Proposed and Appealed Wind Farm Projects within 10-15 kilometres
  - Altgolan Windfarm (7 Turbines Appealed)
  - Meenamullen Windfarm (4 Turbines Proposed)
  - Binawooda Windfarm (13 Turbines Proposed)
  - Crilly/Tullylinn/Pettigo (4 Turbines Proposed)
  - Meehnore Windfarm (2 Turbines Proposed)

**Total: 30 Turbines Proposed and Under Appeal**
  
- Operational and Permitted Wind Farm Projects within 15-20 kilometres
  - Lenalea Windfarm (9 Turbines Permitted)
  - Dromnahough Windfarm (15 Turbines Permitted)
  - Cark Windfarm (24 Turbines Operational)
  - Cark Windfarm Extension (6 Turbines Operational)
  - Cark/Largymore Windfarm (9 Turbines Operating)
  - Anarget Windfarm (6 Turbines Operational)
  - Thornog Windfarm and extension (8 Turbines Permitted)
  - Bessy Bell Windfarms (16 Turbines Operational)
  - Tappaghan Windfarm (13 Turbines Operational)
  - Tappaghan Windfarm Extension (8 Turbines Operational)

**Total: 114 Turbines Operational and Permitted**
  
- Proposed and Appealed Wind Farm Projects within 15-20 kilometres
  - Dunaree Gill Windfarm (6 Turbines Proposed)
  - Koram Hill Windfarm (6 Turbines Proposed)
  - Bessy Bell II Revision (4 Turbines Proposed)
  - Bessy Bell III (10 Turbines Proposed)

**Total: 26 Turbines Proposed and Under Appeal**

Wind farm developments within 5km of Meenbog were reviewed as part of this assessment. Planning details on projects considered in this assessment are provided in Chapter 2 of the EIAR.

**6.7.3.1 Lough Golagh Windfarm**

**PL Ref. 95/914:** Application by Scottish Power PLC for permission to construct 26 no. wind turbines in Barnesmore, approximately 2 kilometres south west of the site boundary. Permission was granted by the Planning Authority in 1996 and was subject to a third-party appeal to An Bord Pleanála. The decision was upheld and a 25 no. the wind turbine farm is now operational.

No EIS is available online for this application.

**6.7.3.2 Straness Wind Farm**

**PL Ref: 04/1526:** Application by Eco Power for the construction of 28 turbines in Straness approximately 3.3 kilometres from the Proposed Development. Permission was granted in September 2009. An Application for an extension of duration for the proposed wind farm was submitted under **PL Ref: 12/50109**. Permission for extension of time granted in July 2012.

No EIS is available online for this application.

### **6.7.3.3 Meenablagh Wind Farm**

**J/2011/0148/F:** Application by Meenablagh Wind Farm to construct 11 no. wind turbines in Meenablagh, Co. Tyrone. Application is currently under appeal to the Planning Appeals Commission.

#### **Flora and Fauna**

The predominant habitats within the wind farm site were peatland, mainly cutover or eroding blanket bog.

Upland Blanket Bog was found to correspond to Annex I status. Some Cutover Bog and Eroding Blanket Bog was found to correspond to Annex I status.

Otter was not recorded however the presence of suitable habitat was noted.

Salmon was not recorded however the presence of suitable habitat was noted.

Significant negative residual effects were not identified with regard to any ecological receptor.

#### **Residual effects**

Significant negative residual effects were not identified with regard to any ecological receptor.

### **6.7.3.4 Meenakeeran Wind Farm**

**J/2008/0240/F:** Application by Northern Wind Power to reduce a 5 no. turbine wind farm proposal to 4 no. turbines in Glenderg, Co. Tyrone. This application was granted by the Department of the Environment.

No EIS is available online for this application.

## **6.7.4 Forestry & Replanting**

Approximately 823 hectares of the site (91.9%) comprises of commercial forestry.

Construction of the proposed wind farm development footprint will require felling of 43 hectares of coniferous forestry. An additional 30.6 hectares of trees will be required to be felled around proposed turbine locations in order to prevent these trees causing a turbulence effect. The total amount of tree felling required on the site is therefore 73.6 hectares or 9.6% of the currently forested area. In line with the Forest Service's published policy on granting felling licenses for wind farm developments, areas cleared of forestry for turbine bases, access roads, and any other wind farm-related uses will have to be replaced by replanting at an alternative location. The Forest Service policy requires replanting on a hectare for hectare basis plus an additional 10% for turbulence felling.

A total of 76.7 hectares of new forestry will therefore be replanted as a condition of any felling licence that might issue in respect of the proposed wind farm development.

Potential replanting areas have been identified. An assessment of these lands is included in Appendix 4.3 of the EIAR. The replanting lands have been the subject of Screening for Appropriate Assessment. Pathways for impact on European Sites were not identified in the screening assessment and when considered in conjunction with the windfarm proposal the replanting will not cumulatively result in adverse effects on European sites.

### **6.7.5 Assessment of Cumulative Effects**

The proposed Meenbog Wind Farm Development will not result in any significant residual effects on any ecological receptors. The potential residual impacts on aquatic receptors will be imperceptible and therefore, there is no potential for the proposed windfarm to contribute to any potential for cumulative impacts in this regard when considered in combination with other plans and projects. Similarly, the Proposed Development will result in only slight residual effects in relation to other identified KERs including loss of peatland habitat and disturbance to bats. The potential for these two slight potential negative impacts to result in significant cumulative effects when considered in combination with other plans and projects was assessed.

In the review of the projects that was undertaken, no connection between the sites, that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the proposed Meenbog Windfarm.

Taking into consideration the reported residual effects from other plan and projects in the area and the predicted effects with the current proposal, no residual cumulative effects have been identified with regard to any KER.

## **6.8 Summary**

Following consideration of the residual effects (post-mitigation) it is noted that the Proposed Development on its own, will not result in any significant effects on any of the identified KERs. No significant effects on receptors of International, National or County Importance were identified.

The potential for effects on the European designated sites are fully described in the Natura Impact Statement that accompanies this application. The NIS concludes that in view of best scientific knowledge and on the basis of objective information, the Proposed Development either individually or in combination with other plans or projects, is not likely to have significant effects on the European Sites that were assessed as part of the Appropriate Assessment process. No Nationally designated sites were identified as KERs and no potential pathways for effect were identified.

The proposed wind farm development will be constructed and operated in strict accordance with the design, best practice and mitigation that is described within this application and as such, significant effects on ecology are not anticipated at any geographical scale on any of the identified KERs.