Natura Impact Statement

Proposed Wind Energy Development, Ardderroo, Roscahill, Co. Galway

McCarthy
Keville
O'Sullivan

Planning & Environmental Consultants

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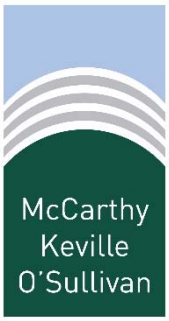
Prepared By:	McCarthy Keville O'Sullivan Ltd. Planning & Environmental Consultants Block 1, G.F.S.C. Moneenageisha Road, Galway



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Appendices

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 light of the finding of the Screening report, a Natura Impact Statement is now being prepared in accordance with the European Commission guidance document *Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC* (EC, 2001) and the Department of the Environment's Guidance on the Appropriate Assessment of Plans and Projects in Ireland (December 2009, amended February 2010).

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

1. DoEHLG (2010) *Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities*. Department of the Environment, Heritage and Local Government,
2. European Communities (2000) *Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*, Office for Official Publications of the European Communities, Luxembourg. European Commission,
3. *Directive 92/43/EEC*, Office for Official Publications of the European Communities, Luxembourg. European Commission,
4. EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – *Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission*. European Commission,
5. EC (2013) *Interpretation Manual of European Union Habitats. Version EUR 28*. European Commission

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 6.1 Scoping Response Summary

No.	Consultee	Response to consultation
1	National Parks and Wildlife Service	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. This correspondence is also provided in Appendix 2.1of the EIAR
2	Bat Conservation Ireland	No response received
3	Inland Fisheries Ireland	No response received
4	Irish Peatland Conservation Council	No response received
6	Irish Wildlife Trust	No response received
7.	Department of Agriculture, Food and the Marine	Written response received on 21st December, 2016.

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 an alternative construction access road onto the N59 being located in the townlands of Knockaunranny 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.

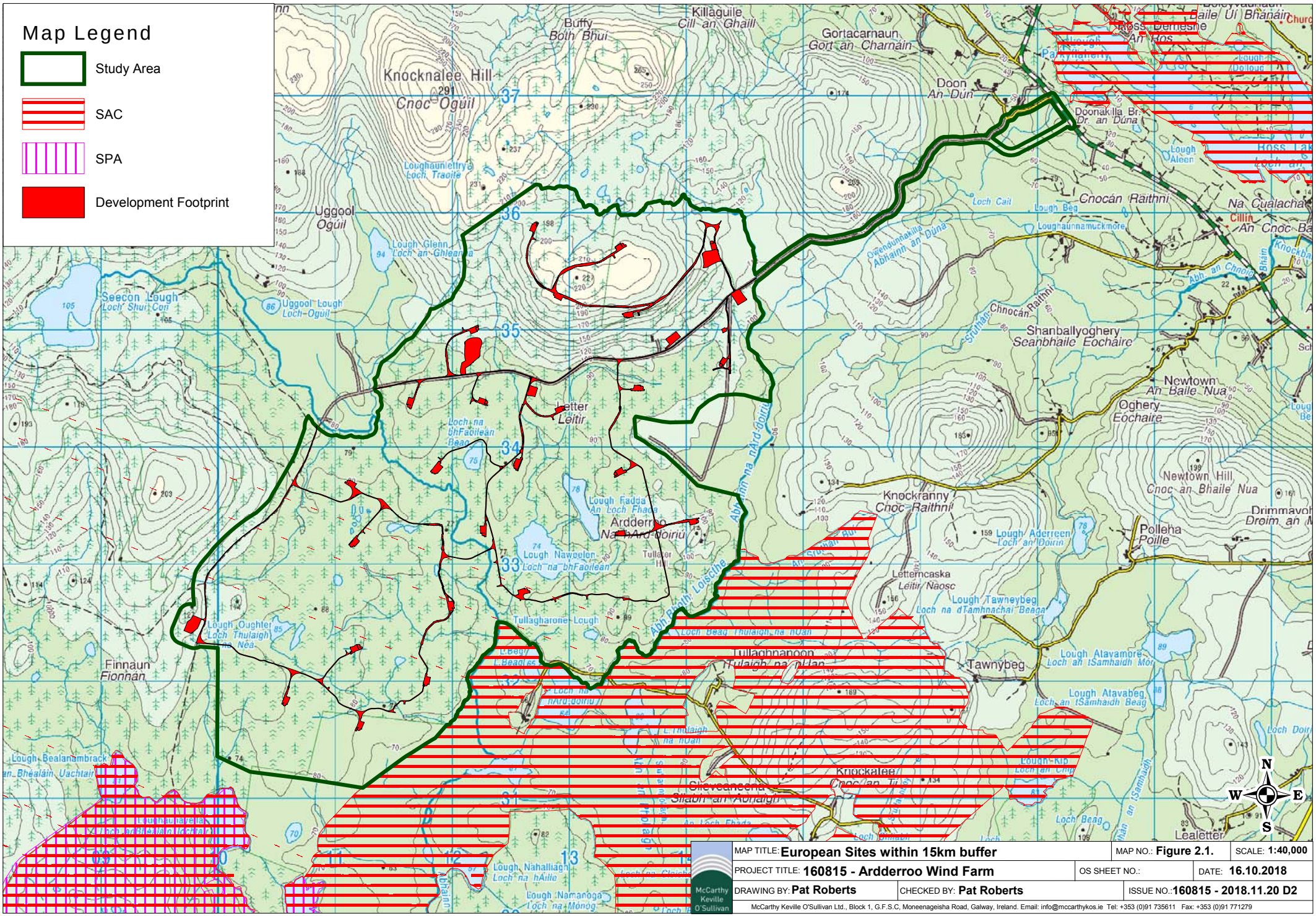
2.2 Characteristics of the Proposed Development

The development is fully described in Chapter 4 of the EIAR and in the planning drawings submitted. These documents have 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 4.4 to the EIAR.

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.



MAP TITLE: **European Sites within 15km buffer**		MAP NO.: **Figure 2.1.**	SCALE: **1:40,000**
PROJECT TITLE: **160815 - Ardderroo Wind Farm**		OS SHEET NO.:	DATE: **16.10.2018**
DRAWING BY: **Pat Roberts**	CHECKED BY: **Pat Roberts**	ISSUE NO.: **160815 - 2018.11.20 D2**	

McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C, Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279

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 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.

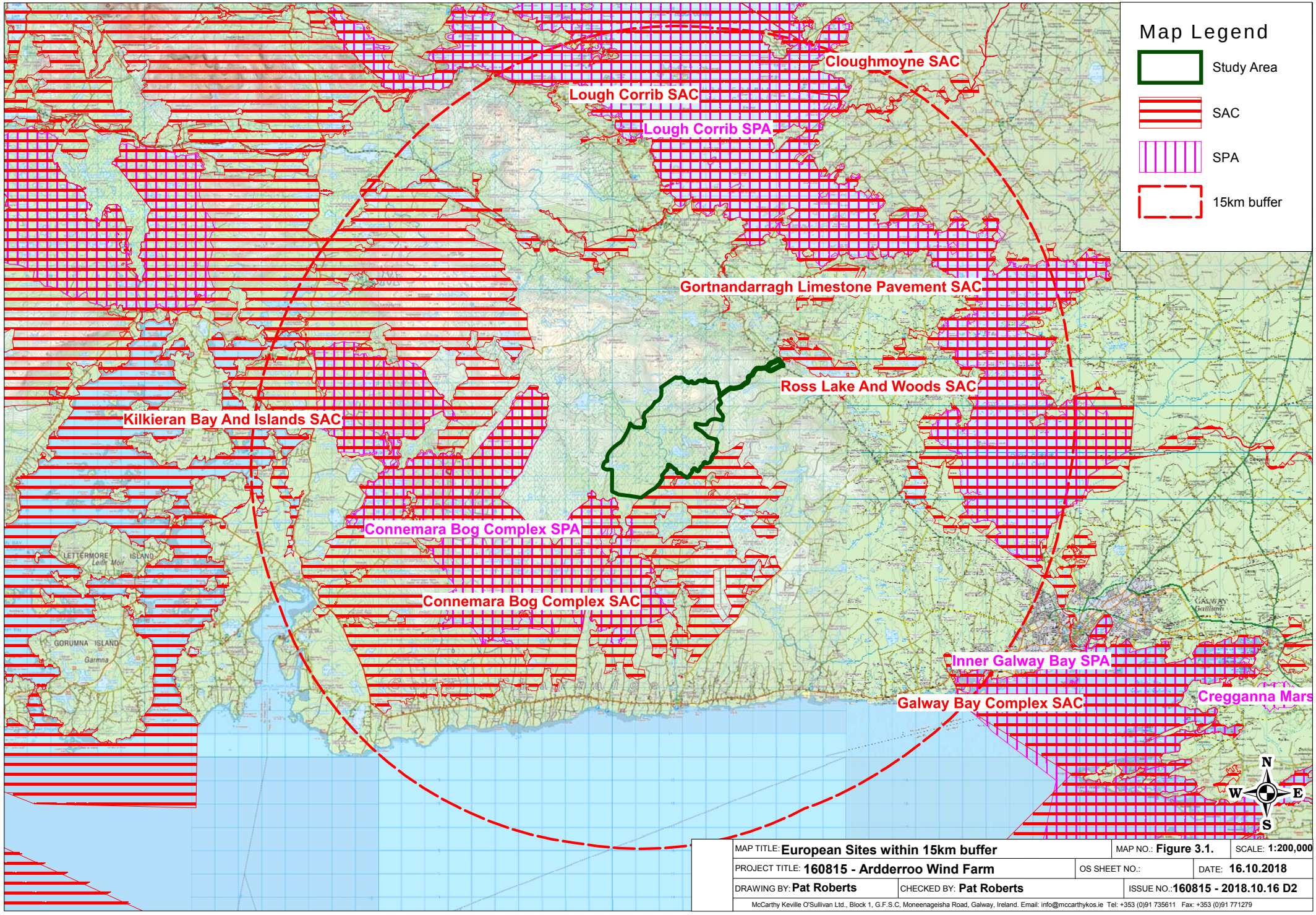
The Connemara Bog Complex SAC is located immediately adjacent to much of the south eastern boundary of the study area but at closest, approximately 160 metres from the development footprint. The Connemara Bog Complex SAC is separated from the footprint of the proposed development by existing Conifer 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.



MAP TITLE: **European Sites within 15km buffer**		MAP NO.: **Figure 3.1.**	SCALE: **1:200,000**
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McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C, Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279

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 alternative 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 within the footprint of the proposed development.

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.

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.

4 ASSESSMENT OF LIKLEY SIGIFICANT EFFECTS ON EUOPREAN SITES

The AA Screening Report that is included as Appendix I 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 2**.

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)
- C01.03.01Hand 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 19/10/2018).

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 4.1. Assessment of pathways for potential adverse effects on the individual Qualifying Interests of Connemara Bog Complex SAC

Qualifying Interest	Assessment of pathways for Effect
Coastal lagoons [1150]	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 theses 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.
Reefs [1170]	

Qualifying Interest	Assessment of pathways for Effect
	The potential for adverse effects on these habitats is therefore not considered further in this document.
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	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. **The potential for adverse effects on these habitats is therefore not considered further in this document**
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]	
European dry heaths [4030]	
Northern Atlantic wet heaths with *Erica tetralix* [4010]	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). 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. **Potential for adverse effects son these habitats is therefore not considered further in this document.**
Blanket bogs (* if active bog) [7130]	
Depressions on peat substrates of the Rhynchosporion [7150]	
Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130]	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.**
Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110]	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.

Qualifying Interest	Assessment of pathways for Effect
Natural dystrophic lakes and ponds [3160]	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 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, in which these habitats are located. **The potential for adverse effects on these habitats is therefore considered further in this document.**
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	
Transition mires and quaking bogs [7140]	
Alkaline fens [7230]	
Salmo salar (Salmon) [1106]	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. 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.**
Lutra lutra (Otter) [1355]	
Najas flexilis (Slender Naiad) [1833]	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.**
Euphydryas aurinia (Marsh Fritillary) [1065]	The results of the surveys that were carried out for this species are provided in Section 6.2.4.4.4 of the EIAR. No suitable habitat or evidence of larval webs was recorded within the development footprint or study area during targeted surveys. There is no identified pathway for effect on this species either within or outside the site of the proposed development. **The potential for significant 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 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 (*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]
- *Salmo salar* (Salmon) [1106]
- *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 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 4.4 to the EIAR 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 states that there will be an indirect, negative, negligible, short term, likely effect on designated sites as a result of hydrology in the absence of mitigation. 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.

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]
- 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]
- *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 50metres 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. 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.*

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 2.**

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)
- C01.04-Mines (Low importance)
- D01.01-paths, tracks, cycling tracks (Medium importance)

- G05.04 -vandalism (Low importance)
- H01.08-diffuse pollution to surface waters due to household sewage and waste waters (High importance)
- H01-Pollution to surface waters (limnic, terrestrial, marine & brackish) (High importance)
- A04.03-abandonment of pastoral systems, lack of grazing (Low importance)
- D03.01.02-piers / tourist harbours or recreational piers (Low importance)
- H02.06-diffuse groundwater pollution due to agricultural and forestry activities (high 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 20/11/2018).

Table 4.2. identifies the QIs for which potential pathways for significant effects as a result of the proposed development were identified.

Table 4.2. Assessment of pathways for potential significant impacts on the individual Qualifying Interests of Ross Lake and Woods SAC

Qualifying Interest	Assessment of pathways for Effect
Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303]	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.**
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]	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.**

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]

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 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 SAChave been reviewed and considered in relation to the current development and are described in Table 4.3 below.

Table 4.3. Extrapolated Targets and attributes associated with site specific conservation objectives for Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1355]

Attribute	Target	Assessment
Population per roost	Minimum numbers of 100 bats maintained	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.
Summer Roosts	No decline	There will no loss or disturbance of any bat roosts associated with the development. 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 & Woods SAC. This roost will be retained along with the vegetative connectivity to the wider surrounding area.
Number of auxiliary roosts	No decline	
Extent of potential foraging habitat	No decline	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
Linear features: length	No significant loss, within 2.5km of qualifying roosts	The development has been designed to retain habitat connectivity and is anticipated to create additional linear features which may be utilised by bats.
Light Pollution	No significant increase in artificial light intensity adjacent to named roosts or along commuting routes within 2.5km of those roosts	There will be no light pollution associated with the proposed development. Aviation lights will be fitted to some turbines but these will be outside the core foraging range and will not increase any artificial lighting around any suitable habitat for the species

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 protection of this watercourse is a primary concern in the design of the alternative access road and no instream works or alteration of the stream are proposed. 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 4.4 to the EIAR 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 states that there will be an indirect, negative, negligible, short term, likely effect on designated sites as a result of hydrology in the absence of mitigation. Following the implementation of mitigation, no significant effects are anticipated.

Post implementation of avoidance and preventive measures the residual impact on the Ross Lake & Woods 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 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] within the Ross Lake & Woods 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 of the conservation condition of the Hard oligo-mesotrophic waters with benthic vegetation of *Chara spp*. within the SAC.

4.3 Lough Corrib SAC

The site synopsis for this designated site is provided in **Appendix 2.**

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 4.4. 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 4.4. Assessment of pathways for potential adverse effects on the individual Qualifying Interests of Lough Corrib SAC

Qualifying Interest	Assessment of pathways for Effect
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]	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 effects with regard to surface water pollution has been identified. **The potential for adverse effects on these Qualifying Interests is therefore considered further in this document.**
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	
Lutra lutra (Otter) [1355]	
Austropotamobius pallipes (White-clawed Crayfish) [1092]	
Petromyzon marinus (Sea Lamprey) [1095]	
Lampetra planeri (Brook Lamprey) [1096]	
Salmo salar (Salmon) [1106]	
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]	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.**
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]	

Qualifying Interest	Assessment of pathways for Effect
Depressions on peat substrates of the Rhynchosporion [7150]	
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]	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.**
Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130]	
Alkaline fens [7230]	
Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]	
Oligotrophic waters containing very few minerals of sandy plains *(Littorelletalia uniflorae)* [3110]	
Najas flexilis (Slender Naiad) [1833]	
Petrifying springs with tufa formation (*Cratoneurion*) [7220]	
Drepanocladus vernicosus (Slender Green Feather-moss) [1393]	
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 *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]

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. Post implementation of these 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.

4.4 Connemara Bog Complex SPA

The site synopsis for this designated site is provided in **Appendix 2.**

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)
- B - Sylviculture, forestry (High importance)
- C01.02 - Loam and clay pits (Low importance)
- E01.03 - dispersed habitation (Medium importance)
- C01.03.02 - mechanical removal of peat (Medium 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 4.5. 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.

Table 4.5. Assessment of pathways for potential adverse impacts on the individual Special Conservation Interests of Connemara Bog Complex SPA

Qualifying Interest	Assessment of pathways for Effect
Cormorant (*Phalacrocorax carbo*) [A017]	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.**
Merlin (*Falco columbarius*) [A098]	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.
Golden Plover (*Pluvialis apricaria*) [A140]	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.
Common Gull (*Larus canus*) [A182]	The development footprint is dominated by conifer planation, 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.**

Qualifying Interest	Assessment of pathways for Effect
	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 that 40km from the development site boundary. The maximum foraging rage 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 4.6. below.

Table 4.6. Extrapolated Targets and attributes associated with site specific conservation objectives for cormorant (breeding-wintering season)

Attribute	Target	Assessment
Breeding population abundance: apparently occupied nests (AONs)	No significant decline	No breeding evidence recorded within the zone of influence of the development
Productivity rate	No significant decline	

Attribute	Target	Assessment
Distribution: breeding colonies	No significant decline	
Prey biomass available	No significant decline	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.
Barrier to connectivity	No significant increase	
Disturbance at the breeding site	Human activities should occur at levels that do not adversely affect the breeding cormorant population	No breeding evidence recorded within the zone of influence of the development
Population trend	Long term population trend stable or increasing	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.
Distribution	There should be no significant decrease in the range, timing or intensity of use of area by cormorant other than that occurring from natural patters in variation.	

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 4.7 below.

Table 4.7 Extrapolated Targets and attributes associated with site specific conservation objectives for Golden Plover

Attribute	Target	Assessment
Population trend	Long term population trend stable or increasing	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.
Distribution	No significant decrease in the numbers or range of areas used by waterbird species other than that occurring from natural patterns of variation	

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. 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 4.8 below.

Table 4.8 Extrapolated Targets and attributes associated with site specific conservation objectives for Common Gull

Attribute	Target	Assessment
Population trend	Long term population trend stable or increasing	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.
Distribution	No significant decrease in the numbers or range of areas used by waterbird species other than that occurring from natural patterns of variation	

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 2.**

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 23/10/2018).

Table 4.9. 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 4.9 Assessment of pathways for potential adverse effects on the individual Special Conservation Interests of Lough Corrib SPA

Special Conservation Interest	Assessment of pathways for Effect
Gadwall (*Anas strepera*) [A051]	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.
Shoveler (*Anas clypeata*) [A056]	
Pochard (*Aythya ferina*) [A059]	
Tufted Duck (*Aythya fuligula*) [A061]	
Common Scoter (*Melanitta nigra*) [A065]	
Coot (*Fulica atra*) [A125]	
Common Tern (*Sterna hirundo*) [A193]	
Arctic Tern (*Sterna paradisaea*) [A194]	
Hen Harrier (*Circus cyaneus*) [A082]	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. **An assessment of direct habitat loss is required.**

Special Conservation Interest	Assessment of pathways for Effect
	Hen Harrier were recorded within the site boundary and 500m buffer. **An assessment of displacement effect with regard to the SPA population is required.** One flight in December 2016 was recorded at potential collision risk height. **A collision risk assessment with regard to the SPA population is required.**
Golden Plover (*Pluvialis apricaria*) [A140]	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.
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	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.
Common Gull (*Larus canus*) [A182]	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 within the potential collision risk zone. **A collision risk assessment is required.**
Greenland White-fronted Goose (Anser albifrons flavirostris) [A395]	This species was not recorded utilising habitat within the site boundary for roosting or feeding. 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 not recorded utilising habitat within the site boundary or within a 5km radius of the proposed development. No potential for displacement effect exists. A flock of 41 birds were recorded flying over the site on one occasion in October 2016. The flight was recorded outside the

Special Conservation Interest	Assessment of pathways for Effect
	potential collision risk zone. A collision risk assessment is not required. No potential pathway for impact on this species was identified.

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 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 4.10 below.

Table 4.10. Extrapolated Targets and attributes associated with site specific conservation objectives for Hen Harrier

Attribute	Target	Assessment
Roost attendance: individual hen harriers	No significant decline	No roost sites were recorded within the development site boundary and none were recorded within the wider study area. Potential impacts are not anticipated.
Suitable foraging habitat	No significant decline	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.

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 will be 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 4.11 below.

Table 4.11 Extrapolated Targets and attributes associated with site specific conservation objectives for Common Gull

Attribute	Target	Assessment
Population trend	Long term population trend stable or increasing	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.
Distribution	No significant decrease in the numbers or range of areas used by waterbird species other than that occurring from natural patterns of variation	

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 4.4 of the EIAR. 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 4.4 to the EIAR.

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

No potentially significant residual disturbance, displacement or habitat loss effects were reported for any receptors within any of the nearby windfarm/other assessment reviewed.

No potentially significant cumulative disturbance, displacement or habitat loss effects on any of the receptors has been identified with regard to the Ardderroo proposal.

6.1.3 Conclusion of Cumulative Assessment

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

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.
x. Forestry Felling.
xi. Permanent Signage.
xii. All associated site development works.

Is 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 online web-mappers: National Parks and Wildlife Service (NPWS), Teagasc, EPA, Water Framework Directive (WFD), Geological Survey of Ireland (GSI), Inland Fisheries Ireland (IFI) & Irish Wetland Bird Survey I-WeBS.
- 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 7.1 Integrity of site checklist and assessment for European Sites

Does the project have the potential to:	Assessment	Residual Impact: Yes/No
Conservation objectives		
Cause delays in progress towards achieving the conservation objectives of the site?	The proposed development will not cause delays or interrupt progress towards achieving the conservation objectives of the European Sites. 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.	No
Interrupt progress towards achieving the conservation objectives of the site?		No
Disrupt those factors that help to maintain the favourable conditions of the site?	The proposed development will not disrupt those factors that help to maintain the favourable conditions of the site European Sites. 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.	No
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	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. 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.	No
Other Indicators		
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	The proposed development will not cause changes to the structure and function of the habitats or ecosystems of the European Sites. 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.	No
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?		No

Does the project have the potential to:	Assessment	Residual Impact: Yes/No
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	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.	No
Reduce the area of key habitats?	There will be no reduction in area of key habitat.	No
Reduce the population of key species?	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. 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.	No
Change the balance between key species?		No
Reduce diversity of the site?		No
Result in disturbance that could affect population size or density or the balance between key species?		No
Result in fragmentation?	The development has been designed to maintain and retain habitat connectivity within and to areas outside the development site boundary.	No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc.)?	No Key features will be lost as a result of the proposed development.	No

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.

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Appendix 1

Article 6(3) Screening Report

Appropriate Assessment Screening Report

Proposed Wind Energy Development, Ardderroo, Roscahill, Co. Galway

McCarthy Keville O'Sullivan

Planning & Environmental Consultants

DOCUMENT DETAILS

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Project title:	Proposed Wind Energy Development, Ardderroo, Roscahill, Co. Galway

Project Number:	160815
Document Title:	Appropriate Assessment Screening Report
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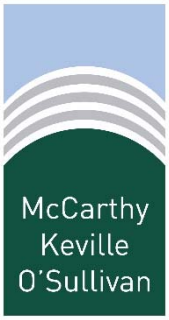
Prepared By:	McCarthy Keville O'Sullivan Ltd. Planning & Environmental Consultants Block 1, G.F.S.C. Moneenageisha Road, Galway



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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) 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.

This Report has been prepared in accordance with the European Commission guidance document *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC* (EC, 2001) and the Department of the Environment's Guidance on the Appropriate Assessment of Plans and Projects in Ireland (December 2009, amended February 2010).

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

1. DoEHLG (2010) *Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities*. Department of the Environment, Heritage and Local Government,
2. European Communities (2000) *Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*, Office for Official Publications of the European Communities, Luxembourg. European Commission,
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4. EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – *Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission*. European Commission,
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8. CIEEM (2016) Institute of Ecology and Environmental Management *Guidelines for Ecological Impact Assessment*.
9. NRA (2009) *Guidelines for Assessment of Ecological Impacts of National Roads Schemes*, National Roads Authority, Dublin.

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 legislation1. 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.

[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 1,493hectares. 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. 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.

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 30/10/2018. 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. Ongoing 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.

Bat Conservation Ireland's *Bats and Appropriate Assessment Guidelines* (2012) were utilised to screen European Sites designated for Lesser Horseshoe Bat. The guidance recommends a 6km screening buffer around roost sites located in SACs. European sites located within the 6km screening buffer are automatically "Screened in".

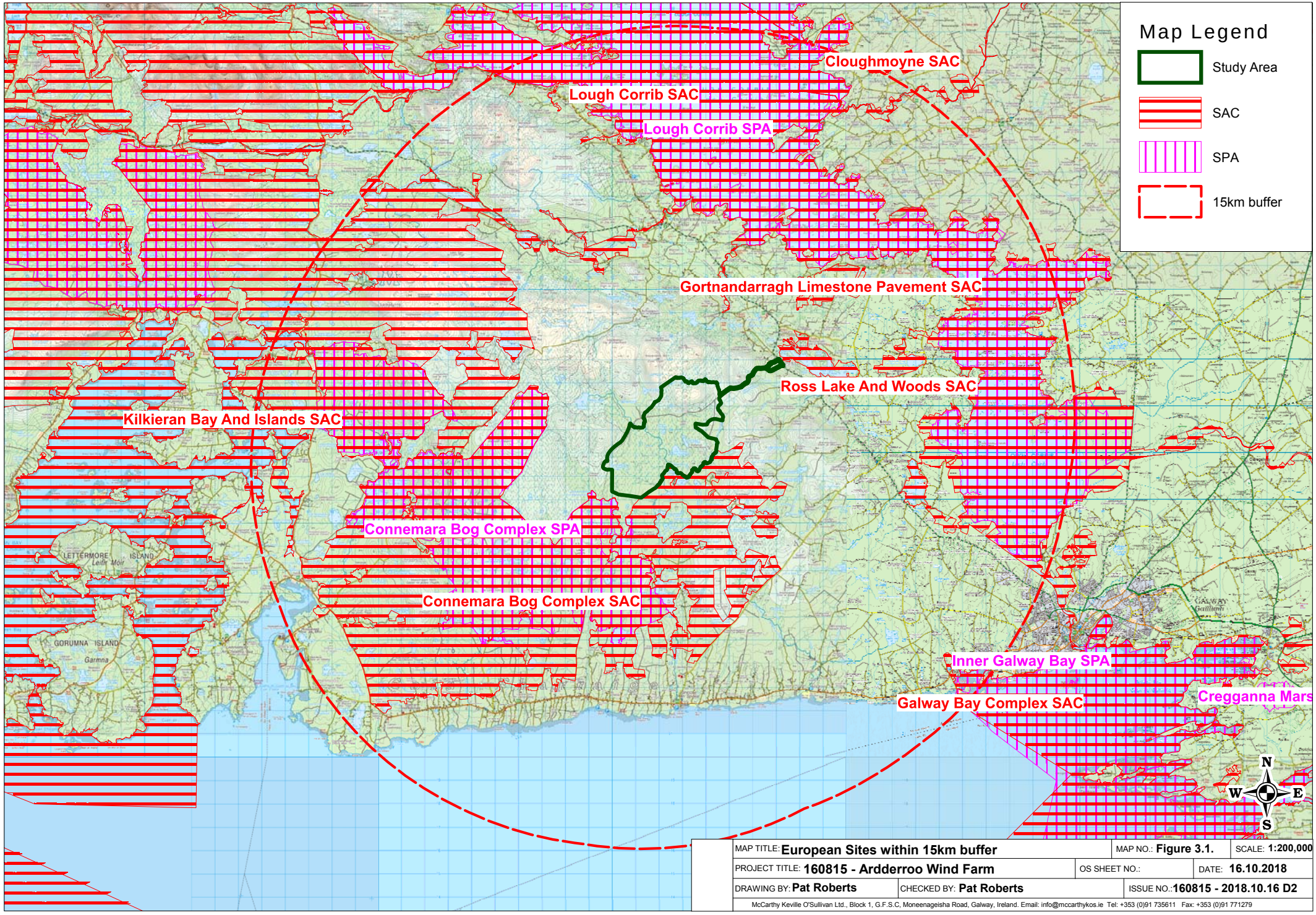
Figure 3.1 shows the location of the proposed development in relation to all European sites within 15km of the proposed wind farm. Table 3.1 below, lists all European Sites that were within 15km of the proposed wind farm and assesses which are within the likely zone of impact. The site synopses and conservation 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 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:



MAP TITLE: **European Sites within 15km buffer**		MAP NO.: **Figure 3.1.**	SCALE: **1:200,000**
PROJECT TITLE: **160815 - Ardderroo Wind Farm**		OS SHEET NO.:	DATE: **16.10.2018**
DRAWING BY: **Pat Roberts**	CHECKED BY: **Pat Roberts**		ISSUE NO.: **160815 - 2018.10.16 D2**

McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C, Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279

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

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
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).

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
thetemporary 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 *Ranunculion 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]	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.**

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
	▪ *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]	
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	▪ *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] ▪ Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]	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.**
Gortnandarragh Limestone Pavement SAC (001271) 4.6 km north east of wind farm study area. 2.4km 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.**

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
Kilkieran Bay & Islands SAC (002111) 12.6km west of wind farm study area, 16.1km west of the temporary construction access road	▪ 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) 12.9 km south east of wind farm study area; 14.1km south east of the temporary construction access road	▪ 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] ▪ Turloughs [3180] ▪ *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
	▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] ▪ Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] ▪ Alkaline fens [7230] ▪ *Lutra lutra* (Otter) [1355] ▪ *Phoca vitulina* (Harbour Seal) [1365]	
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

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
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
	▪ Common Gull (*Larus canus*) [A182] ▪ Sandwich Tern (*Sterna sandvicensis*) [A191] ▪ Common Tern (*Sterna hirundo*) [A193] ▪ Wetlands [A999]	**The SPA is therefore not within the Likely Zone of Impact.**

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.

4 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'

European Site	Screening Summary
Connemara Bog Complex SAC (002034) 0km. wind farm study area shares border with this SAC. 3.3km south 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: ▪ Deterioration of surface water quality resulting from pollution, associated with construction, operation and decommissioning potentially affecting the following aquatic QIs: o Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] o Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] o Natural dystrophic lakes and ponds [3160] o Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] o *Salmo salar* (Salmon) [1106] o *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: o Otter 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 SAC (000297) 2.9 km north of wind farm study area and 2.9km	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:

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: o Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] o Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] o *Austropotamobius pallipes* (White-clawed Crayfish) [1092] o *Petromyzon marinus* (Sea Lamprey) [1095] o *Lampetra planeri* (Brook Lamprey) [1096] o *Salmo salar* (Salmon) [1106] o *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 o Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] o Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] o *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] o *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: o 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: o 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: o Merlin o Golden Plover o Cormorant

	o Common Gull 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: o 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: o Hen Harrier o Golden Plover o 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 4.2 European Sites that have been 'Screened Out'

European Site	Screening Summary

Gortnandarragh Limestone Pavement SAC (001271) 4.6 km north east of wind farm study area. 2.4km north east of alternative wind farm access road	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'.
Kilkieran Bay & Islands SAC (002111) 12.6km west of wind farm study area, 16.1km west of alternative wind farm access road	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'.
Galway Bay Complex SAC (000268) 12.9 km south east of wind farm study area; 14.1km south east of alternative wind farm access road	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'.
Cloughmoyne SAC (000479) 14.8km north east of wind farm study area; 13km north east of alternative wind farm access road	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'.
Inner Galway Bay SPA (004031) 14km south west of wind farm study area; 15km south west of alternative wind farm access road.	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:

- Review of NPWS published information on European Sites including Site Synopses, European Site mapping and Conservation Objectives for European Sites
- Review of 2013 EU Habitats Directive (Article 17) Report,
- Review of OS maps and aerial photographs of the site of the proposed works,
- Review of relevant databases including National Biodiversity Ireland Database,
- Review of other plans and projects within the area,
- Liaison with the project team in relation to the location of the works,
- Desk studies and Field surveys including habitat mapping, mammal and bird surveys completed between 2013 and 2018, details of which are provided in Flora and Fauna and Ornithology Chapters within the EIAR.

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.

- Gortnandarragh 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.

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Appendix 2

NPWS Site Synopses

SITE SYNOPSIS

Site Name: Lough Corrib SAC

Site Code: 000297

Lough Corrib is situated to the north of Galway city and is the second largest lake in Ireland, with an area of approximately 18,240 ha (the entire site is 20,556 ha). The lake can be divided into two parts: a relatively shallow basin, underlain by Carboniferous limestone, in the south, and a larger, deeper basin, underlain by more acidic granite, schists, shales and sandstones to the north. The surrounding lands to the south and east are mostly pastoral farmland, while bog and heath predominate to the west and north. A number of rivers are included within the cSAC as they are important for Atlantic Salmon. These rivers include the Clare, Grange, Abbert, Sinking, Dalgan and Black to the east, as well as the Cong, Bealanabrack, Failmore, Cornamona, Drimneen and Owenriff to the west. In addition to the rivers and lake basin, adjoining areas of conservation interest, including raised bog, woodland, grassland and limestone pavement, have been incorporated into the site.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3110] Oligotrophic Waters containing very few minerals
[3130] Oligotrophic to Mesotrophic Standing Waters
[3140] Hard Water Lakes
[3260] Floating River Vegetation
[6210] Orchid-rich Calcareous Grassland*
[6410] *Molinia* Meadows
[7110] Raised Bog (Active)*
[7120] Degraded Raised Bog
[7150] Rhynchosporion Vegetation
[7210] *Cladium* Fens*
[7220] Petrifying Springs*
[7230] Alkaline Fens
[8240] Limestone Pavement*
[91A0] Old Oak Woodlands
[91D0] Bog Woodland*

[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
[1092] White-clawed Crayfish (*Austropotamobius pallipes*)
[1095] Sea Lamprey (*Petromyzon marinus*)

[1096] Brook Lamprey (*Lampetra planeri*)
[1106] Atlantic Salmon (*Salmo salar*)
[1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)
[1355] Otter (*Lutra lutra*)
[1393] Slender Green Feather-moss (*Drepanocladus vernicosus*)
[1833] Slender Naiad (*Najas flexilis*)

The shallow, lime-rich waters of the southern basin of Lough Corrib support one of the most extensive beds of stoneworts (Charophytes) in Ireland, with species such as *Chara aspera*, *C. hispida*, *C. delicatula*, *C. contraria* and *C. desmacantha* mixed with submerged pondweeds (*Potamogeton perfoliatus*, *P. gramineus* and *P. lucens*), Shoreweed (*Littorella uniflora*) and Water Lobelia (*Lobelia dortmanna*). These *Chara* beds are an important source of food for waterfowl. In contrast, the northern basin contains more oligotrophic and acidic waters, without *Chara* species, but with Shoreweed, Water Lobelia, Pipewort (*Eriocaulon aquaticum*), Quillwort (*Isoetes lacustris*), Alternate Water-milfoil (*Myriophyllum alternifolium*) and Slender Naiad (*Najas flexilis*). The last-named is listed under the Flora (Protection) Order, 2015, and is an Annex II species under the E.U. Habitats Directive.

Large areas of reedswamp vegetation, dominated by varying mixtures of Common Reed (*Phragmites australis*) and Common Club-rush (*Scirpus lacustris*), occur around the margins of the lake. Reedswamp usually grades into species-rich marsh vegetation characterised by Slender Sedge (*Carex lasiocarpa*), Water Mint (*Mentha aquatica*), Water Horsetail (*Equisetum fluviatile*) and Bogbean (*Menyanthes trifoliata*). Of particular note are the extensive beds of Great Fen-sedge (*Cladium mariscus*) that have developed over the marly peat deposits in sheltered bays, particularly in the south-east corner of the lake. Alkaline fen vegetation is more widespread around the lake margins and includes, amongst the typically diverse range of plants, the Slender Cottongrass (*Eriophorum gracile*), a species protected under the Flora (Protection) Order, 2015. Wet meadows dominated by Purple Moor-grass (*Molinia caerulea*) occur in seasonally flooded areas close to the lake shore. These support species such as Sharp-flowered Rush (*Juncus acutiflorus*), Jointed Rush (*J. articulatus*), Carnation Sedge (*Carex panicea*), Devil's-bit Scabious (*Succisa pratensis*), Creeping Bent (*Agrostis stolonifera*) and Tormentil (*Potentilla erecta*), amongst others.

This large site contains four discrete raised bog areas and is selected for active raised bog, degraded raised bog, Rhynchosporion and bog woodland. Active raised bog comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some

of the following associated species, Bog Asphodel (*Narthecium ossifragum*), sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*) and Carnation Sedge.

At Addergoole, on the eastern shores of Lough Corrib, there is an important area of western raised bog. This bog area is one of the most westerly, relatively intact raised bogs in the country. There are also other substantial areas of raised bog along various tributaries of the Corrib in east Co. Galway, namely Slieve Bog, Lough Tee Bog and Killaclogher bog. The active parts of these bogs mostly correspond to the wettest areas, where there are well-developed surface features with hummocks, lawns and pools. It is in such areas that Rhynchosporion vegetation is best represented. The dominant species is the aquatic bog moss *Sphagnum cuspidatum,* which is usually accompanied by Bogbean, White Beak-sedge, Bog Asphodel, Common Cottongrass (*Eriophorum angustifolium*), Bog Sedge (*Carex limosa*) and Great Sundew (*Drosera anglica*). Brown Beak-sedge, a locally rare plant of wet bog pools, has been recorded from a number of the bog areas within the site. At Addergoole a substantial bog lake or soak occurs and this is infilling with large rafts of Rhynchosporion vegetation at present. This area is associated with an important area of wet bog woodland dominated by Downy Birch (*Betula pubescens*).

The largest part of the uncut high bog comprises degraded raised bog. Degraded bog is dominated by a raised bog flora which tends to be rather species-poor because of disturbance and/or drying-out. The most conspicuous vascular plant species are usually Carnation Sedge, Heather (*Calluna vulgaris*), Cottongrasses, Cross-leaved Heath (*Erica tetralix*), Bog Asphodel and Deergrass. Bog-rosemary (*Andromeda polifolia*) and Cranberry (*Vaccinium oxycoccos*), two species indicative of raised bog habitat, are frequent on both degraded and active areas of raised bog. *Sphagnum* cover is generally low within degraded areas due to a combination of drying-out and frequent burning.

Limestone pavement occurs along much of the shoreline in the lower Corrib basin, and supports a rich and diverse flora, including Herb-Robert (*Geranium robertianum*), Bloody Crane's-bill (*G. sanguineum*), Carline Thistle (*Carlina vulgaris*), Spring Gentian (*Gentiana verna*), Wild Thyme (*Thymus praecox*), Rustyback (*Ceterach officinarum*), Wood Sage (*Teucrium scorodonia*), Slender St. John's-wort (*Hypericum pulchrum*), Quaking-grass (*Briza media*) and Blue Moor-grass (*Sesleria albicans*). Areas of Hazel (*Corylus avellana*) scrub occur in association with exposed limestone pavement and these include species such as Hawthorn (*Crataegus monogyna*), Buckthorn (*Rhamnus catharticus*), Spindle (*Euonymus europaeus*), with occasional Juniper (*Juniperus communis*). Three Red Data Book species are also found in association with limestone scrub - Alder Buckthorn (*Frangula alnus*), Shrubby Cinquefoil (*Potentilla fruticosa*) and Wood Bitter-vetch (*Vicia orobus*), the latter is also protected under the Flora (Protection) Order, 2015.

Open areas of orchid-rich calcareous grassland are also found in association with the limestone exposures. These can support a typically rich vegetation, including many orchids such as Pyramidal Orchid (*Anacamptis pyramidalis*), Common Spotted-orchid (*Dactylorhiza fuchsii*), Early-purple Orchid (*Orchis mascula*), Frog Orchid (*Coeloglossum*

viride), Fragrant Orchid (*Gymnadenia conopsea*), Marsh Helleborine (*Epipactis palustris*), Greater Butterfly-orchid (*Platanthera chlorantha*) and Irish Lady's-tresses (*Spiranthes romanzoffiana*). The latter is protected under the Flora (Protection) Order, 2015.

The Hill of Doon, located in the north-western corner of the lake, is a fine example of a Sessile Oak (*Quercus petraea*) woodland. The understorey is dominated by Sessile Oak, Holly (*Ilex aquifolium*) and occasional Juniper. There are occasional Yew (*Taxus baccata*) and Ash (*Fraxinus excelsior*), and a well-developed ground layer dominated by Bilberry (*Vaccinium myrtillus*), Hard Fern (*Blechnum spicant*) and Wood Rush (*Luzula sylvatica*). Woodland also occurs on some of the islands in the lake.

A number of the rivers in the site support submerged and floating vegetation of the Ranunculion fluitantis and Callitricho-Batrachion, including mosses. For example, in the River Corrib species such as Shining Pondweed (*Potamogeton lucens*), Perfoliate Pondweed (*Potamogeton perfoliatus*), Small Pondweed (*P. berchtoldii*), Yellow Water-lily (*Nuphar lutea*), White Water-lily (*Nymphaea alba*) and stoneworts (*Chara* spp.) occur.

The rare and Annex II-listed Slender Green Feather-moss (*Drepanocladus* [*Hamatocaulis*] *vernicosus*) is found at the fen at Gortachalla, north-east of Moycullen. Here it is widespread around the margins, and this constitutes a large and significant population in the national context. A very large population of another rare moss, *Pseudocalliergon trifarium,* is also found in this area.

The lake is rated as an internationally important site for waterfowl. Counts from 1984 to 1987 revealed a mean annual peak total of 19,994 birds. In the past a maximum peak of 38,281 birds was recorded. The lake supports internationally important numbers of Pochard (average peak 8,600) and nationally important numbers of the following species: Coot (average peak 6,756), Mute Swan (average peak 176), Tufted Duck (average peak 1,317), Cormorant (average peak 110) and Greenland White-fronted Goose (average peak 83). The latter species is listed on Annex I of the E.U. Birds Directive. The Coot population is the largest in the country and populations of Tufted Duck and Pochard are second only to Lough Neagh. Breeding pairs of Common Scoter on the lake number 30-41 (1995 data), as well as breeding populations of Arctic Tern and Common Tern. Other bird species of note recorded from or close to the lake recently include Hen Harrier, Whooper Swan, Golden Plover and Kingfisher. All of these species are listed on Annex I of the E.U. Birds Directive.

Otter and Irish Hare have been recorded regularly within this site. Both of these species are listed in the Red Data Book and are legally protected by the Wildlife Act, 1976. Otter is also listed on Annex II of the E.U. Habitats Directive. Lough Corrib is considered one of the best sites in the country for Otter, due to the sheer size of the lake and associated rivers and streams, and also the generally high quality of the habitats. Atlantic Salmon (*Salmo salar*) use the lake and rivers as spawning grounds. Although this species is still fished commercially in Ireland, it is considered to be

endangered or locally threatened elsewhere in Europe and is listed on Annex II of the E.U. Habitats Directive. Lough Corrib is also a well-known fishing lake with a very good Trout (*Salmo trutta*) fishery. The lake has a population of Sea Lamprey (*Petromyzon marinus*), a scarce, though probably under-recorded species listed on Annex II of the E.U. Habitats Directive. Brook Lamprey (*Lampetra planeri*), also listed on Annex II, are also known from a number of areas within the site.

A population of Freshwater Pearl Mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs within the site. White-clawed Crayfish (*Austropotamobius pallipes*), also listed on Annex II, is well distributed throughout Lough Corrib and its in-flowing rivers over limestone. A summer roost of Lesser Horseshoe Bat, another Annex II species, occurs within the site - approximately 100 animals were recorded here in 1999.

The main threats to the quality of this site are from water polluting activities resulting from intensification of agricultural activities on the eastern side of the lake, uncontrolled discharge of sewage which is causing localised eutrophication of the lake, and housing and boating development, which is causing the loss of native lakeshore vegetation. The raised bog habitats are susceptible to further degradation and drying out due to drainage and peat cutting and, on occasions, burning. Peat cutting threatens Addergoole Bog and already a substantial area of it has been cut away. Fishing and shooting occur in and around the lake. Introduction of exotic crayfish species or the crayfish fungal plague (*Aphanomyces astaci*) could have a serious impact on the native crayfish population. The bat roost is susceptible to disturbance or development.

Despite these ongoing issues, however, Lough Corrib is one the best examples of a large lacustrine catchment system in Ireland, with a range of habitats and species still well represented. These include 15 habitats which are listed on Annex I of the E.U. Habitats Directive, six of which are priority habitats, and nine species which are listed on Annex II. The lake is also internationally important for birds and is designated as a Special Protection Area.

SITE SYNOPSIS

SITE NAME: CONNEMARA BOG COMPLEX SPA

SITE CODE: 004181

The Connemara Bog Complex SPA is a large site encompassing much of the south Connemara lowlands of Co. Galway. The site consists of three separate areas - north of Roundstone, south of Recess and north-west of Spiddal. It is underlain predominantly by a variety of igneous and metamorphic rocks including granite, schist, gneiss and gabbro. The whole area was glaciated during the last Ice Age which scoured the lowlands of Connemara.

The Connemara Bog Complex SPA is characterized by areas of deep peat surrounded by heath-covered rocky outcrops. The deeper peat areas are often bordered by river systems and the many oligotrophic lakes that occur, resulting in an intricate mosaic of various peatland/wetland habitats and vegetation communities; these include Atlantic blanket bog with hummock/hollow systems, inter-connecting pools, Atlantic blanket bog pools, flushes, transition and quaking mires, as well as freshwater marshes, lakeshore, lake and river systems.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant, Merlin, Golden Plover and Common Gull.

Lough Scannive, located within Roundstone Bog, supports a nationally important breeding population of Cormorant (160 breeding pairs in 2001). Other breeding birds using the site include Merlin and Golden Plover. A partial survey in 2009 recorded 8 pairs of Merlin at various locations throughout the site; 15 breeding locations for this species were recorded at the site in an earlier survey undertaken in 1985/86. A survey of upland birds in 2004 recorded 27 pairs of Golden Plover within the site. The numerous lakes scattered throughout the site provide suitable breeding locations for Common Gull (45 pairs in 2000); a survey in 2010 recorded 40 pairs of this species at the site.

The site is also utilised by a wintering population of Greenland White-fronted Goose; small flocks of up to 30 birds have been recorded at various locations within the site.

Connemara Bog Complex SPA is of high ornithological importance, in particular for its nationally important breeding populations of Cormorant, Merlin, Golden Plover and Common Gull. It is of note that three of the regularly occurring species, Greenland White-fronted Goose, Merlin and Golden Plover, are listed on Annex I of the E.U. Birds Directive.

30.11.2010

SITE SYNOPSIS

SITE NAME: LOUGH CORRIB SPA

SITE CODE: 004042

Lough Corrib is the largest lake in the country and is located, for the most part, in County Galway, with a small section in the north extending into County Mayo. The lake can be divided into two parts: a relatively shallow basin in the south, which is underlain by Carboniferous limestone, and a larger, deeper basin to the north, which is underlain by more acidic granite, schists, shales and sandstones. The main inflowing rivers are the Black, Clare, Dooghta, Cregg, Owenriff and the channel from Lough Mask. The main outflowing river is the Corrib, which reaches the sea at Galway City.

The shallow, lime-rich waters of the southern basin of the lake support one of the most extensive beds of Stoneworts (Charophytes) in Ireland. These *Chara* beds are a very important source of food for waterfowl. In contrast, the northern basin contains more oligotrophic and acidic waters. Large areas of reedswamp vegetation, dominated by varying mixtures of Common Reed (*Phragmites australis*) and Common Club-rush (*Scirpus lacustris*) occur around the margins of the lake. The lake has numerous islands, which range from relatively bare rocky islets to larger islands with grassland or woodland.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greenland White-fronted Goose, Gadwall, Shoveler, Pochard, Tufted Duck, Common Scoter, Hen Harrier, Coot, Golden Plover, Black-Headed Gull, Common Gull, Common Tern and Arctic Tern. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetlands & Waterbirds.

Lough Corrib is an internationally important site that regularly supports in excess of 20,000 wintering waterbirds including an internationally important population of wintering Pochard (10,107) – except where indicated all figures are five year mean peaks for the period 1995/96 to 1999/2000. The site also supports nationally important populations of wintering Greenland White-fronted Goose (160 - five year mean peak for the period 1994/95 to 1998/99), Gadwall (48), Shoveler (90), Tufted Duck (5,486), Coot (14,426) and Golden Plover (1,727). Other species which occur include Mute Swan (182), Whooper Swan (35), Wigeon (528), Teal (74), Mallard (155), Goldeneye (74), Lapwing (2,424) and Curlew (114).

In winter nationally important numbers of Hen Harrier (8 - four year mean peak count between 2006 and 2009) also utilise the site as a communal roost.

Lough Corrib is also a traditional breeding site for gulls and terns, with various islands being used for nesting each year. There are important colonies of Common Tern (37 pairs in 1995) and Arctic Tern (60 pairs in 1995). The site supports substantial colonies of Black-headed Gull (431 pairs in 2000) and Common Gull (186 pairs in 2000), these representing 3% and 11% of the respective all-Ireland totals. Small numbers of Lesser Black-backed Gull, Great Black-backed Gull and Herring Gull have also been recorded breeding within the site.

The site supports approximately half of the national population of nesting Common Scoter (30 pairs in 1995); Lough Corrib was colonised by this rare, Red Data Book species only as recently as the late1970s/early1980s.

Lough Corrib SPA is an internationally important site which supports in excess of 20,000 wintering waterbirds, including a population of Pochard that is, itself, of international importance. A further six species of wintering waterfowl have populations of national importance. The site also contains a nationally important communal roost site for Hen Harrier. Lough Corrib is the most important site in the country for breeding Common Scoter. Its populations of breeding gulls and terns are also notable, with nationally important numbers of Black-headed Gull, Common Gull, Common Tern and Arctic Tern occurring. It is of note that several species which regularly occur are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Greenland White-fronted Goose, Hen Harrier, Golden Plover, Common Tern and Arctic Tern. Lough Corrib is a Ramsar Convention site.

7.7.2014

SITE SYNOPSIS

Site Name: Connemara Bog Complex SAC

Site Code: 002034

The Connemara Bog Complex SAC is a large site encompassing the majority of the south Connemara lowlands in Co. Galway. The site is bounded to the north by the Galway–Clifden road and stretches as far east as the Moycullen–Spiddal road. The site supports a wide range of habitats, including extensive tracts of western blanket bog, which form the core interest, as well as areas of heath, fen, woodlands, lakes, rivers and coastal habitats.

The site is underlain predominantly by various Galway granites, with small areas along the northern boundary of Lakes Marble, schist and gneiss. The Roundstone Bog area has a diverse bedrock geology composed mainly of the basic intrusive rock, gabbro. An area of rock, possibly Cambrian in age, called the Delaney Dome Formation occurs in the north-west of this area. Gabbro also occurs in the Kilkieran peninsula and near Cashel. The whole area was glaciated in the last Ice Age which scoured the lowlands of Connemara.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1150] Coastal Lagoons*
[1170] Reefs
[3110] Oligotrophic Waters containing very few minerals
[3130] Oligotrophic to Mesotrophic Standing Waters
[3160] Dystrophic Lakes
[3260] Floating River Vegetation
[4010] Wet Heath
[4030] Dry Heath
[6410] *Molinia* Meadows
[7130] Blanket Bogs (Active)*
[7140] Transition Mires
[7150] Rhynchosporion Vegetation
[7230] Alkaline Fens
[91A0] Old Oak Woodlands

[1065] Marsh Fritillary (*Euphydryas aurinia*)
[1106] Atlantic Salmon (*Salmo salar*)
[1355] Otter (*Lutra lutra*)

[1833] Slender Naiad (*Najas flexilis*)

The Connemara Bog Complex is characterized by areas of deep peat surrounded by rocky granite outcrops covered by heath vegetation. However, the main habitat within this site is lowland Atlantic blanket bog, as most of the area is covered by blanket peat greater than 1 m in depth. A mosaic of different communities exists in association with the blanket bog, including hummock/hollow systems, inter-connecting bog pools, flushes, transition and quaking mires, freshwater marshes, lakeshore, lake and river systems. The key plant species of lowland blanket bog are Black Bog-rush (*Schoenus nigricans*), Purple Moor-grass (*Molinia caerulea*), Cross-leaved Heath (*Erica tetralix*), Deergrass (*Scirpus cespitosus*), Common Cottongrass (*Eriophorum angustifolium*), Bog Asphodel (*Narthecium ossifragum*), White Beak-sedge (*Rhynchospora alba*) and bog moss species (*Sphagnum* spp.). Rhynchosporion vegetation is found on the blanket bog by lake and pool margins, in wet hollows and in quaking areas. Species such as White Beak-sedge, Common Cottongrass, Bogbean (*Menyanthes trifoliata*), sundews (*Drosera* spp.) and bog mosses are common. Areas of wet heath are widespread throughout this site, where blanket peat becomes shallower. There is a limited amount of dry heath, with species such as Western Gorse (*Ulex gallii*), St. Dabeoc's Heath (*Daboecia cantabrica*) and Bell Heather (*Erica cinerea*) recorded.

Both oligotrophic and dystrophic lakes are found within Connemara Bog Complex SAC, with the greatest concentration in the west of the site. The latter type are generally smaller, have a mainly peaty bottom and there is generally an abrupt transition from blanket bog to open water. Oligotrophic lakes in this site typically have shallow margins, with a mixed rocky/peaty bottom. Typical plant species of the lake edges include Water Lobelia (*Lobelia dortmanna*), Pipewort (*Eriocaulon aquaticum*), Shoreweed (*Littorella uniflora*), Many-stalked Spike-rush (*Eleocharis multicaulis*) and Bulbous Rush (*Juncus bulbosus*). The rare species Slender Naiad (*Najas flexilis*) and Pillwort (*Pilularia globulifera*) have both been recorded from oligotrophic lakes at this site. Species commonly encountered in dystrophic lakes/pools include the bog mosses *Sphagnum auriculatum* var. *auriculatum* and *S. cuspidatum*, along with White Beak-sedge, Lesser Bladderwort (*Utricularia minor*), Pipewort and Bogbean.

The main river systems within the site are the Owenmore (Ballynahinch) river, the Glashanasmearany and Derrygauna rivers (to the south of Lough Bofin), the Cashla river (which flows out of Glenicmurrin Lough), the Glengawbeg river (which connects Lough Agraffard and Lettercraffoe Lough) and the Owenboliska river and its tributaries (north of Spiddal). Vegetation associated with some of these waterways includes Alternate Water-milfoil (*Myriophyllum alternifolium*), Bulbous Rush, Floating Club-rush (*Scirpus fluitans*), water-lilies, Great Fen-sedge (*Cladium mariscus*), Bog Pondweed (*Potamogeton polygonifolius*), Broad-leaved Pondweed (*P. natans*), Water Horsetail (*Equisetum fluviatile*) and the liverwort *Scapania undulata.*

Within this site, areas of transition mire occur mainly along the margins of lakes and bog streams. The surface of such areas is typically quaking and there is often evidence of base-enrichment. Typical plant species include Bog-sedge (*Carex limosa*), Slender Sedge (*C. lasiocarpa*), Bog Pondweed, Bogbean, Blunt-flowered Rush (*Juncus subnodulosus*), Common Cottongrass, Purple Moor-grass and White Beak-sedge. Locally there may be some Great Fen-sedge or Black Bog-rush. The rare and legally protected species Slender Cottongrass (*Eriophorum gracile*) occurs in this habitat. Moss cover is variable.

Areas of *Molinia* meadow at this site contain species such as Purple Moor-grass, Meadow Thistle (*Cirsium dissectum*), Sharp-flowered Rush (*Juncus acutiflorus*) and Tormentil (*Potentilla erecta*). The community occurs on wet acid soils.

There are a number of areas of old oak woodland, but the woodland at Shannawoneen, north of Spiddal, is the best known. This woodland lies in the valley of the Owenboliska river. It provides a good example of a Sessile Oak (*Quercus petraea*) dominated canopy woodland, although there is also a lot of Downy Birch (*Betula pubescens*). Other examples of this habitat at the site are found at Ballynahinch, Glendollagh, Derrywaking Lake, as well as on some of the lake islands. The invasive alien shrub Rhododendron (*Rhododendron ponticum*) is found in some areas of woodland.

There are some limited, but nonetheless well developed, examples of alkaline fen at this site. These fens are often species-rich, and support species not typically found in association with blanket bog areas - e.g. Dioecious Sedge (*C. dioica*), Black Bog-rush, Broad-leaved Cottongrass (*E. latifolium*), the moss *Campylium stellatum* and Lesser Clubmoss (*Selaginella selaginoides*).

Four main lagoons occur within this site: Lough Ahalia, Doire Bhanbh, Lough Aconeera and Salt Lake. All four are regarded as saline lake lagoons and they range in size from 1–90 ha. The smallest (Doire Bhanbh) is quite shallow and surrounded by Common Reed (*Phragmites australis*) swamp, while the three larger lagoons are relatively deep and are surrounded by moorland and exposed granite. Salt Lake contains a serpulid worm reef. Lough Ahalia consists of a series of basins, and these are deep in places, with an unusual salinity structure. The lowest lake is relatively shallow (0–4 m) and brackish throughout, while the middle lake is deep (13 m) and permanently stratified, with water below 3 m depth measuring 14 ppt. The flora and fauna of this lagoon system are extremely diverse, with many communities found. This, along with Lough Aconeera, is the only known site in Ireland for the Red Data Book stonewort *Chara balthica.* Another Red Data Book plant, *Lamprothamnium papulosum*, also occurs, as well as *Chara aspera* and *C. virgata*. An unusual form of Fennel Pondweed (*Potamogeton pectinatus*) occurs in high salinity water. There are a number of other notable records of plant and animal from this lagoon. Lough Aconeera is less remarkable in terms of flora and fauna, but nonetheless supports a sizeable number of lagoonal specialists.

Nine species protected under the Flora (Protection) Order, 2015, occur within this site: Forked Spleenwort (*Asplenium septentrionale*), Parsley Fern (*Cryptogramma crispa*), Bog Hair-grass (*Deschampsia setacea*), Slender Cottongrass, Bog Orchid (*Hammarbya paludosa*), Slender Naiad, Heath Cudweed (*Omalotheca sylvatica*), Pillwort and Pale Dog-violet (*Viola lactea*). Rare and threatened species such as Dorset Heath (*Erica ciliaris*), Mackay's Heath (*Erica mackaiana*) and Green-winged Orchid (*Orchis morio*) also occur within this site. All of the above species are listed in the Irish Red Data Book, and Slender Naiad is listed on Annex II of the E.U. Habitats Directive.

The Annex II butterfly species, Marsh Fritillary, is known to occur at this site.

Atlantic Salmon, a species listed under Annex II of the E.U. Habitats Directive, occurs in many of the rivers within the site. The Cashla and Ballynahinch systems are good examples of western acidic spate rivers which support the species. Good spawning and nursery grounds for the species occur in these systems. Arctic Char occurs in a number of lakes within the site: Ballynahinch Lake, Glenicmurrin Lough and Lough Shindilla. The species has also been reported from Lough Oorid and Lough Glendollagh in the past, but has not been recorded from these lakes in recent years. Arctic Char is listed as threatened in the Irish Red Data Book.

Otter have been recorded as occurring in the Connemara Bog Complex. Irish Hare, another mammal listed in the Red Data Book, occurs on the site. Common Frog breeds on the site.

The site is of national importance for wintering populations of Greenland White-fronted Goose. Small flocks (up to 30) are found on Roundstone Bog and also use the bogs between Recess and Maam Cross. In April 1989 a synchronised ground and air census of the Connemara bogs located 7 flocks of Greenland White-fronted Goose, totalling 134–137 birds. In 1991/93 wintering numbers were considered to be approximately 60 birds.

There is an internationally important breeding area for Cormorants at Lough Scannive with 218 pairs present in 1985 in a colony which is known to have existed pre-1968. Golden Plover, a species listed on Annex I of the E.U. Birds Directive, nests at up to four locations in the site, with a maximum of two pairs noted at any one location. Another Annex I species known to be present in the site is Merlin. Lough Naskanniva is an important inland breeding site for Common Terns (up to 60 pairs in 1977 and 1992) and Choughs, both of which are also Annex I species under the E.U. Birds Directive.

The main damaging operations and threats in the Connemara Bog Complex are peat cutting, over-grazing and afforestation. Extensive peat extraction using 'Difco' machines has become common in the region in recent years, and cutting by excavator and hopper is also increasing. The hand-cutting of peat is less threatening as it is usually on a much smaller scale, but nonetheless it should be controlled within the site. Over-grazing and poaching by sheep and cattle is a widespread problem within the site, with erosion of peat ensuing. The above operations are the most extensive

but other threats and potentially damaging operations include land drainage and reclamation, fertilization, quarrying and dumping.

In summary, the Connemara Bog Complex encompasses a large area of relatively undamaged lowland Atlantic blanket bog of high conservation significance both in Ireland and at a European level. The site also contains good examples of at least 13 other habitats listed on Annex I of the E.U. Habitats Directive, as well as four species listed in Annex II. Further, the site supports a number of threatened and protected plant species. The site is internationally important for Cormorant and nationally important for Greenland White-fronted Goose, and contains nesting sites for Golden Plover.

SITE SYNOPSIS

Site Name: Ross Lake and Woods SAC

Site Code: 001312

Ross Lake and Woods is located approximately 4 km north-west of Moycullen on the west side of Lough Corrib in Co. Galway. The area is underlain by limestone.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3140] Hard Water Lakes
[1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)

The main habitat on the site is a medium-sized lake, Ross Lake, which has a limestone bed covered by deposits of precipitated marl and a shoreline of marl-encrusted limestone boulders. It is a good example of a hard water lake, and supports beds of stoneworts, including *Chara globularis* var. *virgata, C. pedunculata* and *C. curta*. The last two species in particular are characteristic of marl lakes. The open water also supports Yellow Water-lily (*Nuphar lutea*) and Broad-leaved Pondweed (*Potamogeton natans*).

Most of the shoreline is fringed by wetland vegetation of reedswamp, freshwater marsh, fen, wet woodland and wet grassland. Reedswamp vegetation is dominated by Common Reed (*Phragmites australis*) and Common Club-rush (*Scirpus lacustris*), with Great Fen-sedge (*Cladium mariscus*) also occurring. The rocky limestone shore mostly supports fen-type vegetation characterised by Black Bog-rush (*Schoenus nigricans*). This grades into areas of wet grassland dominated by Purple Moor-grass (*Molinia caerulea*) and species-rich marsh, characterised by species such as Slender Sedge (*Carex lasiocarpa*), Marsh Pennywort (*Hydrocotyle vulgaris*) and Water Mint (*Mentha aquatica*). Also found around the lake edge is well-developed wet woodland, with Alder (*Alnus glutinosa*) and willows (*Salix* spp.) occurring commonly, accompanied by Spindle (*Euonymus europaeus*), Buckthorn (*Rhamnus catharticus*), Guelder-rose (*Viburnum opulus*) and Bog-myrtle (*Myrica gale*).

A small lake, Lough Parkyflaherty, is separated from the main lake by an overgrown railway embankment.

The site contains a large block of coniferous plantation, consisting largely of spruce (*Picea* sp.) and larch (*Larix* sp.) species, on the site of a former mixed-deciduous woodland, Annagh Wood. There are also areas of broadleaved woodland and scrub, dominated variously by Beech (*Fagus sylvatica*), Ash (*Fraxinus excelsior*) or Hazel (*Corylus avellana*).

A breeding colony (not less than 155 individuals counted in 1994) of Lesser Horseshoe Bat occurs in an out-building beside Ross House. This species is threatened within the EU and the population at this site is rated of international importance. The woodlands and lakeside vegetation on the site provide foraging habitat within a small radius of the roost site. The woodlands in particular are very important to this species in providing shelter to reach foraging habitats and seasonal roosts as it does not fly across open areas.

The presence on the site of Otter, a species also listed on Annex II of the E.U. Habitats Directive, and of a small colony of Common Gull (10 individuals breeding in 1992) is notable.

The main land uses within the site are angling, commercial forestry, and grazing of the woodland and wetland areas.

The site is of importance because it contains a good example of a hard water lake, a habitat listed on Annex I of the E.U. Habitats Directive, and for the internationally important population of Lesser Horseshoe Bat, a species listed on Annex II of this Directive, which occurs. The presence of Otter and breeding Common Gull is also of note.