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Project Number: 160815

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Tuam Road, Galway

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1 INTRODUCTION

1.1 Background

McCarthy Keville O’Sullivan Ltd. (MKO) has been appointed to provide the information necessary to allow the competent authority to conduct an Article 6(3) Appropriate Assessment of the proposed Ardderroo Wind Farm development, Co. Galway. An Article 6(3) Assessment has been prepared and is provided in Appendix 1. The screening assessment concluded as follows.

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:

- Connemara Bog Complex SAC (002034)
- Lough Corrib SAC (000297)
- Ross Lake and Woods SAC (001312)
- Connemara Bog Complex SPA (004181)
- Lough Corrib SPA (004042)


In addition to the guidelines referenced above, the following relevant guidance was considered in preparation of this report:

1.2 **Appropriate Assessment Methodology**

The information contained in this NIS is designed to allow the Competent Authority to assess 1) the implications of the project, alone or in combination with other plans and projects, for a European Site in view of its Conservation Objectives, and 2) whether there will be any adverse effects on the integrity of a European Site.

Firstly, in Section 2 of the report, all aspects of the proposed development are described in summary with reference made to the full description within the EIAR chapters.

Following on from this in Section 3, a summary of the baseline environment is provided with reference to the relevant EIAR chapters.

The interaction of the proposed development on the baseline environment is then considered in the context of potential effects thereon. This is undertaken with reference to the potential for the proposed development to result in adverse effects on the integrity of any European Site.

In Section 4, the Qualifying Interests and Conservation Objectives of the “screened in” European sites are described, with subsequent identification of potential pathways for effects on each individual Qualifying Interest.

Where potential pathways for effects are identified, the potential for adverse effects on each Qualifying Interest is assessed with respect to the national level pressures and threats. Where available, the site-specific attributes and targets, associated with the individual Qualifying Interest, are also assessed with regard to the proposed plan or project taking into consideration best practice and design features.

Where site specific conservation objectives are not available, attributes and targets representative of factors considered in the conservation of the Qualifying Interest in other European sites are assessed.

The assessment of potential adverse effects follows the precautionary principle as detailed in Article 191 of the Treaty on the Functioning of the European Union (EU). It aims at ensuring a higher level of environmental protection through preventative decision-taking in the case of risk and underpins the Habitats Directive (DoEHLG 2010). The precautionary principle is the underlying concept of sustainable development which implies that prudent action be taken to protect the environment even in the absence of scientific certainty (DoEHLG 2010).

A summary of the prescribed preventative measures and best practice is provided in Section 5.

Following the assessment of potential adverse effects on a European Site resulting from the project itself, a further assessment of the potential for effects when the project is considered cumulatively and in combination with other proposed developments is made in Section 6.

Finally, in Section 7, a concluding statement is made. This includes a summary of the results of the assessment along with a checklist that demonstrates the lack of adverse effects on the integrity of any European Site (limited to the Conservation Objectives of the site) (as per Box 10 of EC, 2002). As per EC, 2002, the meaning of integrity is defined as follows:
The integrity of a site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site’s conservation objectives’ (MN2000, paragraph 4.6(3)).

The information contained in this report will allow the Competent Authority to determine that the proposed development will not adversely affect the integrity of any European Site.

1.3 Scoping & Consultation

MKO undertook a scoping and consultation exercise during preparation of the EIAR, as described in Section 2.4. Table 2.1 provides a list of the organisations consulted, with regard to Biodiversity, during the scoping process. Copies of all scoping responses are included in Appendix 2.1 of the EIAR. The recommendations of the consultees have informed the preparation of this NIS and the contents of the Biodiversity Chapter of the EIAR.

<table>
<thead>
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<th>No.</th>
<th>Consultee</th>
<th>Response to consultation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>National Parks and Wildlife Service</td>
<td>No written correspondence received in relation to this application. A meeting was held with the NPWS on the 20th February 2017. The adopted minutes of the meeting are included in Appendix 2.1 of the EIAR. It was stated at this meeting that previous written comments in relation to a previous application were still valid.</td>
</tr>
<tr>
<td>2</td>
<td>Bat Conservation Ireland</td>
<td>No response received</td>
</tr>
<tr>
<td>3</td>
<td>Inland Fisheries Ireland</td>
<td>No response received</td>
</tr>
<tr>
<td>4</td>
<td>Irish Peatland Conservation Council</td>
<td>No response received</td>
</tr>
<tr>
<td>5</td>
<td>Irish Wildlife Trust</td>
<td>No response received</td>
</tr>
<tr>
<td>7</td>
<td>Department of Agriculture, Food and the Marine</td>
<td>Written response received on 21st December 2016.</td>
</tr>
</tbody>
</table>

If further responses are received, the comments of the consultees will be considered at any time pre or post planning.
2 DESCRIPTION OF THE PROJECT

2.1 Site Location

The site of the proposed wind farm is located in the townlands of Ardderroo, Killaguile, Letter, and Finnaun, Co. Galway, with a proposed temporary new access road onto the N59 being located in the townlands of Knockaunnanny and Doon. The proposed wind farm site measures approximately 1,493 ha. The Grid Reference co-ordinates for the approximate centre of the site are E112,000 N234,000. The town of Oughterard is located approximately 6.6 kilometres north of the proposed development site. The village of Moycullen is located approximately 6.9 kilometres east of the proposed development site. The windfarm site is located within the Owenboliska catchment with a temporary construction access road located within the Corrib catchment. This temporary road will be a separate planning application to the windfarm but is assessed in this document as part of the overall project.

2.2 Characteristics of the Proposed Development

The development is fully described in Chapter 4 of the EIAR and in the planning drawings submitted. The EIAR Chapter 4 is provided as Appendix 2. This document has been fully reviewed and provide the necessary baseline information to inform this NIS. In addition to the above, a Construction & Environmental Management Plan (CEMP) has been prepared in relation to this development. The CEMP considers all the environmental commitments and mitigation measures that are set out in the EIAR and provides a comprehensive plan for their implementation and monitoring during construction, operation and decommissioning of the proposed development. This document is submitted as Appendix 3. The full description of the proposed development, as per the planning notices, is as follows:

i. Construction of up to 25 No. wind turbines with a maximum overall blade tip height of up to 178.5m and all associated hard-standing areas.

ii. 1 no. permanent Meteorological Mast with a maximum height of up to 112 metres.

iii. Electrical requirements associated with the wind farm including, 1 no. 110kV electrical substation with 2 no. control buildings with welfare facilities, all associated electrical plant and equipment, all associated underground cabling, waste water holding tank and all ancillary works, and connection to the national grid at the existing Knockranny substation.

iv. Upgrade of existing and provision of new internal access roads and all associated drainage control systems.

v. Provision of new construction access road and junction onto N59

vi. 3 no. borrow pits.

vii. 2 no. temporary construction compounds.

viii. Recreation and amenity works, including upgrade of existing/proposed roadways as marked trails, provision of new walkway for recreation site access, conversion of one temporary construction compound into a permanent amenity car park, provision of a toilet/shelter building and associated waste water holding tank, and associated signage for marked trails.

ix. All associated site development works.

x. A ten-year planning permission and 30 year operational life from the date of commissioning of the entire wind farm.

A footprint of the proposed development is provided in Figure.2.1.
Figure 2.1: European Sites within 15km buffer

Map Legend
- Study Area
- SAC
- SPA
- Development Footprint
3 BASELINE ECOLOGY OF THE SITE

The baseline ecology of the site is fully described in terms of Biodiversity and Ornithology in Chapters 6 & 7 of the EIAR respectively. The methodologies followed for assessment of the baseline along with a description of the results and an assessment of the potential effects of the windfarm thereon are fully described in these chapters. Section 6.2 of the EIAR describes the approach taken to the ecological assessment and the methodologies followed. Surveys included a thorough desk study, scoping and consultation with the relevant authorities including National Parks and Wildlife Service, Bat Conservation Ireland, Inland Fisheries Ireland, Irish Peatland Conservation Council and the Irish Wildlife Trust. Multidisciplinary walkover surveys of the site were undertaken in accordance with NRA Guidelines (2009) were undertaken and in addition specialist botanical assessment of turbine bases and related infrastructure (Provided in Appendix 6.3 of the EIAR), specialist aquatic habitat surveys, otter surveys, bat surveys (Provided in Appendix 6.2 of the EIAR) and Kerry Slug Surveys. Section 7.2 of the EIAR describes the survey and assessment methodologies followed in relation to ornithology. All surveys were undertaken without significant limitation and in accordance with the most relevant and up to date guidance and industry requirements.

Additional information from other chapters within the EIAR, in particular Chapter 9 (Water) also assists in the baseline assessment of the biodiversity of the study area. The desk and field surveys undertaken to inform the EIAR provide much of the data required to inform this NIS and are fully referenced throughout the NIS. This information has not been repeated in this NIS but provides much of the scientific data required to undertake a robust analysis of the potential for the proposed development to result in adverse effects on European Sites. The information that is most relevant to the assessments carried out in this NIS are provided in the following Appendices:

Appendix 4. Relevant sections of the EIAR Biodiversity Chapter regarding water quality lesser horseshoe bat and otter. Additional and updated water quality information from field surveys undertaken in 2019.

Appendix 5. Relevant sections of the EIAR Ornithology Chapter regarding specifically the SCI species for the ‘Screened In’ SPAs

Appendix 6. EIAR Water Chapter

The surveys undertaken and described in the EIAR provide all the information necessary to identify the potential for effects on any European Sites and the pathways by which such effects may occur. There follows a summary description of the site of the proposed development with particular emphasis on the potential for effects on European Sites.

The primary land use in the area is commercial forestry. The remainder of the site was occupied by marginal farmland and peatland habitats. Before forestry was planted, the site would have been dominated by peatland habitats with bog and heath species present in areas where the forestry has grown poorly or following clearfell operations. Much of the remaining peatland habitats have been damaged by disturbance and drainage associated with the forestry operations, though some areas of relatively intact peatland within the site, were never planted and have been avoided by the proposed development. Much of the forestry on the site was damaged by fire in 2017, particularly in the southern and western sections of the site.
Access to the site is gained by a network of forestry tracks, tertiary and local roads. A proposed new access onto the N59 national road is assessed in this EIAR but does not form part of the planning application. This will involve the construction of approximately 750 metres of new road over peatland habitats that are located to the south east of the existing road that connects the wind farm to the N59. The proposed The study area covers approximately 1,519 hectares.

The proposed development is not located within any European designated sites (Figure 3.1). There will be no direct effects on any designated site as a result of the construction, operation and decommissioning of the proposed development.

The following paragraphs describe the site in relation to the European Sites that were ‘Screened In’ in the Article 6(3) Screening Assessment that was undertaken in relation to the project and is included as Appendix 1.

The Connemara Bog Complex SAC is located immediately adjacent to much of the south eastern boundary of the study area but at closest, approximately 160 metres from the development footprint. The Connemara Bog Complex SAC is separated from the footprint of the proposed development by existing Conifer Plantation. The footprint of the proposed wind farm is within the Owenboliska catchment and surface water drains to this river within the Connemara Bog Complex SAC. This river system is shown in the site-specific conservation objectives (SSCO) for the site to potentially support the following lacustrine habitats (map 6) that are among the qualifying interests of the SAC:

- (3110) Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
- (3160) Natural dystrophic lakes and ponds
- Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130]

The site-specific conservation objectives also specifically mention the Owenboliska River catchment in relation to it providing habitat for Atlantic Salmon (Salmo salar). Whilst it is not specifically identified in the SSCO document, this river system also has the potential to support other aquatic qualifying interests of the site including the habitat Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation as well as the species Otter (Lutra lutra) and Slender Naiad (Najas flexilis). Slender Naiad is not known from the Owenboliska catchment and map 9 of the SSCO document identifies the known locations of Slender Naiad within the SAC, none are within the Owenboliska catchment.

Lough Corrib SAC is located over 2.9km from the wind farm site at its closest. It is also in an entirely separate surface water catchment with the exception of the proposed temporary construction access road. This is located within the Lough Corrib catchment but the only potential pathway for effect is via a single small watercourse that the proposed temporary road crosses. This stream flows into Ross Lake and from there into the Lough Corrib SAC at Ballyquirke Lough, via a series of drainage channels. There is no potential for disturbance to any of the QI species of Lough Corrib associated with the proposed works. The full description of the proposed temporary construction access road including this stream that will be crossed is provided in Section 6.3.2.1.4 of the EIAR.

Ross Lake & Woods SAC is located over 2.9km from the proposed windfarm development and is an entirely separate surface water catchment from it. However, it
is located approximately 100 metres at closest from the proposed temporary construction access track. This track crosses a small stream that flows into Ross Lake. This is the same small stream that also provides connectivity to the Lough Corrib SAC. Ross Lake itself is an example of Hard oligo-mesotrophic waters with benthic vegetation of *Chara spp.* [3140]. This is among the qualifying interests of the SAC and the small stream that is crossed by the proposed temporary construction access track is the only potential pathway for effect on this habitat.

The SAC is also designated for Lesser Horseshoe Bat (*Rhinolophus hipposideros*) and given that the proposed temporary construction access road is located only 100 metres from the edge of this site, it is considered to be within the core foraging range for this species [Conservation Objectives supporting document – Lesser Horseshoe Bat (*Rhinolophus hipposideros* [NPWS – January 2018])]. The majority of the habitats associated with the temporary access track are not suitable for this species, being open peatlands. There are however, small areas of scrub at either end, that provide suitable cover to provide foraging and commuting habitat for the species. There is no suitable roosting habitat for Lesser Horseshoe Bat in the vicinity of the temporary access track.

**Connemara Bog Complex SPA** is located approximately 0.2km to the south of the proposed wind farm and is within the core foraging range of the Special Conservation Interests (SCIs) of the SPA. The SCI species of the SPA are Merlin (*Falco columbarius*), Golden Plover (*Pluvialis apricaria*), Cormorant (*Phalacrocorax carbo*) and Common Gull (*Larus canus*).

Full details of the surveys undertaken and the results thereof in relation to each of these species is provided in Chapter 7 of the EIAR. The ecological significance of the results pertaining to each species are also evaluated in Section 7.4 of the EIAR. Section 7.5 provides a detailed impact assessment on all the SCI species of this designated site. The relevant information from these surveys is presented in Appendix 5.

**Lough Corrib SPA** is located approximately 4.4km to the west of the proposed development (approx. 6km to the west of the wind farm itself) and is located downstream and connected via the same surface water pathway as for the Lough Corrib SAC and Ross Lake & Woods SPA. In addition, the site is located within the core foraging range of Hen Harrier (*Circus cyaneus*), Golden Plover and Greenland White Fronted Goose (*Anser albifrons flavirostris*). Full details of the surveys undertaken and the results thereof in relation to each of these species is provided in Chapter 7 of the EIAR. The ecological significance of the results pertaining to each species are also evaluated in Section 7.4 of the EIAR. Section 7.5 provides a detailed impact assessment on all the SCI species of this designated site. The relevant information from these surveys is presented in Appendix 5.
4 ASSESSMENT OF EFFECTS ON EUOPREAN SITES

The AA Screening Report that is included as Appendix 1 screens in the potential for significant effects only on Connemara Bog Complex SAC (002034), Lough Corrib SAC (000297), Ross Lake and Woods SAC (001312), Connemara Bog Complex SPA (004181) and Lough Corrib SPA (004042).

Therefore, this Natura Impact Statement presents the data and information on the project and provides an analysis of the potential adverse effects on the above listed European Sites. Potential adverse effects are assessed in view of best scientific knowledge, on the basis of objective information in relation to the proposed development including the proposed avoidance, reduction and preventive measures.

4.1 Connemara Bog Complex SAC

The site synopsis for this designated site is provided in Appendix 7.

4.1.1 Site Specific Pressures and Threats

As per the Natura 2000 Data Form, the site-specific threats, pressures and activities with potential to impact on the SAC are as follows:

- A04.01.02 Intensive sheep grazing [Medium importance]
- C01.03.02 Mechanical removal of peat [High importance]
- J01 Fire and Fire Suppression [High importance]
- C01.03.01 Hand cutting of peat [High importance]

4.1.2 Identification of Potential Effects

The screening assessment has identified potential for the proposed development to adversely affect certain qualifying interests (QIs) of the Connemara Bog Complex SAC in view of their conservation objectives. The Screening Assessment is provided as Appendix 1 to this document. The site-specific conservation objectives were reviewed when carrying out this assessment (most recently 06/03/2019).

Table 4.1. describes the QIs for which potential pathways for significant effects as a result of the proposed development were identified and describes the potential pathways for effect. It also describes the QIs for which no pathways for effect were identified.

<table>
<thead>
<tr>
<th>Qualifying Interest</th>
<th>Assessment of pathways for Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal lagoons [1150]</td>
<td>These habitats do not occur within the boundary of the proposed development. The development site is located a minimum, straight line, distance of 11km from these coastal habitats within the SAC. The nature and scale of the developments is such that there is no potential for a large-scale pollution event at the development site that could potentially affect these coastal habitats. In addition, pollution from the proposed development site would have to travel a significant distance downstream prior to reaching any of these Qualifying Interests. The buffering and dilution effect of the intervening watercourses, lakes and sea will ensure no adverse impacts on these Qualifying Interests. No pathways for Direct or indirect impacts are identified.</td>
</tr>
<tr>
<td>Reefs [1170]</td>
<td></td>
</tr>
<tr>
<td>Qualifying Interest</td>
<td>Assessment of pathways for Effect</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Old sessile oak woods with *Ilex and Blechnum* in the British Isles [91A0]</td>
<td>The potential for adverse effects on these habitats is therefore not considered further in this document.</td>
</tr>
<tr>
<td>Molinia meadows on calcareous, peaty or clayey-silt-laden soils *Molinion caeruleae* [6410]</td>
<td>The potential for adverse effects on these terrestrial habitats is therefore not considered further in this document.</td>
</tr>
<tr>
<td>European dry heaths [4030]</td>
<td>No pathway for effects on these terrestrial habitats has been identified. The detailed site surveys that were undertaken to inform the EIAR that did not record them within or adjacent to the site of the proposed development. They will not be affected by sedimentation or pollution of surface waters and thus no impact pathway was identified. Direct or indirect impacts are not anticipated.</td>
</tr>
<tr>
<td>Northern Atlantic wet heaths with *Erica tetralix* [4010]</td>
<td>These habitats were recorded both within and adjacent to the site of the proposed development during the site surveys that were undertaken to inform the EIAR. However, the closest that the proposed infrastructure comes to the SAC is approximately (160m).</td>
</tr>
<tr>
<td>Blanket bogs (* if active bog) [7130]</td>
<td>Given the nature of the proposed works, the intervening land use (forestry) and substrate between the footprint of the proposed development and the SAC boundary, hydrological or any other changes to these peatland habitats are unlikely. Over the majority of the site boundary, the proposed development is separated from the SAC by the Owenboliska River, which acts as a further barrier to any potential for effects. These habitats will not be impacted by sedimentation or pollution of surface waters. No pathways for direct or indirect effects on these habitats within the SAC were identified.</td>
</tr>
<tr>
<td>Depressions on peat substrates of the Rhynchosporion [7150]</td>
<td>Potential for adverse effects on these habitats is therefore not considered further in this document.</td>
</tr>
<tr>
<td>Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletalia uniflorae* and/or *Isoeto-Nanojuncetea* [3130]</td>
<td>As per the site-specific conservation objectives (NPWS 2013), that were reviewed in undertaking this NIS, there is no potential for this habitat to occur in the Owenboliska catchment. Only potential 3110 is mapped as occurring downstream of the proposed development site. Potential for adverse effects on the 3130 habitat for which the SAC is designated is therefore not considered further in this document.</td>
</tr>
<tr>
<td>Oligotrophic waters containing very few minerals of sandy plains *Littorelletalia uniflorae* [3110]</td>
<td>There will be no direct impacts on these habitats within the SAC as a result of the proposed development. At its closest point the proposed development is located (160m) from the SAC boundary. The impact assessment for the proposed development as provided in Section 6.4.3 of the EIAR has identified potential indirect pathways for water pollution associated with the</td>
</tr>
<tr>
<td>Qualifying Interest</td>
<td>Assessment of pathways for Effect</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Water courses of plain to montane levels with the <em>Ranunculion fluitantis</em> and <em>Callitricho-Batrachion</em> vegetation [3260]</td>
<td>The potential for adverse effects on these habitats is therefore considered further in this document.</td>
</tr>
<tr>
<td>Transition mires and quaking bogs [7140] Alkaline fens [7230]</td>
<td></td>
</tr>
<tr>
<td><em>Salmo salar</em> [Salmon] [1106]</td>
<td>These species are known to occur in/ at riparian margins of the waterbodies of the Owenboliska catchment. There are no instream works and there will be no direct impacts on these species. The impact assessment undertaken for the proposed development as provided in Section 6.4.3 of the EIAR has identified potential indirect pathways for water pollution associated with the development. The pathway for effect is the run off of pollutants from the site of the proposed development to the Owenboliska River and its tributaries, which provide habitat for these species.</td>
</tr>
<tr>
<td><em>Lutra lutra</em> [Otter] [1355]</td>
<td>In addition, potential pathways for disturbance and potential habitat fragmentation has been identified in relation to Otter. The potential for adverse effects on these species is therefore considered further in this document.</td>
</tr>
<tr>
<td><em>Najas flexilis</em> [Slender Naiad] [1833]</td>
<td>The locations of the SAC designated populations of this species are mapped in the Detailed Conservation Objectives document of the European Site. None occur within the zone of influence of the proposed development and no populations of the species are known to occur in the Owenboliska catchment (NPWS 2013). The potential for adverse effects on this species is therefore not considered further in this document.</td>
</tr>
<tr>
<td><em>Euphydryas aurinia</em> [Marsh Fritillary] [1065]</td>
<td>The desk study undertaken for EIAR chapter revealed records for the species in the locality of the Ardderroo 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 24th of September 2013 the habitats within the study area were assessed for their potential to support Marsh Fritillary Butterfly. No suitable habitat was recorded within the development footprint or study area during the survey. No suitable habitat was recorded during any of the walkover ecological surveys and other dedicated faunal surveys that were undertaken throughout 2013, 2014, 2017 and 2018. Consequently, further targeted surveys were not required for this species no pathway for effect on this species either within or outside the site of the proposed development was identified. The potential for significant effects on this species is therefore not considered further in this document.</td>
</tr>
</tbody>
</table>
There will be no direct effects as the proposed development is located entirely outside the designated site. Potential pathways for indirect effects on the Qualifying Interests were identified and are listed below:

- Deterioration of surface water quality resulting from pollution of the Owenboliska River and catchment, associated with construction, operation and decommissioning potentially affecting the following aquatic QIs:
  - Oligotrophic waters containing very few minerals of sandy plains \(\text{[Littorelletalia uniflorae]}\) [3110]
  - Natural dystrophic lakes and ponds [3160]
  - Water courses of plain to montane levels with the \(\text{Ranunculation fluitantis}\) and \(\text{Callitricho-Batrachion vegetation}\) [3260]
  - \(\text{Salmo salar}\) (Salmon) [1106]
  - \(\text{Lutra lutra}\) (Otter) [1355]

- Disturbance and habitat loss/fragmentation related effects on QI species where such species occur outside the boundary of the European Site. Potentially effected species include:
  - Otter

### 4.1.3 Discussion of Potential for Effects Taking into Account Best Practice, Mitigation and Design Features

There are two pathways for effect on the identified QI habitats and species of the Connemara Bog Complex SAC and the proposed development has been specifically designed so that the potential for adverse effects to occur via either pathway is prevented. The methods by which each pathway is blocked is discussed below

#### 4.1.3.1 Deterioration of Surface Water Quality in the Owenboliska River & Catchment

The protection of water quality within the Owenboliska River & catchment were primary considerations in the design of the wind farm at this location. The design was constrained led from the outset with all major infrastructure located over 50m from any watercourse. In addition, a range of measures that are set out in the various chapters of the EIAR (particularly Chapter 6, Biodiversity and Chapter 9, Water) are included within the Construction & Environmental Management Plan (CEMP) that is provided as Appendix 3 and are in place to avoid, reduce and remedy potential adverse impacts on surface water quality during construction, operation and decommissioning. A summary of these measures is provided in Section 5 below.

Section 9.4.5.2 of chapter 9 of the EIAR provides a specific and targeted assessment of the potential for the proposed development to result in effects on designated sites. Chapter 9 of the EIAR is included in its entirety as Appendix 6 as this provides all the details of the surveys undertaken and the results that led to the conclusion reached in Section 9.4.5.2.

The baseline aquatic environment within the windfarm site is described in Sections 6.3.2.1.2 and 6.3.3.1.6 of the EIAR Biodiversity Chapter and an assessment of the potential for effects thereon is fully assessed in the chapter. The residual effect, post mitigation is provided in Section 6.6 of the chapter. The relevant information from the Biodiversity Chapter and from surveys that were subsequently undertaken to update the aquatic baseline in March 2019 are provided in Appendix 4.

A targeted and specific assessment of the potential of the proposed development to result in effects on each of the identified habitats and species in view of the
Conservation Objectives relevant targets and attributes (as set out in the site-specific conservation objectives document for the Connemara Bog Complex SAC).

4.1.3.1 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110]

The range and area of this habitat in Ireland has been assessed as **favourable** in the NPWS Article 17 Report.

The specific structures and functions (including species) and future prospects for the habitat have both been assessed as **bad (declining)**. These parameters relate to a decline in the quality of the habitat where it occurs. On the basis of the above, the overall assessment of conservation status is **bad** with the overall trend assessed as **declining**.

The degree of conservation of the habitat structure, function and restoration possibilities within Connemara Bog Complex SAC is assessed as **A**: excellent conservation (Natura 2000 Data Form 2015).

The pressures and threats (National level) relating to this habitat, as identified in the 2013 Article 17 Report, are listed below:

**Pressures**

- Diffuse pollution to surface waters due to agricultural and forestry activities **(high importance)**
- Diffuse pollution to surface waters due to other sources not listed **(high importance)**
- Water abstractions from groundwater **(high importance)**
- Mechanical removal of peat **(high importance)**
- Diffuse pollution to surface waters due to household sewage and waste waters **(high importance)**
- Pollution to surface waters by industrial plants **(medium importance)**
- Pollution to surface waters by storm overflows **(medium importance)**
- Other point source pollution to surface water **(low importance)**
- Surface water abstractions for public water supply **(low importance)**
- Invasive non-native species **(low importance)**
- Human induced changes in hydraulic conditions **(low importance)**

**Threats**

- Diffuse pollution to surface waters due to agricultural and forestry activities **(high importance)**
- Diffuse pollution to surface waters due to other sources not listed **(high importance)**
- Water abstractions from groundwater **(high importance)**
- Mechanical removal of peat **(high importance)**
- Diffuse pollution to surface waters due to household sewage and waste waters **(medium importance)**
- Pollution to surface waters by industrial plants **(medium importance)**
- Pollution to surface waters by storm overflows **(medium importance)**
- Changes in abiotic conditions **(medium importance)**
- Other point source pollution to surface water **(low importance)**
- Surface water abstractions for public water supply **(low importance)**
- Invasive non-native species **(low importance)**
• Human induced changes in hydraulic conditions (low importance)

The assessment of the proposed development has identified potential pathways for adverse impacts on this habitat in relation to the High Importance Pressures and threats Diffuse pollution to surface waters due to agricultural and forestry activities, Diffuse pollution to surface waters due to other sources not listed. The assessment has identified potential pathways for adverse impact in relation to the Low Importance Pressure and threats Invasive non-native species and Human induced changes in hydraulic conditions.

The targets and attributes for this habitat as per the specific conservation objectives for Connemara Bog Complex SAC have been reviewed and considered in relation to the current development and are described in Table 4.2 below.

The site-specific conservation objective for this habitat is:

‘To maintain the favourable conservation condition of Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets’

Table 4.2. Targets and attributes associated with site specific conservation objectives for Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110]

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>There will be no decline in habitat area associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat</td>
</tr>
<tr>
<td>Habitat Distribution</td>
<td>No Decline, Subject to natural processes</td>
<td>There will be no decline in habitat distribution associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat</td>
</tr>
<tr>
<td>Typical Species</td>
<td>Typical species present, in good condition, and demonstrating typical abundances and distribution</td>
<td>There will be no impacts on typical species, vegetation composition and vegetation associated with the habitat. Pathways that would allow impacts to the supporting habitat of typical species were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Vegetation composition: characteristic zonation</td>
<td>All characteristic zones should be present, correctly distributed and in good condition</td>
<td></td>
</tr>
<tr>
<td>Vegetation distribution: maximum depth</td>
<td>Maintain maximum depth of vegetation, subject to natural processes.</td>
<td></td>
</tr>
<tr>
<td>Hydrological regime: Water level fluctuations</td>
<td>Maintain appropriate natural hydrological</td>
<td>There will be no alteration to the hydrological regime. Pathways that would allow impacts to occur were</td>
</tr>
<tr>
<td>Attribute</td>
<td>Target</td>
<td>Assessment</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>regime necessary to support the habitat</td>
<td>considered in the design of the proposed development and a range of measures are in place to avoid all potential hydrological impacts during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Lake substratum quality</td>
<td>Maintain appropriate substratum type, extent and chemistry to support the vegetation</td>
<td></td>
</tr>
<tr>
<td>Attribute</td>
<td>Target</td>
<td>Assessment</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Water quality: transparency</td>
<td>Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency</td>
<td>There will be no decline in lake substratum quality, water quality, chemistry or turbidity associated with the proposed development. Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Water quality: nutrients</td>
<td>Maintain the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species</td>
<td></td>
</tr>
<tr>
<td>Water quality: phytoplankton biomass</td>
<td>Maintain appropriate water quality to support the habitat, including high chlorophyll status</td>
<td></td>
</tr>
<tr>
<td>Water quality: phytoplankton composition</td>
<td>Maintain appropriate water quality to support the habitat, including high phytoplankton composition status</td>
<td></td>
</tr>
<tr>
<td>Water quality: attached algal biomass</td>
<td>Maintain trace/ absent attached algal biomass (&lt;5% cover) and high phytobenthos status</td>
<td></td>
</tr>
<tr>
<td>Water quality: macrophyte status</td>
<td>Maintain high macrophyte status</td>
<td></td>
</tr>
<tr>
<td>Acidification status</td>
<td>Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes</td>
<td></td>
</tr>
<tr>
<td>Water colour</td>
<td>Maintain appropriate water colour to support the habitat</td>
<td></td>
</tr>
<tr>
<td>Dissolved organic carbon (DOC)</td>
<td>Maintain appropriate organic carbon levels to support the habitat</td>
<td></td>
</tr>
<tr>
<td>Turbidity</td>
<td>Maintain appropriate turbidity to support the habitat</td>
<td></td>
</tr>
<tr>
<td>Fringing habitat</td>
<td>Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3130</td>
<td>There will be no effects on fringing habitats associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat</td>
</tr>
</tbody>
</table>

No direct impacts on this habitat have been identified as the proposed development is located entirely outside the European Site. Emissions to surface water was identified as a potential indirect impact on the Qualifying Interest of the Connemara Bog Complex SAC.
The pathways that would allow potentially adverse impacts to occur were considered in the design of the scheme and a range of measures, as described in Section 5 and in the Construction Environmental Management Plan [Appendix 3], are in place to avoid, reduce and remedy potential adverse impacts on surface water quality during construction, operation and decommissioning.

Post implementation of avoidance and preventive measures the residual impact on the Connemara Bog Complex SAC will be negligible. The design of the scheme has been developed with an overall objective of minimising the impact on ecologically sensitive sites.

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] associated with the Connemara Bog Complex SAC.

4.1.3.1.2 Natural dystrophic lakes and ponds [3160]

The range and area of this habitat in Ireland has been assessed as favourable in the NPWS Article 17 Report.

The degree of conservation of the habitat structure, function and restoration possibilities within Connemara Bog Complex SAC is assessed as A: excellent conservation (Natura 2000 Data Form 2015).

The specific structures and functions (including species) have been assessed as inadequate (declining) and future prospects for the habitat have been assessed as inadequate (stable). On the basis of the above, the overall assessment of conservation status is inadequate with the overall trend assessed as declining.

The pressures and threats (National level) relating to this habitat, as identified in the 2013 Article 17 Report, are listed below:

**Pressures**
- Diffuse pollution to surface waters due to agricultural and forestry activities (high importance)
- Mechanical removal of peat (high importance)
- Water abstractions from groundwater (high importance)
- Modification of hydrographic functioning, general (high importance)
- Diffuse pollution to surface waters due to household sewage and waste waters (low importance)

**Threats**
- Diffuse pollution to surface waters due to agricultural and forestry activities (high importance)
- Mechanical removal of peat (high importance)
- Water abstractions from groundwater (high importance)
- Modification of hydrographic functioning, general (high importance)
- Changes in abiotic conditions (low importance)
- Diffuse pollution to surface waters due to household sewage and waste waters (low importance)
The assessment of the proposed development has identified potential pathways for adverse impacts on this habitat in relation to the *High Importance* Pressures and threat *Diffuse pollution to surface waters due to agricultural and forestry activities*, and *Modification of hydrographic functioning*.

The targets and attributes for this habitat as per the specific conservation objectives for Connemara Bog Complex SAC have been reviewed and considered in relation to the current development and are described in Table 4.3 below.

The site-specific Conservation Objective for this Qualifying Interest is:

*To maintain the favourable conservation condition of Natural dystrophic lakes and ponds in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:*

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>There will be no decline in habitat area associated with the proposed development. Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Habitat Distribution</td>
<td>No decline, Subject to natural processes</td>
<td>There will be no decline in habitat distribution associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat</td>
</tr>
<tr>
<td>Typical Species</td>
<td>Typical species present, in good condition, and demonstrating typical abundances and distribution</td>
<td>There will be no impacts on typical species, vegetation composition or distribution associated with the habitat. Pathways that would allow impacts to the supporting habitat of typical species were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Vegetation composition: characteristic zonation</td>
<td>All characteristic zones should be present, correctly distributed and in good condition</td>
<td></td>
</tr>
<tr>
<td>Vegetation distribution: maximum depth</td>
<td>Maintain maximum depth of vegetation, subject to natural processes.</td>
<td></td>
</tr>
<tr>
<td>Hydrological regime: Water level fluctuations</td>
<td>Maintain appropriate natural hydrological regime necessary to support the habitat</td>
<td>There will be no alteration to the hydrological regime. Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all potential hydrological impacts during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Attribute</td>
<td>Target</td>
<td>Assessment</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Lake substratum quality</td>
<td>Maintain appropriate substratum type, extent and chemistry to support the vegetation</td>
<td>There will be no decline in lake substratum quality, water quality, chemistry or turbidity associated with the proposed development. Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Water quality: transparency</td>
<td>Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency</td>
<td></td>
</tr>
<tr>
<td>Water quality: nutrients</td>
<td>Maintain the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species</td>
<td></td>
</tr>
<tr>
<td>Water quality: phytoplankton biomass</td>
<td>Maintain appropriate water quality to support the habitat, including high chlorophyll a status</td>
<td></td>
</tr>
<tr>
<td>Water quality: phytoplankton composition</td>
<td>Maintain appropriate water quality to support the habitat, including high phytoplankton composition status</td>
<td></td>
</tr>
<tr>
<td>Water quality: attached algal biomass</td>
<td>Maintain trace/absent attached algal biomass (&lt;5% cover) and high phytobenthos status</td>
<td></td>
</tr>
<tr>
<td>Water quality: macrophyte status</td>
<td>Maintain high macrophyte status</td>
<td></td>
</tr>
<tr>
<td>Acidification status</td>
<td>Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes</td>
<td></td>
</tr>
<tr>
<td>Water colour</td>
<td>Maintain appropriate water colour to support the habitat</td>
<td></td>
</tr>
<tr>
<td>Dissolved organic carbon (DOC)</td>
<td>Maintain appropriate organic carbon levels to support the habitat</td>
<td></td>
</tr>
<tr>
<td>Turbidity</td>
<td>Maintain appropriate turbidity to support the habitat</td>
<td></td>
</tr>
<tr>
<td>Fringing habitat</td>
<td>Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160</td>
<td>There will be no impact on fringing habitats associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat.</td>
</tr>
</tbody>
</table>
No direct impacts on this habitat have been identified as the proposed development is located entirely outside the European Site. Emissions to surface water was identified as a potential indirect impact on this Qualifying Interest of the Connemara Bog Complex SAC.

The pathways that would allow potentially adverse impacts to occur were considered in the design of the scheme and a range of measures, as described in Section 5 and in the Construction Environmental Management Plan [Appendix 3], are in place to avoid, reduce and remedy potential adverse impacts on surface water quality during construction, operation and decommissioning.

Post implementation of avoidance and preventive measures the residual impact on the Connemara Bog Complex SAC will be negligible. The design of the scheme has been developed with an overall objective of minimising the impact on ecologically sensitive sites.

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect Natural dystrophic lakes and ponds [3160] associated with the Connemara Bog Complex SAC.

4.1.3.1.3 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]

The range and area of this habitat in Ireland has been assessed as favourable in the NPWS Article 17 Report.

The degree of conservation of the habitat structure, function and restoration possibilities within Connemara Bog Complex SAC is assessed as B: good conservation (Natura 2000 Data Form 2015).

The specific structures and functions (including species) and future prospects for the habitat have both been assessed as inadequate (declining). The future prospects for the habitat is assessed as adequate (stable). On the basis of the above, the overall assessment of conservation status is inadequate (declining). This represents an ongoing decline since 2007.

The pressures and threats (National level) relating to this habitat, as identified in the 2013 Article 17 Report, are listed below:

Pressures:

- Diffuse pollution to surface waters due to agricultural and forestry activities (high importance)
- Pollution to surface waters by industrial plants (high importance)
- Mechanical removal of peat (medium importance)
- Modification of hydrographical functioning, general (high importance)

Threats:

- Diffuse pollution to surface waters due to agricultural and forestry activities (high importance)
- Pollution to surface waters by industrial plants (high importance)
- Modification of hydrographical functioning, general (high importance)
- Mechanical removal of peat (medium importance)
The assessment of the proposed development has identified potential pathways for adverse impacts on this habitat in relation to the *High Importance* Pressures and threat *Diffuse pollution to surface waters due to agricultural and forestry activities*.

The targets and attributes for this habitat as per the specific conservation objectives for Connemara Bog Complex SAC have been reviewed and considered in relation to the current development and are described in Table 4.4 below.

The site-specific Conservation Objective for this Qualifying Interest is:

*To maintain the favourable conservation condition of Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:*

**Table 4.4 Targets and attributes associated with site specific conservation objectives for water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>There will be no decline in habitat area associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat</td>
</tr>
<tr>
<td>Habitat Distribution</td>
<td>No Decline, Subject to natural processes</td>
<td>There will be no impact on habitat distribution associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat</td>
</tr>
<tr>
<td>Hydrological regime: river flow</td>
<td>Maintain appropriate hydrological regimes</td>
<td>There will be no impact on the hydrological regime associated with the proposed development. Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place with a view to preventing water pollution.</td>
</tr>
<tr>
<td>Hydrological Regime: Groundwater discharge</td>
<td>Maintain appropriate hydrological regimes</td>
<td></td>
</tr>
<tr>
<td>Substratum Composition: particle size range</td>
<td>Maintain appropriate substratum particle size range, quantity and quality, subject to natural processes</td>
<td>There will be no impact on substratum composition. Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Water Quality</td>
<td>Maintain appropriate water quality to support</td>
<td>There will be no impact on water chemistry or quality associated with the proposed development. Pathways</td>
</tr>
<tr>
<td>Attribute</td>
<td>Target</td>
<td>Assessment</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation Composition: typical species</td>
<td>Typical species of the relevant habitat sub type should be present and in good condition.</td>
<td>There will be no impact on vegetation composition associated with the proposed development. Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Floodplain connectivity: area</td>
<td>The area of active floodplain at and upstream of the habitat should be maintained</td>
<td>There will be no impact on floodplain connectivity associated with the proposed development. The proposed development will not result in any effects on floodplains within or downstream of the site</td>
</tr>
<tr>
<td>Riparian habitat: area</td>
<td>Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types</td>
<td>There will be no impact on fringing habitats associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat</td>
</tr>
</tbody>
</table>

No direct impacts on this habitat have been identified as the proposed development is located entirely outside the European Site. Emissions to surface water was identified as a potential indirect impact on the Qualifying Interest of the Connemara Bog Complex SAC.

The pathways that would allow potentially adverse impacts to occur were considered in the design of the scheme and a range of measures, as outlined in Section 5 and in the Construction Environmental Management Plan [Appendix 3], are in place to avoid, reduce and remedy potential adverse impacts on surface water quality during construction, operation and decommissioning.

Post implementation of avoidance and preventive measures the residual impact on the Connemara Bog Complex SAC will be negligible. The design of the scheme has been developed with an overall objective of minimising the impact on ecologically sensitive sites.

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260] associated with the Connemara Bog Complex SAC.
4.1.3.1.4 *Salmo salar* (Salmon) [1106]

The range for this species in Ireland has been assessed as **favourable** in the NPWS Article 17 Report. The population however is assessed as **inadequate (Qualifier: stable)**. The habitat of the species has been assessed as **favourable** and future prospects for the species **inadequate (Qualifier: stable)**. On the basis of the above, the overall assessment of conservation status is **inadequate (Qualifier: stable)** with no significant overall change since 2007.

The degree of conservation of the features of the habitat structure which are important for the species in Connemara Bog Complex SAC and possibilities for restoration is assessed as **B**: good conservation (Natura 2000 Data Form 2015).

The pressures and threats (National level) relating to this species, as identified in the 2013 Article 17 Report, are listed below:

**Pressures:**

- Agricultural intensification *(high importance)*
- Intensive sheep grazing *(medium importance)*
- Fertilisation *(medium importance)*
- Artificial planting on open ground (non-native trees) *(medium importance)*
- Forest replanting (non-native trees) *(medium importance)*
- Use of fertilizers [forestry] *(medium importance)*
- Peat extraction *(low importance)*
- Disposal of household / recreational facility waste *(high importance)*
- Disposal of industrial waste *(medium importance)*
- Intensive fish farming, intensification *(medium importance)*
- Poaching *(high importance)*
- Pollution to surface waters by industrial plants *(low importance)*
- Diffuse pollution to surface waters due to agricultural and forestry activities *(high importance)*
- Diffuse pollution to surface waters due to household sewage and waste waters *(high importance)*
- Invasive non-native species *(low importance)*
- Modification of hydrographic functioning, general *(low importance)*
- Water abstractions from surface waters *(medium importance)*
- Management of aquatic and bank vegetation for drainage purposes *(low importance)*
- Predation *(medium importance)*
- Threats and pressures from outside the Member State *(medium importance)*

**Threats:**

- Agricultural intensification *(high importance)*
- Intensive sheep grazing *(low importance)*
- Fertilisation *(low importance)*
- Artificial planting on open ground (non-native trees) *(medium importance)*
- Forest replanting (non-native trees) *(medium importance)*
- Use of fertilizers [forestry] *(medium importance)*
- Peat extraction *(low importance)*
- Disposal of household / recreational facility waste *(high importance)*
- Disposal of industrial waste *(medium importance)*
- Intensive fish farming, intensification *(medium importance)*
• Poaching (high importance)
• Pollution to surface waters by industrial plants (low importance)
• Diffuse pollution to surface waters due to agricultural and forestry activities (high importance)
• Diffuse pollution to surface waters due to household sewage and waste waters (high importance)
• Invasive non-native species (low importance)
• Modification of hydrographic functioning, general (low importance)
• Water abstractions from surface waters (medium importance)
• Management of aquatic and bank vegetation for drainage purposes (low importance)
• Predation (medium importance)
• Threats and pressures from outside the Member State (medium importance)

The assessment of the proposed development has identified potential pathways for adverse impacts on this habitat in relation to the **High and Medium Importance Pressures and Threats**. Diffuse pollution to surface waters due to agricultural and forestry activities, and Invasive non-native species.

The assessment of the proposed development has identified potential pathways for potential adverse impacts on Atlantic Salmon in relation to the **low importance Pressure and Threat** Modification of hydrographic functioning, general.

The targets and attributes for this habitat as per the specific conservation objectives for Connemara Bog Complex SAC have been reviewed and considered in relation to the current development and are described in Table 4.5 below.

The Site Specific Conservation Objective for this species is:

*To restore the favourable conservation condition of Atlantic Salmon in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:*

**Table 4.5. Targets and Attributes associated with site specific conservation objectives for Salmon (Salmo salar) [1106]**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution and extent of anadromy.</td>
<td>100% of river channels down to second order accessible from estuary.</td>
<td>There will be no alteration in the distribution of extent of anadromy given that alterations to river morphology and structures which could limit habitat accessibility are not proposed. The proposed development will in no way prevent fish access to all areas within the catchment.</td>
</tr>
<tr>
<td>Adult spawning fish</td>
<td>Conservation Limit for each system consistently exceeded</td>
<td>There will be no reduction in the number of adult spawning fish associated with the proposed development. The potential for the proposed development to result in water pollution that could affect spawning fish were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning. The proposed</td>
</tr>
<tr>
<td>Attribute</td>
<td>Target</td>
<td>Assessment</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>----------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Salmon fry abundance</td>
<td>Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5min sampling</td>
<td>There will be no reduction in salmon fry abundance associated with the proposed development. The potential for the proposed development to result in water pollution that could affect Salmon fry abundance were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning. The proposed development has been specifically designed to avoid impacts on juvenile fish by avoiding in-stream works.</td>
</tr>
<tr>
<td>Out migrating smolt abundance</td>
<td>No significant decline</td>
<td>There will be no decline in out migrating smolt abundance associated with the proposed development. The potential for the proposed development to result in water pollution that could affect spawning fish were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning. The proposed development has been specifically designed to avoid impacts on migrating fish by avoiding in-stream works.</td>
</tr>
<tr>
<td>Number and distribution of redds</td>
<td>No decline in number and distribution of spawning redds due to anthropogenic causes.</td>
<td>There will be no decline in number and distribution of spawning redds associated with the proposed development. The potential for the proposed development to result in water pollution that could affect spawning fish were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning. The proposed development has been specifically designed to avoid impacts on spawning fish by avoiding in-stream works.</td>
</tr>
<tr>
<td>Water quality</td>
<td>At least Q4 at all sites sampled by EPA</td>
<td>Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning. Monitoring of</td>
</tr>
</tbody>
</table>
Attribute | Target | Assessment
--- | --- | ---
 |  | water quality is proposed as part of the construction and operational mitigation

No direct impacts on this habitat have been identified as the proposed development is located entirely outside the European Site. Emissions to surface water was identified as a potential indirect impact on the Qualifying Interest of the Connemara Bog Complex SAC.

The pathways that would allow potentially adverse impacts to occur were considered in the design of the scheme and a range of measures, as outlined in Section 5 and in the Construction Environmental Management Plan [Appendix 3], are in place to avoid, reduce and remedy potential adverse impacts on surface water quality during construction, operation and decommissioning.

Post implementation of avoidance and preventive measures the residual impact on the Connemara Bog Complex SAC will be negligible. The design of the scheme has been developed with an overall objective of minimising the impact on ecologically sensitive sites.

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect Atlantic Salmon associated with the Connemara Bog Complex SAC. The proposed development will not prevent the restoration of Atlantic Salmon to favourable conservation condition.

### 4.1.3.1.5 Otter (Lutra lutra) [1355]

The range for this species in Ireland has been assessed as favourable in the NPWS Article 17 Report. The population is also assessed as favourable.

The habitat and future prospects for the species have both been assessed as favourable. On the basis of the above, the overall assessment of conservation status is favourable.

The degree of conservation of the features of the habitat structure which are important for the species in Connemara Bog Complex SAC and possibilities for restoration is assessed as A: excellent conservation (Natura 2000 Data Form 2015).

The pressures and threats (National level) relating to this species, as identified in the 2013 Article 17 Report, are listed below:

**Pressures:**
- Roads, motorways *(medium importance)*
- Professional passive fishing *(low importance)*
- Pollution to surface waters (limnic & terrestrial, marine & brackish) *(low importance)*

**Threats:**
- Roads, motorways *(medium importance)*
- Professional passive fishing *(low importance)*
- Pollution to surface waters (limnic & terrestrial, marine & brackish) \textit{(low importance)}

The assessment of the proposed development has identified potential pathways for impacts on this species in relation to the \textit{low importance} Pressure and \textit{Threat Pollution to surface waters (limnic & terrestrial, marine & brackish)}.

The targets and attributes for this habitat as per the specific conservation objectives for Connemara Bog Complex SAC have been reviewed and considered in relation to the current development and are described in Table 4.6 below.

The Site-Specific Conservation Objective for Otter is:

\textit{To maintain the favourable conservation condition of Otter in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:}

\textbf{Table 4.6. Targets and attributes associated with site specific conservation objectives for Otter \textit{(Lutra lutra) [1355]}}

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution.</td>
<td>No significant decline</td>
<td>The proposed development has been designed to avoid all in-stream works and all major infrastructure is located over 50 metres from any watercourse. There are no works within the SAC and therefore, no potential for direct effects within the SAC. No holts, slides, couches or resting place were recorded within the site of the proposed development and no in-stream features that could act as a barrier to the distribution of the species outside the SAC.</td>
</tr>
<tr>
<td>Extent of terrestrial habitat</td>
<td>No significant decline. Area mapped and calculated as 2194.8ha</td>
<td>There will be no decline in the extent of terrestrial, marine of freshwater habitat associated with the proposed development.</td>
</tr>
<tr>
<td>Extent of marine habitat</td>
<td>No significant decline. Area mapped and calculated as 139.0ha.</td>
<td></td>
</tr>
<tr>
<td>Extent of freshwater (river) habitat</td>
<td>No significant decline. Length mapped and calculated as 564.0km</td>
<td></td>
</tr>
<tr>
<td>Extent of freshwater (lake/lagoon) habitat</td>
<td>No significant decline. Area mapped and calculated as 3908.6ha</td>
<td></td>
</tr>
<tr>
<td>Couching sites and holts.</td>
<td>No significant decline</td>
<td>No couches or holting site were identified during the surveys undertaken. There will be no decline in couching or holt sites associated with the proposed development.</td>
</tr>
<tr>
<td>Fish biomass available</td>
<td>No significant decline</td>
<td>There will be no decline in availability of fish biomass associated with the proposed development. Pathways including water pollution that would allow impacts to occur were considered in the design of the proposed development and a range of</td>
</tr>
</tbody>
</table>
No direct impacts on this species have been identified as the proposed development is located entirely outside the European Site. Emissions to surface water was identified as a potential indirect impact on the Qualifying Interest of the Connemara Bog Complex SAC.

The pathways that would allow potentially adverse impacts to occur were considered in the design of the scheme and a range of measures, as outlined in Section 5 and in the Construction Environmental Management Plan [Appendix 3], are in place to avoid, reduce and remedy potential adverse impacts on surface water quality during construction, operation and decommissioning.

Post implementation of avoidance and preventive measures the residual impact on the Connemara Bog Complex SAC will be negligible. The design of the scheme has been developed with an overall objective of minimising the impact on ecologically sensitive sites.

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect the Otter population associated with the Connemara Bog Complex SAC.

**4.1.3.1.6 Conclusion regarding Deterioration of Water Quality**

Post implementation of avoidance and preventive measures the residual effect on the Connemara Bog Complex SAC will be negligible. Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect the following QIs of the Connemara Bog Complex SAC through deterioration of water quality:

- Oligotrophic waters containing very few minerals of sandy plains [*Littorelletalia uniflorae*] [3110]
- Natural dystrophic lakes and ponds [3160]
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]
- *Salmo salar* (Salmon) [1106]
- *Lutra lutra* (Otter) [1355]

**4.1.3.2 Disturbance and Habitat Fragmentation**

The potential for slight effects on Otter where that may occur within watercourses on the site but outside the Connemara Bog Complex SAC or in the Owenboliska River that runs alongside the site and within the SAC.

As described above, the proposed windfarm has been deliberately designed to avoid major infrastructure within 50 metres of any watercourse. The proposed development will require a new crossing of the Owenboliska River and this could potentially result in adverse effects on Otter due to disturbance and fragmentation of habitat outside the SAC. Details of the otter surveys that were undertaken are provided in Section 6.3.3.1.1 of the EIAR Biodiversity Chapter. In addition, dedicated surveys for the species were undertaken in 2019 and the results of these (together with the previously undertaken surveys) are provided in Appendix 4.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
</tbody>
</table>
No otter holts, slides, couches or other resting places were recorded during any of the surveys undertaken and described in Appendix 4. However, it is considered likely that the species is present in the area. It is noted that all major infrastructure is located over 50m from any watercourse and the development involves only three new watercourse crossings, none of which will involve instream works and all of which have been designed to facilitate continued otter access throughout their range outside the SAC.

Mitigation to reduce the potential significance of such effects is provided in Sections 6.5.3.2 and 6.5.3.3 of the EIAR Extracts from these which are provided below:

*A pre-construction mammal survey will be undertaken to identify any Otter holts or Badger setts within the works areas associated with the proposed development. The survey will be undertaken to ensure that Otter or Badger have not taken up residence within or close to the development footprint.*

*Although no evidence of Otter was recorded at the location of the bridge crossings on the Owenboliska River and tributary it is likely that the species does occur on occasion. The welfare of Otters will be ensured primarily through the provision of continued safe access for Otters to their ranges and foraging habitats. Adequate provision for Otters at the river crossings is required to allow the species to retain continued access to their foraging areas. The watercourses will be crossed by clear span structures and part of the riverbank will be retained to provide dry passage for Otter under the structure.*

The site-specific targets and attributes for otter have been considered in relation to displacement and are discussed in Table 4.6 above. Post implementation of avoidance and preventive measures the residual impact in respect of disturbance or fragmentation of Otter habitat associated with the Connemara Bog Complex SAC will be negligible. Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect Otter.

Following the implementation of mitigation, no adverse effects are anticipated with no potential for the proposed development to prevent the maintenance of the conservation condition of this species within the SAC.

### 4.2 Ross Lake and Woods SAC

The site synopsis for this designated site is provided in Appendix 7.

#### 4.2.1 Site Specific Pressures and Threats

As per the Natura 2000 Data Form, the site-specific threats, pressures and activities with potential to impact on the SAC are as follows:

- A10.01-Removal of hedges and copses or scrub (Medium importance)
- I01-Invasive non-native species (Medium importance)
- J02.04.01-Flooding (Medium importance)
- E06-other urbanisation, industrial and similar activities (High importance)
- C01.01-Sand and gravel extraction (Medium importance)
- A04-grazing (Low importance)
- A08-fertilisation (Low importance)
- E06.02-reconstruction, renovation of buildings (High importance)
- A02.01-agricultural intensification (Medium importance)
4.2.2 Identification of Potential Effects

The screening assessment has identified potential for the proposed development to adversely affect the QIs of the Ross Lake and Wood SAC in view of their conservation objectives. Potential significant effects on the Qualifying Interests (QIs) may arise in the form of disturbance and fragmentation affecting key species, where such species occur outside the boundary of the European Site. The Screening Assessment is provided as Appendix 1 to this document. The site-specific conservation objective document for this site was reviewed when carrying out this assessment (most recently 07/03/2019).

Table 4.7 identifies the QIs for which potential pathways for significant effects as a result of the proposed development were identified.

<table>
<thead>
<tr>
<th>Qualifying Interest</th>
<th>Assessment of pathways for Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhinolophus hipposideros [Lesser Horseshoe Bat] [1303]</td>
<td>With regard to Lesser Horseshoe Bat, which is a QI of the SAC, there is potential for disturbance and fragmentation related impacts to the QI species where it occurs outside the boundary of the European Site. The potential for adverse effects on this species is therefore considered further in this document.</td>
</tr>
</tbody>
</table>

Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]

<table>
<thead>
<tr>
<th>Qualifying Interest</th>
<th>Assessment of pathways for Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]</td>
<td>There will be no direct effects as the proposed development is located entirely outside the designated site. There is the potential for indirect effects with regard to surface water pollution associated only with a water crossing on the alternative wind farm access road. The potential for adverse effects on this habitat is therefore considered further in this document.</td>
</tr>
</tbody>
</table>

There will be no direct effects as the proposed development is located entirely outside the designated site. Potential pathways for indirect effects on the Qualifying Interests were identified and are listed below:

- Disturbance and habitat loss/fragmentation related effects on QI species where such species occur outside the boundary of the European Site. Potentially effected species include:
  - Lesser Horseshoe Bat

- Deterioration of surface water quality resulting from pollution, associated with construction, operation and decommissioning of the alternative wind farm access road only. Potentially affecting the following aquatic QIs:
4.2.3 Discussion of Potential for Effects Taking into Account Best Practice and Design Features

There are two pathways for effect on the identified QI habitats and species of the Ross Lake & Woods SAC and the proposed development has been specifically designed so that the potential for adverse effects to occur via either pathway is prevented. The methods by which each pathway is blocked is discussed below.

4.2.3.1 Disturbance and habitat loss/fragmentation for Lesser Horseshoe Bat (Rhinolophus hipposideros)

The proposed wind farm development is located outside the core foraging range of the Lesser Horseshoe Bats associated with Ross Lake & Woods SAC (2.5km). However, the species has been recorded on the wind farm site and effects on the species have been considered as part of this assessment on a precautionary basis. The temporary construction access road is located within the core foraging range of the SAC population but will not involve lighting or significant loss of woodland, scrub, linear features or buildings. The impact of the proposed development on bats is fully considered in Section 6.4.3.6 of the EIAR and in the bat survey report that is provided in Appendix 6.2 to the EIAR. In addition, the potential for the proposed development to result in effects specifically on Lesser Horseshoe Bat is provided below.

The range for this species in Ireland has been assessed as favourable in the NPWS Article 17 Report. The population is also assessed as favourable.

The habitat and future prospects for the species have both been assessed as favourable. On the basis of the above, the overall assessment of conservation status is favourable.

The degree of conservation of the features of the habitat structure which are important for the species in Ross Lake and Woods SAC and possibilities for restoration is assessed as B: good conservation (Natura 2000 Data Form 2015).

The national level pressures and threats identified in the Article 17 report are listed below:

**Pressures:**

- Removal of hedges and copses or scrub *(medium importance)*
- Removal of stone walls and embankments *(low importance)*
- Forest and plantation management and use *(high importance)*
- Demolishment of buildings & human structures *(medium importance)*
- Reconstruction, renovation of buildings *(high importance)*
- Speleology *(low importance)*
- Recreational cave visits *(low importance)*
- Other human intrusions and disturbances *(low importance)*
- Light pollution *(medium importance)*
- Inundation (natural processes) *(medium importance)*

**Threats:**

- Removal of hedges and copses or scrub *(medium importance)*
- Removal of stone walls and embankments *(low importance)*
- Forest and plantation management and use *(high importance)*
• Demolishment of buildings & human structures (medium importance)
• Reconstruction, renovation of buildings (high importance)
• Speleology (low importance)
• Recreational cave visits (low importance)
• Other human intrusions and disturbances (low importance)
• Light pollution (medium importance)
• Inundation (natural processes) (medium importance)

The assessment of the proposed development has identified potential pathways for impacts on this species in relation to the high and low importance pressures and threats Forest and plantation management and use and Other human intrusions and disturbances.

The detailed Conservation Objectives are available for the Ross Lake and Woods SAC were reviewed. Targets and attributes for the conservation of this species within the Ross Lake and Woods SAC have been reviewed and considered in relation to the current development and are described in Table 4.8 below.

The Site-Specific Conservation Objective for lesser horseshoe bat is:
To restore the favourable conservation condition of Lesser Horseshoe Bat in Ross Lake and Woods SAC, which is defined by the following list of attributes and targets

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population per roost</td>
<td>Minimum numbers of 100 bats maintained</td>
<td>There will be no direct impacts on any roosting sites. The development will not result in any effect which could reduce the population of bats for which the SAC has been designated.</td>
</tr>
<tr>
<td>Summer Roosts</td>
<td>No decline</td>
<td>There will no loss or disturbance of any bat roosts within the SAC. The infrequently utilised night roost that is located at letter lodge outhouse is outside the core foraging range of Lesser Horseshoe that are associated with Ross Lake &amp; Woods SAC. This roost will be retained along with the vegetative connectivity to the wider surrounding area.</td>
</tr>
<tr>
<td>Number of auxiliary roosts</td>
<td>No decline</td>
<td></td>
</tr>
<tr>
<td>Extent of potential foraging habitat</td>
<td>No significant decline within 2.5km of the qualifying roost</td>
<td>The proposed development will not result in any reduction in the potential foraging habitat within 2.5 km of the SAC. The alternative wind farm access road will pass through a small area of scrub/woodland alongside the N59 but this will not result in any loss of vegetative connectivity or foraging habitat given the location of the temporary construction access road and its narrow width</td>
</tr>
<tr>
<td>Linear features: length</td>
<td>No significant loss, within 2.5km of qualifying roosts</td>
<td>The development has been designed to retain habitat connectivity and is anticipated to create additional linear features which may be utilised by bats.</td>
</tr>
<tr>
<td>Light Pollution</td>
<td>No significant increase in artificial light</td>
<td>There will be no light pollution associated with the proposed</td>
</tr>
</tbody>
</table>
Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect the Lesser Horseshoe Bat population associated with the Ross Lake and Wood SAC. It will not prevent the restoration of the favourable conservation condition of this species within the SAC.

4.2.3.2 Deterioration of Surface Water Quality in Ross Lake

The wind farm site is located entirely outside of the Ross Lake catchment, but the proposed temporary construction access track is located entirely within it. This track crosses a stream that flows into Ross lake after flowing a distance of approximately 1.7km. This stream provides the potential conduit for pollution of the lake, which corresponds to the lake habitat *Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.* [3140] and is among the Qualifying interests of the SAC.

The design was constraints led from the outset with all major infrastructure located over 50m from any watercourse. In addition, a range of measures that are set out in the various chapters of the EIAR (particularly Chapter 6, Biodiversity and Chapter 9, Water) are included within the Construction & Environmental Management Plan (CEMP) that is provided as Appendix 3 and are in place to avoid, reduce and remedy potential adverse impacts on surface water quality during construction, operation and decommissioning. A summary of these measures is provided in Section 5 below.

Section 9.4.5.2 of chapter 9 of the EIAR provides a specific and targeted assessment of the potential for the proposed development to result in effects on designated sites. Chapter 9 of the EIAR is included in its entirety as Appendix 6 as this provides all the details of the surveys undertaken and the results that led to the conclusion reached in Section 9.4.5.2.

The baseline aquatic environment within the windfarm site is described in Sections 6.3.2.1.2 and 6.3.3.1.6 of the EIAR Biodiversity Chapter and an assessment of the potential for effects thereon is fully assessed in the chapter. The residual effect, post mitigation is provided in Section 6.6 of the chapter. The relevant information from the Biodiversity Chapter and from surveys that were subsequently undertaken to update the aquatic baseline in March 2019 are provided in Appendix 4.

A targeted and specific assessment of the potential of the proposed development to result in effects on Hard Oligo-Mesotrophic waters with benthic vegetation of Chara Spp. in view of the Conservation Objectives relevant targets and attributes (as set out in the site-specific conservation objectives document for the Ross Lake & Woods SAC).

4.2.3.2.1 *Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.* [3140]

The range and area of this habitat in Ireland has been assessed as *favourable* in the NPWS Article 17 Report.
The specific structures and functions (including species) and future prospects for the habitat have both been assessed as **Bad (declining)**. These parameters relate to a decline in the quality of the habitat where it occurs. On the basis of the above, the overall assessment of conservation status is **Bad** with the overall trend assessed as **Declining**.

The main pressures and threats identified in the Article 17 report are listed below:

**Pressures**

- Diffuse pollution to surface waters due to agricultural and forestry activities **(high importance)**
- Diffuse groundwater pollution due to agricultural and forestry activities **(high importance)**
- Pollution to surface waters by industrial plants **(high importance)**
- Diffuse groundwater pollution due to non-sewered population **(high importance)**
- Diffuse pollution to surface waters due to other sources not listed **(medium importance)**
- Pollution to surface waters by storm overflows **(medium importance)**
- Invasive non-native species **(low importance)**
- Diffuse pollution to surface waters due to household sewage and waste waters **(low importance)**
- Surface water abstractions for public water supply **(low importance)**

**Threats**

- Diffuse pollution to surface waters due to agricultural and forestry activities **(high importance)**
- Diffuse groundwater pollution due to agricultural and forestry activities **(high importance)**
- Pollution to surface waters by industrial plants **(high importance)**
- Diffuse groundwater pollution due to non-sewered population **(high importance)**
- Diffuse pollution to surface waters due to other sources not listed **(medium importance)**
- Pollution to surface waters by storm overflows **(medium importance)**
- Invasive non-native species **(low importance)**
- Diffuse pollution to surface waters due to household sewage and waste waters **(low importance)**
- Surface water abstractions for public water supply **(low importance)**
- Changes in Abiotic Conditions **(low importance)**

The targets and attributes for this habitat as per the specific conservation objectives for Ross Lake & Woods SAC have been reviewed and considered in relation to the current development and are described in Table 4.9 below.

The site-specific Conservation Objective for this Qualifying Interest is:

*To restore the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. in Ross Lake and Woods SAC, which is defined by the following list of attributes and targets:*
### Table 4.9. Targets and attributes associated with site specific conservation objectives for Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.[3140]

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>There will be no decline in habitat area associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat</td>
</tr>
<tr>
<td>Habitat Distribution</td>
<td>No decline, Subject to natural processes</td>
<td>There will be no decline in habitat distribution associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat</td>
</tr>
<tr>
<td>Typical Species</td>
<td>Typical species present, in good condition, and demonstrating typical abundances and distribution</td>
<td>There will be no impacts on typical species, vegetation composition or distribution associated with the habitat. Pathways that would allow impacts to the supporting habitat of typical species were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Vegetation composition:</td>
<td>All characteristic zones should be present, correctly distributed and in good condition</td>
<td>There will be no decline in lake substratum quality, water quality, chemistry or turbidity associated with the proposed development. Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all potential hydrological impacts during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>characteristic zonation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation distribution:</td>
<td>Maintain maximum depth of vegetation, subject to natural processes.</td>
<td></td>
</tr>
<tr>
<td>maximum depth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrological regime:</td>
<td>Maintain appropriate natural hydrological regime necessary to support the habitat</td>
<td>There will be no alteration to the hydrological regime. Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all potential hydrological impacts during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Water level fluctuations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake substratum quality</td>
<td>Maintain appropriate substratum type, extent and chemistry to support the vegetation</td>
<td>There will be no decline in lake substratum quality, water quality, chemistry or turbidity associated with the proposed development. Pathways</td>
</tr>
<tr>
<td>Attribute</td>
<td>Target</td>
<td>Assessment</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Water quality: transparency</td>
<td>Maintain appropriate Secchi transparency. There should be no decline in</td>
<td>That would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Water quality: nutrients</td>
<td>Maintain the concentration of nutrients in the water column to sufficiently</td>
<td></td>
</tr>
<tr>
<td>Water quality: phytoplankton</td>
<td>Maintain appropriate water quality to support the habitat, including</td>
<td></td>
</tr>
<tr>
<td>Water quality: phytoplankton</td>
<td>Maintain appropriate water quality to support the habitat, including</td>
<td></td>
</tr>
<tr>
<td>Water quality: attached algal</td>
<td>Maintain trace/ absent attached algal biomass (&lt;5% cover) and high</td>
<td></td>
</tr>
<tr>
<td>Water quality: macrophyte status</td>
<td>Maintain high macrophyte status</td>
<td></td>
</tr>
<tr>
<td>Acidification status</td>
<td>Maintain appropriate water and sediment pH, alkalinity and cation</td>
<td></td>
</tr>
<tr>
<td>Water colour</td>
<td>Maintain appropriate water colour to support the habitat</td>
<td></td>
</tr>
<tr>
<td>Dissolved organic carbon (DOC)</td>
<td>Maintain appropriate organic carbon levels to support the habitat</td>
<td></td>
</tr>
<tr>
<td>Turbidity</td>
<td>Maintain appropriate turbidity to support the habitat</td>
<td>There will be no impact on fringing habitats associated with the proposed development. The identified pathway for effect on this habitat is via deterioration in surface water quality. The proposed development is located entirely outside the SAC and does not have the potential for direct effects such as loss of habitat.</td>
</tr>
<tr>
<td>Fringing habitat</td>
<td>Maintain the area and condition of fringing habitats necessary to</td>
<td></td>
</tr>
</tbody>
</table>

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect the Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. within the
Ross Lake and wood SAC. It will not prevent the restoration of the favourable conservation condition of this habitat within the SAC.

4.3 **Lough Corrib SAC**

The site synopsis for this designated site is provided in Appendix 7.

4.3.1 **Site Specific Pressures and Threats**

As per the Natura 2000 Data Form, the site-specific treats, pressures and activities with potential to impact on the SAC are as follows:

- A02.01-agricultural intensification (High importance)
- H01.08-diffuse pollution to surface waters due to household sewage and waste waters (High importance)
- B01-forest planting on open ground (Medium importance)
- J02.15-other human induced changes in hydraulic conditions (Medium importance)
- I01-invasive non-native species (High importance)
- C01.01-sand and gravel extraction (Low importance)
- E01.03-dispersed habitation (Medium importance)
- D03.01.02-piers / tourist harbours or recreational piers (Medium importance)
- C01.03.02-mechanical removal of peat (High importance)
- E03.01-dispersed habitation (Low importance)
- A08-fertilisation (Medium importance)
- A04.03-abandonment of pastoral systems, lack of grazing (Medium importance)
- A10.01-removal of hedges and copses or scrub (Medium importance)
- J02.01.03-infilling of ditches, dykes, ponds, pools, marshes or pits (Medium importance)
- D01-roads, paths and railroads (Medium importance)
- G05-other human intrusions and disturbances (High importance)
- E01.01-continuous urbanisation (High importance)

4.3.2 **Identification of Potential Effects**

The screening assessment has identified potential for the proposed development to adversely affect certain QIs of the Lough Corrib SAC in view of their conservation objectives. The Screening Assessment is provided as Appendix 1 to this document. The site-specific conservation objectives were reviewed when carrying out this assessment (most recently 23/10/2018).

Table 4.10 describes the QIs for which potential pathways for significant effects as a result of the proposed development were identified and describes the potential pathways for effect. It also describes the QIs for which no pathways for effect were identified.

<table>
<thead>
<tr>
<th>Qualifying Interest</th>
<th>Assessment of pathways for Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]</td>
<td>There will be no direct effects as the proposed development is located entirely outside the designated site. Following an extremely precautionary principle, the potential for indirect</td>
</tr>
<tr>
<td>Qualifying Interest</td>
<td>Assessment of pathways for Effect</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Water courses of plain to montane levels with the <em>Ranunculion fluitantis</em> and  <em>Callitricho-Batrachion</em> vegetation [3260]</td>
<td>The potential for adverse effects on these Qualifying Interests is therefore considered further in this document.</td>
</tr>
<tr>
<td><em>Lutra lutra</em> (Otter) [1355]</td>
<td></td>
</tr>
<tr>
<td><em>Austropotamobius pallipes</em> (White-clawed Crayfish) [1092]</td>
<td></td>
</tr>
<tr>
<td><em>Petromyzon marinus</em> (Sea Lamprey) [1095]</td>
<td></td>
</tr>
<tr>
<td><em>Lampetra planeri</em> (Brook Lamprey) [1096]</td>
<td></td>
</tr>
<tr>
<td><em>Salmo salar</em> (Salmon) [1106]</td>
<td></td>
</tr>
<tr>
<td>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<em>Festuco-Brometalia</em>) [* important orchid sites] [6210]</td>
<td>There will be no direct effects as the proposed development is located entirely outside the designated site. There is no pathway for indirect effects on these terrestrial habitats. The potential for adverse effects on these Qualifying Interests is therefore not considered further in this document.</td>
</tr>
<tr>
<td>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<em>Molinion caeruleae</em>) [6410]</td>
<td></td>
</tr>
<tr>
<td>Active raised bogs [7110]</td>
<td></td>
</tr>
<tr>
<td>Degraded raised bogs still capable of natural regeneration [7120]</td>
<td></td>
</tr>
<tr>
<td>Depressions on peat substrates of the <em>Rhynchosporion</em> [7150]</td>
<td></td>
</tr>
<tr>
<td>Limestone pavements [8240]</td>
<td></td>
</tr>
<tr>
<td>Old sessile oak woods with <em>Ilex</em> and <em>Blechnum</em> in the British Isles [9140]</td>
<td></td>
</tr>
<tr>
<td>Bog woodland [9100]</td>
<td></td>
</tr>
<tr>
<td><em>Margaritifera margaritifera</em> (Freshwater Pearl Mussel) [1029]</td>
<td></td>
</tr>
<tr>
<td>Oligotrophic to mesotrophic standing waters with vegetation of the <em>Littorelletea uniflorae</em> and/or <em>Isoeto-Nanojuncetea</em> [3130]</td>
<td>There will be no direct effects as the proposed development is located entirely outside the designated site. Following a review of the site-specific conservation objectives, no surface water connection to the locations of these habitats and species was identified and thus no pathway for effect was identified. The potential for adverse effects on these Qualifying Interests is therefore not considered further in this document.</td>
</tr>
<tr>
<td>Alkaline fens [7230]</td>
<td></td>
</tr>
<tr>
<td>Calcareous fens with <em>Cladium mariscus</em> and</td>
<td></td>
</tr>
</tbody>
</table>

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## Qualifying Interest

<table>
<thead>
<tr>
<th>Species/ Habitats</th>
<th>Assessment of pathways for Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Caricion davallianae</em> [7210]</td>
<td></td>
</tr>
<tr>
<td>Oligotrophic waters containing very few minerals of sandy plains (<em>Littorelletalia uniflorae</em>) [3110]</td>
<td></td>
</tr>
<tr>
<td><em>Najas flexilis</em> (Slender Naiad) [1833]</td>
<td></td>
</tr>
<tr>
<td>Petrifying springs with tufa formation (<em>Cratoneurion</em>) [7220]</td>
<td></td>
</tr>
<tr>
<td><em>Drepanoclados vernicosus</em> (Slender Green Feather-moss) [1393]</td>
<td></td>
</tr>
</tbody>
</table>
| *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] | Following a review of the site-specific conservation objectives, it is noted that the proposed development is located far outside the zone of influence (2.5km) of the population of Lesser Horseshoe Bats for the protection of which the SAC is designated. This population and its associated foraging area is located on the northern shore of Lough Corrib over 16 km from the site of the proposed development. 

The potential for adverse effects on this species is therefore not considered further in this document. |

There will be no direct effects as the proposed development is located entirely outside the designated site. Potential pathways for indirect effects on the Qualifying Interests were identified and are listed below:

- Deterioration of surface water quality resulting from pollution, associated with construction, operation and decommissioning of the alternative wind farm access road only. Potentially affecting the following aquatic QIs:
  - Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140]
  - Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Calitricho-Batrachion* vegetation [3260]
  - *Austropotamobius pallipes* (White-clawed Crayfish) [1092]
  - *Petromyzon marinus* (Sea Lamprey) [1095]
  - *Lampetra planeri* (Brook Lamprey) [1096]
  - *Salmo salar* (Salmon) [1106]
  - *Lutra lutra* (Otter) [1355]

### 4.3.3 Discussion of Potential for Impacts Taking into Account Best Practice and Design Features

There is a single pathway for effect on the identified QI habitats and species of the lough Corrib SAC and the proposed development has been specifically designed so that the potential for adverse effects to occur via this pathway is prevented. The methods by which this pathway is blocked is discussed below.

#### 4.3.3.1 Deterioration of Surface Water Quality in the Corrib catchment

The potential for pollution of surface water in the Corrib catchment is considered following an extremely precautionary principle. The potential pathway for effect is via Ross Lake and this pathway has been considered in the preceding section of this report in relation to the Ross Lake & Woods SAC. In the case of the Lough Corrib SAC, the
pathway is far more precautionary any polluted waters would have to pass through Ross Lake before flowing for a distance of over 4km to reach the SAC at Ballyquirke Lough.

The same measures are in place to prevent any adverse effects as are described in Section 4.2.3.2 above.

A targeted and specific assessment of the potential of the proposed development to result in effects on each of the identified habitats and species in view of the Conservation Objectives relevant targets and attributes (as set out in the site-specific conservation objectives document for the Lough Corrib SAC).

4.3.3.1.1 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]

The targets and attributes for this habitat as per the specific conservation objectives for Lough Corrib SAC have been reviewed and considered in relation to the current development and are the same as stated in the Site Specific Conservation Objectives of the Ross Lake and Woods SAC. The assessment of the potential for the proposed development to impact on this habitat via surface water is discussed in Table 4.9 above and is not repeated here.

The site-specific Conservation Objective for this Qualifying Interest is:

To restore the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect the Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. within the Lough Corrib SAC. It will not prevent the restoration of the favourable conservation condition of this habitat within the SAC.

Post implementation of the avoidance and preventive measures there will be no residual impact on the Lough Corrib SAC. Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect the Lough Corrib SAC through deterioration of water quality. Following the implementation of mitigation, no adverse effects are anticipated with no potential for the proposed development to prevent the restoration or maintenance of the conservation condition of any habitat or species within the SAC.

4.3.3.1.2 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]

The targets and attributes for this habitat as per the specific conservation objectives for Lough Corrib SAC have been reviewed and considered in relation to the current development and are the same as stated in the Site-Specific Conservation Objectives of the Connemara Bog Complex SAC. The assessment of the potential for the proposed development to impact on this habitat via surface water is discussed in Table 4.4 above and is not repeated here.

The site-specific Conservation Objective for this Qualifying Interest is:
To maintain the favourable conservation condition of Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation in Lough Corrib SAC, which is defined by the following list of attributes and targets:

No direct impacts on this habitat have been identified as the proposed development is located entirely outside the European Site. Emissions to surface water was identified as a potential indirect impact on the Qualifying Interest of the Lough Corrib SAC.

The pathways that would allow potentially adverse impacts to occur were considered in the design of the scheme and a range of measures, as outlined in Section 5 and in the Construction Environmental Management Plan (Appendix 3), are in place to avoid, reduce and remedy potential adverse impacts on surface water quality during construction, operation and decommissioning.

Post implementation of avoidance and preventive measures the residual impact on the Lough Corrib SAC will be negligible. The design of the scheme has been developed with an overall objective of minimising the impact on ecologically sensitive sites.

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation (3260) associated with the Lough Corrib SAC.

4.3.3.1.3 White-clawed Crayfish (Austropotamobius pallipes) [1092]

The range, population and habitat for this species in Ireland has been assessed as Favourable in the NPWS Article 17 Report. The future prospects for the species have been assessed as inadequate (Qualifier: stable). On the basis of the above, the overall assessment of conservation status is Inadequate (Qualifier: stable) with no significant overall change since 2007.

The pressures and threats (National level) relating to this species, as identified in the 2013 Article 17 Report, are listed below:

**Pressures:**

- Invasive non-native species [high importance]
- Leisure fishing [low importance]
- Dredging/ removal of limnic sediments [low importance]
- Management of aquatic and bank vegetation for drainage purposes [low importance]
- Introduction of disease (microbial pathogens) [high importance]
- Pollution to surface waters (limnic & terrestrial, marine & brackish) [low importance]

**Threats:**

- Invasive non-native species [high importance]
- Introduction of disease (microbial pathogens) [high importance]
- Pollution to surface waters (limnic & terrestrial, brackish) [low importance]
- Dredging/ removal of limnic sediments [low importance]
The targets and attributes for this species as per the specific conservation objectives for Lough Corrib SAC have been reviewed and considered in relation to the current development and are described in Table 4.11 below.

The site-specific Conservation Objective for this Qualifying Interest is:

*To maintain the favourable conservation condition of White-clawed Crayfish in Lough Corrib SAC, which is defined by the following list of attributes and targets:*

**Table 4.11. Targets and attributes associated with site specific conservation objectives for White Clawed Crayfish (*Austropotamobius pallipes*) [1092]**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution</td>
<td>No Reduction from baseline</td>
<td>There will be no alteration in the distribution of White-clawed Crayfish given that alterations to river morphology and structures which could limit habitat accessibility are not proposed. The proposed development will in no way prevent Crayfish access to all areas within the catchment.</td>
</tr>
<tr>
<td>Population structure</td>
<td>Juveniles and/or eggs in at least 50% of positive samples.</td>
<td>There will be no reduction in the number of Crayfish juveniles/eggs associated with the proposed development. The potential for the proposed development to result in water pollution that could affect spawning Crayfish were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning. The proposed development has been specifically designed to avoid impacts on Crayfish by avoiding in-stream works.</td>
</tr>
<tr>
<td>Negative indicator species</td>
<td>No alien Crayfish species</td>
<td>The proposed development has been specifically designed to avoid impacts on Crayfish by avoiding in-stream works. Consequently, there is no risk of alien Crayfish species being introduced to the catchment.</td>
</tr>
<tr>
<td>Disease</td>
<td>No occurrence of disease.</td>
<td>The proposed development has been specifically designed to avoid impacts on Crayfish by avoiding in-stream works. Consequently, there is no risk of aquatic disease being introduced to the catchment.</td>
</tr>
<tr>
<td>Water Quality</td>
<td>At least Q3-4 at all sites sampled by the EPA.</td>
<td>There will be no reduction in water quality as a result of the proposed works. The proposed development has been specifically designed to avoid impacts on Crayfish by avoiding in-stream works. Consequently, there is no risk of aquatic disease being introduced to the catchment.</td>
</tr>
</tbody>
</table>

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Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect Crayfish within the Lough Corrib SAC. It will not prevent the maintenance of the favourable conservation condition of this habitat within the SAC.

### 4.3.3.1.4 Sea Lamprey (Petromyzon marinus) [1095]

The range and population for this species in Ireland has been assessed as **Bad** in the NPWS Article 17 Report. The population has been assessed as **Favourable**. The future prospects for the species have been assessed as **Bad (Qualifier: stable)**. On the basis of the above, the overall assessment of conservation status is **Bad (Qualifier: stable)**.

The reasons for change in data since 2007 is based on an improved knowledge of the species.

The pressures and threats (National level) relating to this species, as identified in the 2013 Article 17 Report, are listed below:

**Pressures:**

- Canalisation (**high importance**)
- Reduction in migration/migration barriers (**high importance**)
- Pollution to surface waters (limnic & terrestrial, marine & brackish) (**medium importance**)

**Threats:**

- Bait digging/collection (**medium importance**)
- Pollution to surface waters (limnic & terrestrial, marine & brackish) (**medium importance**)
- Reduction in migration/ migration barriers (**high importance**)
- Canalisation (**high importance**)

The targets and attributes for this species as per the specific conservation objectives for Lough Corrib SAC have been reviewed and considered in relation to the current development and are described in Table 4.12 below.

The site-specific Conservation Objective for this Qualifying Interest is:
To restore the favourable conservation condition of Sea Lamprey in Lough Corrib SAC, which is defined by the following list of attributes and targets:

**Table 4.12. Targets and attributes associated with site specific conservation objectives for Sea Lamprey (Petromyzon marinus) [1095]**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extent of anadromy</td>
<td>Greater than 75% of main stem length of rivers accessible from estuary</td>
<td>The proposed development will not impact on the accessibility to the River Corrib estuary in regard to this species. The proposed development has been specifically designed to avoid instream works.</td>
</tr>
<tr>
<td>Population structure of juveniles</td>
<td>At least three age/size groups present</td>
<td>The proposed development has been specifically designed to avoid instream works, therefore potential for impacts in relation to population structure have been avoided.</td>
</tr>
<tr>
<td>Juvenile density in fine sediment</td>
<td>Mean catchment juvenile density at least 1/m²</td>
<td>The proposed development has been specifically designed to avoid instream works, therefore potential for impacts in relation to juvenile density of this species have been avoided.</td>
</tr>
<tr>
<td>Extent and distribution of spawning habitat</td>
<td>No decline in extent and distribution of spawning beds. Improved dispersal of spawning beds into areas upstream of barriers</td>
<td>The proposed development has been specifically designed to avoid instream works, therefore potential for impacts in relation to juvenile density of this species have been avoided.</td>
</tr>
<tr>
<td>Availability of juvenile habitat</td>
<td>More than 50% of sample sites positive</td>
<td>The proposed development has been specifically designed to avoid instream works, therefore potential for impacts in relation to juvenile habitat has been avoided.</td>
</tr>
</tbody>
</table>

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect Sea Lamprey within the Lough Corrib SAC. It will not prevent the restoration of the favourable conservation condition of this species within the SAC.

4.3.3.1.5 **Brook Lamprey (Lampetra planeri) [1096]**

The range, population and habitat for this species in Ireland has been assessed as **Favourable** in the NPWS Article 17 Report. The future prospects for the species have
also been assessed as **Favourable**. On the basis of the above, the overall assessment of conservation status is **Favourable** with no overall change since 2007.

The pressures and threats (National level) relating to this species, as identified in the 2013 Article 17 Report, are listed below:

**Pressures:**

- Diffuse pollution to surface waters due to agricultural and forestry activities *(medium importance)*
- Dredging/ removal of limnic sediments *(high importance)*
- Other point source pollution to surface water *(medium importance)*
- Siltation rate changes, dumping, depositing of dredged deposits *(medium importance)*

**Threats:**

- Bait digging / collection *(medium importance)*
- Other point source pollution to surface water *(medium importance)*
- Dredging/ removal of limnic sediments *(high importance)*
- Diffuse pollution to surface waters due to agricultural and forestry activities *(medium importance)*
- Siltation rate changes, dumping, depositing of dredged deposits *(medium importance)*
- Invasive non-native species *(low importance)*

The targets and attributes for this species as per the specific conservation objectives for Lough Corrib SAC have been reviewed and considered in relation to the current development and are described in Table 4.13 below.

The site- specific Conservation Objective for this Qualifying Interest is:

*To maintain the favourable conservation condition of Brook Lamprey in Lough Corrib SAC, which is defined by the following list of attributes and targets:*

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution</td>
<td>Access to all watercourses down to first order streams</td>
<td>The proposed development has been specifically designed to avoid instream works, therefore there will be no impacts on access to watercourses.</td>
</tr>
<tr>
<td>Population structure of juveniles</td>
<td>Conservation Limit for each system consistently exceeded</td>
<td>The potential for the proposed development to result in water pollution that could affect juvenile numbers of Brook Lamprey were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during</td>
</tr>
<tr>
<td>Attribute</td>
<td>Target</td>
<td>Assessment</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>---------------------------------------------</td>
<td>--------------------------------------------------------------</td>
</tr>
<tr>
<td>Juvenile density in fine sediment</td>
<td>Mean catchment juvenile density at least 2/m³</td>
<td>The proposed development has been specifically designed to avoid impacts on Brook Lamprey by avoiding in-stream works.</td>
</tr>
<tr>
<td>Extent and distribution of spawning habitat</td>
<td>No decline in extent and distribution of spawning beds</td>
<td>The proposed development has been specifically designed to avoid impacts on Brook Lamprey by avoiding in-stream works.</td>
</tr>
<tr>
<td>Availability of juvenile habitat</td>
<td>More than 50% of sample sites positive</td>
<td>The proposed development has been specifically designed to avoid impacts on Brook Lamprey by avoiding in-stream works.</td>
</tr>
</tbody>
</table>

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect brook lamprey within the Lough Corrib SAC. It will not prevent the restoration of the favourable conservation condition of this habitat within the SAC.

### 4.3.3.1.6 Otter (Lutra lutra) [1355]

The targets and attributes for this habitat as per the specific conservation objectives for Lough Corrib SAC have been reviewed and considered in relation to the current development and are broadly similar to those stated in the Site-Specific Conservation Objectives of the Connemara Bog Complex SAC. None of the differences materially affect the assessment of the potential for the proposed development to affect the species within the SAC. The assessment of the potential for the proposed development to impact on this species via surface water is discussed in Table 4.6 above and is not repeated here.

The site-specific Conservation Objective for this Qualifying Interest is:

*To maintain the favourable conservation condition of otter in Lough Corrib SAC, which is defined by the following list of attributes and targets:*

No direct impacts on this species have been identified as the proposed development is located entirely outside the European Site. Emissions to surface water was identified as a potential indirect impact on the Qualifying Interest of the Lough Corrib SAC.

The pathways that would allow potentially adverse impacts to occur were considered in the design of the scheme and a range of measures, as outlined in Section 5 and in the Construction Environmental Management Plan [Appendix 3], are in place to avoid, reduce and remedy potential adverse impacts on surface water quality during construction, operation and decommissioning.
Post implementation of avoidance and preventive measures the residual impact on the Lough Corrib SAC will be negligible. The design of the scheme has been developed with an overall objective of minimising the impact on ecologically sensitive sites.

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect otter associated with Lough Corrib SAC.

4.3.3.1.7 Atlantic Salmon (Salmo salar) (1106)

The targets and attributes for this habitat as per the specific conservation objectives for Lough Corrib SAC have been reviewed and considered in relation to the current development and are broadly similar to those stated in the Site-Specific Conservation Objectives of the Connemara Bog Complex SAC. None of the differences materially affect the assessment of the potential for the proposed development to affect the species within the SAC. The assessment of the potential for the proposed development to impact on this species via surface water is discussed in Table 4.5 above and is not repeated here.

The site-specific Conservation Objective for this Qualifying Interest is:

To maintain the favourable conservation condition of Atlantic Salmon in Lough Corrib SAC, which is defined by the following list of attributes and targets:

No direct impacts on this species have been identified as the proposed development is located entirely outside the European Site. Emissions to surface water was identified as a potential indirect impact on the Qualifying Interest of the Lough Corrib SAC.

The pathways that would allow potentially adverse impacts to occur were considered in the design of the scheme and a range of measures, as outlined in Section 5 and in the Construction Environmental Management Plan (Appendix 3), are in place to avoid, reduce and remedy potential adverse impacts on surface water quality during construction, operation and decommissioning.

Post implementation of avoidance and preventive measures the residual impact on the Lough Corrib SAC will be negligible. The design of the scheme has been developed with an overall objective of minimising the impact on ecologically sensitive sites.

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the proposed development will not adversely affect otter associated with Lough Corrib SAC.

4.4 Connemara Bog Complex SPA

The site synopsis for this designated site is provided in Appendix 7.

4.4.1 Site Specific Pressures & Threats

As per the Natura 2000 Data Form, the site-specific threats, pressures and activities with potential to impact on the SPA are as follows:

- I01 - invasive non-native species [Low importance]
- G01.02 - walking, horseriding and non-motorised vehicles [Low importance]
4.4.2 Identification of Potential Effects

The screening assessment has identified potential for the proposed development to adversely affect certain Special Conservation Interests (SCIs) of the Connemara Bog Complex SPA. The Screening Assessment is provided as Appendix 1 to this document. The generic conservation objectives were reviewed when carrying out this assessment (most recently 23/10/2018).

Table 4.14. describes the SCIs for which potential pathways for significant effects as a result of the proposed development were identified and describes the potential pathways for effect that were identified in the assessment. Full details of the ornithological surveys and assessments that provide the information to inform this NIS are located in Chapter 7 of the EIAR. The most relevant information from the bird surveys undertaken is provided in Appendix 5.

Table 4.14. Assessment of pathways for potential adverse impacts on the individual Special Conservation Interests of Connemara Bog Complex SPA

<table>
<thead>
<tr>
<th>Qualifying Interest</th>
<th>Assessment of pathways for Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cormorant (Phalacrocorax carbo) [A017]</td>
<td>This species was recorded utilising waterbodies within the site boundary for foraging. The Development footprint is dominated by conifer planation, which does not provide suitable habitat for the species. There is no potential for direct habitat loss. The species was recorded utilising habitat within the site boundary. An assessment of displacement effect with regard to the SPA population is required. This species was recorded flying over the site within the potential collision risk zone. A collision risk assessment with regard to the SPA population is required.</td>
</tr>
<tr>
<td>Merlin (Falco columbarius) [A098]</td>
<td>The potential for habitat loss, while minimal, cannot be excluded. An assessment of direct habitat loss with regard to the SPA population is required. The species was recorded within the site boundary. An assessment of displacement effect with regard to the SPA population is required. This species was not recorded flying within the potential collision risk zone. A collision risk assessment is not required.</td>
</tr>
<tr>
<td>Golden Plover (Pluvialis apricaria) [A140]</td>
<td>The development footprint is dominated by conifer planation, which does not provide suitable breeding habitat for the species. There is no potential for direct habitat loss. Suitable breeding habitat was recorded 450m from proposed windfarm infrastructure. An assessment of displacement effect with regard to the SPA population is required. This species was not recorded flying over the site during the extensive VP survey work undertaken. A collision risk assessment is not required.</td>
</tr>
</tbody>
</table>
Qualifying Interest | Assessment of pathways for Effect
--- | ---
Common Gull (*Larus canus*) [A182] | The development footprint is dominated by conifer plantation, which does not provide suitable breeding or wintering habitat for the species. There is no potential for direct habitat loss. Suitable breeding habitat was recorded within the site boundary and 500m buffer. **An assessment of displacement effect with regard to the SPA population is required.** In June, August, September 2016 and April 2017 pairs or individual birds were recorded flying over the development site within the potential collision risk zone. **A collision risk assessment with regard to the SPA population is required.**

The SCIs for which pathways for potential impacts were identified include the following:

- Cormorant (*Phalacrocorax carbo*) [A017]
- Merlin (*Falco columbarius*) [A098]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Common Gull (*Larus canus*) [A182]

4.4.2.1 Cormorant

Connemara Bog Complex SPA is designated for "reproducing" Cormorant based on a nationally important breeding colony located at Lough Scannive, Roundstone Bog (NPWS site synopsis 2010). This breeding site is located more than 40km from the development site boundary. The maximum foraging range of Cormorant is 35km and the mean from various studies is 25km (Thaxter et. al 2012). Cormorant recorded within the Ardderroo study area during the breeding season are unlikely to be associated with the breeding colony at Roundstone Bog.

Cormorant is not identified as a species which is particularly sensitive to wind energy development in Mc Guinness et. al. 2015.

No evidence of breeding was recorded within the study area. The development footprint is dominated by conifer plantation that does not provide suitable habitat for Cormorant. Potential effects with regard to direct habitat loss are not anticipated. Suitable foraging habitat for the species within the site boundary is buffered from the development footprint by existing conifer plantation and Scrub. Few transits of commuting birds over the study area were recorded and imperceptible displacement effects are not anticipated.

The species was recorded flying with the potential collision risk zone on 47 occasions during the 2016-2018 survey period. A collision risk has been undertaken and full details are provided in Appendix 7.6 of the EIAR. The potential loss of 2.74 Cormorant over the 30-year period of windfarm operation is very small in the context of the local, county, national and international populations. No significant effects on the SPA population are anticipated regarding collision risk.

No detailed Conservation Objectives are available for Connemara Bog Complex SPA; targets and attributes for the conservation of this species are available in detailed Conservation Objectives for other SPAs (004029, 004019, 004076, 004077, 004031, 004182, and 004030). The targets and attributes are representative of factors considered in the conservation of this species in other areas. The extrapolated targets and attributes for this species have been reviewed and considered in relation to the current development and are described in Table 4.15. below.
Table 4.15. Extrapolated Targets and attributes associated with site specific conservation objectives for cormorant (breeding-wintering season)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breeding population abundance: apparently occupied nests [AONs]</td>
<td>No significant decline</td>
<td>No breeding evidence recorded within the zone of influence of the development</td>
</tr>
<tr>
<td>Productivity rate</td>
<td>No significant decline</td>
<td>No breeding evidence recorded within the zone of influence of the development</td>
</tr>
<tr>
<td>Distribution: breeding colonies</td>
<td>No significant decline</td>
<td>No breeding evidence recorded within the zone of influence of the development</td>
</tr>
<tr>
<td>Prey biomass available</td>
<td>No significant decline</td>
<td>There will be no decline in availability of prey biomass associated with the proposed development. Pathways that would allow impacts to occur were considered in the design of the proposed development and a range of measures are in place to avoid all water pollution during construction, operation and decommissioning.</td>
</tr>
<tr>
<td>Barrier to connectivity</td>
<td>No significant increase</td>
<td>No breeding evidence recorded within the zone of influence of the development</td>
</tr>
<tr>
<td>Disturbance at the breeding site</td>
<td>Human activities should occur at levels that do not adversely affect the breeding cormorant population</td>
<td>No breeding evidence recorded within the zone of influence of the development</td>
</tr>
<tr>
<td>Population trend</td>
<td>Long term population trend stable or increasing</td>
<td>The proposed development will not result in any impacts which could adversely affect the population trend and distribution of the species within the European Site.</td>
</tr>
<tr>
<td>Distribution</td>
<td>There should be no significant decrease in the range, timing or intensity of use of area by cormorant other than that occurring from natural patterns in variation.</td>
<td>The proposed development will not result in any impacts which could adversely affect the population trend and distribution of the species within the European Site.</td>
</tr>
</tbody>
</table>

The proposed development will not prevent or obstruct Cormorant within the SPA population from reaching/maintaining favourable conservation status as per Article 1 of the EU Habitats Directive.

Based on the above, it is concluded in view of best scientific knowledge, beyond reasonable scientific doubt on the basis of objective information that the proposed development, will have imperceptible negative impacts on the population of Cormorant associated with Connemara Bog Complex SPA.

4.4.2.2 Merlin

Connemara Bog Complex SPA is designed for “reproducing” Merlin. The SPA population represents 1.8-3.6% of the all-Ireland breeding population (Natura 2000 data form).

This species was not recorded utilising habitat within the site boundary for roosting or breeding. The development footprint is dominated conifer plantation (semi-mature/mature) consequently; direct loss of potential foraging habitat will be insignificant. Substantial areas of undisturbed suitable foraging habitat will remain.
This species was not recorded utilising habitat within the site boundary for roosting or breeding. The development footprint is dominated conifer plantation (semi-mature/mature) consequently; direct loss of potential foraging habitat will be insignificant. Substantial areas of undisturbed suitable foraging habitat will remain.

Disturbance during construction is unlikely to discourage flight activity or foraging in the vicinity of the proposed development. Perceptible displacement effects are not anticipated.

This species was not recorded flying at the potential collision risk height during the extensive VP survey work undertake. Potential collision related mortality is not anticipated.

No detailed conservation objectives are available for this species in Ireland.

Based on the above, it is concluded in view of best scientific knowledge, beyond reasonable scientific doubt on the basis of objective information that the proposed development, will have no or imperceptible negative effects on the population of Merlin associated with Connemara Bog Complex SPA.

### 4.4.2.3 Golden Plover

Connemara Bog Complex SPA is designed for “reproducing” Golden Plover. The SPA population represents 18% of the all-Ireland breeding population [Natura 2000 data form]. Evidence of probable breeding Golden Plover was recorded 500m from the site boundary and the nearest suitable breeding habitat is located over 350m from the development footprint. In addition, areas of suitable habitat are buffered by extensive conifer plantations therefore displacement during the breeding season is not anticipated.

Perceptible disturbance during construction is not anticipated and the proposed development is unlikely to discourage flight activity or foraging in the vicinity. No transits of commuting birds were recorded and there is no evidence to suggest the development site is on a migratory route for the species. Significant displacement effects are not anticipated.

No detailed Conservation Objectives are available for Connemara Bog Complex SPA; targets and attributes for the conservation of this species are available in detailed Conservation Objectives for other SPAs (004026, 004032, 004076, 004028, 004033, 004077, 004158, 004016, 004080, 004031, 004036, 004025, 004027, 004188, 004022, 004087, 004030 and 004023). The listed targets and attributes are representative of factors considered in the conservation of this species in other areas. The extrapolated targets and attributes for this species have been reviewed and considered in relation to the current development and are described in Table 4.16 below.

**Table 4.16 Extrapolated Targets and attributes associated with site specific conservation objectives for Golden Plover**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Long term population trend stable or increasing</td>
<td>The proposed development will not result in any impacts which could adversely affect the population trend and distribution of the species within the European Site.</td>
</tr>
<tr>
<td>Distribution</td>
<td>No significant decrease in the numbers or range of areas used by waterbird species other than that occurring</td>
<td></td>
</tr>
</tbody>
</table>
The proposed development will not prevent or obstruct Golden Plover within the SPA population from reaching/maintaining favourable conservation status as per Article 1 of the EU Habitats Directive.

Based on the above, it is concluded in view of best scientific knowledge, beyond reasonable scientific doubt on the basis of objective information that the proposed development, will have no or imperceptible negative impacts on the population of Golden Plover associated with Connemara Bog Complex SPA.

4.4.2.4 Common Gull

Connemara Bog Complex SPA is designed for “reproducing” Common Gull. The numerous lakes scattered throughout the SPA provide suitable breeding locations for Common Gull, 45 pairs in 2000 and 40 pairs in 2000 (NPWS site synopsis). The SPA population represent approximately 2.3% of the National breeding population.

Common Gull is not identified as a species which is particularly sensitive to wind energy development in Mc Guinness et. al. 2015. The development footprint is dominated conifer plantation that does not provide suitable habitat for Common Gull. Potential effects with regard to direct habitat loss are not anticipated.

Suitable breeding/wintering habitat for the species within/outside the site boundary is buffered from the development footprint by existing conifer plantation and Scrub. Areas of suitable habitat are buffered by extensive conifer plantations therefore displacement during the breeding season is not anticipated.

Very few transits of commuting birds were recorded and there is no evidence to suggest the development site is on a migratory route for the species. Significant displacement effects are not anticipated.

The species was recorded flying with the potential collision risk zone on four occasions during the 2016-2018 survey period. A collision risk has been undertaken and full details are provided in Appendix 7.6 of the EIAR. The potential loss of 0.344 Common Gull over the 30-year period of windfarm operation is insignificant in the context of the local, county, national and international populations. This figure equates to a rate of roughly one collision every 91 years in theory. No perceptible effects are anticipated at the population level regarding collision risk at any geographical scale.

No detailed Conservation Objectives are available for Connemara Bog Complex SPA; targets and attributes for the conservation of this species are available in detailed Conservation Objectives for other SPAs (004026, 004075, 004131, 004188, 004022, 004087, 004030 and 004023). The listed targets and attributes are representative of factors considered in the conservation of this species in other areas. The extrapolated targets and attributes for this species have been reviewed and considered in relation to the current development and are described in Table 4.17 below.

Table 4.17 Extrapolated Targets and attributes associated with site specific conservation objectives for Common Gull

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>from natural patterns of variation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attribute</td>
<td>Target</td>
<td>Assessment</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Population trend</td>
<td>Long term population trend stable or increasing</td>
<td>The proposed development will not result in any impacts which could adversely affect the population trend and distribution of the species within the European Site.</td>
</tr>
<tr>
<td>Distribution</td>
<td>No significant decrease in the numbers or range of areas used by waterbird species other than that occurring from natural patterns of variation</td>
<td></td>
</tr>
</tbody>
</table>

The proposed development will not prevent or obstruct Common Gull within the SPA population from reaching/maintaining favourable conservation status as per Article 1 of the EU Habitats Directive.

Based on the above, it is concluded in view of best scientific knowledge, beyond reasonable scientific doubt on the basis of objective information that the proposed development, will have no or imperceptible negative effects on the population of Common Gull associated with Connemara Bog Complex SPA.

4.5 **Lough Corrib SPA**

The site synopsis for this designated site is provided in Appendix 7.

4.5.1 **Identification of Potential Effects**

The screening assessment has identified potential for the proposed development to adversely affect certain Special Conservation Interests (SCIs) of the Lough Corrib SPA conservation objectives. The Screening Assessment is provided as Appendix 1 to this document. The generic conservation objectives were reviewed when carrying out this assessment (most recently 07/03/2019).

Table 4.18 describes the SCIs for which potential pathways for significant effects as a result of the proposed development were identified and describes the potential pathways for effect. It also considers the SCIs for which no pathways for effect were identified.

**Table 4.18 Assessment of pathways for potential adverse effects on the individual Special Conservation Interests of Lough Corrib SPA**

<table>
<thead>
<tr>
<th>Special Conservation Interest</th>
<th>Assessment of pathways for Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gadwall (Anas strepera) A051</td>
<td></td>
</tr>
<tr>
<td>Shoveler (Anas clypeata) A056</td>
<td></td>
</tr>
<tr>
<td>Pochard (Aythya ferina) A059</td>
<td></td>
</tr>
<tr>
<td>Tufted Duck (Aythya fuligula) A061</td>
<td>With the exception of Tufted Duck, these species were not recorded on the site during ornithological surveys and do not utilise the development site for foraging, breeding or wintering. No potential pathway for impact was identified. A pair of Tufted Duck were only recorded on one occasion on the site and were not seen again – with no sign of breeding recorded.</td>
</tr>
<tr>
<td>Common Scoter (Melanitta nigra) A065</td>
<td></td>
</tr>
<tr>
<td>Coot (Fulica atra) A125</td>
<td></td>
</tr>
<tr>
<td>Common Tern (Sterna hirundo) A193</td>
<td></td>
</tr>
<tr>
<td>Special Conservation Interest</td>
<td>Assessment of pathways for Effect</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Arctic Tern <em>Sterna paradisaea</em> [A194]</td>
<td>Only one observation of Hen Harrier was recorded from the early breeding season in April 2015 with no recordings during the breeding season in 2016 or 2017. This species was subsequently not recorded during the late May-late June period, which is the optimum time to establish evidence of breeding (Ruddock et.al. 2016). The study area does not support a breeding population. Effects on Hen Harrier are not anticipated during the breeding season. No Hen Harrier roost sites were identified within the study area. The potential for habitat loss, while minimal, cannot be excluded. <strong>An assessment of direct habitat loss is required.</strong> Hen Harrier were recorded within the site boundary and 500m buffer. <strong>An assessment of displacement effect with regard to the SPA population is required.</strong> One flight in December 2016 was recorded at potential collision risk height. <strong>A collision risk assessment with regard to the SPA population is required.</strong></td>
</tr>
<tr>
<td>Hen Harrier <em>Circus cyaneus</em> [A082]</td>
<td>The species was not recorded utilising habitat within the site boundary/500m buffer during the winter season. Suitable breeding habitat was recorded within a 500m buffer of the site boundary. It is unlikely that the birds recorded as probable breeders from the area of suitable habitat within 500m of the site boundary are associated with Lough Corrib SPA. This species was not recorded flying over the site during the extensive VP survey work undertake. A collision risk assessment is not required.</td>
</tr>
<tr>
<td>Golden Plover <em>Pluvialis apricaria</em> [A140]</td>
<td>Only one incidental sighting of a commuting bird was recorded during the ornithological surveys. The flight was not within the potential collision risk zone. No effects on this species are anticipated. No potential pathway for impact on this species was identified.</td>
</tr>
<tr>
<td>Black-headed Gull <em>Chroicocephalus ridibundus</em> [A179]</td>
<td>This species was not recorded within a 2.8km radius of the site boundary during the winter season. No effects during the winter period are anticipated. The development footprint is dominated by conifer planation, which does not provide suitable breeding habitat for the species. There is no potential for direct habitat loss. Suitable breeding habitat was recorded within the site boundary and 500m buffer. It is unlikely that the birds recorded as probable breeders within the development site /500m buffer are associated with Lough Corrib SPA. In June, August, September 2016 and April 2017 pairs or individual birds were recorded flying over the development site</td>
</tr>
<tr>
<td>Common Gull <em>Larus canus</em> [A182]</td>
<td>This species was not recorded within a 2.8km radius of the site boundary during the winter season. No effects during the winter period are anticipated. The development footprint is dominated by conifer planation, which does not provide suitable breeding habitat for the species. There is no potential for direct habitat loss. Suitable breeding habitat was recorded within the site boundary and 500m buffer. It is unlikely that the birds recorded as probable breeders within the development site /500m buffer are associated with Lough Corrib SPA. In June, August, September 2016 and April 2017 pairs or individual birds were recorded flying over the development site</td>
</tr>
</tbody>
</table>
4.5.1.1 Hen Harrier

Lough Corrib SPA is designated for Hen Harrier and supports a nationally important winter population (NPWS Site Synopsis).

This species was not recorded utilising habitat within the site boundary for roosting or breeding. The development footprint is dominated by conifer plantation (semi-mature/mature) consequently; direct loss of potential foraging habitat will be insignificant. Substantial areas of undisturbed suitable foraging habitat will remain. Disturbance during construction is unlikely to discourage flight activity or foraging in the vicinity of the proposed development. While Madden & Porter (2007) observed reductions in flight activity around turbines during the construction phase, the activity of bird populations quickly returned to pre-construction levels. Significant displacement effects are not anticipated.

The species was recorded flying with the potential collision risk zone only once during the 2016/2018 survey season. A collision risk has been undertaken and full details are provided in Appendix 7.6 of the EIAR. The potential collision risk of 0.001 Hen Harrier (one bird every 1000 years) per year over the 30-year period of windfarm operation is insignificant in the context of the local, county, national and international populations. This figure equates to a rate of roughly one collision every 1,000 years in theory. No significant effects on the SPA population are anticipated regarding collision risk.

No detailed Conservation Objectives are available for Lough Corrib SPA; targets and attributes for the conservation of this species are available in detailed Conservation Objectives for Wexford Harbour and Slobs SPA (004076). The targets and attributes are representative of factors considered in the conservation of this species in other areas. The extrapolated targets and attributes for this species have been reviewed and considered in relation to the current development and are described in Table 4.19 below.

Table 4.19. Extrapolated Targets and attributes associated with site specific conservation objectives for Hen Harrier

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roost attendance: individual hen harriers</td>
<td>No significant decline</td>
<td>No roost sites were recorded within the development site boundary and none</td>
</tr>
</tbody>
</table>
The proposed development will not prevent or obstruct Hen Harrier within the SPA population from reaching/maintaining favourable conservation status as per Article 1 of the EU Habitats Directive.

Based on the above, it is concluded in view of best scientific knowledge, beyond reasonable scientific doubt on the basis of objective information that the proposed development, will have no or imperceptible negative effects on the population of Hen Harrier associated with Lough Corrib SPA.

4.5.1.2 Common Gull

Lough Corrib SPA is designated for “reproducing” and “wintering” Common Gull.

There is potential for habitat loss or disturbance to this species within the SPA.

The species was recorded flying with the potential collision risk zone on four occasions during the 2016-2018 survey period. A collision risk has been undertaken and full details are provided in Appendix 7.6. The potential loss of 0.33 Common Gull (one bird every 91 years) over the 30-year period of windfarm operation is insignificant in the context of the local, county, national and international populations. This figure equates to a rate of roughly one collision every 91 years. No significant effects are anticipated regarding collision risk at any geographical scale.

No detailed Conservation Objectives are available for Lough Corrib SPA; targets and attributes for the conservation of this species are available in detailed Conservation Objectives for other SPAs (004026, 004075, 004131, 004188, 004022, 004087, 004030 and 004023). The listed targets and attributes are representative of factors considered in the conservation of this species in other areas. The extrapolated targets and attributes for this species have been reviewed and considered in relation to the current development and are described in Table 4.20 below.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Target</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Long term population trend stable or increasing</td>
<td>The proposed development will not result in any impacts which could adversely affect the population trend and distribution of the species within the European Site.</td>
</tr>
<tr>
<td>Distribution</td>
<td>No significant decrease in the numbers or range of areas used by waterbird species other than that occurring from natural patterns of variation</td>
<td></td>
</tr>
</tbody>
</table>
The proposed development will not prevent or obstruct Common Gull within the SPA population from reaching/maintaining favourable conservation status as per Article 1 of the EU Habitats Directive.

Based on the above, it is concluded in view of best scientific knowledge, beyond reasonable scientific doubt on the basis of objective information that the proposed development, will have no or imperceptible negative effects on the population of Common Gull associated with Lough Corrib SPA.
5 SUMMARY OF PREVENTIVE MEASURES AND MITIGATION

This section provides a summary of the main measures that are in place to mitigate any potential adverse effects on any ecological receptors associated with the proposed development during construction, operation or decommissioning. All these measures are included within the EIAR, CEMP and associated documents that have been submitted in support of the planning application. These measures ensure that any pathway for adverse effects on the integrity of any European is blocked and no such potential remains.

These measures are designed to ensure that the proposed development does not prevent or obstruct any of the qualifying interests from maintaining or restoring favourable conservation status as per Article 1 of the EU Habitats Directive. A definition of Favourable Conservation Status is provided below:

‘conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2;

The conservation status will be taken as ‘favourable’ when:

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

5.1.1 Potential for Direct Impacts on the European Sites

The Wind Farm development and all associated works are located outside of European sites.

No pathways for direct impacts as a result of the development on any of the QIs/SCIs of any European Site were identified.

5.1.2 Potential for Indirect Effects on the European Sites

Emissions to surface water was identified as a potential indirect effect on the Qualifying Interests of the Connemara Bog Complex SAC and the Lough Corrib SAC. As per Chapter 9 of the EIAR, no adverse hydrological effects on the SAC are anticipated due to the suite of proposed pollution prevention measures for protection of surface water quality. Wind farm drainage control measures (i.e. interceptor drains, collector drains, swales, silt traps, and settlement ponds) will ensure that the quality of surface water runoff from the proposed development areas will be very high. Therefore, significant indirect impacts on the European Sites are not anticipated.
5.1.3 Best Practice incorporated into the project design

- A Construction and Environmental Management Plan (CEMP) has been prepared and is included as Appendix 3. The CEMP will be in place prior to the start of the construction phase.
- Machinery and materials will either be parked/stored in the specified compound areas. Wherever possible, vehicles will be refuelled off-site. This will be the case for regular, road-going vehicles.
- For construction machinery that will be based on-site continuously, a limited amount of fuel will have to be stored on site.
- On-site refuelling of machinery will be carried out using a mobile double skinned fuel bowser.
- The fuel bowser, a double-axle custom-built refuelling trailer will be refilled off site and 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, a Project Ecologist, Project Hydrologist and 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.

Additional preventive measures that will be applied during both construction and operational that will protect local surface water quality are detailed in Chapter 9 of the EIAR (Water).

5.1.3.1 Invasive Species

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 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 (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.

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.
Although no third schedule species have been recorded at the development site, a precautionary approach has been adopted and appropriate spread prevention measures have been incorporated into the design of the project. An invasive species management plan is provided in Section 3.10 of the CEMP that is included as Appendix 3.

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

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

- Good construction site hygiene will be employed to prevent the introduction and spread of problematic 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 CUMULATIVE IMPACT ASSESSMENT

Material for this assessment of cumulative effects was compiled on the relevant developments near the proposed Ardderroo site. 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 QIs/SCI of European sites identified as part of the current assessment.

6.1.1 Other Wind Farm Developments

Planning details on projects considered in this assessment are provided in Chapter 2 of the EIAR.

6.1.1.1 Cloosh Wind Farm (overlaps with Ardderroo)

Flora and Fauna
The wind farm development is dominated by commercial forestry plantation.

Otter Spraint was recorded at Seecon Lough along with and identified holt. Evidence was also recorded form Loughaunayella.

The only bat species recorded within the development site was Common Pipistrelle.

Fish sampling was not conducted for this development but results from IFI fish sampling in 2007/2008 were utilised to inform the impact assessment. The results revealed the absence of Atlantic salmon from the western main stem of the Owenboliska River.

Ornithology
Surveys were carried out in two stages: 2005/06 and 2008/09. Sixty-one bird species were recorded.

No evidence of breeding Hen Harrier was recorded although the species visited the site occasionally during the winter period.

Golden plover was never recorded flying over the site.

Greenland White fronted goose did not utilise the development site due to lack of suitable habitat but a number of flight lines were recorded in September and October. Flights were very high and above the potential collision risk height.

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

6.1.1.2 Uggool Wind Farm (Adjacent to Ardderroo)

Flora and Fauna
As per the EIS submitted in 2003, no habitats of conservation concern were identified. However, the site was located predominantly on peatland habitat and when considered in line with current best practice guidance the peatland habitat is likely to have corresponded to Annex I status.
No evidence of Otter was recorded. Common Pipistrelle was the only species of bat recorded.

**Ornithology**
As per the EIS submitted in 2003, no Annex species or I species listed on the BoCCI Redlist were recorded during surveys. As part of a proposed redesign of the wind farm additional surveys were conducted to accompany an application in 2011. The only recorded of an SCI species was of an incidental sightings of Merlin. No breeding evidence was observed.

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

### 6.1.1.3 Secon Wind Farm (Adjacent to Ardderroo)

**Flora and Fauna**
The development site is entirely dominated by commercial forestry plantation.

Otter spraint was recorded at the edge of bog and forestry to the east of the site and it recognised that the species occurs in the wider area.

Three species of bats were recorded: Common Pipistrelle, Soprano Pipistrelle and Daubenton’s bat.

**Ornithology**
The following observation of SCI species were recorded:

- Greenland White Fronted Geese were recorded near the site but were never recorded using or flying over the site.
- Merlin was recorded on tow occasion during winter VP surveys.
- Golden plover was heard on four occasions during VP surveys. This species was never observed.

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

### 6.1.1.4 Lettercraffore Wind Farm (Adjacent to Ardderroo)

The predominant habitat within the wind farm site was coniferous plantation.

Habitats of ecological significance identified included Wet Heath, Dystrophic Lake, Upland Blanket Bog and Transition Mire and Quaking Bog. The Transition Mire and Quaking bog were fore to have viable characteristics of Annex I habitats.

Bat species recorded included Common Pipistrelle, Soprano Pipistrelle and Daubenton’s Bat.

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

Significant negative residual effects were not identified with regard to any ecological receptor.
Ornithology
The following observation of SCI species were recorded:
- Merlin were not recorded during the breeding season. Two sightings were recorded during the winter season
- Golden plover was only recorded outside the site. Flocks were recorded in November 2009 and in March 2010. Max flock size was 160. Flocks were recorded flying over areas of upland blanket bog.

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

6.1.1.5 Knockranny Windfarm (Adjacent to Ardderroo)

Flora and Fauna
Wet Heath and Lowland Blanket Bog recorded within the site boundary were found to correspond to Annex I status.

No evidence of Otter was recorded.

Bat species recorded within the windfarm site included: Common and Soprano Pipistrelle and Myotis spp.

It was noted that the steams in the study area offered generally low quality potential spawning and nursey habitat.

Ornithology
The following observation of SCI species were recorded:
- Golden Plover flocks were frequently recorded during the winter season
- No evidence of breeding was recorded.

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

6.1.1.6 Windfarms in the Wider Area

Ornithological data from additional windfarms in the wider area including Lettergunnet Wind Farm, Shannagurran Wind Farm, Inverin Wind Farm and Knockalough Wind Farm was reviewed.

The assessments do not identify any significant residual impacts on Ecological receptors.

6.1.1.7 Other (Non-Wind Farm) Projects

The full list of projects considered in the assessment of cumulative effects is provided in Chapter 2 of the EIAR. The majority of other planning applications near the study area are related to the provision and/or alteration of telecommunications masts and wind-monitoring masts. The assessments associated with the developments were reviewed.

No significant residual effects on ecological receptors were identified.
6.1.2 **Assessment of Cumulative Effects**

The identified potential effects of the proposed development on European Sites included:

- Potential for deterioration of surface waters that ultimately flow into Connemara Bog Complex SAC, Ross Lake & Woods SAC and Lough Corrib SAC.
- Potential for disturbance to Otter where it occurs outside the Connemara Bog Complex SAC.
- Potential for disturbance, habitat loss and fragmentation in respect of Lesser Horseshoe Bat associated with Ross Lake and Woods SAC.
- Potential for disturbance, displacement and collision risk for certain SCI species associated with the Lough Corrib SPA and the Connemara Bog Complex SPA.

Following the implementation of mitigation (as described in Section 6 above and in Appendix 3) it is objectively concluded that the proposed development does not have the potential, when considered on its own, to result in adverse effects on the conservation objectives or integrity of the identified European Sites within the Zone of Likely Impact. It cannot, therefore, contribute to any cumulative effect when considered in combination with other plans and projects.

However, when reviewing the plans and projects in the surrounding area and listed above, particular attention was paid to the potential for those developments to result in the same effects (i.e. pollution of surface waters, disturbance, habitat loss, and collision risk). No significant residual effects in this regard were identified in relation to any of the other projects.

Consideration was also given to the potential for additional or new effects on European Sites (other than those already identified) that may arise specifically as a result of the ongoing development of the area. No such additional cumulative or in-combination effects were identified.

6.1.3 **Conclusion of Cumulative Assessment**

The proposed development has been designed to avoid or minimise effects on sensitive ecological receptors through sensitive project design, mitigation and preventative measures and has avoided the potential for adverse effects on any European Site. Taking into consideration the predicted lack of effects on the identified European Sites when considered on its own, the proposed development cannot contribute to any further cumulative effect on European Sites when considered in combination with other plans or projects.

In addition, in a review of residual effects from other plan and projects, no significant potential for additional cumulative effects was identified.
7 CONCLUDING STATEMENT

7.1 Characteristics of the Site and Development

Name and Location of European Sites

- Connemara Bog Complex SAC
- Lough Corrib SAC
- Ross Lake and Woods SAC
- Lough Corrib SPA
- Connemara Bog Complex SPA

Brief Description of Project

The proposed development comprises the construction of a wind farm of up to 25 wind turbines and all associated works. The proposed turbines will have a maximum ground to blade tip height of up to 178.5 metres. The application is seeking a ten-year planning permission. The full description of the proposed development, as per the public planning notices, is as follows:

i. Construction of up to 25 No. wind turbines with a maximum overall blade tip height of up to 178.5m
ii. 1 no. permanent Meteorological Mast with a maximum height of up to 112 metres.
iii. 1no. 110kV electrical substation with 2 no. control buildings with welfare facilities, 6no. battery containers, all associated electrical plant and equipment, security fencing, all associated underground cabling, waste water holding tank and all ancillary works
iv. Underground cabling connecting the turbines to the proposed substation and connection from the proposed substation to the national grid at the existing Eirgrid substation in the townland of Letter
v. Upgrade of existing tracks, roads and provision of new site access roads and hardstand areas;
vi. 3 no. borrow pits.
vii. 2 no. temporary construction compounds.
viii. Recreation and amenity works, including marked trails, conversion of one temporary construction compound into a permanent amenity car park, provision of a toilet/shelter building and associated waste water holding tank, and associated recreation and amenity SIGNAGE
ix. Site Drainage.

Are the project directly connected with or necessary to the management of the site?

The project is not directly connected with or necessary to the management of any European Site.

Are there any other projects or plans that together with the project being assessed could affect the site?

A search in relation to plans and projects that may have the potential to result in cumulative impacts on European sites was carried out as part of the Appropriate Assessment Process. As detailed above in Section 6, the proposed development will
have no perceptible, individual or in combination effects on any European Site in any regard.

7.2 Assessment of Significance of Effects

Describe how the project is likely to affect the Natura 2000 sites

The project as planned will not adversely affect the integrity of any European site. During the screening assessment, pathways for potential adverse effects on the Qualifying Interests and Special Conservation Interests of the Connemara Bog Complex SAC, Connemara Bog Complex SPA, Ross Lake and Wood SAC, Lough Corrib SAC and Lough Corrib SPA were identified. This report has provided an assessment of all potential pathways for direct or indirect effects on European Sites. Any identified potential pathways for effect were then robustly blocked.

Explain why these effects are not considered significant

- There will be no direct effects or reduction in Annex I habitat area within any European Site.
- There will be no reduction in key habitats supporting populations of Annex II species and no reduction in the populations of any Annex II species.
- Any potential pathways for effect have been blocked through good design, best practice and a thorough investigation of the suitability of the lands for development of this type.
- The works themselves will involve little disturbance or disruption to the ecological processes in the area during either construction, operation or decommissioning.

7.3 Data Collected to Carry Out Assessment

In preparation of the report, the following sources were used to gather information:

- Review of the EIAR for the proposed development, the CEMP and all associated documentation.
- Review of the Bat Conservation Ireland (BCI) Private Database
- Review of the publically available National Biodiversity Data Centre (NBDC) web-mapper
- Inland Fisheries Ireland (IFI) Reports
- Records from the NPWS 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.
- Review of other plans and projects within the area.
- Desk studies and Field surveys including habitat mapping, mammal and bird surveys completed throughout 2013-2018, details of which are provided in Biodiversity Chapter within the EIAR

7.4 Integrity of the European Sites

Based on the objective information gathered and the predictions made about the changes that are likely to result from the construction and operation stages of the project, the integrity of site checklist, as per Box 10 of EC, 2002, is completed for the Connemara Bog Complex SAC, Lough Corrib SAC, Ross Lake and Woods SAC, Connemara Bog Complex SPA and Lough Corrib SPA in Table 7.1 below.
<table>
<thead>
<tr>
<th>Does the project have the potential to:</th>
<th>Assessment</th>
<th>Residual Impact: Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation objectives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cause delays in progress towards achieving the conservation objectives of the site?</td>
<td>The proposed development will not cause delays or interrupt progress towards achieving the conservation objectives of the European Sites.</td>
<td>No</td>
</tr>
<tr>
<td>Interrupt progress towards achieving the conservation objectives of the site?</td>
<td>A suite of best practice has been incorporated into the project design to avoid and minimise potential impacts.</td>
<td>No</td>
</tr>
<tr>
<td>Disrupt those factors that help to maintain the favourable conditions of the site?</td>
<td>The proposed development will not disrupt those factors that help to maintain the favourable conditions of the site European Sites.</td>
<td>No</td>
</tr>
<tr>
<td>Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?</td>
<td>The proposed development will not interfere with the balance, distribution and density of key species that are the indicators of the favourable condition European Sites.</td>
<td>No</td>
</tr>
<tr>
<td>Other Indicators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?</td>
<td>The proposed development will not cause changes to the structure and function of the habitats or ecosystems of the European Sites.</td>
<td>No</td>
</tr>
<tr>
<td>Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?</td>
<td>The proposed development will not cause changes to the structure and function of the habitats or ecosystems of the European Sites.</td>
<td>No</td>
</tr>
<tr>
<td>Does the project have the potential to:</td>
<td>Assessment</td>
<td>Residual Impact: Yes/No</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?</td>
<td>Potential indirect unmitigated impacts may occur through pollution of surface watercourses during the construction phase. This could impact on protected habitats and species downstream of the proposed development. A suite of best practice has been incorporated into the project design to avoid and minimise potential impacts. No potential significant impacts on any QI/SCI species of any European site has been identified.</td>
<td>No</td>
</tr>
<tr>
<td>Reduce the area of key habitats?</td>
<td>There will be no reduction in area of key habitat.</td>
<td>No</td>
</tr>
<tr>
<td>Reduce the population of key species?</td>
<td>The proposed development will reduce population of key species or change the balance between Key species. The development is no anticipated to result in a reduction in diversity within any European site.</td>
<td>No</td>
</tr>
<tr>
<td>Change the balance between key species?</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Reduce diversity of the site?</td>
<td>A suite of best practice has been incorporated into the project design to avoid and minimise potential impacts.</td>
<td>No</td>
</tr>
<tr>
<td>Result in disturbance that could affect population size or density or the balance between key species?</td>
<td>No potential significant impacts on any QI/SCI species of any European site has been identified.</td>
<td>No</td>
</tr>
<tr>
<td>Result in fragmentation?</td>
<td>The development has been designed to maintain and retain habitat connectivity within and to areas outside the development site boundary.</td>
<td>No</td>
</tr>
<tr>
<td>Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc.)?</td>
<td>No Key features will be lost as a result of the proposed development.</td>
<td>No</td>
</tr>
</tbody>
</table>

### 7.5 Conclusion

The proposed development, by itself or in combination with other plans and projects, in light of best scientific knowledge in the field, will not, in view of the sites’ conservation objectives, adversely affect the integrity of any European Sites.
BIBLIOGRAPHY


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NPWS Protected Site Synopses and maps available on http://www.npws.ie/en/ProtectedSites/.


Scott Wilson et al. (September 2006) Appropriate Assessment of Plans.


Scottish Natural Heritage (SNH) (July 2013) Assessing Connectivity with Special Protection Areas (SPA)


Water status data available on http://www.epa.ie and http://www.wfdireland.ie
Appendix 1

Article 6(3) Screening Report
Revised Appropriate Assessment Screening Report

Proposed Wind Energy Development, Ardderreo, Roscahill, Co. Galway
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1 INTRODUCTION

1.1 Background

McCarthy Keville O’Sullivan Ltd. (MKO) has been appointed to provide the information necessary to allow the competent authority to conduct an Article 6(3) Screening for Appropriate Assessment of the proposed Ardderroo Wind Farm development, Co. Galway.

The current project is not directly connected with, or necessary for, the management of any European Site consequently the project has been subject to the Appropriate Assessment Screening process.

The assessment in this report is based on a desk study and field surveys undertaken between 2013 and 2018. It specifically assesses the potential for the proposed development to result in likely significant effects on European sites.


In addition to the guidelines referenced above, the following relevant guidance was considered in preparation of this report:


8. EPA (2003), Advice Notes on current practice in the preparation of Environmental Impact Statements. Environmental Protection Agency, and


1.2 Background to Appropriate Assessment

1.2.1 Screening for Appropriate Assessment

Screening is the process of determining whether or not an Appropriate Assessment is required for a plan or project. Under Part XAB of the Planning and Development Act, 2000 as amended, Screening must be carried out by the Competent Authority to assess, in view of best scientific knowledge, if a land use plan or proposed development, individually or in combination with another plan or project, is likely to have a significant effect on a European site. The Competent Authority’s determination as to whether or not an Appropriate Assessment is required must be made on the basis of objective information and should be recorded. The competent authority may request information to be supplied to enable it to carry out screening.

Consultants or project proponents may undertake a form of screening to establish if an Appropriate Assessment is required and provide advice, or may submit the information necessary to allow the Competent Authority to conduct a screening with an application for consent. Where it cannot be excluded beyond reasonable scientific doubt, that a proposed plan or project, individually or in combination with other plans and projects, would have a significant effect on the conservation objectives of a European site, an Appropriate Assessment (Natura Impact Statement [NIS]) of the plan or project is required.

1.2.2 Appropriate Assessment (Natura Impact Statement)

The term Natura Impact Statement (NIS), is defined in legislation\(^1\). An NIS, where required, should present the data, information and analysis necessary to reach a definitive determination as to 1) the implications of the plan or project, alone or in combination with other plans and projects, for a European site in view of its conservation objectives, and 2) whether there will be adverse effects on the integrity of a European site. The NIS should be underpinned by best scientific knowledge, objective information and by the precautionary principle.

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\(^1\) As defined in Section 177T of the Planning and Development Act, 2000 as amended, an NIS means a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own and in combination with other plans and projects, for a European site in view of its conservation objectives. It is required to include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for the European site in view of its conservation objectives.
2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Site Location
The site of the proposed wind farm is located in the townlands of Ardderroo, Killaguile, Letter, and Finnaun, Co. Galway, with a proposed temporary new access road onto the N59 being located in the townlands of Knockaunranny and Doon.

The proposed wind farm site measures approximately 1,493 hectares. The Grid Reference co-ordinates for the approximate centre of the site are E112,000 N234,000. The town of Oughterard is located approximately 6.6 kilometres north of the proposed development site. The village of Moycullen is located approximately 6.9 kilometres east of the proposed development site.

The windfarm site is located within the Owenboliska catchment with a temporary construction access road located within the Corrib catchment. This temporary road will be a separate planning application to the windfarm but is assessed in this document as part of the overall project.

2.2 Characteristics of the Proposed Development
The proposed development comprises the construction of a wind farm of up to 25 wind turbines and all associated works. The proposed turbines will have a maximum ground to blade tip height of up to 178.5 metres. The application is seeking a ten-year planning permission. The full description of the proposed development, as per the public planning notices, is as follows:

i. Construction of up to 25 No. wind turbines with a maximum overall blade tip height of up to 178.5m
ii. 1 no. permanent Meteorological Mast with a maximum height of up to 112 metres.
iii. 1 no. 110kV electrical substation with 2 no. control buildings with welfare facilities, 6 no. battery containers, all associated electrical plant and equipment, security fencing, all associated underground cabling, waste water holding tank and all ancillary works
iv. Underground cabling connecting the turbines to the proposed substation and connection from the proposed substation to the national grid at the existing Eirgrid substation in the townland of Letter
v. Upgrade of existing tracks, roads and provision of new site access roads and hardstand areas;
vi. 3 no. borrow pits.
vii. 2 no. temporary construction compounds.
viii. Recreation and amenity works, including marked trails, conversion of one temporary construction compound into a permanent amenity car park, provision of a toilet/shelter building and associated waste water holding tank, and associated recreation and amenity SIGNAGE
ix. Site Drainage.
x. Forestry Felling.
xi. Permanent Signage.
xii. All associated site development works.

An additional element that does not form part of the windfarm planning application but is considered in this assessment is a temporary construction access road that is creates a new junction onto the N59 for the construction phase of the development.
3 Identification of Relevant European Sites

3.1 Background to European Sites

The Habitats Directive (92/43/EEC) (together with the Birds Directive (2009/147/EC)) forms the cornerstone of Europe’s nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. All in all the directive protects over 1,000 animal and plant species and over 200 “habitat types” (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance.

With the introduction of the EU Habitats Directive and Birds Directive which were transposed into Irish law as S.I. No. 94/1997 European Communities (Birds and Natural Habitats) Regulations 1997, the European Union formally recognised the significance of protecting rare and endangered species of flora and fauna, and also, more importantly, their habitats. The 1997 Regulations and their amendments were subsequently revised and consolidated in S.I. No. 477/2011- European Communities (Birds and Natural Habitats) Regulations 2011. This legislation requires the establishment and conservation of a network of sites of particular conservation value that are to be termed ‘European Sites’.

Habitats Directive/Special Areas of Conservation

Articles 3 – 9 of the EU Habitats Directive (92/43/EEC) provide the EU legislative framework of protecting rare and endangered species of flora and fauna, and habitats. Annex I of the Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. Marsh Fritillary, Atlantic Salmon, and Killarney Fern) whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection such as Lesser Horseshoe Bat and Otter, and Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish Hare, Common Frog and Pine Marten.

Species can be listed in more than one Annex, as is the case with Otter and Lesser Horseshoe Bat which are listed on both Annex II and Annex IV.

Birds Directive/Special Protection Areas

Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (Birds Directive) has been substantially amended several times. In the interests of clarity and rationality the said Directive was codified in 2009 and is now cited as Directive 2009/147/EC. The Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3).

A subset of bird species have been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).
3.2 Identification of the Designated Sites within the Likely Zone of Impact of the Proposed Development

The most up to date GIS spatial datasets for European designated sites were downloaded from the NPWS website (www.npws.ie) most recently on the 04/03/2019. Using the GIS software, Mapinfo (Version 10.0), European sites within the likely zone of impact of the project were identified. The following rationale was used to identify the likely zone of impact. Initially, sites within a 15km radius of the proposed development were identified (as per the DoEHLG Guidance [2010]). In addition, using the precautionary principle, European Sites located outside the 15km buffer zone were also taken into account and assessed. Bird activity surveys have not revealed the site of the proposed development to be located on an identifiable migration route and no other pathway for effect was identified. In this case, no potential for effects on European Sites that are outside the 15 km buffer were identified.

In relation to screening of Special Protection Areas, in the absence of any specific European or Irish guidance in relation to such sites, the Scottish Natural Heritage (SNH) Guidance, 2016, Assessing Connectivity with Special Protection Areas (SPA) was consulted. This document provides guidance in relation to the identification of connectivity between development proposals and Special Protection Areas. The guidance takes into consideration the distances that certain species may travel beyond the boundary of their SPAs and outlines information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects. In addition, the rationale and methodology that was used in the preparation of the ‘Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland’ (Birdwatch Ireland, 2015) was followed in the assessment of the zones of sensitivity surrounding SPA’s for species considered in that document to be particularly sensitive to impacts resulting from windfarm developments.

NPWS Conservation Objectives supporting Document – Lesser Horseshoe Bat (Rhinolophus hipposideros) (2018) were utilised to screen European Sites designated for Lesser Horseshoe Bat. The guidance identifies a 2.5km core foraging range around roost sites. Where site specific conservation objectives are identified for European Sites where Lesser Horseshoe is a Qualifying Interest, targets are set within a 2.5km distance of the roost. European sites located within the 2.5km screening buffer are automatically “Screened in”.

Figure 3.1 shows the location of the proposed development in relation to all European sites within 15km of the proposed wind farm. Table 3.1 below, lists all European Sites that were within 15km of the proposed wind farm and assesses which are within the likely zone of impact. The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were considered at the time of preparation of this report (most recently 30/10/2018). Details of these sites, including their distance from the proposed development, are provided in Table 3.1.

Ross Lake & Woods SAC, Connemara Bog Complex SAC, Lough Corrib SAC, Kilkieran Bay & Islands SAC, Galway Bay Complex SAC and Inner Galway Bay SPA all have detailed conservation objectives that were reviewed throughout the assessment and finally on the 18th October 2018.

Gortnandarragh Limestone Pavement SAC and Cloughmoyne SAC have generic conservation objective:

“To maintain or restore the favourable conservation condition of the Annex I..."
Figure 3.1. European Sites within 15km buffer

- Cloughmoyne SAC
- Lough Corrib SAC
- Lough Corrib SPA
- Gortnadarragh Limestone Pavement SAC
- Kilkieran Bay And Islands SAC
- Ross Lake And Woods SAC
- Connemara Bog Complex SPA
- Connemara Bog Complex SAC
- Inner Galway Bay SPA
- Galway Bay Complex SAC
- Creganna Marsh

Map Legend
- Study Area
- SAC
- SPA
- 15km buffer

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*habitat[s] and/or the Annex II species for which the SAC has been selected*

Connemara Bog Complex SPA, Lough Corrib SPA have generic conservation objective:

*To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.*

Lough Corrib SPA also has the additional conservation objective:

*To maintain or restore the favourable conservation of the wetland habitat at Lough Corrib SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.*
Table 3.1 Designated sites within the Likely Zone of Impact

<table>
<thead>
<tr>
<th>European Site</th>
<th>Qualifying Interests/Special Conservation Interests for which the European Site has been designated (<a href="http://www.npws.ie">www.npws.ie</a> 30/10/2018)</th>
<th>Likely Zone of Impact determination</th>
</tr>
</thead>
</table>
| Connemara Bog Complex SAC (002034) 0km. wind farm study area shares border with this SAC. 3.3km south of the temporary construction access road. | - Coastal lagoons [1150]  
- Reefs [1170]  
- Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110]  
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130]  
- Natural dystrophic lakes and ponds [3160]  
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]  
- Northern Atlantic wet heaths with *Erica tetralix* [4010]  
- European dry heaths [4030]  
- Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]  
- Blanket bogs (*if active bog*) [7130]  
- Transition mires and quaking bogs [7140]  
- Depressions on peat substrates of the Rhynchosporion [7150]  
- Alkaline fens [7230]  
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]  
- *Euphydryas aurinia* (Marsh Fritillary) [1065]  
- *Salmo salar* (Salmon) [1106]  
- *Lutra lutra* (Otter) [1355]  
- *Najas flexilis* (Slender Naiad) [1833] | This site is located immediately adjacent to the study area. There is potential for indirect effects on the SAC in the form of disturbance to Otter. In addition, there may be potential for indirect effects on habitats outside the site and for water pollution and hydrological change in the downstream Owenboliska catchment that is within the SAC the south of the proposed development. **The SAC is therefore within the Likely Zone of Impact and further assessment is required.** |
| Lough Corrib SAC (000297) 2.9 km north of wind farm study area and 2.9km north of | - Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110]  
- Oligotrophic waters containing very few minerals of sandy plains (*Littorelletea uniflorae*) [3110] | The wind farm study area is in an entirely separate hydrological catchment from the SAC. In addition, the development is located outside the foraging range [2.5km] of the population of Lesser Horseshoe Bat for which the SAC is designated [Site specific conservation objectives NPWS 2017]. |

McCarthy Keville O’Sullivan Ltd. – Planning & Environmental Consultants 8
European Site Qualifying Interests/Special Conservation Interests for which the European Site has been designated (www.npws.ie 30/10/2018)

The temporary construction access road.

- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130]
- Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]
- Water courses of plain to montane levels with the *Ranunculetum fluitantis* and *Callitricho-Batrachion* vegetation [3260]
- Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia* (*important orchid sites*) [6210]
- Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]
- Active raised bogs [7110]
- Degraded raised bogs still capable of natural regeneration [7120]
- Depressions on peat substrates of the *Rhynchosporion* [7150]
- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]
- Petrifying springs with tufa formation (*Cratoneurion*) [7220]
- Alkaline fens [7230]
- Limestone pavements [8240]
- Old sessile oak woods with *ilex* and *Blechnum* in the British Isles [91A0]
- Bog woodland [91D0]
- *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]
- *Austropotamobius pallipes* (White-clawed Crayfish) [1092]
- *Petromyzon marinus* (Sea Lamprey) [1095]

Likely Zone of Impact determination

The temporary construction access road, however, is located within the Corrib catchment. Following an extremely precautionary principle, the potential for the proposed works to result in surface water pollution that could potentially enter the Lough Corrib SAC (after first passing through Ross Lake) has been identified.

No other pathways for significant effects were identified.

The SAC is within the Likely Zone of Impact and further assessment is required.
<table>
<thead>
<tr>
<th>European Site</th>
<th>Qualifying Interests/Special Conservation Interests for which the European Site has been designated [<a href="http://www.npws.ie">www.npws.ie</a> 30/10/2018]</th>
<th>Likely Zone of Impact determination</th>
</tr>
</thead>
</table>
| Ross Lake and Woods SAC (001312) 2.9 km east of wind farm study area and approximately, 0.1km east of the temporary construction access road | ▪ *Lampetra planeri* (Brook Lamprey) [1096]  
▪ *Salmo salar* (Salmon) [1106]  
▪ *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]  
▪ *Lutra lutra* (Otter) [1355]  
▪ *Drepanocladus vernicosus* (Slender Green Feather-moss) [1393]  
▪ *Najas flexilis* (Slender Naiad) [1833] | The wind farm study area is in an entirely separate hydrological catchment from the SAC. Whilst the wind farm study area is located outside the foraging range (2.5km) of the population of Lesser Horseshoe Bat for which the SAC is designated, it is close to this range and the potential for effects is considered on a precautionary basis. The alternative wind farm access road is located within 100metres of the SAC and the potential for effects is also considered. The temporary construction access road is located upstream of the SAC and there is potential for water pollution to enter the SAC. **The SAC is therefore within the Likely Zone of Impact and further assessment is required.** |
| Gortnadarragh Limestone Pavement SAC (001271) 4.6 km north east of wind farm study area. 2.4km north east of the temporary construction access road | ▪ *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]  
▪ Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] | No surface water, groundwater or habitat connectivity was identified between the proposed project and this SAC. No source-pathway-receptor chains for direct or indirect impacts were identified. **The SAC is therefore not within the Likely Zone of Impact.** |
<table>
<thead>
<tr>
<th>European Site</th>
<th>Qualifying Interests/Special Conservation Interests for which the European Site has been designated (<a href="http://www.npws.ie">www.npws.ie</a> 30/10/2018)</th>
<th>Likely Zone of Impact determination</th>
</tr>
</thead>
</table>
| Kilkieran Bay & Islands SAC (002111)  | - Mudflats and sandflats not covered by seawater at low tide [1140]  
- Coastal lagoons [1150]  
- Large shallow inlets and bays [1160]  
- Reefs [1170]  
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]  
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]  
- Machairs [* in Ireland] [21A0]  
- Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510]  
- *Lutra lutra* (Otter) [1355]  
- *Phoca vitulina* (Harbour Seal) [1365]  
- *Najas flexilis* (Slender Naiad) [1833] | No surface water, groundwater or habitat connectivity was identified between the proposed project and this SAC. No source-pathway-receptor chains for direct or indirect impacts were identified. **The SAC is therefore not within the Likely Zone of Impact.** |
| Galway Bay Complex SAC (000268)       | - Mudflats and sandflats not covered by seawater at low tide [1140]  
- Coastal lagoons [1150]  
- Large shallow inlets and bays [1160]  
- Reefs [1170]  
- Perennial vegetation of stony banks [1220]  
- Salicornia and other annuals colonising mud and sand [1310]  
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]  
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]  
- *Juniperus communis* formations on heaths or calcareous grasslands [5130] | No direct surface water (the outfall of the Owenboliska is separated from the SAC by approximately 12km of seawater offering a buffer to any potential for effects as a result of the proposed development), groundwater or habitat connectivity was identified between the proposed project and this SAC. No source-pathway-receptor chains for direct or indirect impacts were identified. **The SAC is therefore not within the Likely Zone of Impact.** |
European Site | Qualifying Interests/Special Conservation Interests for which the European Site has been designated (www.npws.ie 30/10/2018) | Likely Zone of Impact determination
--- | --- | ---
| | | |
| | | |
| | | |
| | | |

**Cloughmoyne SAC (000479)**
14.8km north east of wind farm study area; 13km north east of the temporary construction access road

- Limestone pavements [8240]

No surface water, groundwater or habitat connectivity was identified between the proposed project and this SAC. No source-pathway-receptor chains for direct or indirect impacts were identified. The SAC is therefore not within the Likely Zone of Impact.

**Connemara Bog Complex SPA (004181)**
0.2km south of wind farm study area. 8.4km south-west of the temporary construction access road.

- Cormorant (*Phalacrocorax carbo*) [A017]
- Merlin (*Falco columbarius*) [A098] (core foraging Range 5km)
- Golden Plover (*Pluvialis apricaria*) [A140] (core foraging range 3km)
- Common Gull (*Larus canus*) [A182]

In accordance with SNH Guidelines (2016), the development is located with the potential foraging range of SCI species associated with the SPA. Consequently, the potential for direct and indirect impacts on SCI species cannot be discounted as this stage of the assessment process and further assessment is required.

There will be no direct effects on the supporting wetland habitat of waterbirds within the SPA. There is potential for indirect effects with regard to surface water pollution as the south western corner of the wind farm study area drains to Lough Boliska, which is within the SPA. The SPA is therefore within the Likely Zone of Impact and further assessment is required.

**Lough Corrib SPA (004042)**

- Gadwall (*Anas strepera*) [A051]
- Shoveler (*Anas clypeata*) [A056]

In accordance with SNH Guidelines (2016), the development is located with the potential foraging range of SCI species associated with the...
Qualifying Interests/Special Conservation Interests for which the European Site has been designated (www.npws.ie 30/10/2018)

### 6km west of wind farm study area; 4.4km west of the temporary construction access road
- Pochard (Aythya ferina) [A059]
- Tufted Duck (Aythya fuligula) [A061]
- Common Scoter (Melanitta nigra) [A065]
- Hen Harrier (Circus cyaneus) [A082] (core foraging range 2km)
- Coot (Fulica atra) [A125]
- Golden Plover (Pluvialis apricaria) [A140] (core foraging range 3km)
- Black-headed Gull (Chroicocephalus ridibundus) [A179]
- Common Gull (Larus canus) [A182]
- Common Tern (Sterna hirundo) [A193]
- Arctic Tern (Sterna paradisaea) [A194]
- Greenland White-fronted Goose (Anser albifrons flavirostris) [A395] (core foraging range 5-8km)

SPA. Consequently, the potential for direct and indirect impacts on SCI species cannot be discounted as this stage of the assessment process and further assessment is required.

There will be no direct effects on the supporting wetland habitat of waterbirds within the SPA. Following the precautionary principle, there is potential for indirect effects with regard to surface water pollution as the alternative wind farm access road is located upstream of Ross Lake that ultimately drains to Lough Corrib.

**The SPA is therefore within the Likely Zone of Impact and further assessment is required.**

### Inner Galway Bay SPA [004031]
14km south west of wind farm study area; 15km south west of the temporary construction access road.
- Great Northern Diver (Gavia immer) [A003]
- Cormorant (Phalacrocorax carbo) [A017]
- Grey Heron (Ardea cinerea) [A028]
- Brent Goose (Branta bernicla hrota) [A046]
- Wigeon (Anas penelope) [A050]
- Teal (Anas crecca) [A052]
- Shoveler (Anas clypeata) [A056]
- Red-breasted Merganser (Mergus serrator) [A069]
- Ringed Plover (Charadrius hiaticula) [A137]
- Golden Plover (Pluvialis apricaria) [A140]
- Lapwing (Vanellus vanellus) [A142]
- Dunlin (Calidris alpina) [A149]
- Bar-tailed Godwit (Limosa lapponica) [A157]
- Curlew (Numenius arquata) [A160]
- Redshank (Tringa totanus) [A162]
- Turnstone (Arenaria interpres) [A169]
- Black-headed Gull (Chroicocephalus ridibundus) [A179]

In accordance with SNH Guidelines [2016] the development is located outside the potential core foraging range of the SCI species associated with the SPA.

In accordance with Mc Guinness et.al [2015] the development is located in excess of 12km outside the zone of sensitivity of SCI species associated with the SPA. SCI species, for which zones of sensitivity have not been described in Mc Guinness et.al [2015], are not identified as particularly vulnerable to wind energy development due to their flight behavior or habitat requirements. Consequently, the potential for adverse impacts on populations of SCI species associated with the SPA can be discounted.

There will be no direct effects on the supporting wetland habitat of waterbirds within the SPA. There is no potential for indirect effects with regard to surface water pollution as there is no direct hydrological linkage between the development site and the SPA.
European Site: Qualifying Interests/Special Conservation Interests for which the European Site has been designated (www.npws.ie, 30/10/2018) | Likely Zone of Impact determination
---|---
| | The SPA is therefore not within the Likely Zone of Impact.
| Common Gull (*Larus canus*) [A182] | |
| Sandwich Tern (*Sterna sandvicensis*) [A191] | |
| Common Tern (*Sterna hirundo*) [A193] | |
| Wetlands [A999] | |
3.3 Cumulative and In Combination Effects

This in-combination assessment was carried out on the most recently on the 30.10.2018. Information on developments, plans and projects that could lead to potential in combination and cumulative effects was gathered through a search of relevant online Planning Registers, reviews of relevant EIS/ EIAR documents, planning application details and planning drawings, and served to identify recently granted, constructed or ongoing projects, their activities and their environmental impacts.

Where potential pathways for impact are identified on a European Site, it cannot be concluded that there is no potential for in-combination effects when assessed alongside other plans and projects.

Given potential pathways for impact on the European Sites listed below, the potential for in combination effects on those sites cannot be excluded without further examination.

The European Sites for which pathways for individual and cumulative effects have been identified are:

- Connemara Bog Complex SAC
- Ross Lake and Woods SAC
- Lough Corrib SAC
- Connemara Bog Complex SPA
- Lough Corrib SPA.

No other European Sites were considered to be at risk from in-combination effects as no pathway for effect was identified.
ARTICLE 6(3) SCREENING REPORT AND CONCLUSIONS

4.1 Potential for Effects on European Sites

The findings of this Screening Report are presented below.

4.1.1 Sites that are ‘Screened In’

Where the potential for impacts on any particular European Site cannot be excluded without further analysis, a summary of such potential impacts is provided in Table 4.1.

Where in view of best scientific knowledge and on the basis of objective information it cannot be excluded that the proposed development, individually or in combination with other plans and projects, will be likely to have a significant effect on any European Sites, they are considered to be ‘Screened In’. As a result, an appropriate assessment of the proposed development is required with regard to these European Sites.

Those European Sites for which significant effects could not be excluded are presented in Table 4.1 below.

Table 4.1 European Sites that have been ‘Screened In’

<table>
<thead>
<tr>
<th>European Site</th>
<th>Screening Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connemara Bog Complex SAC</td>
<td>There will be no direct effects as the proposed development is located entirely outside the designated site. Potential pathways for indirect effects on the Qualifying Interests were identified and are listed below:</td>
</tr>
<tr>
<td>[002034]</td>
<td>▪ Deterioration of surface water quality resulting from pollution, associated with construction, operation and decommissioning potentially affecting the following aquatic QIs:</td>
</tr>
<tr>
<td></td>
<td>o Oligotrophic waters containing very few minerals of sandy plains (<em>Littorelletalia uniflorae</em>) [3110]</td>
</tr>
<tr>
<td></td>
<td>o Oligotrophic to mesotrophic standing waters with vegetation of the <em>Littorelletea uniflorae</em> and/or <em>Isoeto-Nanojuncetalia</em> [3130]</td>
</tr>
<tr>
<td></td>
<td>o Natural dystrophic lakes and ponds [3160]</td>
</tr>
<tr>
<td></td>
<td>o Water courses of plain to montane levels with the <em>Ranunculion fluitantis</em> and <em>Callitricho-Batrachion</em> vegetation [3260]</td>
</tr>
<tr>
<td></td>
<td>o <em>Salmo salar</em> (Salmon) [1106]</td>
</tr>
<tr>
<td></td>
<td>o <em>Lutra lutra</em> (Otter) [1355]</td>
</tr>
<tr>
<td></td>
<td>▪ Disturbance and habitat loss/fragmentation related effects on QI species where such species occur outside the boundary of the European Site. Potentially effected species include:</td>
</tr>
<tr>
<td></td>
<td>o Otter</td>
</tr>
<tr>
<td></td>
<td>Consequently, the potential for significant effects on this European Site cannot be excluded at this stage of the Appropriate Assessment process and it is ‘Screened In’.</td>
</tr>
<tr>
<td>Lough Corrib SAC [000297]</td>
<td>There will be no direct effects as the proposed development is located entirely outside the designated site. Potential pathways for indirect effects on the Qualifying Interests were identified and are listed below:</td>
</tr>
<tr>
<td>2.9 km north of wind farm study area and 2.9 km</td>
<td></td>
</tr>
</tbody>
</table>
### north of the temporary construction access road

- Deterioration of surface water quality resulting from pollution, associated with construction, operation and decommissioning of the alternative wind farm access road only. Potentially affecting the following aquatic QIs:
  - Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]
  - Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]
  - Austropotamobius pallipes (White-clawed Crayfish) [1092]
  - Petromyzon marinus (Sea Lamprey) [1095]
  - Lampetra planeri (Brook Lamprey) [1096]
  - Salmo salar (Salmon) [1106]
  - Lutra lutra (Otter) [1355]

Consequently, the potential for significant effects on this European Site cannot be excluded at this stage of the Appropriate Assessment process and it is ‘Screened In’.

Note: following review of the site specific conservation objectives for the site, no pathway for effect on the following aquatic QIs was identified as they are not recorded downstream of the proposed development:

- Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110]
- Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130]
- Margaritifera margaritifera (Freshwater Pearl Mussel) [1029]
- Najas flexilis (Slender Naiad) [1833]

### Ross Lake and Woods SAC (001312)

- 2.9 km east of wind farm study area and approximately; 0.1km east of temporary construction access road.

There will be no direct effects as the proposed development is located entirely outside the designated site. Potential pathways for indirect effects on the Qualifying Interests were identified and are listed below:

- Disturbance and habitat loss/fragmentation related effects on QI species where such species occur outside the boundary of the European Site. Potentially effected species include:
  - Lesser Horseshoe Bat
- Deterioration of surface water quality resulting from pollution, associated with construction, operation and decommissioning of the alternative wind farm access road only. Potentially affecting the following aquatic QIs:
  - Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]

Consequently, the potential for significant effects on this European Site cannot be excluded at this stage of the Appropriate Assessment process and it is ‘Screened In’.

### Connemara Bog Complex SPA (004181)

- 0.2km south of wind farm study area. 8.4km south-west of the temporary construction access road.

There will be no direct effects as the proposed development is located entirely outside the designated site.

Potential pathways for indirect effects on the Special Conservation Interests were identified and are listed below:

- Disturbance and habitat loss/fragmentation related effects on SCI species where such species occur within their foraging range outside the boundary of the European Site. Potentially effected species include:
  - Merlin
  - Golden Plover
  - Cormorant
Consequently, the potential for significant effects on this European Site cannot be excluded at this stage of the Appropriate Assessment process and it is ‘Screened In’

Lough Corrib SPA (004042) 6km west of wind farm study area; 4.4km west of the temporary construction access road. There will be no direct effects as the proposed development is located entirely outside the designated site. Potential pathways for indirect effects on the Qualifying Interests were identified and are listed below:

- Deterioration of surface water quality resulting from pollution, associated with construction, operation and decommissioning of the alternative wind farm access road only. Potentially affecting the following aquatic QIs:
  - Wetlands
- Disturbance and habitat loss/fragmentation related effects on SCI species where such species occur within their foraging range outside the boundary of the European Site. Potentially effected species include:
  - Hen Harrier
  - Golden Plover
  - Greenland White Fronted Goose

Consequently, the potential for significant effects on this European Site cannot be excluded at this stage of the Appropriate Assessment process and it is ‘Screened In’

Note the potential for effects on other SCI species was excluded for the following reasons:

- The development is located outside the potential foraging range of the SCI species associated with the SPA that are listed in SNH (2016) other than those listed above.
- It is located in excess of 2km outside the zone of sensitivity of any species that is listed as particularly sensitive to wind energy development in Mc Guinness et.al (2015).
- Ongoing bird activity surveys have not revealed the site of the proposed development to be located on an identifiable migration route.

Consequently, the potential for adverse impacts on populations of SCI species associated with the SPA can be discounted.

4.1.2 Sites that are ‘Screened out’

Where it is concluded 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 screening exercise as described above, are considered to be ‘Screened Out’. The sites that have been ‘Screened Out’ are shown in Table 4.2. As a result, an Appropriate Assessment of the proposed development is not required with regard to these European Sites.

<table>
<thead>
<tr>
<th>European Site</th>
<th>Screening Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 4.2 European Sites that have been ‘Screened Out’</td>
<td></td>
</tr>
</tbody>
</table>
There will be no direct effects as the proposed development is located entirely outside the designated site. There will be no indirect effects as the terrestrial habitat for which this SAC is designated located over 4.5 kilometres from any part of the proposed development with no identifiable habitat, surface water or ground water connection. No complete impact source-pathway-receptor chain was identified during this Screening Assessment. Significant effects on the European Site resulting from the proposed development can be excluded and it is ‘Screened Out’.

There will be no direct effects as the proposed development is located entirely outside the designated site. There is no potential for indirect effects as there is no identifiable hydrological or habitat connectivity between the proposed development and the European Site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section Four of this report. Significant effects on the European Site resulting from the proposed development can be excluded and it is ‘Screened Out’.

There will be no direct effects as the proposed development is located entirely outside the designated site. There is no potential for indirect effects as there is no identifiable hydrological or habitat connectivity between the proposed development and the European Site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section Four of this report. Significant effects on the European Site resulting from the proposed development can be excluded and it is ‘Screened Out’.

There will be no direct effects as the proposed development is located entirely outside the designated site. There is no potential for indirect effects. There is no potential for indirect effects as there is no identifiable hydrological or habitat connectivity between the proposed development and the European Site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section Four of this report. Significant effects on the European Site resulting from the proposed development can be excluded and it is ‘Screened Out’.

The development is located in excess of 14 km from the SPA with no habitat or direct surface water connectivity.

The development is located outside the potential foraging range of the SCI species associated with the SPA that are listed in SNH (2016).

It is also located in excess of 12km outside the zone of sensitivity of any species that is listed as particularly sensitive to wind energy development in Mc Guinness et.al (2015).

Ongoing bird activity surveys have not revealed the site of the proposed development to be located on an identifiable migration route.

Consequently, the potential for adverse impacts on populations of SCI species associated with the SPA can be discounted.

### 4.2 Data Collected to Carry Out Assessment

In preparation of the assessment, the following sources were used to gather information:
4.3 Overall Conclusions

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.

- Gortnadarragh Limestone Pavement SAC (001271)
- Kilkieran Bay & Islands SAC (002111)
- Galway Bay Complex SAC (000268)
- Cloughmoyne SAC (000479)
- Inner Galway Bay SPA (004031)
- Lough Mask SPA (004062)

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:

- Connemara Bog Complex SAC (002034)
- Lough Corrib SAC (000297)
- Ross Lake and Woods SAC (001312)
- Connemara Bog Complex SPA (004181)
- Lough Corrib SPA (004042)

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.
BIBLIOGRAPHY


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NPWS Protected Site Synopses and maps available on http://www.npws.ie/en/ProtectedSites/.


Scott Wilson et al. (September 2006) Appropriate Assessment of Plans. Scott Wilson, Basingstoke.


Scottish Natural Heritage [SNH] (2016) Assessing Connectivity with Special Protection Areas (SPA)


Water status data available on http://www.epa.ie and http://www.wfdireland.ie

4 DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the development and its component parts which is the subject of a proposed application for planning permission to An Bord Pleanála in accordance with Section 37(e) of the Planning and Development Act 2000, (as amended) (‘the Proposed Development’). The Proposed Development comprises:

(i) Construction of up to 25 No. wind turbines with a maximum overall blade tip height of up to 178.5m
(ii) 1 no. permanent Meteorological Mast with a maximum height of up to 112 metres.
(iii) 1no. 110kV electrical substation with 2 no. control buildings with welfare facilities, 6no. battery containers, all associated electrical plant and equipment, security fencing, all associated underground cabling, waste water holding tank and all ancillary works
(iv) Underground cabling connecting the turbines to the proposed substation and connection from the proposed substation to the national grid at the existing Eirgrid substation in the townland of Letter
(v) Upgrade of existing tracks, roads and provision of new site access roads and hardstand areas;
(vi) 3 no. borrow pits.
(vii) 2 no. temporary construction compounds.
(viii) Recreation and amenity works, including marked trails, conversion of one temporary construction compound into a permanent amenity car park, provision of a toilet/shelter building and associated waste water holding tank, and associated recreation and amenity SIGNAGE
(ix) Site Drainage.
(x) Forestry Felling.
(xi) Permanent Signage.
(xii) All associated site development works.

This application seeks a ten year planning permission and 30 year operational life from the date of commissioning of the entire wind farm.

The development of the proposed wind farm development will require the felling of approximately 149.52 hectares of commercial forestry, 65.7 hectares of which will require replanting elsewhere in the state. Details regarding the area to be felled are outlined in Section 4.3.10 below. The Forest Service policy on the granting of felling licences requires replanting of forestry on a hectare by hectare basis. Five potential replanting lands have been identified for assessment purposes. These lands, located in Counties Clare, Cork, Kerry and Roscommon, have all been granted Forest Service Technical Approval (or are the subject of applications for Technical Approval) for afforestation and these or similarly approved lands will be used for replanting should the Proposed Development receive planning permission.

All elements of the Proposed Development including grid connection, forestry felling and replanting have been assessed as part of this EIAR.
Although not included in the planning application for the proposed Ardderroo Wind Farm development, an alternative construction access road and junction off the N59 has been assessed as part of this EIAR.

4.2 Development Layout

The layout of the Proposed Development has been designed to minimise the potential environmental effects of the wind farm, while at the same time maximising the energy yield of the wind resource passing over the site. A constraints study, as described in Section 3.5.1 of this EIAR, has been carried out to ensure that turbines and ancillary infrastructure are located in the most appropriate areas of the site. The Proposed Development layout makes maximum use of the existing access road and tracks within the site.

The overall layout of the Proposed Development is shown on Figure 4.1. This drawing shows the proposed locations of the wind turbines, electricity substation, borrow pits, construction compounds, internal roads layout and the main site entrance. Detailed site layout drawings of the Proposed Development are included in Appendix 4.1 to this EIAR. The alternative construction access road is also shown in Figure 4.1.

4.3 Development Components

4.3.1 Wind Turbines

4.3.1.1 Turbine Locations

The proposed wind turbine layout has been optimised using wind farm design software (a combination of WAsP, ResGen, WindPro and WindFarmer) to maximise the energy yield from the site, while maintaining sufficient distances between the proposed turbines to ensure turbulence and wake effects do not compromise turbine performance. The Grid Reference coordinates of the proposed turbine locations are listed in Table 4.1 below. The final ground level of the turbine foundations will be determined by the actual ground conditions at each proposed turbine location and may differ slightly from those levels listed in Table 4.1. Also, in accordance with the *Wind Energy Development Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government (DOEHLG), 2006) the provision of micro-siting of the turbine positions may be required, any proposed move from the positions outlined in Table 4.1 will be fully assessed to ensure the findings of this EIAR remain valid.

<table>
<thead>
<tr>
<th>Turbine</th>
<th>Irish Grid Coordinates</th>
<th>Top of Foundation Elevation (m OD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Easting</td>
<td>Northing</td>
</tr>
<tr>
<td>1</td>
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<tr>
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<tr>
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<td>7</td>
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</tr>
<tr>
<td>8</td>
<td>112295</td>
<td>234380</td>
</tr>
</tbody>
</table>
Figure 4.1 Proposed Site Layout Map

Map Legend
- EIAR Site Boundary
- Proposed Turbine Location
- Proposed Met Mast Location
- Proposed Electricity Substation Compound
- Proposed Borrow Pit Area
- Proposed Construction Compound (Construction Phase)
- Proposed Visitor Car Park (Operational Phase)
- Proposed Temporary Construction Compound
- Existing Roads to be Upgraded
- Proposed New Roads
- Existing Roads
- Temporary Construction Access Road
  (Assessed in the EIAR)

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Eoin McCarthy
Michael Watson
25-10-2018
1:25,000
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Proposed Site Boundary
Proposed Turbine Location
Proposed Met Mast Location
Proposed Electricity Substation Compound
Proposed Borrow Pit Area
Proposed Construction Compound (Construction Phase)
Proposed Visitor Car Park (Operational Phase)
Proposed Temporary Construction Compound
Existing Roads to be Upgraded
Proposed New Roads
Existing Roads
Temporary Construction Access Road
(Assessed in the EIAR)
### Turbine Type

Wind turbines use the energy from the wind to generate electricity. A wind turbine, as shown in Plate 4.1 below, consists of four main components:

- Foundation unit
- Tower
- Nacelle (turbine housing)
- Rotor

<table>
<thead>
<tr>
<th>Turbine</th>
<th>Irish Grid Coordinates</th>
<th>Top of Foundation Elevation (m OD)</th>
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<tbody>
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<tr>
<td>25</td>
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</tbody>
</table>
The proposed wind turbines will have a tip height of up to 178.5 metres. Within this size envelope, various configurations of hub height, rotor diameter and ground to blade tip height may be used. The exact make and model of the turbine will be dictated by a competitive tender process, but it will not exceed a tip height of up to 178.5 metres. Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics, with only minor cosmetic differences differentiating one from another. The wind turbines that will be installed on the site will be conventional three-blade turbines, that will be geared to ensure the rotors of all turbines rotate in the same direction at all times. The turbines will be grey matt in colour.

For the purposes of this EIAR, various types and sizes of wind turbines within the 178.5-metre tip height envelope have been selected and considered in the relevant sections of the EIAR to assess the worst-case scenario. Turbine design parameters have a bearing on the assessment of shadow flicker, noise, visual impact, traffic and transport and ecology (specifically birds), as addressed elsewhere in this EIAR. In each EIAR section that requires the consideration of turbine parameters as part of the impact assessment, the turbine design parameters that have been used in the impact assessment are specified.

At the turbine selection stage of the project, pre-construction, new turbines models or variants may be available that were not on the market or considered suitable at the pre-planning and EIAR preparation stage, which would better suit the site and fit within the proposed size envelope. Should this circumstance arise, the specific parameters of the new turbines will be assessed for their compliance with the criteria set out and considered in this EIAR, the relevant guidance in place at the time and any conditions that may be attached to any grant of planning permission that might issue.

A drawing of the proposed wind turbine is shown in Figure 4.2. The individual components of a typical geared wind turbine nacelle and hub are shown in Figure 4.3 below.
1. Proposed wind turbines to have a maximum ground to blade tip height of up to 178.5m.
2. Exact make and model of the turbine to be dictated by a competitive tender process.
3. Installed wind turbine not to exceed maximum size envelope set out above in any blade length and hub-height configuration.
Figure 4.3 Turbine nacelle and hub components

Figure 4.4 shows a typical turbine base layout, including turbine foundation, hard standing area, assembly area, access road and surrounding works area.

4.3.1.3 Turbine Foundations

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use different shaped turbines foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier. The turbine foundation transmits any load on the wind turbine into the ground. The typical horizontal and vertical extent of a turbine’s foundation is shown in Figure 4.2.

After the foundation level of each turbine has been formed using piling methods or on competent strata, the bottom section of the turbine tower “Anchor Cage” is levelled and reinforcing steel is then built up around and through the anchor cage (Plate 4.2 below). The outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete and is backfilled accordingly with appropriate granular fill to finished surface level (Plate 4.3 below).
1. Typical Layout, final dimensions and configuration will be based on manufacturer's specifications.
4.3.1.4 Hard Standing Areas

Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are typically used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. The sizes, arrangement and positioning of hard standing areas are dictated by turbine suppliers. The hard-standing area is intended to accommodate a crane during turbine assembly and erection. The proposed hard standing areas shown on the detailed layout drawings included in Appendix 4.1 to this report are indicative of the sizes required, but the extent of the required areas at each turbine location may be optimised on-site depending on topography, position of the site access road, the proposed turbine position and the turbine supplier’s exact requirements.

4.3.1.5 Assembly Area

Levelled assembly areas will be located on either side of the hard-standing area as shown on Figure 4.4. These assembly areas are required for offloading turbine blades, tower sections and hub from trucks until such time as they are ready to be lifted into position by cranes and to assist the main crane during turbine assembly. The exact location and number of assembly areas will be determined by the selected turbine manufacturer.

4.3.1.6 Power Output

It is anticipated the proposed wind turbines will have a rated electrical power output in the 3.5 to 4.8 megawatt (MW) range depending on further wind data analysis and power output modelling. Turbines of the exact same make, model and dimensions can also have different power outputs depending on the capacity of the electrical generator installed in the turbine nacelle. For the purposes of this EIAR, a rated output of 3.65MW has been chosen to calculate the power output of the proposed 25-turbine wind farm, which would result in an estimated installed capacity of 91.25MW.

Assuming an installed capacity of 91.25 MW, the Proposed Development therefore has the potential to produce up to 279,973 MWh (megawatt hours) of electricity per year, based on the following calculation:

\[ A \times B \times C = \text{Megawatt Hours of electricity produced per year} \]

where: \( A = \ldots.. \) The number of hours in a year: 8,760 hours
B = ...... The capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc. A capacity factor of 35% is applied here

C = ...... Rated output of the wind farm: 91.5 MW

The 279,973 MWh of electricity produced by the Proposed Development would be sufficient to supply 66,660 Irish households with electricity per year, based on the average Irish household using 4.2 MWh of electricity (this latest figure is available from the March 2017 CER Review of Typical Consumption Figures Decision).

The 2016 Census of Ireland recorded a total of 112,054 households in Co. Galway (including Galway City). Per annum, based on a capacity factor of 35%, the Proposed Development would therefore produce sufficient electricity for the equivalent of approximately 60% of all households in Co. Galway.

4.3.2 Site Roads

4.3.2.1 Road Construction Types

To provide access within the site of the Proposed Development and to connect the wind turbines and associated infrastructure existing tracks will need to be upgraded and new access roads will need to be constructed. The road construction preliminary design has taken into account the following key factors as stated in the AGEC’s Peat & Spoil Management Plan in Appendix 4.2:

1. Buildability considerations
2. Serviceability requirements for construction and wind turbine delivery and maintenance vehicles
3. Minimise excavation arisings
4. Requirement to minimise disruption to peat hydrology

Whilst the above key factors are used to determine the road design the actual construction technique employed for a particular length of road will be determined on the prevailing ground conditions encountered along that length of road.

4.3.2.1.1 Upgrade of Existing Access Roads or Tracks

The general construction methodology for upgrading of existing sections of excavated and floating roads or tracks, as presented in AGEC’s Peat & Spoil Management Plan in Appendix 4.2, is summarised below. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

1. For upgrading of existing excavated access tracks the following guidelines apply:
   a. Excavation will be required on one or both sides of the existing access track to a competent stratum.
   b. Granular fill to be placed in layers in accordance with the designers’ specification.
   c. The surface of the existing access track should be overlaid with up to 300mm of selected granular fill.
   d. Access roads to be finished with a layer of capping across the full width of the road.
   e. A layer of geogrid/geotextile may be required at the surface of the existing access road (to be confirmed by the designer).
   f. For excavations in peat & spoil, side slopes shall be not greater than 1 [v]: 2 or 3 [h]. This slope inclination should be reviewed during
construction, as appropriate. Where areas of weaker peat are encountered then slacker slopes will be required.

2. For upgrading of existing floated access tracks the following guidelines apply:
   a. The typical make-up of the existing floating access roads on site appears to be locally tree brash/trunks laid directly onto the peat surface and/or geotextile overlain by up to 300mm of coarse granular fill/till type [fine granular/cohesive] site won material. It should be noted that there are localised variations in the make-up of the existing floated access tracks on site, frequently no tree brash/trunks were used in the make-up and the presence of a geogrid was also noted in localised sections of the existing track.
   b. The surface of the existing access track should be graded/tidied up prior the placement of any geogrid/geotextile, where necessary [to prevent damaging the geogrid/geotextile].
   c. Where coarse granular fill has been used in the existing floated access road make-up, a layer of geogrid should be placed on top of the existing floated access track.
   d. Where fine granular/cohesive type material has been used in the existing floated access road make-up [as is the case on some of the existing access roads in the southeast of the site], a layer of geotextile is likely to be required as a separator layer with a layer of geogrid.
   e. The geogrid may be overlaid with up to 500mm of selected granular fill. Granular fill to be placed in layers in accordance with the designers- specification.

3. The finished road width will be approximately 5m with localised widening for turning and passing [to be confirmed by the designer].

4. On side long sloping ground any road widening works required should be done on the upslope side of the existing access road, where possible.

5. At transitions between floating and existing excavated roads a length of road of about 10 to 20m shall have all peat excavated and replaced with suitable fill. The surface of this fill shall be graded so that the road surface transitions smoothly from floating to excavated road.

6. A final surface layer shall be placed over the existing access track, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic.

A typical section of existing excavated road for upgrade is shown in Figure 4.5. A typical section through an existing floating road to be upgraded is shown in Figure 4.6.

4.3.2.1.2 Construction of New Excavated Roads

Excavate and replace type access roads are the conventional method for construction of access roads on peatland sites and the preferred construction technique in shallow peat provided sufficient capacity is available on site for the excavated peat and in areas where topographical conditions restrict the use of floated roads.

The general construction methodology for the construction of excavated roads, as presented in AGEC’s Peat & Spoil Management Plan in Appendix 4.2, is summarised
Solid/Competent Strata

Up to 300mm of selected granular fill

5.0m width

Existing Access Track

Geotextile/Geogrid (if required by designer)

0.3m

Clean out drainage ditches as necessary

Cable duct trench (only located on one side of roadway across majority of the site). Cable trench can be located on either side of the road surface but where possible it should be located on the upstream side of the road surface.

Figure 4.5

Road Type A - Upgrade of Existing Excavated Access Track

Ardderoo Wind Farm, Co. Galway

PROJECT TITLE:

DRAWING TITLE:

DRAWING BY:

CHECKED BY:

DRAWING No.:

OS SHEET No.:

SCALE:

DATE:

PROJECT No.:

22.11.2018

0815 - 48

Gerry Kane

Paul Jennings

AIGEC geotechnical engineering consultants
Peat

 Existing Floated Access Track

 Existing Geotextile/Geogrid

 Existing tree trucks/ brush as basal layer

 Geogrid/Geotextile (as required) - see notes 1 & 2

 500mm of selected granular fill

 (1) Where coarse granular fill has been used in the existing floated access road make-up, a layer of geogrid should be placed on top of the existing floated access road.

 (2) Where fine granular/cohesive type material has been used in the existing floated access road make-up (as is the case on some of the existing access roads in the southeast of the site), a layer of geotextile is likely to be required as a separator layer with a layer of geogrid.

 Figure 4.6

 Road Type B - Upgrade of Existing Floated Access Track

 1:50

 Ardderroo Wind Farm, Co. Galway

 PROJECT TITLE:

 DRAWING TITLE:

 DRAWING BY:

 CHECKED BY:

 DRAWING No.:

 OS SHEET No.:

 SCALE:

 DATE:

 PROJECT No.:

 22.11.2018

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below. This methodology includes procedures that are to be included in the
construction to minimise any adverse impact on peat stability.

1. Prior to commencing road construction movement monitoring posts should be
installed in areas where the peat depth is greater than 2m.

2. Interceptor drains should be installed upslope of the access road alignment to divert
any surface water away from the construction area.

3. Excavation should take place to a competent stratum beneath the peat (as agreed
with the site designer and resident engineer).

4. Road construction should be carried out in sections of approximately 50m lengths i.e.
no more than 50m of access road should be excavated without re-placement with
stone fill.

5. Excavation of materials with respect to control of peat stability.
   a. Acrotelm (top about 0.3 to 0.4m of peat) is generally required for landscaping
      and shall be stripped and temporarily stockpiled for re-use as required. 
      Acrotelm stripping shall be undertaken prior to main excavations.
   b. Where possible, the acrotelm shall be placed with the vegetation part of the
      sod facing the right way up to encourage growth of plants and vegetation.
   c. All catotelm peat (peat below about 0.3 to 0.4m depth) shall be transported
      immediately on excavation to the designated peat and spoil placement areas.

6. Side slopes in peat shall be not greater than 1 (v): 2 or 3 (h). This slope inclination will
be reviewed during construction, as appropriate. Where areas of weaker peat are
encountered then slacker slopes will be required. Battering of the side slopes of the
excavations should be carried out as the excavation progresses.

7. The surface of the excavated access road should be overlaid with up to 500mm of
selected granular fill. Granular fill to be placed in layers in accordance with the
designers’ specification.

8. Access roads to be finished with a layer of capping across the full width of the road.

9. A layer of geogrid/geotextile may be required at the surface of the competent stratum
(to be confirmed by the designer).

10. At transitions between floating and excavated roads a length of road of about 10 to
20m shall have all peat excavated and replaced with suitable fill. The surface of this
fill shall be graded so that the road surface transitions smoothly from floating to
excavated road.

11. Where relatively steep peat slopes are encountered along with relatively deep peat
(i.e. typically greater than 1m) and where it is proposed to construct the access road
perpendicular to the slope contours it is best practice to start construction at the
bottom of the slope and work towards the top, where possible. This method avoids
any unnecessary loading to the adjacent peat and greatly reduces any risk of peat
instability.
12. A final surface layer shall be placed over the excavated road, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic.

A typical section of a new excavated road is shown in Figure 4.7

**4.3.2.1.3 Construction of New Floating Roads**

In a number of areas across the site of the Proposed Development it will be necessary to construct floating roads over peat. It should be noted that these locations should be confirmed by the project designer at the detailed design stage.

A detailed stability analysis will be carried out by the designer where it is proposed to install floating access roads over the peat prior to any construction work commencing on site.

Floating roads minimise impact on the peat, particularly peat hydrology. As there is no excavation required no peat arisings are generated. However, where the underlying peat has insufficient bearing capacity or due to topographic restrictions an excavated type access road may be more suitable.

The general construction methodology for the construction of floating, as presented in AGEC’s *Peat and Spoil Management Plan* in Appendix 4.2, is summarised below. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

1. Prior to commencing floating road construction movement monitoring posts should be installed in areas where the peat depth is greater than 3m.

2. Base geogrid to be laid directly onto the existing peat surface along the line of the road in accordance with geogrid provider’s requirements.

3. Construction of road to be in accordance with appropriate design from the designer.

4. The typical make-up of the new floated access road is 500 to 750mm of selected granular fill with 2 no. layers of geogrid with possibly the inclusion of a basal layer of tree trunks/brash (To be confirmed with the site designer).

5. Granular fill to be placed in layers in accordance with the designers specification.

6. Following the detailed design of the floated access roads it may be deemed necessary to include pressure berms either side of the access road in some of the deeper peat areas. The inclusion of a 2 to 5m wide pressure berm (typically 0.5m in height) either side of the access road will reduce the likelihood of potential bearing failures beneath the access road.

7. The finished running width of the road will be approximately 5m with localised widening for turning and passing (to be confirmed by the designer).

8. Stone delivered to the floating road construction shall be end-tipped onto the constructed floating road. Direct tipping of stone onto the peat shall not be carried out.
Solid/Competent Strata

Up to 500mm of selected granular fill

Geotextile/Geogrid (if required by designer)

Interceptor drain installed upslope of access road

2 or 3

1

Peat

TYP. < 2.0m

5.0m width

2 or 3

TYP. < 2.0m

1

Cable Corridor

Cable duct trench (only located on one side of roadway across majority of the site). Cable trench can be located on either side of the road surface but where possible it should be located on the upstream side of the road surface.

Geotextile/Geogrid (if required by designer)
9. To avoid excessive impact loading on the peat due to concentrated end-tipping all stone delivered to the floating road shall be tipped over at least a 10m length of constructed floating road.

10. Where it is not possible to end-tip over a 10m length of constructed floating road then dumpers delivering stone to the floating road shall carry a reduced stone load (not greater than half full) until such time as end-tipping can be carried out over a 10m length of constructed floating road.

11. Following end-tipping a suitable bulldozer shall be employed to spread and place the tipped stone over the base geogrid along the line of the road.

12. A final surface capping layer shall be placed over the full width of the floating road, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic.

A typical section of a new floating road is shown in Figure 4.8.

4.3.3 Borrow Pits

4.3.3.1 Description

It is proposed to develop 3 No. on-site borrow pits as part of the Proposed Development. It is proposed to obtain the majority of all rock and hardcore material that will be required during the construction of the proposed development from the on-site borrow pits. All 3 No. borrow pits are located adjacent to existing site roads. Usable rock may also be won from other infrastructure construction including the substation and the turbine base excavations.

Borrow pit No. 1 located approximately 70 metres south of Turbine No. 4, measures approximately 31,700m² in area and is intended to supply hardcore materials for the construction of the turbines in the centre and southeast of the site, access roads thereto, the electricity substation and the temporary construction compound. Borrow pit No. 2 located adjacent to Turbine No. 3, measures approximately 15,300m² in area and is intended to supply hardcore materials for the construction of turbines in the north of the site, access roads thereto, the easternmost construction compound/visitor car park and the anemometry mast. Borrow pit No. 3 is located approximately 990 metres northwest of Turbine No. 23, measures approximately 12,850m² in area and is intended to supply hardcore materials for the construction of the turbines in the southwest of the site and access roads thereto.

All borrow pits are shown on Figure 4.1 and on the detailed site layout drawings included as Appendix 4.1 to this EIAR. Figures 4.9 to 4.11 below shows detailed sections through the proposed borrow pits. The borrow pits will, on removal of all necessary and useful rock, be reinstated with excavated peat and subsoils as described in Section 4.3.4 below.

Post-construction, the borrow pits areas will be permanently secured and a stock-proof fence will be erected around the borrow pit areas to prevent access to these areas. Appropriate health and safety signage will also be erected on this fencing and at locations around the fenced area.

At certain turbine foundation and hardstand locations, depending on local ground conditions, the extraction of rock may be required in order to obtain a level construction
400mm thick layer of selected granular fill (as required)
800mm thick layer of selected granular fill
Typically > 2.0m deep

Tree trunks/brush as basal layer (as required by designer)

Geogrid (as required by designer)
Geogrid/Geotextile (as required by designer)

Cable duct

Figure 4.8
Road Type D - New Floated Access Track
1:50
Gerry Kane Paul Jennings
Ardderroo Wind Farm, Co. Galway
PROJECT TITLE:
DRAWING TITLE:
DRAWING BY:
CHECKED BY:
DRAWING No.:
OS SHEET No.:
SCALE:
DATE:
PROJECT No.:
22.11.2018 0815 - 51