Derrybrien Wind Farm Development Decommissioning Project – Retained Development

Remedial Natura Impact Statement (rNIS)

Electricity Supply Board (ESB)

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Contents

1 Introduction

1.1 Purpose of the report

This remedial Natura Impact Statement (rNIS) has been prepared by ESB Engineering and Major Projects (EMP) on behalf of Gort Windfarms Ltd. (a wholly owned subsidiary of ESB) as part of an application for substitute consent to retain in situ specific features of the existing Derrybrien Wind Farm Development as part of the proposed "Derrybrien Wind Farm Development Decommissioning Project ".

The proposed "Derrybrien Wind Farm Development Decommissioning Project" comprises two elements:

- The carrying out of physical works to decommission specific features of the existing development (the "Prospective Development"); and,
- The proposed retention in situ of other specific features of the existing development (the "Retained Development").

This rNIS report provides supporting information to assist the relevant Competent Authority (An Bord Pleanála) in undertaking an Appropriate Assessment of the Retained Development in accordance with the requirements of Article 6(3) of the EU Habitats Directive (Directive 92/43/EEC) and Regulation 42 of the Birds and Natural Habitats Regulations 2011, as amended. It accompanies the application made to An Bord Pleanála, under section 177E of the Planning and Development Act 2000, as amended ("the 2000 Act") for substitute consent in respect of the Retained Development. In addition, an application has also been made simultaneously, under section 37L for permission in respect of the Prospective Development (which application is accompanied by, inter alia, an Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS)).

The assessment examines the construction, operation and ceased operation phases of the project, which comprises the wind farm, the Derrybrien – Agannygal 110 kV overhead line (OHL), the Agannygal Substation and all associated works, as well as the Retained Development. A peat slide occurred during the construction of the wind farm in October 2003. The slide and works undertaken in response to the slide are also addressed in the assessment.

The purpose of the report is to first determine whether the existing Derrybrien Wind Farm Development (including the Retained Development), either alone or in combination with other plans and projects, has had or is likely to have had, is having or is likely to have a significant effect on any European sites[1] in view of the sites' conservation objectives. If likely significant effects cannot be ruled out, it must be demonstrated that the existing Derrybrien Wind Farm Development (including the Retained Development) did not or will not adversely affect the integrity of any

[1] Natura 2000 Sites are referred to as European sites in this report

European sites, either alone or in combination with other plans and projects, taking into account the conservation objectives of the site.

As stated above, this rNIS accompanies the application for the Retained Development; planning permission for the Prospective Development will be applied for separately under section 37L of the 2000 Act. However, the potential significant effects of the Prospective Development have been assessed cumulatively with those of the Retained Development as part of this rNIS. The Retained Development is described in detail in Section 4.2.5.5.2.

1.2 Statement of competence

The NIS has been prepared by **Kate-Marie O'Connor**, Senior Ecologist with ESB Engineering and Major Projects (EMP), with specialist input with respect to birds from **Dr. Brian Madden**, Biosphere Environmental Services, bats from **Rachel Potter** and **Owain Gabb**, BSG Ecology; and aquatic ecology from **Lauren Williams**; all of whom are ecological consultants working on behalf of ESB EMP.

Kate-Marie O'Connor (BA MSc, MCIEEM) is a Senior Ecologist with ESB and has over 13 years' professional experience in ecological assessment. She holds an honours degree in Natural Sciences from Trinity College Dublin, specialising in Botany, and obtained a distinction in her Masters in Environmental Modelling, Monitoring and Reconstruction from the University of Manchester. She also holds an advanced diploma in Planning and Environmental Law from The Honourable Society of King's Inn. She is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Kate-Marie provides ecological support and advice on a range of electricity infrastructure projects through all project stages, including pre-planning, construction and operation. Her experience primarily includes the preparation and review of Ecological Impact Assessments, Biodiversity Chapters of Environmental Impact Assessment (EIA) reports, Appropriate Assessment (AA) Screening reports and Natura Impact Statements (NIS) for a range of public and private projects across Ireland. Kate-Marie has extensive experience undertaking ecological surveys to inform various assessments, including surveys for habitats, bats, badger, otter, breeding and wintering birds and newts.

Dr. Brian Madden (BA Mod, PhD, MCIEEM) qualified in Natural Sciences at the University of Dublin in 1984 and earned a doctorate degree in 1990 from the National University of Ireland for research in peatland ecosystem processes. Since 1994, Brian has worked as an independent environmental consultant. Brian is an expert ornithologist and has carried out various surveys for the National Parks and Wildlife Service, including survey of breeding birds of western machair systems and co-ordination of the National Peregrine Survey in 2002. Brian has extensive experience in the assessment of electricity infrastructure projects including high voltage transmission lines, substations, underground cables and wind energy projects. For many of the projects, Brian has been involved from pre-planning impact assessment stage through to the implementation and monitoring of mitigation measures during

the operational stage. Brian has been involved in the Derrybrien Wind Farm Project since 2004.

Rachel Potter (Principal Ecologist at BSG Ecology; BSc MSc ACIEEM) has co-ordinated bat surveys at the Derrybrien wind farm since 2016 during which time she has designed and adapted approaches to reflect changing industry guidance, and been responsible for the bat assessment as part of the remedial EIA for the Site. Her current and recent work has also included co-ordinating ecological and ornithological inputs, including scoping and consultation for several wind farm projects in Wales. Other recent experience includes the production of ecological reports (Habitat Management and Monitoring Plans, licencing documentation and baseline monitoring reports) to facilitate the sign off of ecological conditions in relation to Garreg Lwyd Hill wind farm, Powys, and the management of post-construction monitoring work relating to hedgerow and stream corridor habitats, dormouse, great crested newt, and breeding waders for that site. Rachel also helped to complete pre-construction surveys for otter and bats, and identify key reptile habitat at RWE Renewables's Brechfa Forest West Wind Farm (Carmarthenshire), and designed and implemented bat work to address monitoring conditions for both that site and Vattenfall's Pen-y-Cymoedd wind farm (Neath Port Talbot / Rhondda Cynon Taf). Qualifications include: BSc (Hons), Zoology; MSc, Environmental Biology: Conservation and Resource Management; Associate Member Chartered Institute of Ecology and Environmental Management; and, holds bat and great crested newt licences for England and Wales.

Owain Gabb (Director at BSG Ecology; BSc MSc MCIEEM CEnv) has overseen the bat survey work at Derrybrien since 2016, reviewing all approaches and baseline reports and providing review comment and written input to this chapter. He has worked on onshore wind projects since 2003 and has led the ornithological and / or ecological input to numerous schemes throughout the UK and Ireland. His experience includes planning and co-ordinating ornithological, protected species and habitat survey work, co-ordinating consultation with statutory conservation agencies and LPAs, writing and reviewing technical reports, helping discharge conditions, and acting as expert witness at public hearings. He has also led monitoring work including: radio tracking of nightjar to determine proximity of nesting birds to operational turbines; dog-searches to assess levels of bird and bat fatality; and, flight line and distribution studies to assess evidence for flight avoidance of turbine blades and displacement of birds from wind farms. Owain provided expert ornithological support to RES with regard to the Upper Ogmore wind farm, Bridgend. This was the first wind farm to be determined through the DNS process, and Owain's involvement included representing RES at the hearing. Owain has had recent involvement in many other wind farm projects, including ornithological monitoring at Pen y Cymoedd (Rhondda / Neath Port Talbot), condition discharge and ecological monitoring at Brechfa Forest West (Carmarthenshire), baseline survey, consultation and scoping for Alwen Forest (Conwy), and review of the Ornithological Impact Assessment and Ecological Impact Assessment for the Clachindarroch extension wind farm (Aberdeenshire). He has also planned and co-ordinated extensive bird survey work on behalf of EirGrid in the Irish Midlands and southern counties, and in relation to the

Carrownaweelaun wind farm (County Clare). Qualifications include: BSc (Hons) Countryside Management; MSc Environmental Biology; Full Member Chartered Institute of Ecology and Environmental Management; and, Chartered Environmentalist (CEnv).

Lauren Williams BSc PGDip MCIEEM, a Senior Freshwater Ecologist with 24 years professional consultancy experience. Lauren holds a BSc in Zoology, a Certificate in Environmental Law and a Post Graduate Diploma in Environmental Monitoring Assessment and Engineering with Distinction from Trinity College Dublin. She is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). For 21 years Lauren worked as joint Principal Freshwater Ecologist in the Aquatic Services Unit (ASU), University College Cork (UCC) where she worked with Gerard Morgan (ASU Manager) who prepared the 2020 rEIAR for the Derrybrien Wind Farm Project and the 2024 EIAR for the Derrybrien Wind farm Development Decommissioning Project. Lauren assisted with those projects providing analysis and review of ASU biological water quality data between 2011 and 2020 and carrying out field studies and data analysis in 2022 as part of the 2024 EIAR Derrybrien Wind farm Development Decommissioning Project. Lauren specialises in water quality assessment, fisheries and protected aquatic species and habitat surveys, monitoring, aquatic ecological impact assessment (EcIA), regularly undertaking baseline studies and preparation of EcIA reports, EIAR chapters and Appropriate Assessment (AA) reporting in relation to a wide range of large infrastructural developments throughout Ireland. She has carried out aquatic sampling, monitoring, and reporting as part of EPA national river monitoring programmes. She is a recognized practitioner of the Q-value biotic index system and is a trainer for the EPA's Small Streams Risk Assessment (SSRS) method. Lauren is a recognized professional in aquatic protected species survey (freshwater pearl mussel and white-clawed crayfish, on behalf of National Parks and Wildlife Service (NPWS)), and an accredited River Habitat Survey (RHS) and River Hydromorphology Assessment Technique (RHAT) practitioner.

2 Appropriate Assessment

2.1 Regulatory context

The EU Habitats Directive 92/43/EEC provides legal protection for habitats and species of European importance through the establishment of a network of designated conservation areas known as the Natura 2000 Network. The Natura 2000 network includes sites designated as Special Areas of Conservation (SAC) under the EU Habitats Directive and Special Protection Areas (SPA) designated under the EU Birds Directive 79/209/EEC. Collectively in this report these sites are referred to herein as '*European sites*'.

The Habitats Directive was initially transposed into Irish national law in 1997, with the European Communities (Natural Habitats) Regulations, SI 94/1997. These Regulations have since been amended by SI 233/1998 & SI 378/2005. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate the

European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010.

The requirements for an Appropriate Assessment are set out under Article 6(3) of the Habitats Directive 92/43/EEC which state:

6(3) Any plan or project not directly connected with or necessary to the management of the site (Natura 2000 sites) [European sites] *but likely to have significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the sites conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.*

6(4) If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

This provision is transposed into Irish law by Part XAB of the Planning and Development Act, 2000 as amended. Section 177U(4) of the said Act provides for screening for Appropriate Assessment as follows:

"The competent authority shall determine that an appropriate assessment of [...] a proposed development [...] is required if it cannot be excluded, on the basis of objective information, that the [...] proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site."

Section 177U(5) provides as follows:

"The competent authority shall determine that an appropriate assessment of a […] proposed development, […], is not required if it can be excluded, on the basis of objective information, that the […] proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site."

Section 177T(1) and (2) of the Act provide that a NIS is:

A statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own or in combination with other plans or projects,

for one or more than one European site, in view of the conservation objectives of the site or sites.

It specifies that:

[The statement] *shall include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for one or more than one European site in view of the conservation objectives of the site or sites.*

2.2 Appropriate Assessment process

The key stages in the Appropriate Assessment (AA) process relating to Article 6 (3) of the Habitats Directive and addressed in this report are set out below, as per European and Irish Government guidance (EC 2019, EC 2001 and DoEHLG 2009 (Rev 1 2010)). The outcome of each successive stage determines if a further stage in the process is required.

Stage 1. Screening for Appropriate Assessment

The first step in the screening process is to determine if the plan or project is directly connected to or necessary for the management of a Natura 2000 site. The process then identifies whether a plan or project, either alone or in combination with other plans or projects, is likely to have significant effects on a European site in view of its conservation objectives.

Stage 2. Appropriate Assessment

This stage considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a European site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. A Natura Impact Statement (NIS) must be prepared as part of this stage of the process. The AA is carried out by the competent authority, and is supported by the NIS.

Stage 3. Alternative Solutions

If Stage 2 of the process concludes that there is likely to be significant effects to a European site, Stage 3 then examines any alternative solutions or options that could enable the plan or project to proceed without adverse effects on the integrity of a European site.

Stage 4. Imperative Reasons of Overriding Public Interest (IROPI)/Derogation

Stage 4 is the main derogation process of Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project that will have adverse effects on the integrity of a European site to proceed in cases where it has been established that no less damaging alternative solution exists.

2.3 Conservation Status of habitats and species

Definitions of conservation status, integrity and significance used in this assessment are defined in accordance with ‘Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC’ (European Commission, 2019).

- The conservation status of a natural habitat is defined as the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species.
- The conservation status of a species is defined as the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its population.
- The integrity of a European site is defined as the coherence of the site’s ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified.
- Significant effect should be determined in relation to the specific features and environmental conditions of the protected site concerned by the plan or project, taking particular account of the site’s conservation objectives.

Favourable conservation status

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within European sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Article (1) of the Habitats Directive (92/43/EEC) describes favourable conservation status for habitats and species as follows:

Favourable conservation status of a habitat is achieved when:

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

Favourable conservation status of a species is achieved 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.

3 Methodology

3.1 Overview

The baseline date for the assessment of environmental effects in the rEIAR is the date when the environmental impact assessment (EIA) should originally have been carried out and taken into account by the decision-maker. The decisions in relation to the planning applications and appeals for the Derrybrien Wind Farm and grid connection were made in the period 1998 – 2001. Therefore, for the purposes of this rNIS the baseline date is 1998.

Baseline data to inform the construction phase impacts was collected from a desktop review of existing datasets and the original Environmental Impact Statements (EISs)[2] prepared for the project. Aerial photography from the OSi Mapviewer was used to assist in determining the type and distribution of habitats within the project area prior to the commencement of the construction phase.

Ecological monitoring of the project has been ongoing since the construction phase (i.e. 2003 onwards) to present. The monitoring has included bird, bat, terrestrial habitat and aquatic ecology and fisheries field surveys. The results of these surveys have informed the impact assessment of the operational phase of the project and have also provided the evolving receiving environment conditions in the 26 years since 1998 against which the potential impacts associated with the ceased operation phase and Retained Development can be assessed.

3.2 Assessment criteria

This assessment has been undertaken in accordance with all relevant legislation and with regard to the following best practice guidelines:

- Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission;

[2] EIS submitted with GCC Reg. Ref. 97/3470 / ABP Reg. Ref. PL.07.106290 – ‘the Phase 1 EIS’,
EIS submitted with GCC Reg. Ref. 97/3652 / ABP Reg. Ref. PL.07.106292 – ‘the Phase 2 EIS’,
EIS submitted with GCC Reg. Ref. 00/4581 / ABP Reg. Ref. PL.07.122803 – ‘the Phase 3 EIS’

- Directive 2009/147/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission;
- European Communities (Birds and Natural Habitats) Regulations 2011, as amended;
- Planning and Development Acts 2000 - 2024 (and associated Regulations);
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (Department of the Environment Heritage and Local Government, 2009 (Revision 1, 2010));
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission, updated 2021);
- Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (European Commission, 2019);
- Office of the Planning Regulator (OPR) (2021) OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management;
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPW 1/10 & PSSP 2/10; and,
- Assessing Connectivity with Special Protection Areas (SPAs) Guidance. Published by Scottish Natural Heritage (SNH, 2016a).

The assessment is also cognisant of case law relevant to Appropriate Assessment.

3.3 Desktop study

A desktop study was conducted to examine the potential ‘Zone of Influence’ (refer to Section 3.4) of the project and to identify any European sites within this area which may have been affected or have the potential to be affected as a result of the project.

The National Parks and Wildlife Service (NPWS) website database was examined in relation to designated nature conservation areas and relevant reports. GIS data was accessed using the NPWS mapviewer (accessed date January 2024).

The desktop study included a review of historic and current mapping including aerial photographs, historic and current reports and data relating to the wind farm site and adjoining areas.

The following databases, websites and reports have been consulted:

- The National Parks and Wildlife Service (NPWS) of the Department of Culture, Heritage and the Gaeltacht (DCHG) (www.npws.ie);
- The National Biodiversity Data Centre (NDBC) (www.biodiversityireland.ie);
- Bat Conservation Ireland (www.batconservationireland.org);
- Aerial photography (past and present) and photographs taken at the site;
- Ordnance survey data (past and present) www.osi.ie;
- Information on water quality in the area available from www.epa.ie;
- Information on local watercourse catchments from www.catchments.ie;

- Information on soils, geology and hydrogeology in the area available from www.gsi.ie;
- Information on the status of EU protected habitats and species in Ireland (NPWS, 2019a, 2019b and 2019c);
- Review of specially requested records from the NPWS Rare and Protected Species Database for the hectads which overlap with the study area.
- Annual reports from the Hen Harrier Project (www.henharrierproject.ie), which includes the Slieve Aughty Mountains SPA, were reviewed for period 2017-2021.
- Reports of the various National Surveys of Breeding Hen Harrier in Ireland were reviewed, as follows:
    - Norriss, D.W., Marsh, J., McMahon, D. and Oliver, G.A. (2002) A national survey of breeding Hen Harriers Circus cyaneus in Ireland 1998-2000. Irish Birds 7: 1-10.
    - Barton, C., Pollack, C., Norriss, D.W., Nagle, T.A., Oliver, G.A. & Newton, S. (2006) The second national survey of breeding Hen Harriers Circus cyaneus in Ireland 2005. Irish Birds 8: 1-20.
    - Ruddock, M., Dunlop, B.J., O'Toole, L., Mee, A., & Nagle, T. (2012) Republic of Ireland National Hen Harrier Survey 2010. Irish Wildlife Manual No. 59. NPWS, Dublin.
    - Ruddock, M., Wilson-Parr, R., Lusby, J., Connolly, F., Bailey, J. & O'Toole, L. (2024) The 2022 National Survey of Breeding Hen Harrier in Ireland. Irish Wildlife Manual No. 147. NPWS, Dublin.
- Monitoring data for the Lesser Horseshoe Roost at Lough Cutra Castle was provided by National Parks and Wildlife Service.
- Galway County Council Planning Website http://www.eplanning.ie/GalwayCC/searchexact to search for planning applications.
- Information on the location, nature and design of the Retained Development provided by the design team, as presented in Chapter 1 Introduction and Chapter 4 Project Description of the rEIAR.
- Information relevant to biodiversity contained within the rEIAR in particular Chapter 6 Biodiversity (Terrestrial and Avian Ecology), Chapter 7 Biodiversity (Aquatic Ecology and Fisheries), Chapter 8 Lands, Soils and Geology and Chapter 9 Hydrology and Hydrogeology.

The Galway County Council website was used to search for planning applications relevant to the current assessment, in particular with regard to in-combination effects.

Literature sources:

- A review of the Environmental Assessments (3 phases) carried out in the late 1990s by Saorgus Energy Ltd. for the Derrybrien Wind Farm project:

Environmental Impact Statement (EIS) submitted with GCC Reg. Ref. 97/3470 / ABP Reg. Ref. PL.07.106290 – 'the Phase 1 EIS',
EIS submitted with GCC Reg. Ref. 97/3652 / ABP Reg. Ref. PL.07.106292 – 'the Phase 2 EIS',
EIS submitted with GCC Reg. Ref. 00/4581 / ABP Reg. Ref. PL.07.122803 – 'the Phase 3 EIS',

- Anon (2004) *Investigation into the effects of Landslide of Peat bog at Derrybrien North into the Owendalulleegh River Catchment – Second Report – July 2004*. Shannon Regional Fisheries Board
- Inis Environmental Services (2004a). Summer assessment of the lesser horseshoe bat roost at Lough Cutra demesne.
- Inis Environmental Services (2004b). Impact assessment of Derrybrien Peat Slide on habitats, cormorants and Bat fauna of Lough Cutra, County Galway.
- Inis Environmental Services (2004c). Derrybrien Windfarm Peat Slip Environmental Impact Assessment on the Owendalulleegh River. March 2004.
- Wilson (2012) Derrybrien Wind Farm Bat Assessment (Draft report)

3.4 Zone of influence

The 'zone of influence' (ZoI) for a project is the area over which ecological features may be subject to significant effects as a result of the project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries. The ZoI will vary for different ecological features depending on their sensitivity to an environmental change. It may therefore be appropriate to identify different zones of influence for different features. The features affected could include habitats, species, ecosystems and the processes on which they depend (CIEEM, 2018)

Departmental guidance states that '*A distance of 15 km is currently recommended in the case of plans and derives from UK guidance (Scott Wilson et al., 2006). For projects, the distance could be much less than 15km and in some cases less than 100m, but this must be evaluated on a case-by-case basis….'* (DoEHLG, 2009 (Rev 1 2010)).

The first step in determining the ZoI is to analyse the characteristics of the project and identify the range of ZoI using the source-pathway-receptor conceptual model. Impacts associated with the project, both known and potential have been used to establish the potential zone(s) of influence.

The mechanism for defining the ZoI is summarised as follows:

- The nature, size and location of the project have been considered;
- The sensitivities of the relevant ecological receptors have been considered; and
- The known and potential impact sources and pathways have been identified.

Further information on potential impact pathways and the ZoI of the project (including the Retained Development) in relation to European sites is provided in Section 4.4.

3.5 Field surveys

Extensive ecological monitoring surveys have been undertaken within the project area and its environs over the lifetime of the project. The data generated from this monitoring has provided essential information on the status of the receiving environment during and post construction and has been used to assess actual and potential impacts during the operation of the wind farm as well as impacts which are likely during the ceased operation stage and as part of the Retained Development. Some of these surveys began during the construction stage between 2003 and 2005.

3.5.1 Bird surveys

Hen harrier and merlin

A programme for post construction vantage point monitoring of hen harrier distribution within the Derrybrien Wind Farm commenced in March 2004. Post-construction monitoring of operational wind farms usually only focuses on target or key species. Hen harrier *Circus cyaneus* and merlin *Falco columbarius* were identified as target species given that they are the sole Special Conservation Interests for the Slieve Aughty Mountains SPA and the fact that both are of high conservation importance. All other bird species observed or heard were recorded during the vantage point surveys and general time spent within the wind farm site and the surrounding areas.

The objectives of the monitoring programme, which has continued at intervals up to the present (see below), were as follows:

- To determine if hen harriers that may nest in the vicinity (up to c.5 km from wind farm site) use any part of the wind farm site for nesting and/or foraging purposes
- To determine what distance foraging birds will approach wind turbines
- To determine if birds habituate to the presence of turbines

The survey methodology used was that as recommended for monitoring hen harriers at wind farm projects in upland areas by the National Parks & Wildlife Service (NPWS Hen Harrier Survey Methodology, Draft 12/03/03). At the time (2004), this was based on survey techniques established by Madders (2002); these were later developed by Scottish Natural Heritage as standard methods for survey of birds at onshore wind farm sites (current version SNH, 2017).

The method involves survey of the core wind farm site through the breeding season (March/April to July/August), with coverage also of a wide area (up to 5 km) around the wind farm site to establish locations of nesting pairs in the vicinity. Part of the route of the Derrybrien to Agannygal overhead line grid connection was included as part of the wider 5 km study zone. The distance of 5 km was as recommended by

NPWS methodology based on the distance where majority of hunting is done from a nest site. With the use of VHF transmitter tags, Irwin *et al.* (2012) showed that 89% of hunting was done within 5km of the focal nest.

The core site survey area was defined as the wind farm site and a strip approximately 500 m beyond the outermost turbines. Two principal vantage points (VPs) were established within the wind farm from which observations were made, as follows:

Vantage Point (VP)	Description
VP A : M 60560 05219	On track out on open bog with views back west into centre of site and views east over Caheranearl to Earl's Chair.
VP B : M 58704 04749	Looking over clearfell, open bog and forest edge at northwest corner of site from track c.300m north of '365m' high point on Cashlaundrumlahan.

Six hours of observations were made from each VP in each month of survey. Casual observations were also made from various other locations whilst travelling around the wind farm.

The wider area around the site, to approximately 5 km from the site boundary, was checked for breeding occupancy based largely on information available from previous surveys. This wider area is known as the hinterland or peripheral area. Surveys here were mainly in the early part of the season (March-May) when territorial birds are most active. However, later visits were made to occupied territories to assess breeding success.

Monitoring surveys for breeding birds were carried out in the following years:

- 2004 – construction works had commenced but were on hold due to peat slide and no turbines yet erected, site still largely afforested – construction phase
- 2006, 2007, 2009, 2011, 2015, 2018 – operational phase
- 2022, 2024 – ceased operational phase

3.5.1.1 Transect surveys for breeding birds, 2022 and 2024

Surveys by transects were carried out for all breeding birds within the wind farm site and along the overhead line corridor in 2022 and 2024. The survey was in accordance with the Countryside Bird Survey methodology (BirdWatch Ireland / NPWS), which is based on Bibby *et al*. (2000).

Sampling locations were selected along sections of wind farm roads to represent the main habitats present, as follows (and see Figure 1):

- No. 1: T28[3] to T37 – through cutover blanket bog (see Plate 1[4])
- No. 2: T23 to T70 – through peat slide section

[3] T stands for turbine.
[4] Plates 1 – 3 provide a sample of transects walked during bird surveys.

- No. 3: T12 to T15 – through regenerating bog area (see Plate 2[4])
- No. 4: T47 to T50 – through standing conifer plantation

For the overhead line corridor, routes were selected partly due to ease of access, as follows (see Figure 2):

- No. 5: PS1[5] (substation) to PS4 – tall conifers to both sides (see Plate 3[4])
- No. 6: PS10 to PS12 (both sides of Black Road) - tall conifers to both sides
- No. 7: Local road to PS36 to AM34[6] – clear felled area to both sides, with bog and wet grassland vegetation

The transects were surveyed on two occasions within the following periods:

- 24th – 26th May 2022
- 28th – 30th June 2022

- 9th – 11th May 2024
- 18th – 20th June 2024

The transects were walked at a slow pace, with a 5 minute stop near each turbine or poleset location. Birds were recorded at distances of up to 300 m either side of the transect, both by sight and sound.

[5] PS stands for pole set.
[6] AM stands for angle mast, which is a steel structure.

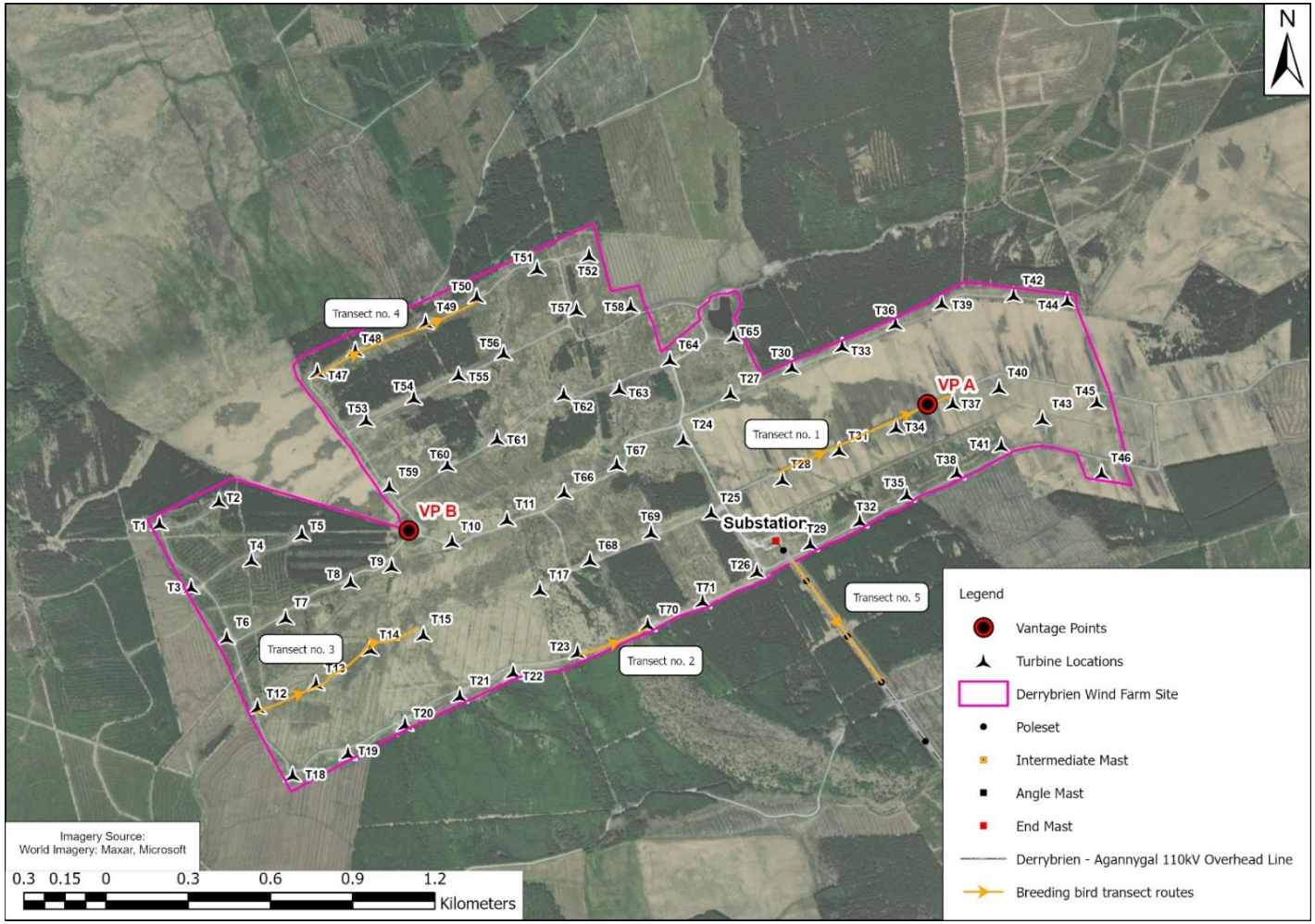

Figure 1 Survey transects used on Derrybrien Wind Farm site, 2022 and 2024

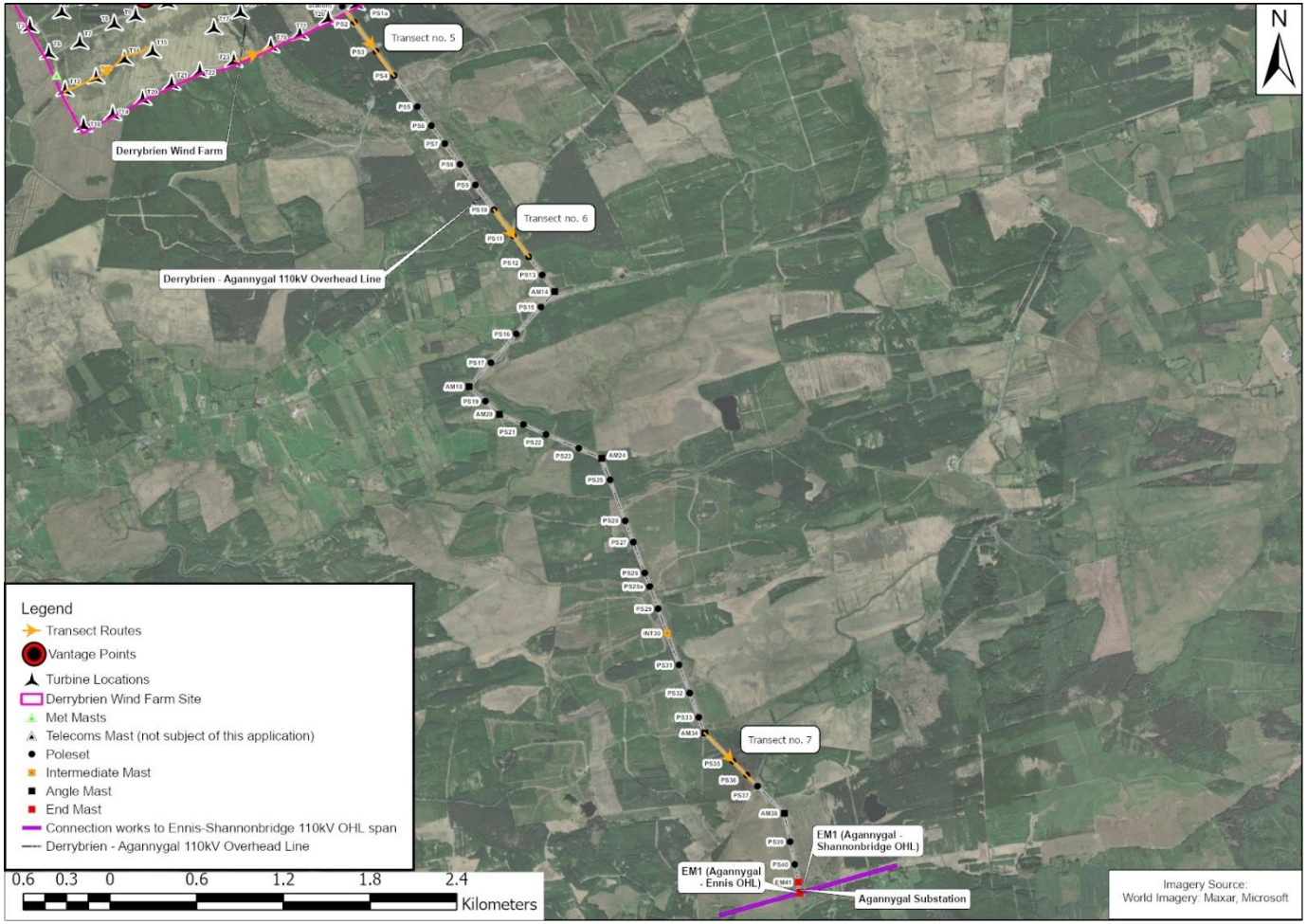

Figure 2 Survey transects used along overhead line grid connection between Derrybrien Wind Farm and Agannygal Substation, 2022 and 2024

Plate 1 Survey transect No. 1 through bog in eastern sector of site, May 2022

Plate 2 Survey transect No. 3 through regenerating bog in western sector of site, May 2022

Plate 3 Survey transect No. 5 along the overhead line corridor, May 2022

3.5.1.2 Winter Bird Surveys

Monitoring surveys for wintering birds were carried out in the following years:

Winter 2011-12: a survey was carried out from November 2011 to January 2012. This included observations from the vantage points within the wind farm (9 hours in November, 7 hours in December, 8 hours in January).

Specific searches for night roosting hen harriers in the hinterland area were undertaken on six dates between November and January. The winter roost survey followed the method of the Irish Hen Harrier Winter Survey (O'Donoghue, 2019).

Winter 2019-20: a survey commenced in October 2019 and continued to March 2020. This included vantage point watches within the wind farm (6 hrs from each VP per month). Specific searches for night roosting hen harriers in the hinterland area were also undertaken (following the method of the Irish Hen Harrier Winter Survey, O'Donoghue 2019).

Winter 2024-25: a further winter survey commenced in October 2024 and continued to March 2025. As with the earlier surveys, this included vantage point watches within the wind farm and specific searches for night roosting hen harriers in the hinterland area (following the method of the Irish Hen Harrier Winter Survey, O'Donoghue 2019).

3.5.2 Bat surveys

Bat survey work was undertaken at Lough Cutra Castle Demesne following the peat slide that occurred in 2003, as this site is designated as an SAC for lesser horseshoe bat. Further bat survey work was undertaken at the wind farm site in order to assess the

impact of the operational wind farm, ceased operation and Retained Development on all bat species but with a particular emphasis on the lesser horseshoe bat, as a number of SACs designated for this Annex II and Annex IV species are present in the surrounding landscape.

3.5.2.1 Bat surveys 2004

Bat surveys were undertaken in the Lough Cutra Castle Demesne in March and August 2004 by Inis Environmental Services (2004a). The purpose of the surveys was to gather information on the spring and summer bat fauna on the shores of Lough Cutra focusing on lesser horseshoe bat and to determine if the peat slide had any impact on the local bat population.

3.5.2.2 Bat surveys 2011

A bat activity survey was undertaken on 5th November 2011 across the operational wind farm and in the wider landscape using bat detectors. During the survey each turbine was visited and bat activity was recorded using a variety of bat detectors (Heterodyne Bat Detector: Pettersson D100; Time Expansion Bat Detector: Pettersson D240; Frequency Division Bat Detector: Bat Box Duet). Time was spent at each turbine location during the survey and the networks of tracks between each turbine were also driven slowly with the bat box mounted on the window of each vehicle pointing upwards to record any bat passes. Bats were identified by their ultrasonic calls coupled with behavioural and flight observations. The survey results were included in the 2012 bat study report (Wilson, 2012).

3.5.2.3 Bat surveys 2016

Further bat survey work was commissioned at the wind farm site in 2016 and was undertaken by BSG Ecology.

The aims of bat survey work undertaken at the wind farm site between April and September 2016 were to establish:

- The species of bat using the wind farm over the period
- Areas of the wind farm and adjacent habitats subject to particular use by bat species
- The likelihood of roosts occurring in close proximity to the wind farm
- An indication of whether bat mortality was occurring
- A baseline for the assessment of likely impacts on bat species

Survey methods were derived with reference to guidance documents produced by BCI (2012), Natural England (2014) and the Bat Conservation Trust (Hundt, 2012).

Field surveys to inform the assessment for the site comprised the following elements:

- Driven transect survey
- Static bat detector survey
- A search, using specially trained dogs, for bat corpses (accompanied by a scavenger removal study).

3.5.2.4 Bat surveys 2019

Bat survey methods employed by BSG Ecology in 2019 were derived with reference to guidance documents produced by Bat Conservation Ireland (BCI) (2012), and multi-agency guidance published by Scottish Natural Heritage (SNH *et al.*, 2019).

Sampling was completed during the autumn (29th August to 8th October 2019) at each of 32 turbine locations using the static detectors (11 detectors were rotated between the 32 locations). The same locations were sampled as the surveys in 2016, along with an additional 14 locations which were spread evenly across the site. Ten consecutive nights of data were collected at each location.

Bat data were analysed using the same processes and parameters as the 2016 data.

3.5.2.5 Bat survey 2020 and 2021

Bat survey methods in 2020 and 2021 were derived with reference to guidance for onshore wind farms produced by SNH *et al*. (2019[7]). Survey work comprised:

- Static bat detector survey. SNH et al. (2019) guidance was applied. This indicated that for a wind farm of 70 turbines a total of 32 locations should be sampled for a total of ten consecutive nights in each of spring, summer and autumn using static detectors. Data for summer and autumn were collected in 2020. Spring, summer and autumn data were collected in 2021. Bat fatalities were searched for during each of the periods in which static detectors were deployed[8].

Bat data were analysed using the same processes and parameters as the 2016 data.

3.5.2.6 Bat survey 2022 and 2023

BSG Ecology completed field surveys in August and September 2022 and July 2023 to inform the Prospective Development with reference to best practice survey methodologies set out by Bat Conservation Trust (Collins 2023; Collins 2016). These included the assessment of the potential use of Derrybrien substation and Agannygal substation by bats, which comprised internal and external inspections and bat activity surveys. eDNA analysis of bat droppings collected during these surveys was completed by a specialist laboratory. In August 2022, they also assessed the potential use of three bridges along the L4214 by bats using an endoscope. Trees to be removed as part of the Prospective Development along with barrages 3 and 4 were also assessed for bats in August and September 2022.

[7] This has since been superseded, and is now attributable to NatureScot et al (2021). The changes between the 2019 and 2021 guidance are minor.

[8] These were completed using specialist search dogs. A total of 32 turbines were searched at a rate of 8 turbines per day for 10 consecutive days in each of spring, summer and autumn 2021 and in summer and autumn 2020. Fatality surveys were also completed, at a far more limited scale, during late summer and autumn 2016. The work was undertaken to inform the remedial EIA. The work in 2020 and 2021 followed a curtailment strategy being implemented. A curtailment strategy was implemented mid-Autumn 2020 that stopped the operation of turbines when temperatures were above 11 degrees Celsius and wind speed was below 5 m/s between dusk and dawn each night.

Further details with regard to bat survey methodologies employed on the project can be found in Chapter 6 Biodiversity (Terrestrial and Avian Ecology) of the rEIAR.

3.5.3 Aquatic ecology and fisheries surveys

The following aquatic ecology and fisheries surveys have been undertaken on receiving waters in the study area:

(i) Macroinvertebrate Q-value surveys in 2011, 2014, 2018, 2019, 2020, 2022 and 2024

(ii) Electrofishing surveys in 2011, 2014, 2019 and 2022

(iii) Water chemistry surveys in 2011, 2018, 2019 and 2022

(iv) A benthic grab sampling survey in Lough Cutra, to characterise the nature of the bottom substrates in the lake and to assess the type of soft sediment benthic macroinvertebrates present (October 2019)

Macroinvertebrate Q-value Surveys

A total of 74 sites: 2011 (11), 2014 (6), 2018 (7), 2019 (26), 2020 (1), 2022 (17) and 2024 (6) were surveyed for Q-value assessment within the project drainage area. Figure 3 includes all these sites along with a few where water samples were also collected. Several sites were surveyed in more than one year. They were distributed along the main channel of the Owendalulleegh and Boleyneendorrish rivers, as well as on the smaller streams in these catchments draining the wind farm site or lands immediately adjoining the wind farm site. Two sites were also surveyed in the Duniry catchment to which a tiny portion of the footprint of the wind farm drains to the east. Finally, four sites were surveyed on small streams draining the OHL corridor, the Agannygal Substation and the proposed access track to the Agannygal Substation for the proposed decommissioning phase. One (OHL1) eventually joins the main channel of the Owendalulleegh and the other three which flow southwards into the northern shore of Lough Atorick to the south of the study area. The strategy underlying the choice of sites was to cover all the smaller and larger streams draining the wind farm, the Agannygal Substation and the OHL during the construction, operation, ceased operation and decommissioning phases.

Electrofishing surveys

Electrofishing surveys were carried out at a total of 39 sites as follows: 2011 (12), 2014 (6), 2019 (11) and 2022 (10). Several sites were visited on more than one occasion across the four survey years. Survey sites were situated mainly on tributary streams draining the wind farm site in the two main river catchments (Owendalulleegh and Boleyneendorrish) but also at a number of main channel sites in both catchments and at a site in the upper reaches of the Duniry catchment (2011) – see Figure 3.

The choice of survey site was prompted by a number of considerations. These included the need to assess the smaller tributaries, in particular, given that the 2003 peat slide most profoundly affected a small tributary, and in the absence of pre-slide fish records it

was important to get an understanding of the significance of these small streams to the overall population within each catchment. It was also considered prudent to survey a number of main channel sites both upstream and downstream of the peat slide impacted stretch on the Owendalulleegh in order assess the current populations in both the affected and unaffected stretches and to gauge the likely importance of the unaffected stretch towards the recovery of the population in the impacted stretch after the slide. Finally, because IFI's fishing surveys (2009, 2013 and 2016) over the past decade have been in the lower reaches of the Owendalulleegh it was considered important to sample at least one site within this area to compare the fish densities and age structures derived from the current surveys with those obtained by IFI. A single main channel site was surveyed also on the Boleyneendorrish River.

Water Chemistry

Water chemistry surveys were undertaken at a total of 30 sites between 2011 and 2022. Some key sites were sampled several times while others were sampled once. The number of sites sampled by year were: 2011 (11), 2018 (7), 2019 (15) and 2022 (13) – Figure 3. Water sample sites were primarily situated on lower order tributaries rather than main channels and mainly coincided with Q-value survey locations. Chemistry data was required in order to characterise the nature of the conservative parameters i.e. pH, conductivity, alkalinity, anions and cations etc., i.e. those that would be influenced by the nature of the overburden as well as the underlying geology in the various sub-catchments. In addition, Biological Oxygen Demand (BOD) and the nutrient content (phosphate, ammonia, TON[9]) was assessed to see if these data could help explain some of the water quality findings derived from the Q-value surveys.

Grab Sampling for Sediments and Invertebrates on Lough Cutra

The survey entailed taking a single Van Veen grab sample (0.047m^2) of the bottom sediment at 11 sites from the lower reaches of the Owendalulleegh River to the outflow of the Beagh River.

Further details with regard to aquatic ecology survey methodologies employed on the project can be found in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR.

[9] TON = Total Oxidised Nitrogen (in mg/l, as N). This is the sum of nitrate and nitrite but because in well oxygenated water like that in the project area streams, the nitrite level is very low, TON is effectively the same as Nitrate (as N).

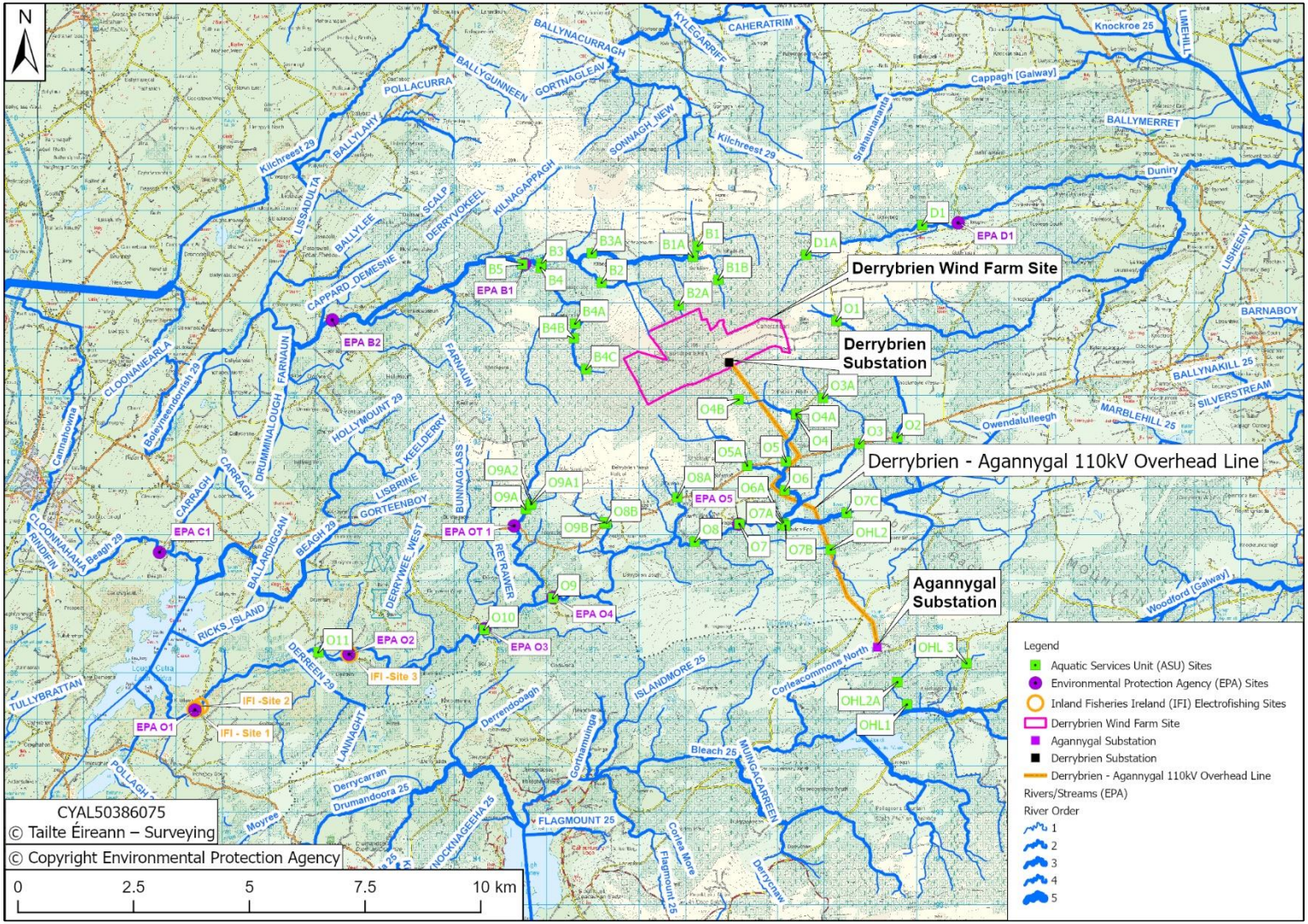

Figure 3 Locations of ASU, EPA and IFI sampling points

4 Screening for Appropriate Assessment

4.1 Introduction

Screening determines whether appropriate assessment is necessary by examining:

1. Whether a plan or project can be excluded from AA requirements because it is directly connected with or necessary to the management of the site, and
2. The potential effects of a project or plan, either alone or in-combination with other projects or plans, on a Natura 2000 site in view of its conservation objectives and considering whether these effects will be significant (DoEHLG, 2009 (Rev 1 2010).

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

Screening for AA involves the following:

1. Description of project
2. Identification of relevant European sites and compilation of information on their qualifying interests and conservation objectives
3. Identification of effects – direct, indirect and cumulative and determination as to their likely significance
4. Conclusions of the Screening Report.

4.2 Description of project

4.2.1 Overview of Existing Derrybrien Wind Farm Development

The main components of the existing Derrybrien Wind Farm Development are:

- Derrybrien Wind Farm, including the Derrybrien Substation, and associated ancillary works
- Grid connection comprising Derrybrien - Agannygal 110 kV OHL, Agannygal Substation and associated ancillary works
- Works undertaken in response to the peat slide which occurred during the construction of the wind farm and associated ancillary works

In line with the three main components of the project identified above, the project is located on three distinct ‘sites’ – namely the wind farm site and associated discrete ancillary works locations, the site of the grid connection (route of Derrybrien-Agannygal 110 kV OHL and Agannygal Substation) and associated discrete ancillary works locations together with locations of the discrete sites where works were undertaken in response to the peat slide. The location of the project is shown in Figure 4.

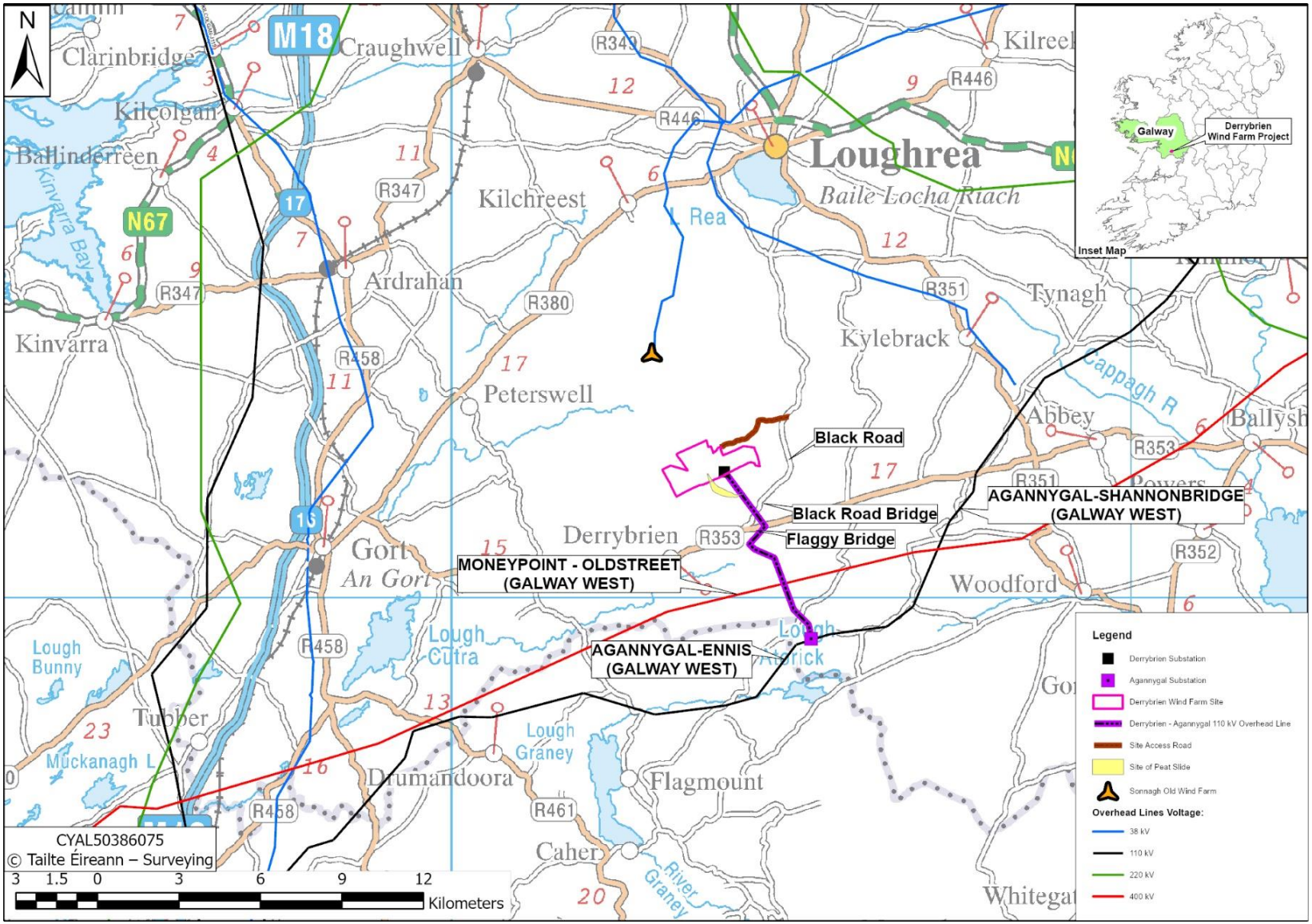

Figure 4 Project location south of Loughrea in Co. Galway

4.2.1.1 Existing wind farm and grid connection

The main project is a 70 turbine wind farm together with associated grid connection comprising a 7.8 km 110kV OHL, substation and connection to the pre-existing Ennis-Shannonbridge 110kV OHL.

4.2.1.2 Peat slide event and response works

A peat slide occurred during the construction of the existing Derrybrien Wind Farm Development on the 16th October 2003. Works were undertaken in response to this unforeseen event. This section provides a brief description of the peat slide event and the measures/works undertaken in response to the peat slide.

The peat slide originated within the wind farm site close to the southern boundary, as excavation works were underway at the location for the foundations for turbine T68.

The peat slide involved the disturbance and partial displacement of peat and forest debris mainly onto land downslope of the peat slide area to Black Road Bridge.

The site of the peat slide extended approximately 1.65 km downslope from turbine T68 and displaced peat and forestry over an area of approximately 25 ha. The majority of the peat slide area was in Coillte coniferous forests outside and to the south of the wind farm site.

From the peat slide area, debris from the slide entered the valley of the stream, a tributary of the Owendalulleegh River, located in the Derrybrien North sub-catchment into an area of flatter ground down to the Black Road Bridge approximately 1.0 km downslope from the slide area. This was the primary run-out zone for the slide. The location of the peat slide and run-out zone is shown in Figure 5.

Some peat was transported further down the Owendalulleegh River with some peat being deposited along the river banks. The peat debris remobilised on the 30th October 2003 after heavy rain[10]. In the days and weeks after the peat slide, following subsequent rainfall events, water entered the upper reaches of the stream and caused the peat slide debris to move downstream.

A site walkover by geotechnical specialists in 2019 (downslope of Black Road Bridge) showed little/no visual evidence of any remaining peat debris deposited along the banks of the streams and rivers. Over time, any material deposited along the river banks has been eroded or degraded.

The estimated volume of peat in the peat slide area, based on the extent of the peat slide area was 450,000 m^3. Estimates suggest that possibly 50 to 70 % of the failed debris left the peat slide area. The remaining material within the peat slide area comprised typically

[10] Based on review of hourly data for Shannon synoptic station (nearest then-active station with hourly data) and daily data for Derrybrien II daily station. In the month prior to the 16th October slide a daily average of 1.6mm rain fell at Derrybrien met station, well below the long-term average (1982-2019) of 3.9mm. No rainfall was recorded on the 16th October for either station. The 39.3mm rainfall on 30th October was the highest daily rainfall at the station since 1999 when 64mm fell.

isolated detached rafts of peat, peat debris and a thin covering of intact basal peat. The balance of the debris remains within the site of the peat slide.

The peat slide occurred in the Owendalulleegh River Catchment with the bulk of the debris settling out in the approximately 4 km^2 lake area of Lough Cutra. The finer buoyant material is likely to have over time been carried through Lough Cutra via the Beagh/Gort River and eventually discharged into Galway Bay at Kinvarra.

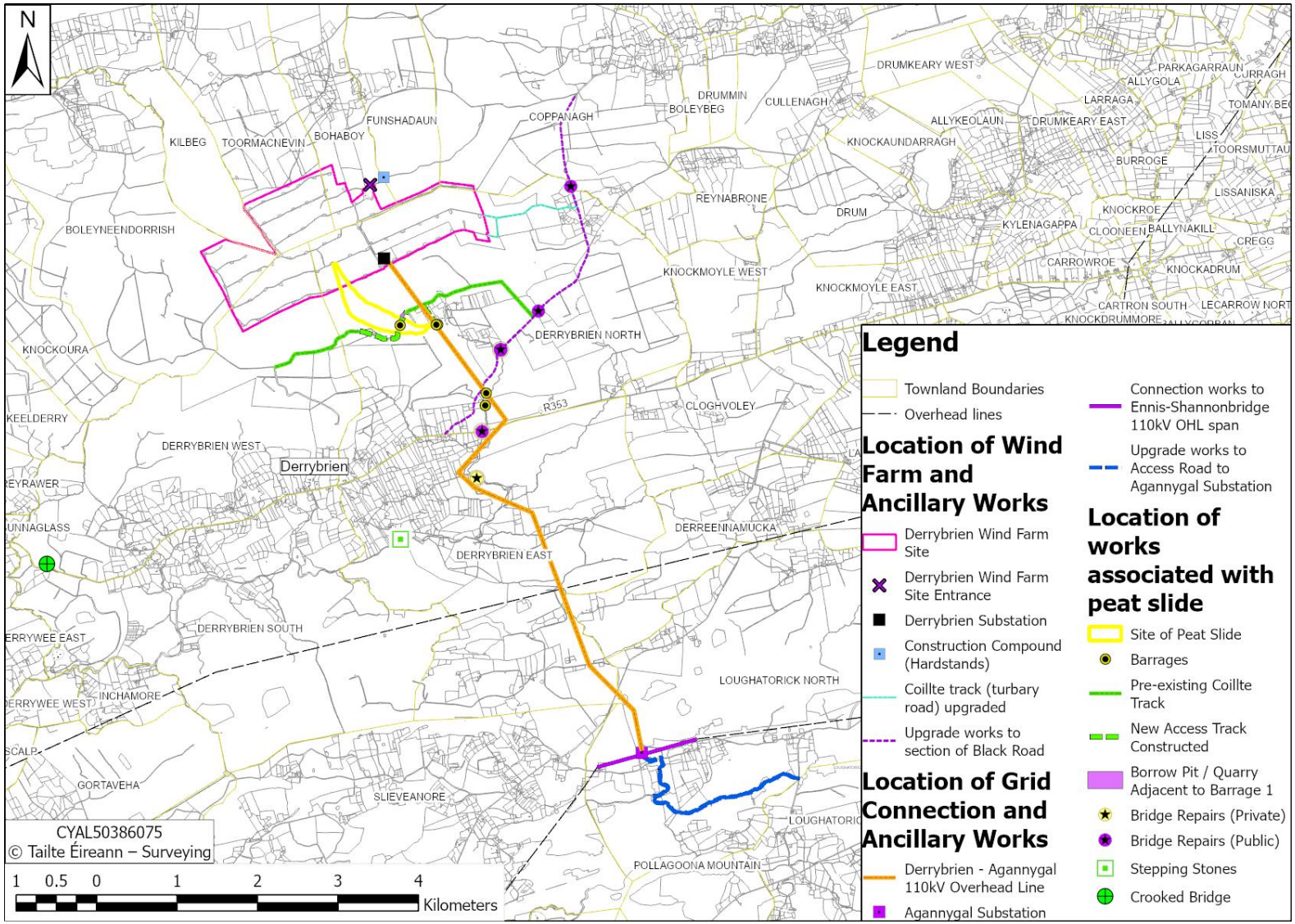

Figure 5 Existing Derrybrien Wind Farm Development works and townlands

4.2.2 Project location

4.2.2.1 Existing wind farm site

Derrybrien Wind Farm site is located in the northern part of the Slieve Aughty Mountains approximately 11 km south of Loughrea County Galway and 12.7 km east of Gort, Co. Galway and 24 km west of Portumna, County Galway. The wind farm site is in the south of the county approximately 4.6 km from the border with County Clare and 21 km from the border with County Tipperary in the south east. The centre of the site is at ITM co-ordinates E 559572.0998, N 705010.181.

The wind farm site is located within the townlands of Coppanagh, Boleyneendorrish, Kilbeg, Toormacnevin, Funshadaun, Bohaboy, Derrybrien North and Derrybrien West.

The overall area of the site is approximately 344.5 ha, but the wind farm infrastructure occupies only a very small proportion of this (31.1 ha - approximately 9% of site).

The wind farm site is accessed from a Coillte access road in the townlands of Bohaboy, Funshadaun and Coppanagh, via a minor public road known as the Black Road (approximately 3.1 km from the wind farm to the Black Road/Coillte junction). The Black Road generally runs in a north south direction between the R353 at its southern end and Killeenadeema village (south of Loughrea) at its northern end. Access to the Black Road is via the R353 Regional Road, which originates near Portumna, crossing over Flaggy Bridge before passing through the village of Derrybrien to join the N66 Loughrea - Gort National Secondary Road near Gort. From Gort the Black Road is accessed via the N66 for a distance of 1.7 km and the R353 for a distance of 14 km. Alternatively, the Black Road / Coillte access road can be accessed via minor public roads from Loughrea a distance of approximately 10 km.

4.2.2.2 Existing Derrybrien to Agannygal 110 kV OHL

The Derrybrien to Agannygal 110 kV Overhead Line (OHL) is the grid connection constructed for exporting the electricity generated at the wind farm to the national grid. It begins at the Derrybrien Substation (located within the Derrybrien wind farm site, ITM 559916E, 704736N) and ends at the Agannygal Substation (located to the south-east of the windfarm site, ITM 563118E, 698593N). It is within the townlands of Loughatorick North, Derrybrien East, Derreennamucka and Derrybrien North.

The grid connection comprises of c. 7.8 km 110 kV conductor, 34 no. double wood pole structures, 2 no. end masts, 5 no. angle masts and 1 no. intermediate mast. The OHL connects into the Ennis – Shannonbridge line at the Agannygal 110kV Substation. The Agannygal 110kV substation splits this line into two circuits: Agannygal – Shannonbridge (Galway West) and Agannygal – Ennis (Galway West).

Periodic access to the overhead line structures for inspection is from nearby roads and Coillte forestry tracks.

4.2.2.3 Peat slide and associated works

Measures undertaken in response to the peat slide included the rebuilding of short sections of floating road within the wind farm site at two locations in the vicinity of T68 and T23-T70 (which also acted as barrages) and the installation of eight barrages (four boulder and four earthen) along and downslope of the route of the slide between the wind farm and downstream of Flaggy Bridge.

Of the eight barrages originally built, two (Barrages 1 and 2) are located upstream of Black Road Bridge and now act as Coillte access tracks, two (Barrages 3 and 4) are within a tributary of the Owendalulleegh River and four were removed and are no longer in place (Barrages A, B, C and D).

Peat from the peat slide which had accumulated on adjacent land and peat excavated for the construction of Barrages 2 and 3 was placed in three peat repositories, one immediately upslope of the Black Road Bridge and two between Black Road Bridge and Flaggy Bridge.

The location of the peat slide and works associated with the peat slide are mainly located within the townlands of Derrybrien North. Some minor works are located in the townland of Derrybrien East.

4.2.3 Project setting

4.2.3.1 Overview

The site is largely bounded by Coillte-owned coniferous forestry plantations. The closest settlement to the wind farm site is the village of Derrybrien some 2 km to the south. The nearest occupied houses are located just over 2 km from the wind farm site.

The Slieve Aughty Mountains within which Derrybrien Wind Farm is located have some of the largest concentrations of coniferous forest in the country which was mainly planted in the 1960s and 1970s and much of which is located on peat bog. The forest cover is one of the defining characteristics of the Derrybrien area and the Slieve Aughty Mountains area generally.

The wind farm site is located on peat bog which had been disturbed by afforestation and turbary, ranging in depth across the site from 1-7 m deep, but in the main peat depths are in the range 2-3 m with the average peat depth across the site of approximately 2.6 m. Turf cutting has and continues to take place on the eastern part of the site and also external to the site to the east and immediately adjacent to it.

Most of the wind farm site is within the Owendalulleegh and Boleyneendorrish River Catchments with the remainder draining into the Owenaglanna/Duniry River Catchments. A small section of the overhead line and Agannygal Substation are located in the catchment of Lough Atorick.

Derrybrien Wind Farm is within the Slieve Aughty Mountains SPA which was classified as a SPA in March 2007 and formally designated by Statutory Instrument in March 2012. The SPA encompasses the entire Slieve Aughty range from just south of Lough Rea in the

north to Lough Derg in the east and beyond Lough Graney to the south west. The SPA is designated for the protection of hen harrier and merlin.

The majority of the Derrybrien – Agannygal 110 kV OHL route is covered by shallow to locally deep blanket peat which was largely forested in 1998. Prior to the construction of Agannygal Substation, the ground at the site comprised a shallow layer of peat (approximately 1m) over glacial till.

4.2.3.2 Hydrological Context

The wind farm site partially extends over the catchments of three rivers, the Owendalulleegh and Boleyneendorrish in the Galway Bay South East EPA catchment and Duniry in the Lower Shannon EPA catchment[11, 12].

The Derrybrien-Agannygal 110kV Overhead Line is predominately located within the Owendalulleegh catchment with a short section close to Agannygal Substation and Agannygal Substation itself being located within the Bleach catchment within the Lough Derg WMU.

The site of the peat slide and associated offsite works is within the Owendalulleegh catchment.

The location of project works relative to the hydrological Water Management Units, catchments and sub-catchments are shown in Figure 6.

The three main river catchments directly connected to the wind farm site are described briefly below.

- The Owendalulleegh River System drains approximately two-thirds (66.2%) of the wind farm site through a number of small hill slope stream tributaries – Cloghvoley (designated as subcatchment SC6), Derrybrien North (SC7, further divided into SC7(a), (b), (c) and (d) owing to the large portion of the wind farm which drains to the respective streams) and Derrybrien South (SC8 and SC9). The Owendalulleegh River rises in the townland of Gorteenayanka and flows westward to the south of the site to Lough Cutra approximately 22 km downstream. It then flows to the northwest through a heavily karstified region where it disappears underground. It reaches Kinvarra town approximately 15 km further downstream, at which point it enters Galway Bay.
- The Boleyneendorrish River drains approximately 33.4 % of the site via subcatchments SC1, SC2, SC3 and SC4. It flows westward to the northwest through a heavily karstified region before also entering the sea at Kinvarra town.
- The Duniry River drains a very small section of the overall site (0.6 %) to the northeast, designated as subcatchment SC5. The river is a tributary of the River Kilcrow which flows into Lough Derg on the River Shannon.

[11] Catchment information from EPA Database
[12] Sub-catchment information obtained from OPW Flood Studies Update (FSU) portal

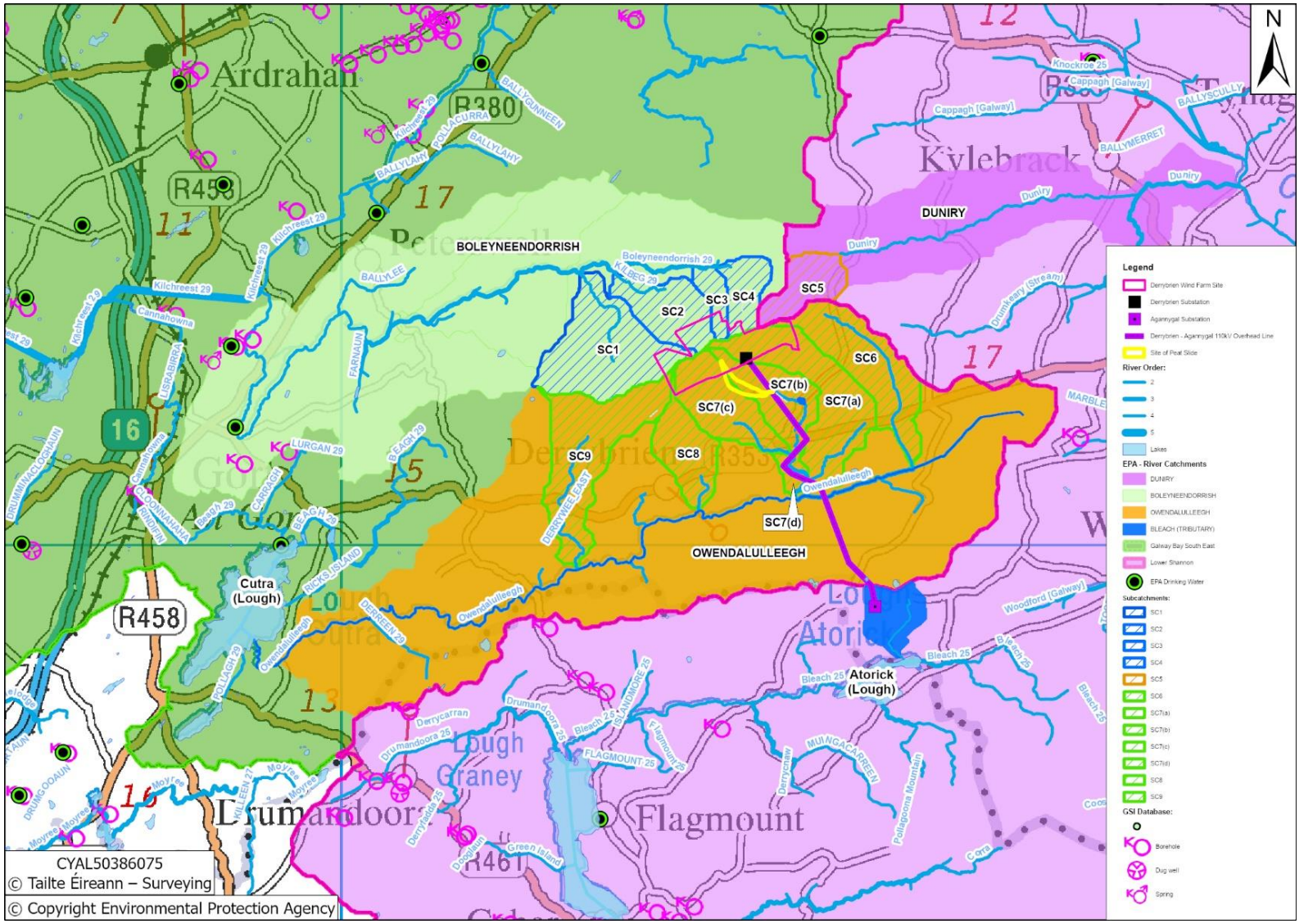

Figure 6 Hydrological and hydrogeological context of the project and its surrounding environment

4.2.4 Project timelines

The main phases of the project lifecycle are listed below:

- **Pre-Development Phase (1998 - June 2003):** This phase ran from the baseline date (1998) to commencement of construction (June 2003). The majority of the project site was in use as per the baseline conditions as managed commercial forestry (which had been planted between 1963 and 1994) and turf cutting under turbary rights[13] undertaken in non-forested areas in the east of the wind farm site.
- **Construction Phase 1 (June - October 2003):** This phase comprised construction works up to the peat-slide including initial tree felling to facilitate construction of wind farm site access roads, construction of site access tracks and construction of approximately 50% of the turbine bases.
- **Peat Slide and Response Phase (October 2003 - June 2004):** This phase covers the period from the occurrence of the peat slide to the resumption of construction activity on the project during which works were carried out in response to the slide.
- **Construction Phase 2 (June 2004 - March 2006):** This phase covers all construction works post-peat slide to commercial operation of the project, which included the bulk of felling, civil works and electrical works associated with the wind farm site and grid connection, some works associated with the peat slide and wind farm commissioning.
- **Operational Phase (March 2006 – February 2022):** This phase covers works and activities which have occurred associated with the operation of the project from the start of commercial operations (March 2006) This phase immediately ceased following the refusal by An Bord Pleanála on the 7th of February 2022 to grant Substitute Consent (ABP planning reference no. ABP-308019-20).
- **Ceased Operation Phase (February 2022 – present day):** This phase covers the period after operation following the refusal by An Bord Pleanála on the 7th of February 2022 to grant Substitute Consent (ABP planning reference no. ABP-308019-20). It covers the cessation of wind farm generation activities, and all other activities, on the site.
- **Decommissioning Phase (Prospective Development):** The proposed "Derrybrien Wind Farm Development Decommissioning Project" comprises the Prospective Development and the Retained Development. The Prospective Development covers the carrying out of decommissioning works to remove the majority of above-ground features from the site – including all turbines, masts, electrical plant, overhead lines etc; and enable the final decommissioning of the site. As described in Section 1.1, the Prospective Development is subject to a separate application for permission to An Bord Pleanála.

[13] A right of turbary means the right to cut and carry away turf from another person's land for use as fuel in the house of the holder of the turbary right.

- **Post Decommissioning Phase (Retained Development):** This phase covers the 'retention' *in situ* and in perpetuity of part of the existing Derrybrien Wind Farm Development – including at-ground and below-ground structures such as turbine and other foundations; and development associated with historic peat slide events that occurred during construction such as barrages, peat repositories, on-site borrow pits / quarries etc.

4.2.5 Project phases

4.2.5.1 Overview

The existing Derrybrien Wind Farm Development was constructed between June 2003 and March 2006. The current impact assessment addresses likely significant effects of the project during that time as well as post construction impacts associated with the operation and maintenance phase (2006 to February 2022) as well as ceased operation phase (February 2022 to present day) and the Retained Development.

The project can be described under the following headings

(i) Construction of the wind farm between 2003 and 2006.

(ii) Construction of the grid connection (OHL and Agannygal Substation).

(iii) Containment works required from 2003 to 2006 to stabilise a peat slide which occurred during the construction phase of the wind farm in October 2003.

(iv) Operational and maintenance works on the wind farm and along the OHL during the operation of the wind farm

(v) Cessation of operation in February 2022 until the present day

(vi) Retained Development

4.2.5.2 Construction phase: circa June 2003-March 2006

The following characters of the project construction phase are noted as part of this assessment:

- Site clearance and the felling of approximately 222 ha of commercial conifer plantation
- The construction of 70 turbines, with hub height and blade length of 49 m and 26 m respectively, and associated foundations, hardstands and underground cables.
- Construction of site access tracks – approximately 17.5 km in total, 14.6 km of new access tracks were constructed, largely comprising floating roads and 0.9 km of existing floating roads were upgraded;
- The construction of an on-site 110 kV/20 kV substation with control house
- The erection of two anemometer masts
- The use of three borrow pits during the construction phase
- The construction of an overhead line, approximately 7.8 km in length, connecting the wind farm to the national grid via Agannygal Substation including removal of forest plantation estimated at 33.1 ha along the overhead line corridor. The OHL

comprises 43 structures, including 34 double wood pole structures, 2 end masts (1 within Derrybrien Substation), 6 angle masts and 1 intermediate mast. There are two additional masts within Agannygal Substation associated with the connection to the National Grid on the Ennis-Shannonbridge 110kV line.

- The construction of Agannygal Substation and access road including removal of forest plantation from site (1.6 ha).
- Access to Agannygal Substation - (a) upgrading of pre-existing Coillte track (approx. length 2.9km, approx. width 3.5m) and (b) construction of new access road (approx. length 0.14km, approx. width 3.5m) from public road to Agannygal Substation
- The construction of various barrages in response to the peat slide which occurred in October 2003.

Construction works on site commenced in June 2003 with tree felling operations which were undertaken by a contractor on behalf of Coillte. Civil engineering works commenced in July 2003 with road construction and excavations at turbine locations. The works were stopped on 16th October 2003 due to a peat slide on site. Construction works re-commenced in June 2004, including work on the Derrybrien to Agannygal 110kV overhead line and Agannygal Substation, and were complete by March 2006.

4.2.5.3 Peat slide and associated works October 2003

The following works were undertaken in response to the peat slide which occurred in October 2003 (see Figure 7):

- Felling and site preparation works
- Construction of Borrow pit adjacent to Barrage 1 for sourcing material for barrages. Approximate plan area 2,314 m^2 (0.23 ha), estimated volume 1371 cum.
- Wind Farm Access tracks rebuilt within the wind farm site at T68 and between T23 and T70 to replace sections of on-site floating roads damaged by the peat slide.
- Barrage 1 - approximate max length 94 m, max width 8 m, estimated volume 900 cum rock/boulders
- Replacement of forestry access road across area of peat slide and Barrage 1 - approximate length 830 m, width 4.5 m (approx.)
- New floating access track to Barrage 2 -approximate length 284 m, approximate width 4.5 m
- Barrage 2: approximate max length 17 m, max width 20 m, estimated volume 650 cum rock/boulders
- Peat repository area at Barrage 2 - approximate max length 34 m, max width 108 m, estimated area 3498 m^2
- Barrage 3: approximate max length 41 m, max width 9m; estimated volume 350 cum rock/boulders
- Peat repository area at Barrage 3 -approximate max length 41.5 m, max width 16 m; estimated area 597 m^2
- Barrage 4: approximate max length 25 m, max width 10m; estimated volume 300 cum rock/boulders

- Four additional barrages (A, B, C and D) were constructed and then removed.
- Peat repository area at Black Road Bridge- repository in two sections -north west section and south east section:
    - North west section: approximate max length 130 m and width 73 m; estimated area 5322 m^2.
    - South east section: approximate max length 68 m and width 51 m; estimated area 2898 m^2.
- Drainage works within and in the vicinity of the site of the peat slide area and peat repository areas
- Repairs to bridges on public roads (Black Rd Bridge and Flaggy Bridge)
- Repair to Bridge repairs on private land (Unnamed Bridge C) and Replacement of stepping stones across Owendalulleagh River.

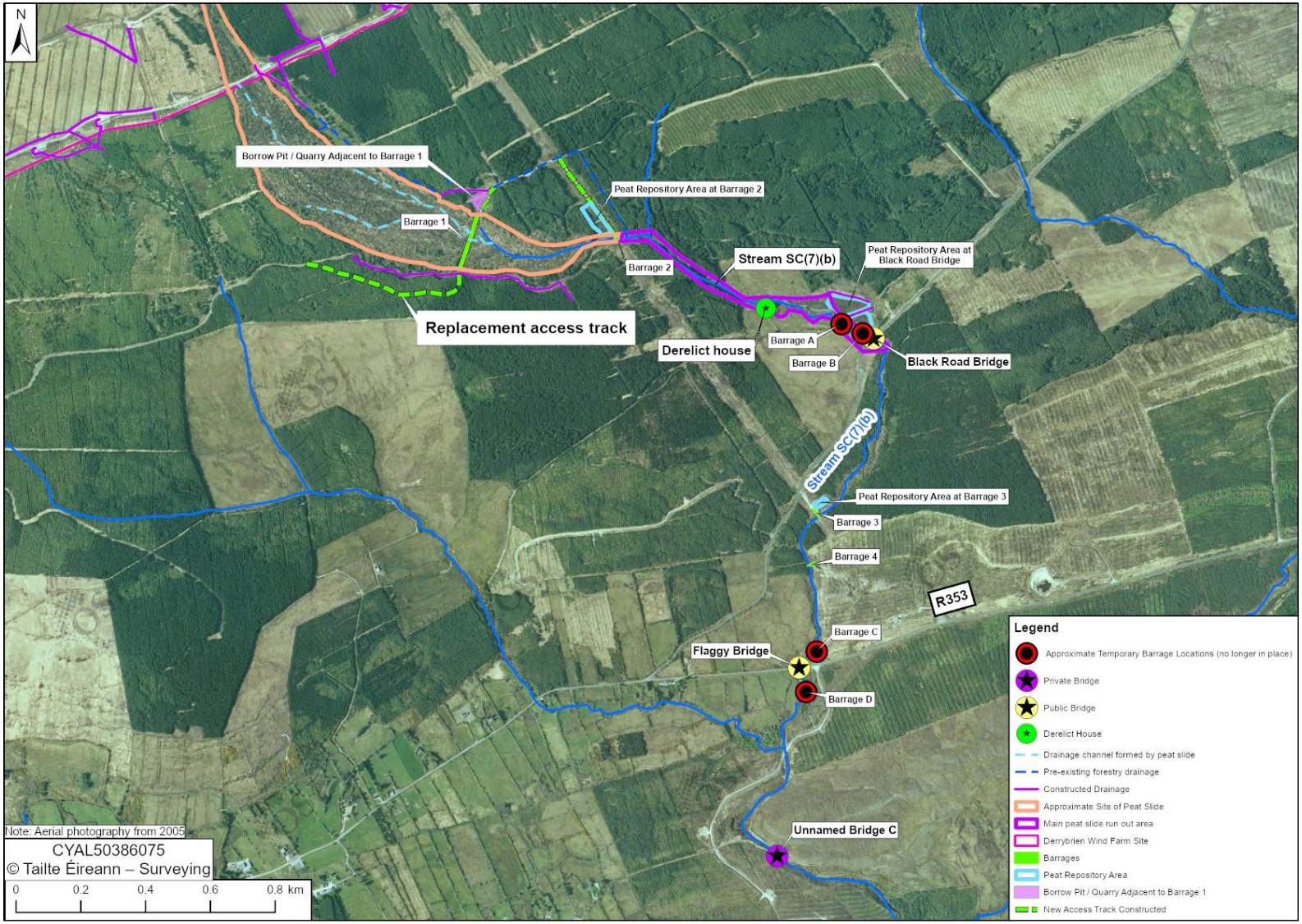

Figure 7 Location of and approximate extent of peat slide and main peat slide run out area

4.2.5.4 Operation Phase: 2006 – February 2022

The main activities undertaken on site which are not specifically related to the Vestas (routine maintenance and repair of turbines) contract are as follows:

- Maintenance of access tracks
- Cutting back of tree regrowth along the OHL and at along four sections of track within the wind farm site
- Substation inspection and maintenance.
- Maintenance of existing drainage network
- Maintenance of existing cables and ducting
- Waste management
- Routine inspections and maintenance at barrages, peat repositories and roads/bridges

Maintenance of access tracks

Throughout the operation of the wind farm routine access track maintenance and repair works have been undertaken. In 2014, improvement works were carried out on the floating roads (over approximately 6 km) which comprised the placing of geogrid reinforcement followed by approximately 150 mm crushed rock capping material and 10mm granular blinding along road surface. Minor works to repair large potholes were also carried out at selected locations along sections of the road network. The potholes were filled with Class 6F2 granular capping material using an 18-tonne rubber-tyred excavator. The fill material imported to the site was stockpiled on the crane hard standings and brought to the locations of the localised repairs using the 9-tonne dumper.

The 2014 road improvement works included remedial works to improve and widen the existing floating road over culverts at Turbines T10, T24, T35, T50, T66 where the existing road was too narrow and where the side slope down into the drainage channel was too steep, which posed a health and safety risk to vehicles using the road.

Cutting back of tree growth in previously felled areas

Cutting back of tree regrowth was carried out in 2018 using specialist low ground bearing pressure forestry machine suitable for operating directly on the peat. The cut trees were left in place on the site. The methodology adopted for the cutting back of tree growth was as follows:

- Cutting works were undertaken using a 10-tonne low ground pressure machine so as to be minimally invasive.
- The excavator had a saw head attachment rather than a digging bucket.
- All of the trimmed vegetation was cut and left in place on the peat slopes with no additional handling, which minimises machine movements and loading on the peat.

In 2018 cutting back of tree regrowth was carried out for a distance of 10 metres either side of the site access track along the top turbary road from Turbines T27 to T44, Turbines T26 to T70, Turbine T3 to T5 and Turbine T1 to T2.

Cutting back of tree regrowth along the OHL was carried out along the OHL route in 2018 and 2019. Access was via existing forestry tracks. The works were carried out using a 10

tonne wide-tracked excavator with a saw head attachment. The trees were cut but not extracted and cut material was left in place on the ground.

Cables and ducting

Between September 2005 and 2020 the only maintenance work that was carried out on the installed cables was the maintenance of adequate backfill cover to cables in cable trenches.

In September 2017, as part of an upgrade to the turbine control systems, approximately 7.6 km of new 12 core single-mode fibre-optic cable was installed on the site to improve the response of communication signals between the turbine controllers and the central control system. The total length of ducting was approximately 2.55 km. A mole plough was used to bury the ducts directly in the peat at a depth of 0.5-0.6 m with a warning tape overhead without having to open up a trench. At the 5 road crossings the 50mm ducting was fed through a 75mm diameter galvanized pipe that was pushed horizontally through the peat under the floating roads to avoid having to open up a trench in the roads.

Maintenance of the drainage network

Periodic inspections of the site between 2005 and 2022 were undertaken to assess maintenance requirements for short and long-term stability. The resultant drainage works undertaken related to maintenance of drainage around turbines and general site drainage.

Minor drainage works were carried out by hand. More substantial works were carried out by mechanical excavation with a wide-tracked 13-tonne low ground bearing pressure excavator suitable for working directly on the peat.

The majority of the drainage improvement works were carried out within 6 years of completion of the wind farm (i.e. up to 2011). A major drainage maintenance programme was completed on the site in 2011. Since 2011, inspections have resulted in only minor repair works to the drainage network, which indicates that maintenance requirements for the site drainage are at a residual level.

Turbulence felling

In order to optimise productivity of the wind farm, Coillte agreed to undertake offsite phased tree felling (46.2 ha in total) under felling licence immediately to the west of the wind farm site in 2016, 2017 and 2018. It is noted that these areas had been scheduled for felling in 2015 as part of Coillte's normal tree felling programme and that the felled areas were replanted. Specific requirements relating to hen harrier were set out in the licence. Felling was to be spread out over three years and no operations were allowed during the hen harrier breeding season (1st April to 15th August inclusive) without express permission. Operations were to adhere to the Forest Service document - *"Procedures regarding disturbance operations and hen harrier SPAs".*

Waste Management

The nature of wind farm operations is such that it does not have significant potential for generating large amounts of waste. Only small amounts of waste were generated on site. Waste was managed by the turbine contractor Vestas.

Routine inspections and maintenance at barrages, peat repositories and roads/bridges

Maintenance activities undertaken in relation to offsite measures were limited to the clearance of debris from behind barrages. Barrages 1 and 2 were last cleared of debris in June 2007 and the cleared debris essentially comprised silt. A small quantity of silt i.e. less than $2m^3$ was removed from a silt trap behind Barrage 1 in February 2009. Since the commencement of wind farm operations, the lower two barrages namely Barrages 3 and 4 have not needed to be cleared as accumulated debris was not evident.

Inspections of the peat repositories were undertaken in the period 2006-2020. There has been no maintenance required in relation to the peat repositories.

There has been no maintenance required in relation to offside roads and bridges. Galway County Council undertook limited maintenance on the Black Road in 2012 at the request of Gort Windfarms Ltd. The road condition had deteriorated due to usage unconnected to wind farm activities. The works required were carried out over a couple of days.

4.2.5.5 Decommissioning of Wind Farm Project

As noted in Section 1.1, the proposed 'Derrybrien Wind Farm Development Decommissioning Project' comprises two types of "development" for which separate Prospective Development Consent and Retrospective Development Consent is sought from An Bord Pleanála:

- "Prospective Development" - the carrying out of decommissioning works to remove the majority of above-ground features from the site – including all turbines, masts, electrical plant, overhead lines etc; and enable the final decommissioning of the site (the "prospective development" and "prospective works", see Section 4.2.5.5.1); and
- "Retained Development" - the 'retention' in situ and in perpetuity of part of the existing development – including at-ground and below-ground structures such as turbine and other foundations; and development associated with historic peat slide events that occurred during construction such as barrages, peat repositories, on-site borrow pits / quarries etc. (see Section 4.2.5.5.2).

4.2.5.5.1 Decommissioning Phase (Prospective Development)

A detailed description of the decommissioning activities associated with the Prospective Development has been included in the EIAR submitted with the application for permission under section 37L of the 2000 Act.

In summary, the decommissioning works will involve the following:

- Enabling works to facilitate the decommissioning, dismantling and removal of the Derybrien Wind Farm, including:
    - Establishment of temporary compounds. 3 no. temporary site compounds and hardstand areas will be re-established at the Derrybrien Wind Farm site and the Agannygal Substation.
    - Minimal vegetation/scrub clearance and minor levelling works at the existing hardstand areas and access tracks. Waste arising from these

enabling works is expected to comprise of vegetation, rubble and gravel. Any clean material that cannot be reused on site will be removed by licensed waste carriers for disposal at appropriately licensed facilities.

- Improvements to existing access roads and forestry tracks. The existing access road and forestry tracks typically comprise a 3m wide running track constructed of crushed rock which has been founded on the mineral soil underlying the peat and floating road construction. Minor permanent upgrades to some sections of the access roads may be required to facilitate heavy plant accessing the wind farm. It is envisaged that the improvement works would include filling potholes and localised widening where necessary. Temporary widening of the turbary road and certain sections of turning heads may also be required to provide safe access to the mobile crane that will be used to dismantle the turbines. 1 No. 10m long turning area at Turbine No.4 is required to facilitate access and it is proposed to remain in place post decommissioning.

- Decommissioning works associated with the wind farm site:
  - De-energising of the site, which will involve initially disconnection of turbines, low voltage (LV) components followed by disconnection of high voltage (HV) elements;
  - Temporary widening of the Turbary Road and certain sections of turning heads;
  - Controlled dismantling of 70 no. turbines (blades, nacelle, and tower) and 2 no. anemometer lattice masts;
  - Controlled removal of electrical equipment from Derrybrien substation and demolition of substation building.
- Decommissioning works associated with the grid connection:
  - Destringing of the overhead line conductor
  - Removal of the overhead line infrastructure (34 no. double wood pole structures and 8 no. masts)
  - Controlled removal of Agannygal substation and demolition of control building
  - Controlled removal of standby generator (bunded) and diesel tank, external lighting poles, lightning mast
  - Removal of palisade fencing surrounding the Agannygal substation
  - Reinstatement of the Ennis-Shannonbridge 110kV Line.

4.2.5.5.2 Post Decommissioning Phase (Retained Development)

The features of the Retained Development, to remain in situ in perpetuity after the Prospective Development has been completed are listed below:

- At-ground and below-ground structures/features associated with the Derrybrien Wind Farm Development, including:

  <u>Derrybrien Wind Farm including the Derrybrien 110kV Substation</u>

  - Reinforced concrete foundations for 70 no. wind turbines.

- Reinforced concrete foundations of structures within the Derrybrien Substation compound.
- Reinforced concrete foundations of 2 no. Anemometer masts.
- Approximately 17.5km of access tracks and 70 no. hardstand areas.
- Direct buried underground electrical and communications cabling.
- 3no. Borrow Pits / Quarries.
- Naturalised Peat Repository areas.
- Onsite Drainage Infrastructure.

Derrybrien to Agannygal 110 kV OHL and Agannygal 110kV Substation

- Below ground element of 34no. double wooden pole sets.
- Reinforced concrete foundations for 2 no. end masts.
- Reinforced concrete foundations for 5 no. angle masts.
- Reinforced concrete foundations for 1 no. intermediate mast.
- Reinforced concrete foundations of structures within the Agannygal Substation compound.

- Offsite development constructed in response to the peat slide in 2003, including:
  - Barrage 1 and Coillte Access Track.
  - Barrage 2, Access Track and Peat Repository Area.
  - Barrage 3 and Repository Area.
  - Barrage 4.
  - Repository Area at the Black Road Bridge.
  - Drainage Diversion Works.
  - Repairs to Black Road Bridge, Flaggy Bridge, Unnamed Bridge C and Crooked Bridge.

The Derrybrien Windfarm Development Decommissioning Project - Retained Development application boundary is shown in Figure 8.

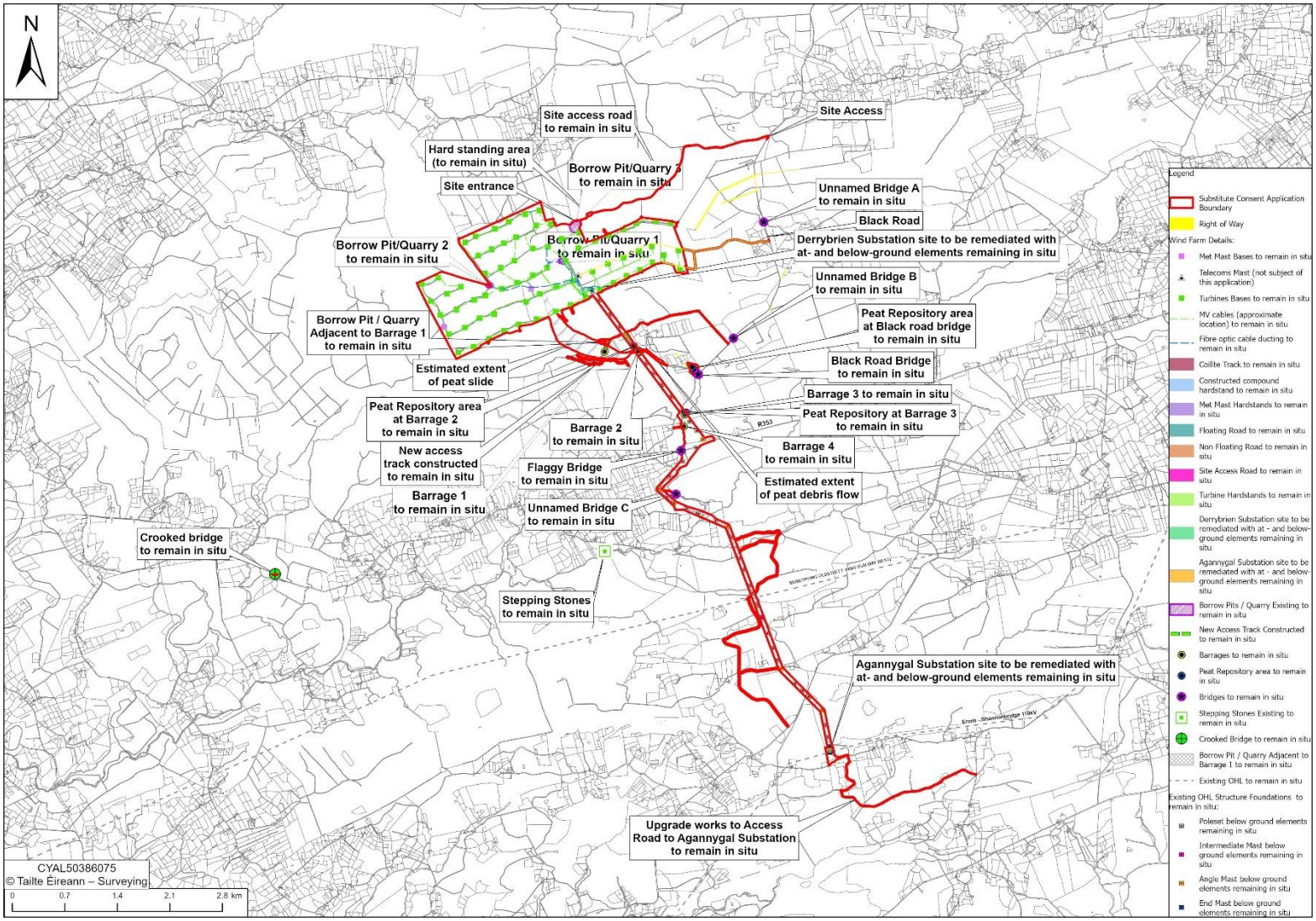

Figure 8 Retained development red line application boundary

4.2.6 Related Projects

On 20th May 2003, Coillte was granted a two-year felling licence by the Forest Service under the Forestry Act 1946, to fell 263 ha of forestry on the wind farm site. In lieu of the clear-felling and non-replanting of 263 ha of Lodgepole pine and Sitka spruce on the wind farm site, the Felling Licence (Ref FL 3983) required the licensee, within 1 year from the expiry date of the felling licence, to plant 119.3 ha within identified townlands in Counties Roscommon and Tipperary to comprise 55% Sitka spruce, 30% Diverse conifers and 15% Broadleaved species.

In subsequent correspondence between Coillte and the Forest Service, Coillte committed to plant the appropriate portion of this 119.3 ha or an appropriate equivalent yield class area agreed with the Forest Service, as a percentage of the 263 ha clearfelled under the terms of the felling licence. If all 263 ha were not clearfelled, Coillte agreed to plant this appropriate portion within the 12 months from expiry of felling licence.

Coillte has advised that the planting was carried out within forestry compartments at lands in County Roscommon and County Tipperary. The townlands within which the forestry compartments are located are as listed in Table 1. The planting locations in County Tipperary and Roscommon are over 50 km and 80 km respectively from the wind farm site and are not physically connected to the project area.

Table 1 Derrybrien Felling Licence-Townlands within which trees were planted

County	Townland	Planting Year	Compartment	Area (ha) (approximate)
Roscommon	ARDCORCORAN	2008	73915C	17.8
Roscommon	BRACKLOON	2008	68170Q	5.2
Roscommon	BRACKLOON	2008	68170Q	13.3
Roscommon	OLDTOWN	2008	73918K	16.0
Tipperary	FOILMAHONMORE	2006	44777M	8.2
Tipperary	COONMORE	2003	44751I	24.4
Tipperary	COONMORE	2006	44778H	14.3
Tipperary	KNOCKNABANSHA	2007	44776R	51.7

Additionally, all the lands in the compartments set out in Table 1 had been under use for horticultural plantation (Christmas trees) prior to the year 2000, which was not considered to be afforestation by the Forest Service. When planting with commercial forest plantation occurred the lands were then considered to be afforested and became part of the National Forest estate.

Approximately 222 ha of forestry was felled on the wind farm site during construction rather than 263 ha and the area of planting required using the equivalent yield class in the licence would have thus been reduced pro-rata. The reduced requirement would have been approximately 101 ha. However, the total area of the listed forest compartments is 151.8 ha.

The planting locations relative to Derrybrien are shown on Figure 9 and the townland locations in Counties Roscommon and Tipperary are shown in Figures 10 and 11 respectively. A cumulative assessment of the impacts of the wind farm and the tree planting has been carried out in Section 4.6 of this report.

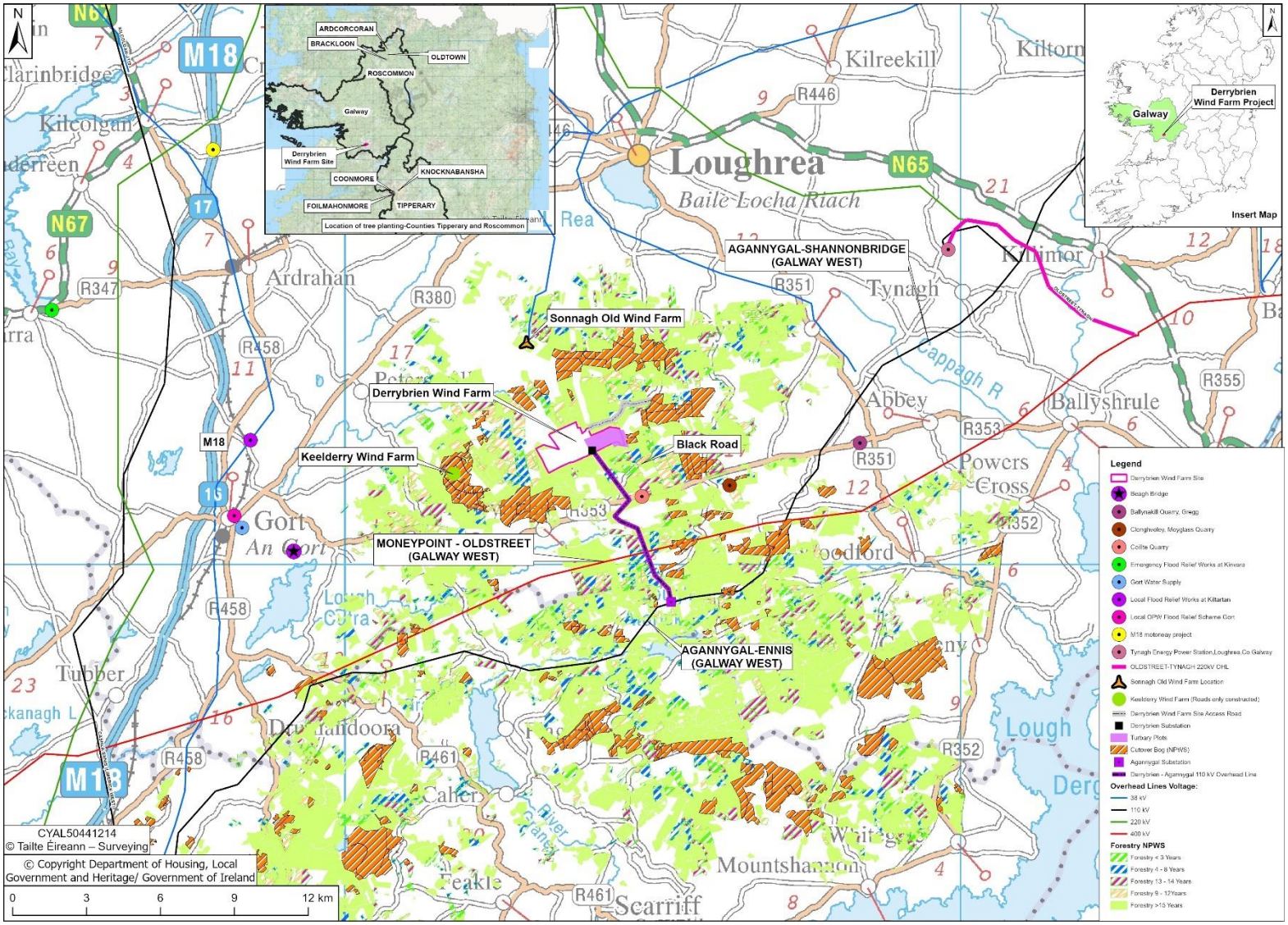

Figure 9 Location of projects/Activities considered for cumulative impact assessments

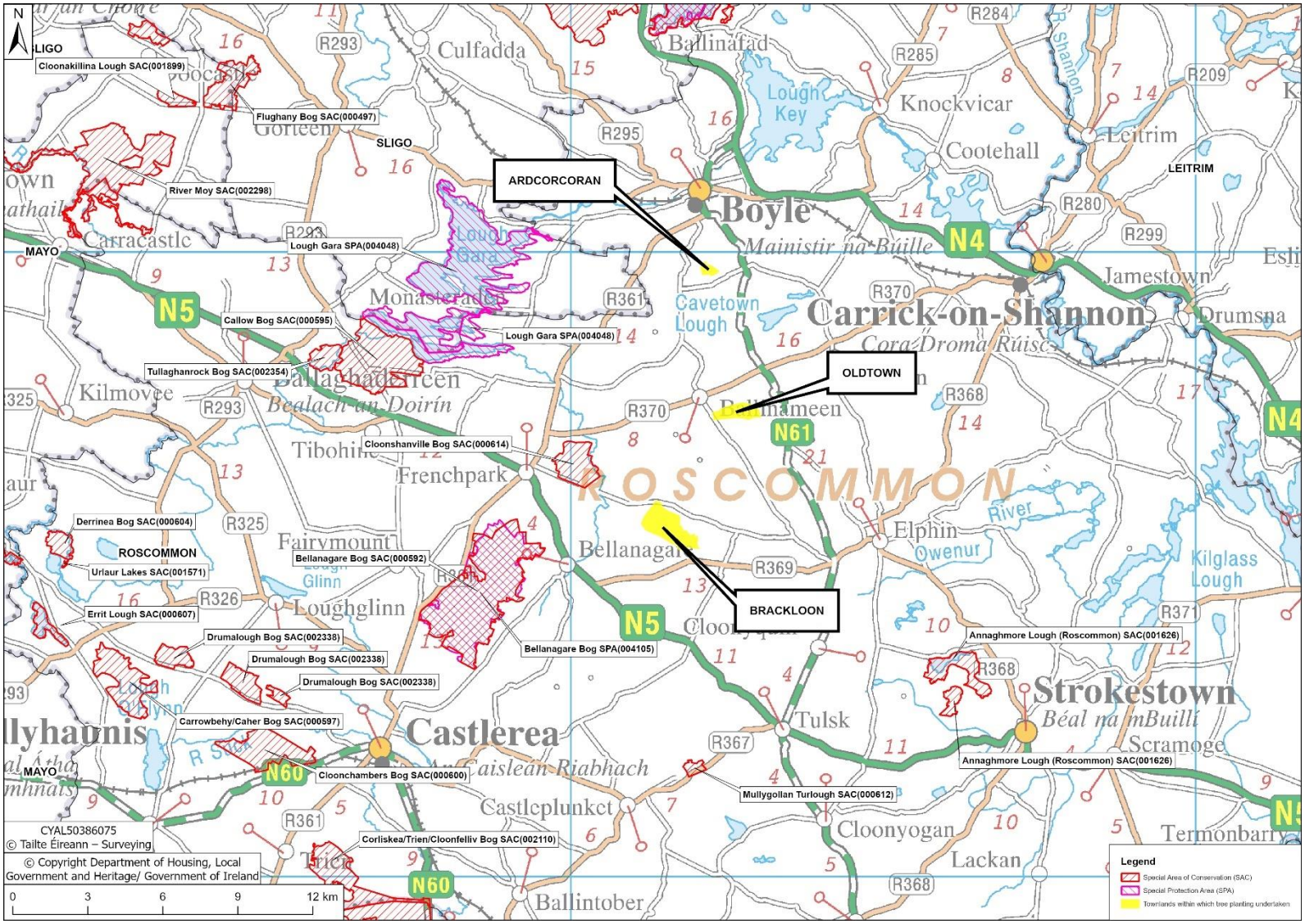

Figure 10 Location of tree planting in lieu of forestry felled for project - County Roscommon

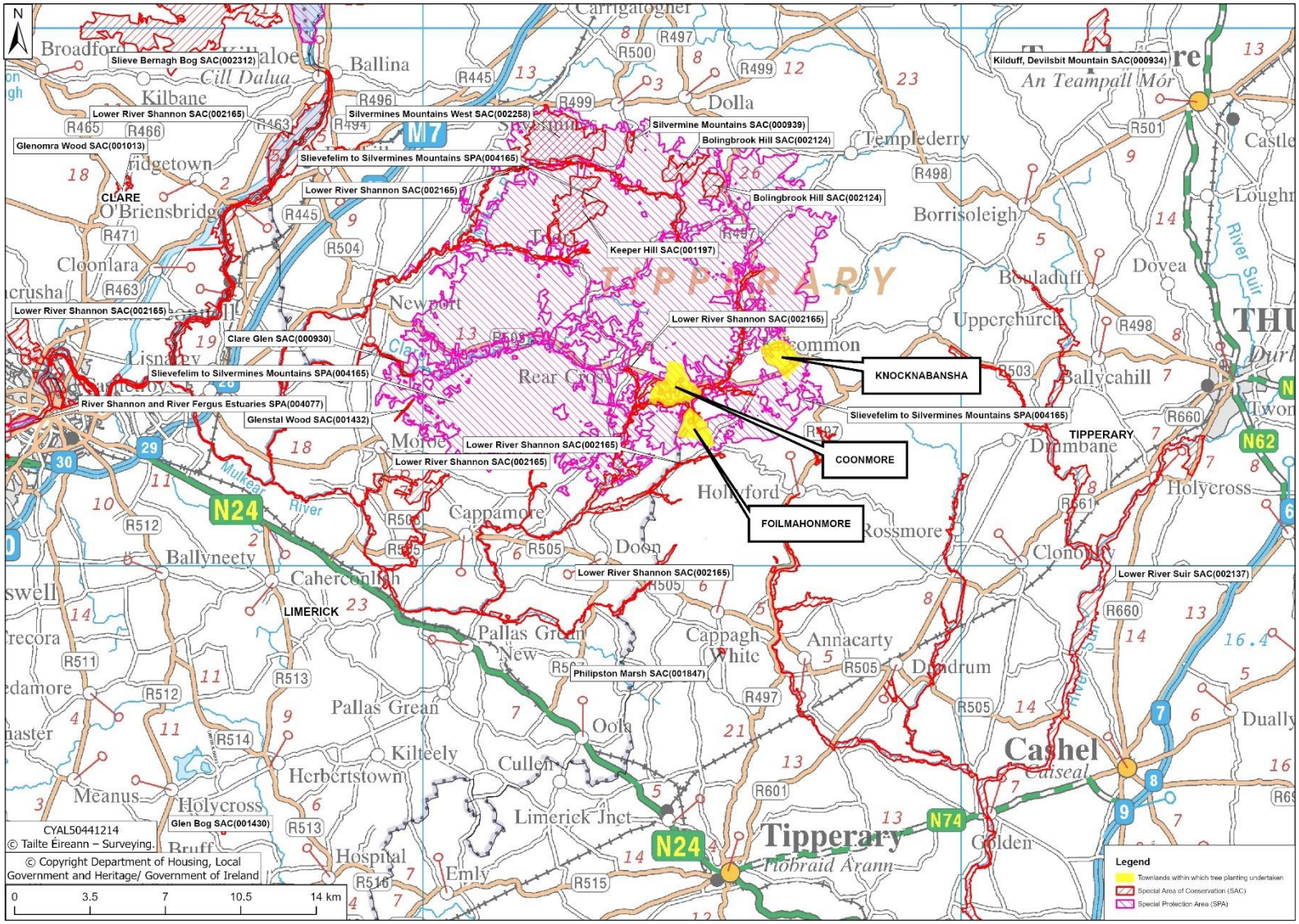

Figure 11 Location of tree planting in lieu of forestry felled for project - County Tipperary

4.3 Description of European Sites within Zone of Influence

The project (including the Retained Development) is entirely within the Slieve Aughty Mountains SPA (site code 004168). In addition to the Slieve Aughty Mountains SPA, 25 other European sites have been identified within a 15 km radius of the project (4 SPAs and 21 SACs). A further 4 European sites are hydrologically connected to the project and located 15 km beyond the project.

The existing Derrybrien Wind Farm site drains to three river catchments. The Owenaglanna flows east becoming the Duniry River eventually discharging into Lough Derg, whereas the Boleyneendorrish and the Owendalulleegh Rivers flow westward, the latter discharging to Lough Cutra and the former joining a nexus of tributaries and dropping underground into the karst geology just north east of Gort. The outflow from Lough Cutra, the Beagh River drops underground in the Punchbowl and emerges again as the Cannahowna River which then flows north to Gort. Thereafter, known locally as the Gort River (EPA name “Cannahowna”), it flows north before dropping underground at Pollatoophil at Castletown, emerging 900m away as a surface channel again before going underground again, emerging west north west near Kiltartan where it is joined by the combined flows of the Boleyneendorrish and Kilchreest Rivers that drain the northern slopes of the Slieve Aughty Mountains. The combined flow of these surface rivers then flow due south as the KIchreest River to the Coole-Garryland wetland complex. Flows from here continue entirely underground until they emerge west north west in Galway Bay at Kinvarra. All these underground watercourses discharge to the sea at Kinvarra Bay. A small section of the OHL and Agannygal Substation drain to Lough Atorick which is within one of the sub-basins of the Bleach River. The Bleach River flows from Lough Atorick on into Lough Graney which in turn flows into the lower portion of Lough Derg at Scarriff Co. Clare, part of the River Shannon catchment.

The peat slide which occurred at the wind farm in 2003 (described in Sections 4.2.1.2 and 4.2.5.3), had a profound impact on fisheries in the upper sections of the Owendalulleegh River (refer to Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR). On account of this, all European sites hydrologically connected to the Owendalulleegh River system, downstream of the wind farm project, as far as the sea at Kinvarra (hydrologically over 45 km from the Project), have been included in this assessment. Although not impacted by the peat slide, the same has been applied to the other river systems within the catchments of the project and all European sites hydrologically connected within these catchments have been included for assessment.

The ZoI for birds will vary with species and type of impact: relevant factors include conservation status, sensitivity to disturbance and species core foraging distances, as described in the Scottish Natural Heritage Guidelines (SNH, 2016a). Target bird species occurring within the study area were identified during the desk review and core foraging ranges were established for these species. For hen harrier, the core foraging range from nest sites during the breeding season is approximately 2 km, with a maximum range of up to 10 km. With regards to merlin, the core foraging range from nest sites during the breeding season will vary depending on habitats present. Cramp and Simmons (1980) note that male merlins may fly several kilometres to hunt, while in a study in Sweden it was found that the hunting range could be twice the pair’s territory, the latter averaging about 2km^2 (cited in Sale 2016). Whooper swan has a core foraging range from night roosts during the winter season

of less than 5 km. Based on the bird species which have been identified as target species for the purpose of this assessment, the ZoI for birds is up to 10 km of the wind farm project site, though most focus is on a distance of 2 km from the wind farm project area. This ZoI, which has been established with reference to the guidance document Assessing Connectivity with Special Protection Areas (SPAs) (SNH, 2016a).

Bats are highly mobile species, and capable of travelling large distances to forage and during migration. Of particular importance is the area around a bat roost in which habitat availability and quality will have an influence on the resilience and conservation status of that roost (the core sustenance zone). For Irish bat species the core sustenance zone ranges from approximately 1 to 4 km (Collins, 2023), although individual flights can be longer. Shiels *et al.* (1999) found that the maximum (mean) flight distance recorded for individuals from two Leisler's bat maternity roosts ranged from approximately 4.5 km to 7.5 km throughout the year. Given the long distances that can be travelled by bats a zone of influence of 10 km for bat species is considered appropriate for the project.

Industry guidance suggests a 10 km zone of influence is considered when assessing impacts of new wind farm proposals on bats; 'Bats and onshore wind turbines: survey, assessment and mitigation' (SNH *et al.,* 2021)) and EUROBATS Guidelines for consideration of bats in windfarm projects (Rodrigues *et al.,* 2015). However, the zone of influence for the project is likely to be very localised with regard to bats.

The ZoI for terrestrial habitats is considered to be within the red line boundary of the project area and immediately adjoining the site boundary. This has been determined based on the fact that direct impacts to habitats would be confined to the footprint of the project within the site boundary and any associated works. Habitats immediately adjoining the site boundary were assessed in relation to indirect impacts.

The existing Derrybrien Wind Farm site drains to three river catchments. The Owenaglanna flows east becoming the Duniry River eventually discharging into Lough Derg, whereas the Boleyneendorrish and the Owendalulleegh Rivers flow westward, the latter discharging to Lough Cutra and the former joining a nexus of tributaries and dropping underground into the karst geology just north east of Gort. The outflow from Lough Cutra, the Beagh River drops underground in the Punchbowl and emerges again as the Cannahowna River which then flows north to Gort. Thereafter, known locally as the Gort River (EPA name "Cannahowna"), it flows north before dropping underground at Pollatoophil at Castletown, emerging 900m away as a surface channel again before going underground again, emerging west north west near Kiltartan where it is joined by the combined flows of the Boleyneendorrish and Kilchreest Rivers that drain the northern slopes of the Slieve Aughty Mountains. The combined flow of these surface rivers then flow due south as the KIchreest River to the Coole-Garryland wetland complex. Flows from here continue entirely underground until they emerge west north west in Galway Bay at Kinvarra. All these underground watercourses discharge to the sea at Kinvarra Bay. A small section of the OHL and Agannygal Substation drain to Lough Atorick which is within one of the sub-basins of the Bleach River. The Bleach River flows from Lough Atorick on into Lough Graney which in turn flows into the lower portion of Lough Derg at Scarriff Co. Clare, part of the River Shannon catchment.

The peat slide which occurred at the wind farm in 2003 (described in Sections 4.2.1.2 and 4.2.5.3), had a profound impact on fisheries in the upper sections of the Owendalulleegh River (refer to Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR). On

account of this, all European sites hydrologically connected to the Owendalulleegh River system, downstream of the wind farm project, as far as the sea at Kinvarra (hydrologically over 45 km from the Project), have been included in this assessment. Although not impacted by the peat slide, the same has been applied to the other river systems within the catchments of the project and all European sites hydrologically connected within these catchments have been included for assessment.

Based on this review the potential ZoI for European sites designated for terrestrial habitats and species was determined to be 15 km (conservative approach). All European sites within a 15 km radius of the wind farm, OHL and Agannygal Substation are shown on Figure 12 and included for assessment in this report. The potential ZoI for European sites designated for water-dependent habitats and species has been defined as those sites hydrologically connected to the river systems draining the project. In the case of the Owendalulleegh River, the ZoI extends up to 45 km downstream.

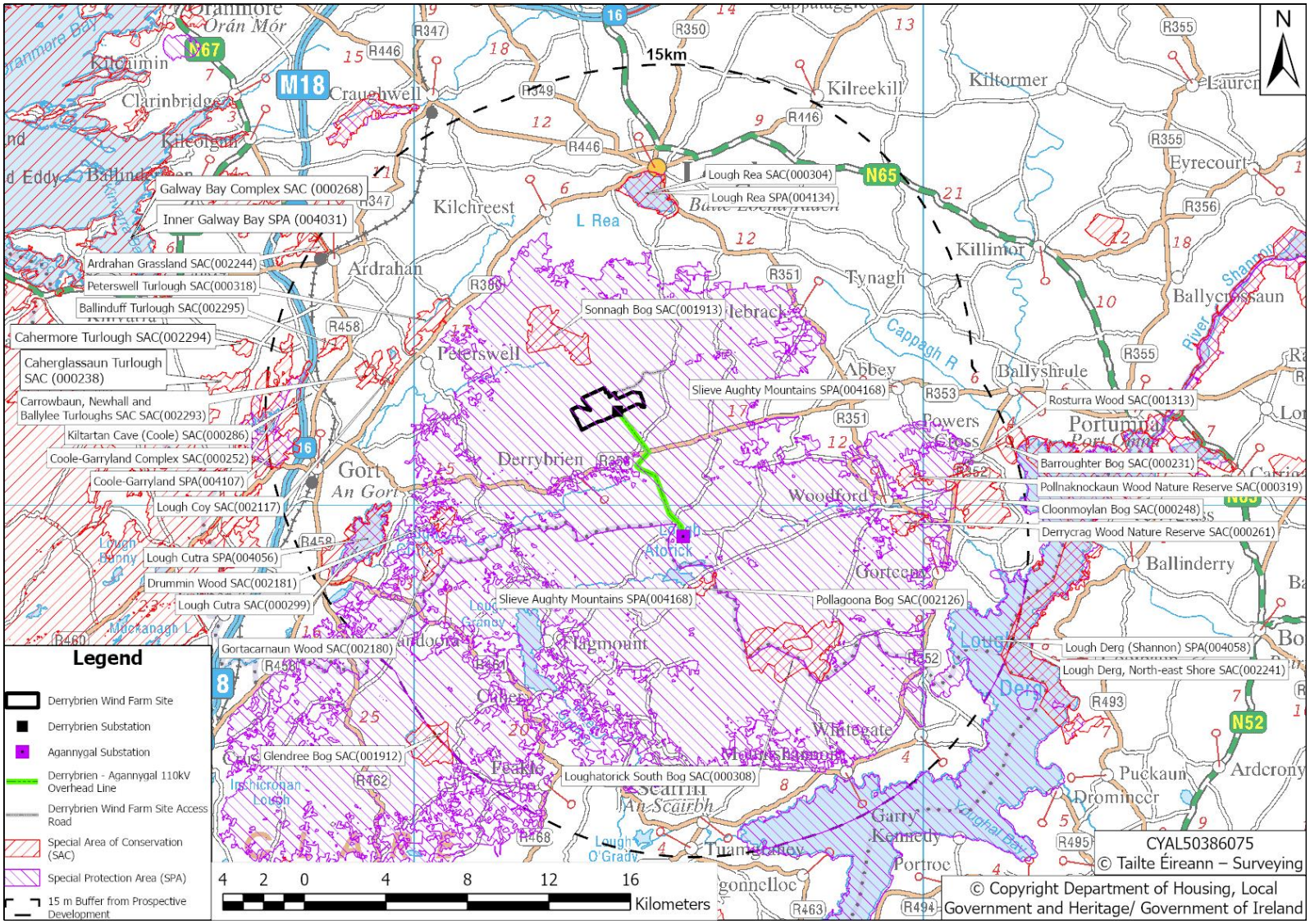

Figure 12 European sites within 15km radius of project

4.4 Identification of European Sites

All European sites identified within a 15 km radius of the project have been identified as being within the Zone of Influence of the project (refer to Section 4.3). 24 sites have been identified within the 15 km radius of the wind farm project (5 SPAs and 19 SACs). Some of these sites are hydrologically linked to the wind farm and while these hydrological pathways are over a distance greater than 15 km the actual sites are located within the 15 km radius.

A further 6 European sites outside of the 15 km radius have been identified as being within the ZoI of the project (i.e. having the potential to have been impacted by the project) owing to the hydrological connection between these sites and the Project area. One of these sites is a SPA (Inner Galway Bay SPA). The other 5 sites are SACs - Galway Bay SAC; Cahermore Turlough SAC; Caherglassun Turlough SAC; Barroughter Bog SAC and Lough Derg North East Shore SAC. These sites were identified using GIS data downloaded from www.npws.ie (accessed January 2025).

All but two of the 30 European sites identified had been proposed for designation under the Habitats and Birds Directives by the time works began on the project. The Slieve Aughty Mountains SPA was not proposed as a SPA until March 2007 and Lough Rea SPA was not proposed as a SPA until February 2007. Work commenced on the wind farm project in June 2003 and commenced operation in March 2006.

Although many sites were not formally designated by Statutory Instrument (S.I.) until much later, legal protections, consummate with those set out in the Directives, have applied to the sites since initially proposed for designation either as Sites of Community Importance (SCI) for SACs or proposed Special Protection Areas (pSPAs).

Table 2 presents information relating to these European sites including their Qualifying Interests / Special Conservation Interests and Conservation Objectives. All European sites have site specific conservation objectives.

Table 2 Details of European sites identified within potential zone of influence of the project

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
Slieve Aughty Mountains SPA (004168)	Date site classified as SPA : 2007-03 https://www.npws.ie/protected-sites/spa/004168	S.I. No. 83 of 2012. 21 March 2012 http://www.irishstatutebook.ie/eli/2012/si/83/made/en/pdf	The entire wind farm project is within the boundary of the SPA.	– Hen Harrier (*Circus cyaneus*) [A082] – Merlin (*Falco columbarius*) [A098]	To restore the favourable conservation condition of hen harrier in Slieve Aughty Mountains SPA, To maintain the favourable conservation condition of merlin in the Slieve Aughty Mountains SPA (NPWS, 2022)
Sonnagh Bog SAC (001913)	Date site proposed as SCI: 1997-11 https://www.npws.ie/protected-sites/sac/001913	S.I. No. 657 of 2019 17 December 2019 http://www.irishstatutebook.ie/eli/2019/si/657/made/en/print?q=habitats&years=2019	1.5 km north west of wind farm site 2.8 km north west of grid connection	– Blanket bogs (* if active bog) [7130]	To restore the favourable conservation condition of Blanket bogs (* if active bog) in Sonnagh Bog SAC. (NPWS,2019)
Drummin Wood SAC (002181)	Date site proposed as SCI: 1999-12 https://www.npws.ie/protected-sites/sac/002181	S.I. No. 248 of 2016 17 May 2016 http://www.irishstatutebook.ie/eli/pdf/2016/en.si.2016.0248.pdf	7.4 km south west of wind farm site 9.3 km west of grid connection	– Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	To maintain the favourable conservation condition of Old sessile oak woods with *Ilex and Blechnum* in the British Isles in Drummin Wood SAC. (NPWS, 2021)
Peterswell Turlough SAC (000318)	Date site proposed as SCI: 1997-11	None	7.7 km north west of wind farm site	– Turloughs [3180]	To restore the favourable conservation condition of

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
	https://www.npws.ie/protected-sites/sac/000318		9.8 km north west of grid connection	– Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270]	Turloughs* in Peterswell Turlough SAC To restore the favourable conservation condition of Rivers with muddy banks with *Chenopodion rubri p.p. and Bidention p.p*. vegetation in Peterswell Turlough SAC, (NPWS, 2021)
Lough Rea SPA (004134)	Date site classified as SPA: 2007-02 https://www.npws.ie/protected-sites/spa/004134	S.I. No. 72 of 2010 19 February 2010 http://www.irishstatutebook.ie/eli/2010/si/72/made/en/pdf	8.9 km north of wind farm site 9.7 km north of grid connection	– Shoveler (*Anas clypeata*) [A056] – Coot (*Fulica atra*) [A125] – Wetland and Waterbirds [A999]	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. To maintain or restore the favourable conservation condition of the wetland habitat at Lough Rea SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. (NPWS, 2025)
Lough Rea SAC (000304)	Date site proposed as SCI: 1998-05 https://www.npws.ie/protected-sites/sac/000304	S.I. No. 447 of 2017 12 October 2017	8.9 km north of wind farm site 9.7 km north of grid connection	– Hard oligo-mesotrophic waters with benthic vegetation of *Chara spp*. [3140]	To maintain the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of *Chara spp.* in Lough Rea SAC

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
		http://www.irishstatutebook.ie/eli/2017/si/447/made/en/pdf			(NPWS, 2019)
Lough Coy SAC (002117)	Date site proposed as SCI: 1997-11 https://www.npws.ie/protected-sites/sac/002117	S.I. No. 145 of 2024 11 April 2024 https://www.irishstatutebook.ie/eli/2024/si/145/made/en/pdf	9 km north west of wind farm site 11 km north west of grid connection	– Turloughs [3180]	To restore the favourable conservation condition of Turloughs in Lough Coy SAC (NPWS, 2021)
Pollagoona Bog SAC (002126)	Date site proposed as SCI: 1997-08 https://www.npws.ie/protected-sites/sac/002126	S.I. No. 602 of 2019 29 November 2019 http://www.irishstatutebook.ie/eli/2019/si/602/made/en/print?q=habitats&years=2019	9 km south east of wind farm site 2 km south of grid connection	– Blanket bogs (* if active bog) [7130]	To restore the favourable conservation condition of Blanket bogs (* if active bog) in Pollagoona Bog SAC (NPWS 2017)
Gortacarnaun Wood SAC (002180)	Date site proposed as SCI: 1999-09 https://www.npws.ie/protected-sites/sac/002180	S.I. No. 247 of 2016 17 May 2016 http://www.irishstatutebook.ie/eli/pdf/2016/en.si.2016.0247.pdf	9 km south west of wind farm site 11 km west of grid connection	– Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]	To maintain the favourable conservation condition of Old sessile oak woods with Ilex and Blechnum in the British Isles in Gortacarnaun Wood SAC. (NPWS, 2021)
Carrowbaun, Newhall and	Date site proposed as SCI: 2003-02	S.I. No. 295 of 2016 3 June 2016	9.6 km west of wind farm site	– Turloughs [3180]	To restore the favourable conservation condition of

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
Ballylee Turloughs SAC (002293)	https://www.npws.ie/protected-sites/sac/002293	http://www.irishstatutebook.ie/eli/2016/si/295/made/en/pdf	11.9 km west of grid connection		Carrowbaun, Newhall and Ballylee Turloughs SAC (NPWS, 2021)
Lough Cutra SPA (004056)	Date site classified as SPA: 1995-11 https://www.npws.ie/protected-sites/spa/004056	S.I. No. 243 of 2010. 26 May 2010 http://www.irishstatutebook.ie/eli/2010/si/243/made/en/pdf	10 km south west of wind farm site 12 km west of grid connection 22 km from wind farm site hydrologically	– Cormorant (*Phalacrocorax carbo*) [A017]	To restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. (NPWS, 2025)
Lough Cutra SAC (000299)	Date site proposed as SCI: 2003-03 https://www.npws.ie/protected-sites/sac/000299	S.I. No. 446 of 2017 12 October 2017 http://www.irishstatutebook.ie/eli/2017/si/446/made/en/pdf	10 km south west of wind farm site 12 km west of grid connection 22 km from wind farm site hydrologically	– *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	To restore the favourable conservation condition of Lesser Horseshoe Bat in Lough Cutra SAC (NPWS, 2018)
Ballinduff Turlough SAC (002295)	Date site proposed as SCI: 2003-02 https://www.npws.ie/protected-sites/sac/002295	S.I. No. 526 of 2016 12 October 2016 http://www.irishstatutebook.ie/eli/2016/si/526/made/en/pdf	11.7 km north west of wind farm site 13.7 km north west of grid connection	− Turloughs [3180]	To maintain the favourable conservation condition of Turloughs in Ballinduff Turlough SAC (NPWS, 2021)

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
Pollnaknockaun Wood Natura Reserve SAC (000319)	Date site proposed as SCI: 1997-08 https://www.npws.ie/protected-sites/sac/000319	S.I. No. 241 of 2016 17 May 2016 http://www.irishstatutebook.ie/eli/pdf/2016/en.si.2016.0241.pdf	12.6 km south east of wind farm site 10.9 km east of grid connection	– Old sessile oak woods with *Ilex and Blechnum* in the British Isles [91A0]	To maintain the favourable conservation condition of Old sessile oak woods with *Ilex and Blechnum* in the British Isles in Pollnaknockaun Wood Nature Reserve SAC (NPWS 2018)
Loughatoric South Bog SAC (000308)	Date site proposed as SCI: 1997-11 https://www.npws.ie/protected-sites/sac/000308	S.I. No. 474/2019 20 September 2019 http://www.irishstatutebook.ie/eli/2019/si/474/made/en/print?q=habitats&years=2019	12.8 km south east of wind farm project 6 km south east of grid connection	– Blanket bogs (* if active bog) [7130]	To restore the favourable conservation condition of Blanket bogs (* if active bog) in Loughatorick South Bog SAC. (NPWS, 2019)
Kiltartan Cave (Coole) SAC (000286)	Date site proposed as SCI: 2002-01 https://www.npws.ie/protected-sites/sac/000286	S.I. No. 239 of 2016 17 May 2016 http://www.irishstatutebook.ie/eli/pdf/2016/en.si.2016.0239.pdf	12.7 km west of wind farm site 15 km west of grid connection	– Caves not open to the public [8310] – *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	Caves not open to the public (8310) is integrally linked to lesser horseshoe bat (*Rhinolophus hipposideros*) (1303) as part of the habitat for the species; therefore, a separate conservation objective has not been set for the habitat in Kiltartan Cave (Coole) SAC. (NPWS, 2018)

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
Derrycrag Wood Nature Reserve SAC (000261)	Date site proposed as SCI: 1997-08 https://www.npws.ie/protected-sites/sac/000261	S.I. No. 238 of 2016 17 May 2016 http://www.irishstatutebook.ie/eli/pdf/2016/en.si.2016.0238.pdf	13 km south east of wind farm site 10 km east of grid connection	– Old sessile oak woods with *Ilex and Blechnum* in the British Isles [91A0]	To maintain the favourable conservation condition of Old sessile oak woods with *Ilex and Blechnum* in the British Isles in Derrycrag Wood Nature Reserve SAC (NPWS 2018)
Coole-Garryland Complex SAC (000252)	Date site proposed as SCI: 1998-05 https://www.npws.ie/protected-sites/sac/000252	S.I. No. 470 of 2022 20 September 2022 https://www.irishstatutebook.ie/eli/2022/si/470/made/en/pdf	13.4 km west of wind farm site 15.5 km west of grid connection	– Natural eutrophic lakes with *Magnopotamion or Hydrocharition* - type vegetation [3150] – Turloughs [3180] – Rivers with muddy banks with *Chenopodion rubri p.p. and Bidention p.p.* vegetation [3270] – *Juniperus communis* formations on heaths or calcareous grasslands [5130] – Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia)* (* important orchid sites) [6210]	To maintain the favourable conservation condition of Natural eutrophic lakes with *Magnopotamion or Hydrocharition* - type vegetation in Coole-Garryland Complex SAC. To restore the favourable conservation condition of Turloughs* in Coole-Garryland Complex SAC. To restore the favourable conservation condition of Rivers with muddy banks with *Chenopodion rubri p.p. and Bidention p.p. vegetation* in Coole-Garryland Complex SAC. To restore the favourable conservation condition of *Juniperus communis* formations on heaths or

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
				– Limestone pavements [8240] – *Taxus baccata* woods of the British Isles [91J0]	calcareous grasslands in Coole-Garryland Complex SAC. To restore the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) in Coole-Garryland Complex SAC. Favourable conservation condition of Limestone pavements* in Coole Garryland Complex SAC. To restore the favourable conservation condition of *Taxus baccata woods* of the British Isles* To maintain the Favourable conservation condition of the Lesser Horseshoe Bat in Coole Garryland Complex SAC. (NPWS, 2024)
Coole-Garryland SPA (004107)	Date site classified as SPA: 1996-10 https://www.npws.ie/protected-sites/spa/004107	S.I. No. 236 of 2010 26 May 2010 http://www.irishstatutebook.ie/eli/2010/si/236/made/en/pdf	13.8 km west of wind farm site 16 km west of grid connection	– Whooper Swan (*Cygnus cygnus*) [A038]	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
					(NPWS, 2025)
Ardrahan Grassland SAC (002244)	Date site proposed as SCI: 2002-01 https://www.npws.ie/protected-sites/sac/002244	S.I. No. 522 of 2019 22 October 2019 http://www.irishstatutebook.ie/eli/2019/si/522/made/en/print?q=habitats&years=2019	14.6 km north west of wind farm site 16 km north west of grid connection	– Alpine and Boreal heaths [4060] – *Juniperus communis* formations on heaths or calcareous grasslands [5130] – Limestone pavements [8240]	To maintain the favourable conservation condition of Alpine and Boreal heaths in Ardrahan Grassland SAC. To restore the favourable conservation condition of Juniperus communis formations on heaths or calcareous grasslands in Ardrahan Grassland SAC. To restore the Favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) in Ardrahan Grassland SAC. To maintain the favourable conservation condition of Limestone pavements* in Ardrahan Grassland SAC. (NPWS, 2024)
Rosturra Wood SAC (001313)	Date site proposed as SCI: 1997-08	S.I. No. 243 of 2016 17 May 2016	15.5 km east of wind farm site	– Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	To maintain the favourable conservation condition of Old sessile oak woods with *Ilex and*

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
	https://www.npws.ie/protected-sites/sac/001313	http://www.irishstatutebook.ie/eli/pdf/2016/en.si.2016.0243.pdf	13.7 km east of grid connection		*Blechnum* in the British Isles in Rosturra Wood SAC (NPWS 2018)
Cloonmoylan Bog SAC (000248)	Date site proposed as SCI: 1997-11 https://www.npws.ie/protected-sites/sac/000248	S.I. No. 158 of 2022 31 March 2022 https://www.irishstatutebook.ie/eli/2022/si/158/made/en/pdf	15.9 km east of wind farm site 13.7 km east of grid connection	– Active raised bogs [7110] – Degraded raised bogs still capable of natural regeneration [7120] – Depressions on peat substrates of the *Rhynchosporion* [7150] – Bog woodland [91D0]	To maintain the favourable conservation condition of Bog woodland in Cloonmoylan Bog SAC. The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Cloonmoylan Bog SAC. (NPWS, 2016)
Glendree Bog SAC (001912)	Date site proposed as SCI: 1997-11 https://www.npws.ie/protected-sites/sac/001912	S.I. No. 652 of 2019 17 December 2019 https://www.irishstatutebook.ie/eli/2019/si/652/made/en/pdf	16 km south west of wind farm site 15 km south west of grid connection	– Blanket bogs (* if active bog) [7130]	To restore the favourable conservation condition of Blanket bogs (* if active bog) in Glendree Bog SAC. (NPWS, 2019)

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
Barroughter Bog SAC (000231)	Date site proposed as SCI: 1997-11 https://www.npws.ie/protected-sites/sac/000231	S.I. No. 39 of 2023 8 February 2023 https://www.irishstatutebook.ie/eli/2023/si/39/made/en/pdf	18 km east of wind farm 14.3 km east of grid connection 22 km from wind farm site hydrologically	– Active raised bogs [7110] – Degraded raised bogs still capable of natural regeneration [7120] – Depressions on peat substrates of the *Rhynchosporion* [7150]	To restore the favourable conservation condition of Active raised bogs in Barroughter Bog SAC. The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not Depressions on peat substrates of the *Rhynchosporion* is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Barroughter Bog SAC (NPWS, 2015)
Lough Derg (Shannon) SPA (004058)	Date site classified as SPA: 1995-11 https://www.npws.ie/protected-sites/spa/004058	S.I. No. 331 of 2019 2 July 2019 http://www.irishstatutebook.ie/eli/2019/si/331/	18 km south east of wind farm site 13 km east of grid connection	– Cormorant (*Phalacrocorax carbo*) [A017] – Tufted Duck (*Aythya fuligula*) [A061]	To restore the Favourable conservation condition of Cormorant in Lough Derg (Shannon) SPA.

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
		made/en/print?q=Lough+Derg	23 km from wind farm site hydrologically	– Goldeneye (*Bucephala clangula*) [A067] – Common Tern (*Sterna hirundo*) [A193] – Wetland and Waterbirds [A999]	To maintain the Favourable conservation condition of Tufted Duck at Lough Derg (Shannon) SPA. To maintain the Favourable conservation condition of Goldeneye at Lough Derg (Shannon) SPA. To restore the Favourable conservation condition of Common Tern in Lough Derg (Shannon) SPA. To maintain the Favourable conservation condition of Wetland habitats in Lough Derg (Shannon) SPA as a resource for the regularly-occurring migratory waterbirds that utilise these areas. (NPWS, 2024)
Lough Derg, North-east Shore SAC (002241)	Date site proposed as SCI: 2002-01 https://www.npws.ie/protected-sites/sac/002241	S.I. No. 74 of 2018 6 February 2018 http://www.irishstatutebook.ie/eli/2018/si/74/made/en/print?q=Lough+Derg	18 km east of wind farm 13 km east of grid connection 23 km from wind farm site hydrologically	– *Juniperus communis* formations on heaths or calcareous grasslands [5130] – Calcareous fens with *Cladium mariscus* and	To restore the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in Lough Derg, North-east Shore SAC. To maintain the favourable conservation condition of

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
				species of the *Caricion davallianae* [7210] – Alkaline fens [7230] – Limestone pavements [8240] – Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* [91E0] – *Taxus baccata woods* of the British Isles [91J0]	Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae** in Lough Derg, North-east Shore SAC. To maintain the favourable conservation condition of Alkaline fens in Lough Derg, North-east Shore SAC. To restore the favourable conservation condition of Limestone pavements* in Lough Derg, North-east Shore SAC. To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)** in Lough Derg, North-east Shore SAC. To maintain the favourable conservation condition of *Taxus baccata woods* of the British Isles* in Lough Derg, North-east Shore SAC. (NPWS, 2019)

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
Caherglassaun Turlough SAC (000238)	Date site proposed as SCI: 2002-01 https://www.npws.ie/protected-sites/sac/000238	None	16 km west of wind farm project 18 km west of grid connection 40 km from wind farm site hydrologically	– Turloughs [3180] – Rivers with muddy banks with *Chenopodion rubri p.p. and Bidention p.p.* vegetation [3270] – *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	To restore the favourable conservation condition of Turloughs in Caherglassaun Turlough SAC (NPWS 2019) To maintain the favourable conservation condition of Rivers with muddy banks with *Chenopodion rubri p.p. and Bidention p.p. vegetation* / Lesser Horseshoe Bat in Caherglassaun Turlough SAC (NPWS 2018)
Cahermore Turlough SAC (002294)	Date site proposed as SCI: 2003-02 https://www.npws.ie/protected-sites/sac/002294	S.I. No. 250 of 2016 17 May 2016 http://www.irishstatutebook.ie/eli/2016/si/250/made/en/print?q=Cahermore+Turlough	16 km west of wind farm project 18 km west of grid connection 40 km from wind farm site hydrologically	– Turloughs [3180]	To restore the favourable conservation condition of Turloughs in Cahermore Turlough SAC. (NPWS, 2021)
Galway Bay Complex SAC (000268)	Date site proposed as SCI: 1999-08 https://www.npws.ie/protected-sites/sac/000268	S.I. No. 548 of 2021 15 October 2021 https://www.irishstatutebook.ie/eli/2021/si/548/made/en/pdf	21 km north west of wind farm project 23 km west of grid connection 45 km from wind farm site hydrologically	– Mudflats and sandflats not covered by seawater at low tide [1140] – Coastal lagoons [1150]	To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide / Large shallow inlets and bays / Reefs / Perennial vegetation of stony banks / Salicornia and other annuals

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
				– Large shallow inlets and bays [1160] – Reefs [1170] – Perennial vegetation of stony banks [1220] – Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] – 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] – Semi-natural dry grasslands and scrubland facies on calcareous substrates *(Festuco-Brometalia*) (*	colonising mud and sand / Turloughs / Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* / Alkaline fens / Harbour Seal in Galway Bay Complex SAC (NPWS 2013) To restore the favourable conservation condition of Coastal lagoons / Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)* / Mediterranean salt meadows (*Juncetalia maritimi)* / *Juniperus communis* formations on heaths or calcareous grasslands / Otter in Galway Bay Complex SAC (NPWS 2013)

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
				important orchid sites) [6210] – Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] – Alkaline fens [7230] – Limestone pavements [8240] – *Lutra lutra* (Otter) [1355] – *Phoca vitulina* (Harbour Seal) [1365]	
Inner Galway Bay SPA (004031)	Date site proposed as SCI: 1994-11 https://www.npws.ie/protected-sites/spa/004031	S.I. No. 515/2019 16 October 2019 http://www.irishstatutebook.ie/eli/2019/si/515/made/en/print?q=Inner+Galway+Bay+	21 km north west of wind farm site 23 km west of grid connection 45 km from wind farm site hydrologically	– Great Northern Diver (*Gavia immer)* [A003] – Cormorant *(Phalacrocorax carbo)* [A017] – Grey Heron *(Ardea cinerea)* [A028] – Light-bellied Brent Goose (*Branta bernicla hrota)* [A046] – Wigeon (Anas penelope) [A050]	To maintain the favourable conservation condition of Great Northern Diver in Inner Galway Bay SPA. To maintain the favourable conservation condition of Cormorant in Inner Galway Bay SPA. To maintain the favourable conservation condition of Grey Heron in Inner Galway Bay SPA. To maintain the favourable conservation condition of Light-

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
				– 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]	bellied Brent Goose in Inner Galway Bay SPA. To maintain the favourable conservation condition of Wigeon in Inner Galway Bay SPA. To maintain the favourable conservation condition of Teal in Inner Galway Bay SPA. To maintain the favourable conservation condition of Shoveler in Inner Galway Bay SPA. To maintain the favourable conservation condition of Red-breasted Merganser in Inner Galway Bay SPA. To maintain the favourable conservation condition of Ringed Plover in Inner Galway Bay SPA. To maintain the favourable conservation condition of Golden Plover in Inner Galway Bay SPA. To maintain the favourable conservation condition of Lapwing in Inner Galway Bay SPA.

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
				– Black-headed Gull *(Chroicocephalus ridibundus)* [A179] – Common Gull *(Larus canus)* [A182] – Sandwich Tern (*Sterna sandvicensis*) [A191] – Common Tern *(Sterna hirundo)* [A193] – Wetland and Waterbirds [A999]	To maintain the favourable conservation condition of Dunlin in Inner Galway Bay SPA. To maintain the favourable conservation condition of Bar-tailed Godwit in Inner Galway Bay SPA. To maintain the favourable conservation condition of Curlew in Inner Galway Bay SPA. To maintain the favourable conservation condition of Redshank in Inner Galway Bay SPA. To maintain the favourable conservation condition of Turnstone in Inner Galway Bay SPA. To maintain the favourable conservation condition of Black-headed Gull in Inner Galway Bay SPA. To maintain the favourable conservation condition of Common Gull in Inner Galway Bay SPA. To maintain the favourable conservation condition of Sandwich Tern in Inner Galway Bay SPA,

European Sites (Natura 2000)	Date site proposed for Classification	Statutory Instrument	Distance from Wind Farm Project (Approximate)	Qualifying Interest / Special Conservation Interest	Conservation Objectives
					To maintain the favourable conservation condition of Common Tern. To maintain the favourable conservation condition of wetland habitat in Inner Galway Bay SPA as a resource for the regularly occurring migratory waterbirds that utilise itrn in Inner Galway Bay SPA. (NPWS, 2013)

4.4.1 Brief description of European sites

All of the following descriptions have been sourced from NPWS site synopses (referenced in Section 6) and found at www.npws.ie.

4.4.1.1 Slieve Aughty Mountains SPA (004168)

The Slieve Aughty Mountains SPA is a very large site that extends from just south of Lough Rea in the north to as far south as Scariff in Co. Clare. The peaks are not notably high or indeed pronounced, with a maximum of 378 m near Cappaghabaun Mountain. The site includes many small and medium sized lakes, notably Lough Graney and Lough Atorick. Important rivers which rise in the site include the Owendalulleegh and Graney. Lough Derg occurs immediately to the south-east of the site. The Slieve Aughty hills are predominantly comprised of Old Red Sandstone. Outliers of Lower Palaeozoic provide occasional outcrops capping the hills.

The site consists of a variety of upland habitats, though approximately half is afforested. The coniferous forests include first and second rotation plantations, with both pre-thicket and post-thicket stands present. Substantial areas of clearfell are also present at any one time. The principal trees are sitka spruce (*Picea sitchensis*) and lodgepole pine (*Pinus contorta*). Almost one-third of the site is unplanted blanket bog and heath, with both wet and dry heath present. Well developed blanket bog occurs at several locations. The remainder of the site is largely rough grassland that is used for hill farming. This varies in composition, with some wet areas with rushes (*Juncus* spp.) and some areas with scrub encroachment.

The SPA is of importance for supporting nationally important populations of hen harrier and merlin. Red grouse, a Red-listed species, is widespread in the bog and heath habitats throughout the site.

4.4.1.2 Sonnagh Bog SAC (001913)

Sonnagh Bog is located at the northern end of the Slieve Aughty Mountains, approximately 8 km south-west of Loughrea in Co. Galway. The site ranges in altitude from 198 m to 317 m. The topography of the site is of a narrow plateau and valleys, one of which is occupied by Lough Belsrah.

Sonnagh Bog is important as a good example of an intact, lightly grazed, highland blanket bog. Blanket Bog is a rare and increasingly threatened habitat that is listed with priority status on Annex I of the E.U. Habitats Directive.

4.4.1.3 Drummin Wood SAC (002181)

Drummin Wood is situated on sloping ground in the foothills of the Slieve Aughty Mountains in Co. Galway, at an altitude of approximately 50-70 m, some 3 km east of Lough Cutra. The area is drained by the Owendalulleegh River, which occurs to the south. Woodland

occupies about 60% of the area of the site. Most of the woodland is referrable to a type known as the 'Blechno-Quercetum petraeae association, sub-association coryletosum'.

The other main habitats on the site are heath and areas dominated by Bracken (*Pteridium aquilinum*). The heath is of good quality and includes species such as Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*), Purple Moor-grass (*Molinia caerulea*) and Tormentil (*Potentilla erecta*). A stream and small lake (Lodgehill Lough) occur within the site, along with some marsh and wet grassland vegetation.

4.4.1.4 Peterswell Turlough SAC (000318)

Peterswell Turlough is a large and important site which shows an excellent range of vegetation along the turlough-callow gradient and includes a summer-dry turlough filled by a river. Further, Peterswell Turlough is part of a complex of turloughs running down to Lough Coy and Ballylee. The site is the lower valley and sink for the Kilchreest River, with a tributary from Castledaly

4.4.1.5 Lough Rea SPA (004134)

Lough Rea, a hard water lake, is situated directly south of the town of Loughrea, Co. Galway. The lake is 2.5 km at its longest axis. It is an important ornithological site for the nationally important populations of Shoveler and Coot and the regionally/locally important populations of a further ten species that it holds.

4.4.1.6 Lough Rea SAC (000304)

Lough Rea is a hard water lake, a habitat listed on Annex I of the E.U. Habitats Directive. The site is largely surrounded by intensively farmed pasture and consequently the main threat to the lake comes from agricultural run-off.

4.4.1.7 Lough Coy SAC (002117)

Lough Coy is situated approximately 6.5 km north-east of Gort in Co. Galway and lies close to the Slieve Aughty hills. The site consists of a small permanent lake in the middle of an almost circular turlough basin. There are drift deposits, as well as outcropping rocks and boulders on the relatively steep side walls, and small areas of scrub towards the top of the basin. Areas of improved grassland above the normal flood line are included in the site for hydrological reasons. Lough Coy is part of a complex of small sites (along with nearby Blackrock, Ballylee and Bullaunagh turloughs)

The main land use within the site is cattle grazing which is quite heavy at the lake margins and on parts of the slopes. There is some removal of gravel from the drift deposits on the north western edge.

Lough Coy is an excellent example of a eutrophic (nutrient-rich) turlough. The extreme water fluctuation supports a distinctive zonation of vegetation and provides many niches for specialist plants.

4.4.1.8 Pollagoona Bog SAC (002126)

Pollagoona Bog is located close to the Clare-Galway county boundary, 300 m south-east of Lough Atorick and 10 km south-west of Woodford. The bog is situated on a shallow saddle, on flat to gently sloping land surrounded by conifers at an altitude of 150 m. The site is a small blanket bog that shows some features of a raised bog.

4.4.1.9 Gortacarnaun Wood SAC (002180)

This site is situated in the foothills of the Slieve Aughty Mountains in Co. Galway, approximately 2 km east of Lough Cutra. The northern boundary is marked by the Owendalulleegh River. Gortacarnaun Wood consists of a substantial area of woodland on sloped ground between approximately 60 and 90 m. The woodland is classified as the 'Blechno-Quercetum petraeae var. coryletosum' type.

4.4.1.10 Carrowbaun, Newhall and Ballylee Turloughs SAC (002293)

The Carrowbaun, Newhall and Ballylee Turloughs SAC complex is a group of three turloughs which are hydrologically linked in times of high flood. The site is at the southern end of a larger complex of turloughs which includes the SACs Lough Coy and Peterswell. It is usually the last of these to flood. The vegetation of Carrowbaun, Newhall and Ballylee has been largely modified by drainage works, fertilization and over-grazing, which reduce their botanical value.

4.4.1.11 Lough Cutra SPA (004056)

Lough Cutra is a large oligo/mesotrophic freshwater lake lying on limestone but with much sediment washed down from the sandstone hills above. The Owendalulleegh River is the main in-flowing river. Woodland occurs around much of the lakeshore. While much of this is planted, wet woodland with willows (*Salix spp*.) and Alder (*Alnus glutinosa*) is also represented. The lake has a number of islands, some of which are wooded.

Historical data for Lough Cutra show that it was a long-established breeding site for Cormorant (166 pairs in 1985), with birds recorded breeding on Parsons Island and appearing to commute to the coast for feeding (2009 site synopsis). However, declines were reported in 1996 (34 pairs) and monitoring conducted in 2010 as part of a study undertaken by Tierney *et al.* (2011) revealed that the colony at Lough Cutra had been recently abandoned. More recent counts undertaken in May 2017 showed that cormorants were present at the site but no breeding activities were recorded (Data provided by NPWS in 2018).

4.4.1.12 Lough Cutra SAC (000299)

Lough Cutra is a large oligo/mesotrophic freshwater lake lying on limestone, but with much sediment washed down from the sandstone hills above. Woodland occurs around much of the lakeshore, as well as on a number of islands. These woodlands provide feeding grounds for Lesser Horseshoe bats which roost at the site. Between 1999 and 2001 up to 93 bats were recorded in hibernation at Lough Cutra Castle and it is thought likely that a summer nursery roost also occurs here. A peak count of 142 bats was recorded in 2010. The most recent count data received from the NPWS show that the population of Lesser Horseshoe bat at the site is stable with 128 bats recorded in 2018.

4.4.1.13 Ballinduff Turlough SAC (002295)

Ballinduff Turlough is situated in a narrow basin in the limestone lowlands of south Co. Galway. It is part of the Coole Lough complex of lakes and turloughs, most of which are Special Areas of Conservation (SACs) or Natural Heritage Areas (NHAs). There are rock outcrops around the northern half and glacial drift in the south. The hydrology of the site is probably controlled by a complex of swallow holes and subsidence near Coolfin. During floods the turlough drains overland towards Coole Lough.

4.4.1.14 Pollnaknockaun Wood Natura Reserve SAC (000319)

Pollnaknockaun Wood is a large area of former oakwood with significant remnants of the original stands of Sessile Oak (*Quercus petraea*) and even larger areas of intact ground flora. Old Oak Woodlands are listed on Annex I of the E.U. Habitats Directive.

4.4.1.15 Loughatoric South Bog SAC (000308)

Loughatorick South Bog is located about 8 km north-west of Mountshannon, straddling the Clare/Galway border. It occupies the summit of Scalp Mountain and extends down the gentle slopes to the south and to the east. Scalp is one of the southernmost, and lower, of the Slieve Aughty Mountains, reaching a height of 325 m. At this elevation, the bog is an intermediate between lowland and mountain blanket bog and can be described as a highland blanket bog. Much of the rest of the Slieve Aughty range is heavily afforested, but this bog is remarkably intact, making it all the more valuable.

4.4.1.16 Kiltartan Cave (Coole) SAC (000286)

Kiltartan cave is a natural limestone cave situated north of Coole Park in Co. Galway, just off the main Galway-Ennis road. It is used as a hibernating site for the Lesser Horseshoe Bat. This cave, which has been well documented since 1863, is a segment of an abandoned stream course of the Gort River. A 3 m descent into the cave divides into two main

passages. The cave contains the following representative cave features: elliptical phreatic tube with local modification by roof collapse, roof tube still preserved in places, gour pools, straw stalactites and botryoidal calcite deposits. Water levels within the cave are known to fluctuate in winter with some passages filling completely with water; during severe flooding in 1994/95, all sections of the cave were filled with water except for small pockets in the roof.

The Lesser Horseshoe Bat, an Annex II species, uses the cave as a hibernation site. Numbers of Lesser Horseshoe Bats counted prior to the serious flooding in 1994/95 varied between 44 and 70. During the floods the cave was filled to the entrance. Following the floods, bat numbers remained low (10-15) until January 2001, when 41 individuals were counted. Most hibernating bats are found on the right hand side of the cave entrance, in a passage historically known as the 'Bat Passage', which runs north for 40 m and is floored by boulders. Coole Wood is within 500 m of the cave.

This is a particularly fine example of a fossil streamway cave, which contains many features of geological interest. Caves are listed on Annex I of the E.U. Habitats Directive. The presence of a significant population of Lesser Horseshoe Bat makes the site of international importance.

4.4.1.17 Derrycrag Wood Natura Reserve SAC (000261)

Derrycrag Wood is an old oak woodland, situated 1.5 km south-east of Woodford, Co. Galway, and is traversed by the Woodford River. The underlying rock is Old Red Sandstone, which is overlain in places by drift. The soils vary from thin, acidic podzols to deeper, gleyed brown earths. The site is dominated by planted conifers, but fragments of old oak woodland still occur.

Before commercial conifer planting in the 1930s and 1940s, this would have been part of the largest oak woodlands in the country. In the fragments remaining, the Sessile Oak (*Quercus petraea*) canopy can be up to 17m tall. The woodland also contains Rowan (*Sorbus aucuparia*) and Downy Birch (*Betula pubescens*), and Holly (*Ilex aquifolium*) and Yew (*Taxus baccata*) are locally abundant. Hazel (*Corylus avellana*) and Ash (*Fraxinus excelsior*) occur on the slightly richer soil.

Management of the wood includes the gradual removal of all conifers except for a few areas with mature Scots Pine. The cleared areas, however, are vulnerable to invasion by non-native species, e.g. Beech (*Fagus sylvaticus*) and to grazing by deer.

4.4.1.18 Coole-Garryland Complex SAC (000252)

The Coole-Garryland Complex is situated in a low-lying karstic limestone area west of Gort, in Co. Galway. It contains a series of seasonal lakes (turloughs), which are fed by springs and a partly submerged river, surrounded by woodland, pasture and limestone heath. The more well-known turloughs present in the site include Lydacan, Crannagh North, Raheen, Crannagh South, Coole, Garryland, Newtown and Hawkhill. The turloughs at Coole-Garryland are particularly good examples of this habitat type.

The Coole River itself is of particular interest for the occurrence of a rare riverine habitat characterised by Trifid Bur-marigold (*Bidens tripartita*), Red Goosefoot (*Chenopodium rubrum*) and species of Knotgrass (*Polygonum* spp.). In the habitat 'natural eutrophic lake' at the site, species such as Pondweeds (*Potamogeton perfoliatus* and *P. berchtoldii*), Water-starworts and Rigid Hornwort (*Ceratophyllum demersum*) are to be found.

4.4.1.19 Coole-Garryland SPA (004107)

The Coole-Garryland SPA is situated in a low-lying karstic limestone area west of Gort, Co. Galway. It comprises a series of turloughs, which are fed by springs and a partly submerged river, surrounded by woodland, pasture and limestone heath. Coole Lough is the largest and most permanent of the turloughs, and retains some water throughout the year. Water levels vary greatly depending on rainfall and this has consequences on the numbers of birds present. During prolonged dry spells, higher numbers of some species are present as birds from other sites in the catchment are attracted to the permanent waters of Coole Lough.

Coole-Garryland SPA is of international importance for its population of Whooper Swan, a species that is listed on Annex I of the E.U. Birds Directive. Coole Lough, a Wildfowl Sanctuary, has particular significance for wintering waterfowl as during prolonged dry spells it is one of the few sites in the catchment which retains open water. Coole Lough and Garryland Wood is a Ramsar Convention site, and parts of the Coole-Garryland SPA are designated as Statutory Nature Reserves and are managed by the National Parks and Wildlife Service.

4.4.1.20 Ardrahan Grassland SAC (002244)

This site lies immediately west and north of Ardrahan in south Co. Galway. It is dominated by a large flat limestone area with a mosaic of calcareous habitats including limestone pavement, alpine heath, Juniper scrub and species rich dry grasslands. In contrast, the south-west of the site consists of a small marl lake and adjoining fens and marshes, with Juniper heath frequent on the higher ground. Soils associated with limestone pavement are generally thin rendzina, deeper pockets are more mineral rich and support limestone grassland and scrub in places. The site contains a good example of limestone pavement, a priority habitat listed on Annex I of the E.U. Habitats Directive, a small though excellent example of the Annex I habitat alpine heath, along with one other Annex I habitat, Juniper scrub.

Land use at this site consists mainly of the traditional practise of winter grazing by cattle. This is a low intensity farming practise generally confined to the Burren in Ireland and one that is vital to the maintenance of the high scientific interest of this site. However, recent agricultural improvement has damaged the scientific interest of part of the site through loss of habitat in the turlough and limestone pavement areas. Intensification of the land usage around Brackloon Lough could lead to a deterioration in the water quality of the lake.

4.4.1.21 Rosturra Wood SAC (001313)

Rosturra Wood comprises part of what was formerly a large stand of Sessile Oak (*Quercus petraea*) woodland. It is situated about 3 km east of Woodford, Co. Galway and consists of two separate areas. In the 1930s and 1940s much of the wood was cleared and planted with coniferous species. However, the wood retains significant remnants of the original stands of Sessile Oak and its associated ground flora. The wood is situated on rich loamy soils and consequently the size and quality of the hardwood and the diversity of the ground flora is greater than in most Irish Sessile Oak woods. Almost half of Rosturra Wood is designated as a Statutory Nature Reserve.

Oak woods are rare in Ireland and those found on rich soils which are not the result of planting are even more rare. The remnants of original oak wood at Rosturra Wood (and at the neighbouring Derrycrag Wood and Pollnaknockaun Wood) are part of what was, until 1940, the largest area of natural oak wood in the country. Oak and Yew woodland such as that found at Rosturra Wood are habitats of considerable conservation significance and are listed on Annex I of the E.U. Habitats Directive.

4.4.1.22 Cloonmoylan Bog SAC (000248)

Cloonmoylan Bog is a very large expanse of level raised bog, situated close to the western shore of Lough Derg, near Woodford in Co. Galway. It lies at an altitude of approximately 50 m above sea-level.

This site contains a large area of good quality, intact active raised bog habitat. The surface displays a typical, undulating pattern of pools, wet channels and low hummocks. A wide variety of bog mosses occur over the surface of the bog, forming hummocks and wet lawns and colonising the pools.

At least half of the surface of the peat dome comprises degraded raised bog. These areas have significantly lower water levels than in adjoining active areas of bog and this results in the presence of a more species-poor peatland flora and a much lower cover of peat-forming Sphagnum mosses. The vegetation is generally dominated by more robust bog species such as Deergrass, Common Cottongrass, Heather, Cross-leaved Heath (*Erica tetralix*), Bog Asphodel and Carnation Sedge.

4.4.1.23 Glendree Bog SAC (001912)

Glendree Bog is located in the Slieve Aughty range of hills, 13 km north-west of Scarriff in Co. Clare. This highland blanket bog consists of a series of small plateaux and valleys, rimmed with sandstone outcrops. Lough Ea occurs on its eastern boundary.

Adding to the diversity of the site are three lakes and two small streams. The lakes, and especially the largest (Lough Ea), provide good examples of oligotrophic lakes, with characteristic species, including Shoreweed (*Littorella uniflora*), Water Lobelia (*Lobelia dortmanna*), and the regionally rare Quillwort (*Isoetes lacustris*).

The main threat to Glendree Bog is peat-cutting; significant areas of turbary are found adjacent to the track winding through the centre of the site.

Glendree is a very species-rich bog, on account of the wide diversity of habitats it contains. It is of particular importance because of the national scarcity of highland blanket bog and because of the presence of Quillwort, a regionally rare species.

4.4.1.24 Barroughter Bog SAC (000231)

Barroughter Bog is a relatively small raised bog, situated on the shores of Lough Derg in Co. Galway, a few kilometres east of Woodford, and bounded in the north by the Cappagh River.

A threat to the extent and quality of the central and most interesting habitat is present in the form of active "hopper" turf extraction around 90% of the bog's perimeter.

Barroughter Bog is a raised bog of considerable conservation value. Given its relatively small size, the area of outstanding quaking habitat is remarkably large. Its proximity to the shores of Lough Derg, with its succession from open water through extensive reed beds and marginal scrub, to raised bog, adds to its importance. It is also the only raised bog on the shores of Lough Derg.

4.4.1.25 Lough Derg (Shanon) SPA (004058)

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant, Tufted Duck, Goldeneye and Common Tern. 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 Wetland & Waterbirds.

Lough Derg (Shannon) SPA is of high ornithological importance as it supports nationally important breeding populations of Cormorant and Common Tern. In winter, it has nationally important populations of Tufted Duck and Goldeneye.

4.4.1.26 Lough Derg, North-east Shore SAC (002241)

Lough Derg, the lowest order lake on the River Shannon, is one of the largest bodies of freshwater in Ireland. This SAC, however, only includes the northern shore of the lake from the mouth of the Cappagh River in the north-west to just below Black Lough at the north-eastern shore.

This is a site of significant ecological interest, with six habitats listed on Annex I of the E.U. Habitats Directive. Four of these are priority habitats - *Cladium* fen, alluvial woodland, limestone pavement and Yew woodland. Other annexed habitats present include alkaline fen and Juniper scrub formations on heath and calcareous grasslands.

The main threats to the quality of the site are water polluting activities resulting from intensification of agricultural activities around the lake shore, uncontrolled discharge of sewage, which is causing eutrophication of the lake, and housing and boating development which has resulted in the destruction of lakeshore habitats. There is also significant fishing and shooting pressure on and around the lake. Forestry can result in the loss of some areas of wetland habitat.

4.4.1.27 Caherglassaun Turlough SAC (000238)

Caherglassaun is a large lake located 6 km north-west of Gort and 5 km south-east of Kinvarra in the low-lying farmland of east Co. Galway. Situated in a natural depression just 2 km to the north-west of Coole Nature Reserve, this site comprises a permanent lake at its core, while the rest of the basin functions as a turlough. At times of high water, the site can flood to a depth of 10-15 m. Because of its proximity to sea-level, the lake fluctuates 30 cm or so in a tidal cycle, but it is delayed significantly behind tidal height at Kinvarra.

Caherglassaun Turlough SAC is designated for the Annex I habitats - Turloughs [3180], Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270] and the Annex II Species *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]. A bat roost exists within the site. Lesser Horseshoe Bat and Natterer's Bat

Any development which would involve drainage or alteration of the water table would threaten this site. Presence of grazers will also influence the site - low grazing levels would facilitate the further development of woodland at the site.

4.4.1.28 Cahermore Turlough SAC (002294)

Cahermore Turlough SAC is situated in the limestone lowlands of south Co. Galway, about 5 km north-west of Gort and 5.5 km south-east of Kinvara. The site is designated for the Annex I habitat - Turloughs [3180] and is part of a series of lakes and turloughs in the region. The nearest is Caherglassaun Turlough, the water levels of which are slightly higher than Cahermore.

The turlough is on the dry end of the spectrum, and there is no standing water in summer except for a few small ponds dug for cattle. A few collapse features occur in the drift on the southern side with a regular swallow-hole at the edge of the flooded area. Another hole occurs in the south-east corner. The turlough appears to flood largely from the southern side.

4.4.1.29 Galway Bay Complex SAC (000268)

Situated on the west coast of Ireland, this site comprises the inner, shallow part of a large bay which is partially sheltered by the Aran Islands. A diverse range of marine, coastal and terrestrial habitats, including several listed on Annex I of the E.U. Habitats Directive, occur within the site, making the area of high scientific importance.

Galway Bay South holds a very high number of littoral communities (12). They range from rocky terraces, to sandy beaches with rock or sand dunes behind. The intertidal sediments of Galway Bay support good examples of communities that are moderately exposed to wave action.

Fishing and aquaculture are the main commercial activities within the site. A concern is that sewage effluent and detritus of the aquaculture industry could be deleterious to benthic communities. Reef and sediment communities are vulnerable to disturbance or compaction from tractors accessing oyster trestles. The *Paracentrotus lividus* populations have been shown to be vulnerable to over-fishing. Extraction of maerl in Galway Bay is a threat. Owing to the proximity of Galway city, shoreline and terrestrial habitats are under pressure from urban expansion and recreational activities. Eutrophication is probably affecting some of the lagoons and is a continued threat. Drainage is a general threat to the turlough and fen habitats. Bird populations may be disturbed by aquaculture activities.

4.4.1.30 Inner Galway Bay SPA (004031)

Inner Galway Bay SPA is a very large, marine-dominated site situated on the west coast of Ireland. The inner bay is protected from exposure to Atlantic swells by the Aran Islands and Black Head. Subsidiary bays and inlets (e.g. Poulnaclough, Aughinish and Kinvarra Bays) add texture to the patterns of water movement and sediment deposition, which lends variety to the marine habitats and communities. The terraced Carboniferous (Viséan) limestone platform of the Burren sweeps down to the shore and into the sublittoral. The long shoreline is noted for its diversity, and comprises complex mixtures of bedrock shore, shingle beach, sandy beach and fringing salt marshes. Intertidal sand and mud flats occur around much of the shoreline, with the largest areas being found on the sheltered eastern coast between Oranmore Bay and Kinvarra Bay. A number of small islands and rocky islets in the Bay are included within the site.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Black-throated Diver, Great Northern Diver, Cormorant, Grey Heron, Light-bellied Brent Goose, Wigeon, Teal, Red-breasted Merganser, Ringed Plover, Golden Plover, Lapwing, Dunlin, Bar-tailed Godwit, Curlew, Redshank, Turnstone, Black-headed Gull, Common Gull, Sandwich Tern and Common Tern. 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 Wetland & Waterbirds.

Inner Galway Bay supports an excellent diversity of wintering wetland birds, with divers, grebes, cormorants, dabbling duck, sea duck and waders all well represented. The site has several important populations of breeding birds, most notably colonies of Sandwich Tern (81 pairs in 1995) and Common Tern (98 pairs in 1995 on Green Island and 46 pairs in 2001 on Mutton Island). A large Cormorant colony occurs on Deer Island - this had 200 pairs in 1985 and 300 pairs in 1989.

4.5 Identification of potential impacts

The potential impacts associated with the construction (including the peat slide and associated works that occurred in 2003), operation and ceased operation of the project as well as the Retained Development are identified in this section. The impacts identified below are those which are likely to have occurred, which are occurring or which can reasonably be expected to occur based on the nature and scale of the project and the Qualifying Interests and Special Conservation Interests of the European sites identified in Table 2.

Potential impacts due to construction activities

- Loss of habitat (including subsequent alteration/change of habitat)
- Mortality of individual birds / bats
- Disturbance of birds / bats due to presence of personnel/machinery
- Pollution of surface waters and impact on fisheries owing to an increase in runoff of inorganic and peat solids, combined with increased nutrients from clearfelling.

Potential impacts due to peat slide and associated activities

- Loss of habitat (including subsequent alteration/change of habitat)
- Mortality of individual birds / bats
- Disturbance of birds due to presence of personnel/machinery
- Pollution of surface waters and impact on aquatic life owing to peat solids.

Potential impacts due to operation and maintenance activities

- Collision risk to birds and bats associated with operating turbines
- Collision risk to birds with overhead powerline
- Displacement of birds and bats due to operation of turbines
- Disturbance to species associated with maintenance activities on site e.g. removal of self-sown conifers, road and drain maintenance
- Impacts on reproductive output in relation to wind turbine proximity
- Barrier effects
- Pollution of receiving waters with siltation due to maintenance activities

Potential impacts due to ceased operation

- Collision risk to birds with overhead powerline
- Habitat change due to spread of self-seeded conifer trees in areas where they were managed during operation
- Habitat change due to re-wetting of bog arising from the absence of any drain maintenance

Potential impacts due to Retained Development

- Permanent loss of cutover bog habitat due to retention of concrete turbine foundations, hardstand areas, the substation foundations, and constructed roads within the unplanted eastern sector of the site
- Long-term habitat change due to retention of naturalised peat repository areas previously covered in non-native conifer plantation
- Long-term establishment of wet grassland and scrub habitats in the offsite barrages and repository areas that were previously occupied by non-native conifer plantation
- Long-term improvement in quality of surface water owing to reduced efficiency of the drainage network and the installation of a new culvert along the Coillte forest access track (Lough Atorick catchment) that will replace an existing collapsed/subsided culvert (as part of the Prospective Development)
- Long-term low level of suspended solids wash-out to the Derrywee East stream from the residual small, largely vegetated, hardcore layby area east of Crooked Bridge with no noticeable effects on any sensitivities of the Knocknarebana sub catchment. Into the future, the lay-by area may further vegetate, further reducing the source area for solids wash-out.
- Permanent/Long-term minor reduction in downstream mobilisation of finer substrates[14] associated with the retention of Barrages 3 and 4 on the Derrybrien North stream, but with no likely significant negative effect on quality of fisheries habitat in the Owendalulleegh River given there are considerable alternative sources of fine substrate from numerous adjoining tributaries.

[14] Finer substrates are required to provide suitable downstream habitat for fish species.

4.6 Assessment of significance of effects

All sites identified as being within the ZoI of the project have been assessed in the following section to determine if there is an impact pathway between the project and the sites, if the project is likely to have had or to have an effect on these sites and if the effects are likely to have been or to be significant. The source (potential impacts from the project), pathways (hydrological, physical or ecological connectivity) and receptors (Qualifying Interests and Special Conservation Interests of the European sites) were examined to determine potential source – pathway – receptor connectivity. This was undertaken using GIS software and various data sources including NPWS and EPA data.

Most European sites that are within the same river catchment or which have a hydrological connection have been grouped together for assessment, as many of the potential impacts on these sites are similar (or related) owing to their connectivity and features of interest.

The potential for impacts and likelihood of significant effects on the features of interest identified in this report is based on information collated from the desk study, the nature of the project, site visits and the detailed information provided in the relevant chapters of the rEIAR.

4.6.1 Slieve Aughty Mountains SPA (004168)

The Slieve Aughty Mountains SPA is designated for hen harrier and merlin, both Annex I listed species.

In the most recent national survey for hen harrier in 2022, the SPA held 3-5 breeding pairs, which equates to 4.7% of the national population and 11.6% of the SPA network population (Ruddock *et al.* 2024).

The population decline of hen harrier which had been recorded within the 5 km radius of the Derrybrien Wind Farm during the monitoring period was reflected in the Slieve Aughty Mountains SPA as a whole.

Survey results of the estimated population within the SPA in various years are presented in Table 3. Data are from the National Hen Harrier Surveys (Norriss *et al*. 2002, Ruddock *et al*. 2012, 2016, 2024) and from the Hen Harrier Project (2020, 2021).

Table 3 Comparative population data from the national hen harrier surveys in 1998-2000, 2005, 2010, 2015 and 2022 for the Slieve Aughty Mountains, and from Hen Harrier project for 2020 and 2021. Figures are total estimated pairs.

1998-2000	2005	2010	2015	2020	2021	2022	Change % (2005-2022)
10-21	24-27	16-24	8-14	7	8	3-5	-67%

Note: Survey effort in 1998-2000 survey was less than in subsequent surveys.

A detailed study of hen harriers in three areas (Slieve Aughty Mountains, Ballyhoura Mountains and West Clare hills) by researchers from University College Cork showed population declines in all three areas between 2007 and 2011 and also that the numbers of young fledged at successful hen harrier nests was quite low compared to other populations (Irwin *et al*. 2012).

The cause(s) of the marked population decline and low productivity within the Slieve Aughty Mountains SPA, and indeed in areas such as the Ballyhoura Mountains and the West Clare hills and several other SPAs, remain largely unknown but are expected to be due to a number of reasons, perhaps in combination, including the following (after Ruddock *et al*. 2016):

- Habitat change (largely forest management affecting prey availability)
- Predation
- Persecution
- Access and recreation (walking paths, cycling tracks etc)
- Non-intensive grazing
- Wind energy and Utility and service lines

Of relevance to power lines within the Slieve Aughty SPA, Ruddock *et al.* (2016) wrote the following:

> "*There appeared to be a positive association, although this was not statistically tested, and supported by behavioural observations, that habitat management (i.e. clearance) for power line infrastructure may provide corridors for movement and foraging by hen harriers within the forested landscape. The use of such corridors could prove useful to increasing connectivity with suitable nesting and foraging areas and particularly linking forested areas with open habitats which are shown to be used more frequently in Ireland.*"

For the Slieve Aughty Mountains SPA, the 2020 Hen Harrier Project report noted the following:

> *"A number of potential pressures were noted in the SPA. These include forestry operations and recreational and vehicle traffic on access roads and tracks near nest sites. Turf cutting and pine marten were noted regularly near nest sites."*

The 2021 Hen Harrier Project report noted the following in relation to the Slieve Aughty Mountains SPA:

> *"A significant pressure on Hen Harrier in this SPA is the direct and indirect effects of habitat loss and fragmentation. The extent and age profile of the forest plantations in the SPA may be leading to an increased vulnerability top predation. Forestry activities along with recreational traffic are regularly observed near nest and pose an ongoing risk of disturbance".*

Following a further significant decline in the breeding population of the Slieve Aughty Mountains in 2022, Ruddock *et al.* (2024) wrote the following:

> *"The Slieve Aughties region (Co. Galway and Co. Clare), which is larger than the Slieve Aughty Mountains SPA, has had its population decline by around two thirds since 2015 and now holds fewer than six pairs of breeding hen harrier. The extent of declines here since previous surveys is severe, with an 82% decline when compared to the peak population recorded in 2005 (27 breeding pairs). The extent of losses of breeding hen harrier in the region are widespread and substantial in the national context. The range of pressures and threats recorded by surveyors include a predominance of coniferous forest plantation and the associated forest and plantation management and use, forest clearance (clear-cutting, removal of all trees) and wind energy developments and associated utility and service lines (e.g. power-lines, pipelines). There was also a spectrum of grazing levels across the region, from intensive grazing by sheep and deer to non-intensive grazing. In some areas, a notable abandonment of pastoral systems, and lack of grazing provided excellent suitable habitat but was countered by totally unsuitable habitat in other areas. The extent of turf cutting, including both hand-cutting of peat and mechanical removal of peat, is widespread, across large areas of supporting peatland habitat, and the associated impact includes human and machinery disturbance at key temporal periods during the breeding season. Various recreational activities including paths, tracks, cycling tracks, outdoor sports and leisure activities, recreational activities such as walking, horse-riding and various off-road vehicles were also recorded by surveyors. In addition, extensive and uncontrolled burning (e.g. widespread unmanaged and/or malicious burning) was reported by surveyors across the region which is likely contributing to the loss and/or poor condition of supporting habitats for both breeding hen harrier and their prey."*

From the available data on the hen harrier population in the Slieve Aughty Mountains SPA, it is concluded that the population has undergone a substantial decline (>67%) since the designation of the SPA in 2007.

From an analysis by Moran & Wilson-Parr (2015), the SPA has between 33.4% and 37.4% suitable nesting habitat and 50.0% to 54.0% suitable foraging habitat. At the time of analysis, there were 31,744 ha in forest/woodland cover (equating to 53.4% of total SPA area) of which 5,789.5 ha to 8,173.9 ha was classed as suitable for nesting hen harriers.

The size of the merlin population within the SPA is not well known but is likely to exceed 5 pairs (NPWS, 2015).

The project is entirely within the Slieve Aughty Mountains SPA. The SPA had not been publicly notified at the time of the planning and construction of the project (classified as a SPA in March 2007 and formally designated by Statutory Instrument in March 2012 (S.I. No. 83 of 2012)). For the purposes of this report all aspects of the project will be assessed, whether pre – or post – designation, in terms of potential impact on the hen harrier and merlin populations within the Slieve Aughty Mountains.

Construction phase / peat slide

Construction works on site commenced in June 2003 with tree felling operations, which were undertaken by a contractor on behalf of Coillte. Civil engineering works commenced in July 2003 with road construction and excavations at turbine locations. The works were stopped on 16th October 2003 due to a peat slide on site. Construction works re-commenced in June 2004, including work on the Derrybrien to Agannygal 110kV OHL and Agannygal Substation, and were complete by March 2006.

The principal impacts on birds which occurred or had the potential to have occurred during the construction phase of the wind farm project were:

(i) Loss of habitats (including subsequent alteration/change of habitat),
(ii) Disturbance to birds (noise, human presence etc.)

Operation phase (2006 – 2022)

During the operational phase of the project (2006 – 2022), there has been potential for various impacts on the Special Conservation Interests of the SPA. Identified potential impacts are:

- collision
- displacement
- impacts on reproductive output in relation to wind turbine proximity
- barrier effects
- development of habitats

In addition, maintenance works include maintenance and periodic upgrade of access tracks and drains, and substation inspections and maintenance.

On one occasion in 2018, the cutting back of self-seeded tree growth to a 10 m width was required along four sections of track within the wind farm site to allow crane access. Also in 2018, self-seeded tree growth beneath the overhead line was cut back where required.

Ceased operation phase (2022 – present)

During the ceased operation phase of the project (2022 – present), there is potential for impacts on the Special Conservation Interests of the SPA as a result of:

- Collision risk to birds with overhead powerline
- Habitat change due to spread of self-seeded conifer trees in areas where they were managed during operation
- Habitat change due to re-wetting of bog arising from the absence of any drain maintenance

At the Derrybrien Wind Farm, there is no collision risk as turbines are in a prolonged non-operational state (subject to maintenance by the turbine supplier) during the ceased operation phase. The risk of collision with rotating turbine blades will be completely eliminated at the Derrybrien Wind Farm as part of the Prospective Development.

Retained Development (Post Decommissioning phase)

The Retained Development may result in the potential impacts on the Special Conservation Interests of the SPA as a result of the following:

- Loss of cutover bog habitat
- Re-establishment of peatland, wet grassland and scrub habitats from conifer plantations

The potential for significant effects on the Slieve Aughty Mountains SPA arising from these impacts is further assessed in the Natura Impact Statement (Section 5).

4.6.2 Sonnagh Bog SAC (001913)

Sonnagh Bog is important as a good example of an intact, lightly grazed, highland blanket bog. Blanket Bog is a rare and increasingly threatened habitat that is listed with priority status on Annex I of the E.U. Habitats Directive.

The project is over 1.4 km from this SAC and separated from the Sonnagh Bog by the Boleyneendorrish River.

There is no impact pathway between the project and this SAC. The project has not had nor is likely to have any effect on this SAC.

4.6.3 Lough Rea SPA (004134)

This SPA is designated for two waterbird species, shoveler and coot and provides good quality feeding and roosting habitat for both. Shoveler duck prefer shallow eutrophic waters rich in plankton, and occur on a variety of habitats while wintering in Ireland, including coastal estuaries, lagoons and inland lakes and callows. They also feed on small molluscs, insects and larvae, seeds and plant material and are frequently seen dabbling around the edges of waterpools. Winter distribution is more widespread than breeding distribution, birds are found on lakes, coastal estuaries and river systems, but show a clear preference for large inland lakes.

Coot feed on both plants and animals, but mainly on plants. Food taken from the water surface, including emergent plants and whilst diving. Food includes plant shoots, seeds, insects, algae and fish.

The wind farm site and OHL corridor have never contained habitats suitable for these wetland bird species. The small (0.1 ha) lake within the wind farm site is dystrophic and contains very little plant or animal life. The SPA is located approximately 9 km north of the wind farm and these bird species have not been recorded near the wind farm site during vantage point surveys.

It is considered that there is no potential for the project to directly affect the Special Conservation Interests of this SPA. The project is also within different river catchments to the Lough Rea SPA and therefore as there is no impact pathway between the project and this SPA the project has no potential to indirectly affect the wetland habitats for which the site has been designated. The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SPA. The

ceased operation phase of the project has not had nor is likely to have any effect on this SPA. The Retained Development is not likely to have any effect on this SPA.

4.6.4 Lough Rea SAC (000304)

Lough Rea SAC is designated for the Annex I habitat Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]. The SAC is located approximately 9 km north of the project and is within a different river catchment (Kilcolgan River) to the project. There is no impact pathway between the project and this SAC and no potential for direct or indirect impacts on the SAC. The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.5 Drummin Wood SAC (002181)

Drummin Wood is situated on sloping ground in the foothills of the Slieve Aughty Mountains, at an altitude of approximately 50-70 m, some 3 km east of Lough Cutra. The SAC is designated for old sessile oak woods with *Ilex* and *Blechnum* in the British Isles.

A tributary of the Owendalulleegh known as the Derrykeel, runs along the eastern boundary of Drummin Wood SAC. Although hydrologically connected to the Owendalulleegh River, Drumin Wood is situated 1 km upstream of the main river channel. As such, there is no potential for the project to directly or indirectly impact this SAC. The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.6 Gortacarnaun Wood SAC (002180)

Gortacarnaun Wood SAC is designated for the Annex I habitat Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]. This site is situated in the foothills of the Slieve Aughty Mountains in Co. Galway.

The Owendalulleegh River flows along the northern boundary of this site approximately 14.3 km downstream of the project and Lough Cutra is approximately 2 km to the west of the site. Gortacarnaun Wood consists of a substantial area of woodland on sloped ground between approximately 60 and 90 m.

The peat slide which occurred during construction of the project in October 2003 did impact the full length of the Owendalulleegh River. However, a survey of the river and river banks undertaken by the Shannon Regional Fisheries Board shortly after the slide recorded that the physical impact on river morphology was greatest from Flaggy Bridge on the R353 to the first major tributary confluence (Anon, 2004). Gortacarnaun Wood SAC is located 13 km downstream of this confluence. Given the elevation of the

woodland and the distance downstream from the main impact of the slide, the slide is not likely to have had an impact on the qualifying interest of the site. Considering the distance downstream from the project, the operation of the project is not likely to have had any effect on this SAC.

As stated in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for impacts on this SAC.

With regards to the Retained Development, the main issue for water quality and the downstream aquatic environment (as demonstrated during the construction phase) is the level of peat stability and the degree to which retention of individual, at and below ground elements could cause peat failure into the future. The risk to peat stability as a result of the Retained Development is assessed in Chapter 8 Soils, Geology and Land of the rEIAR, while the corresponding risk to the downstream aquatic environment is assessed in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR. A low to negligible residual risk of peat failure associated with the Retained Development was identified and as such a low risk of impacts on the downstream aquatic environment. This is in consideration of the following aspects of peat stability and the Retained Development:

- Peat under floating and rockfill berm roads has increased in strength through compression which has decreased probability of shear failure.
- These retained elements act as a shear key preventing shear failure in peat upslope of them, i.e., increased peat stability
- Minor reduction in efficiency of drainage network over time will gradually restore groundwater levels with low significance in terms of peat stability.
- Remoulded, excavated peat has become stable and revegetated, underlying peat has consolidated and increased in shear strength reducing likelihood of peat failure
- Borrow pits/quarries were closed since 2005 and have been stable since. Borrow pits/quarry No. 3 (wind farm site entrance) has filled with groundwater and has a stable water level.
- Barrages 3 and 4 are rockfill berms on glacial till below, with negligible effect on stability of underlying geology.
- The concrete foundations for OHL polesets are built on glacial till below the peat and apply no load to peat. With above ground structure removed, no load will be applied to underlying geology.
- Concrete foundations at Agannygal Substation are built on glacial till below the peat and apply no load to peat. With above ground structure removed, no load will be applied to underlying geology.

Therefore, based on the above (and considering the fact that the actual peat slide that occurred in October 2003 is not likely to have had an impact on the qualifying interest of

this site for reasons outlined above), there is no potential for significant effects on this SAC as a result of peat slide and subsequent impacts on the downstream aquatic environment.

During rainfall events, there may be a deduction in surface water quality in the Derrywee East stream (a tributary of the Owendalulleegh River) as a result of the release of low level suspended solids associated with the lay-by area at Crooked Bridge, which was created during construction and will be retained as part of the Retained Development. However, any effects on the downstream aquatic environment are considered to be imperceptible due to the very limited source area associated with this lay-by and the fact that it is vegetated and will be vegetated further, thereby further reducing the source area for solids wash-out.

The Retained Development may result in positive effects on the downstream aquatic environment in this catchment due to absence of ongoing site maintenance leading to reduced efficiency of the drainage networks which will enhance on-site attenuation and infiltration and buffer solids wash-out.

In conclusion, the construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.7 Lough Cutra SPA (004056)

Lough Cutra SPA is designated for breeding cormorant (*Phalacrocorax carbo*). The lake was once a long-established breeding site for cormorant (166 pairs in 1985), however declines were reported in 1996 (34 pairs) and monitoring conducted in 2010 as part of a study undertaken by Tierney *et al.* (2011) revealed that the colony had been recently abandoned. More recent counts undertaken in May 2017 showed that cormorants were present at the site, but no breeding activities were recorded (Data provided by NPWS in 2018).

Cormorants have not been recorded within the wind farm area during surveys from 2004 to 2020. Given the upland nature of the wind farm site it is unlikely that this species would fly through the wind farm site with any regularity. The only potential for the wind farm to impact the cormorants at Lough Cutra would be via sediment from the wind farm site impacting fish in the Owendalulleegh River system which feeds into Lough Cutra. The stretch of river between Lough Cutra and the wind farm site is over 22 km in length.

The peat slide which occurred during the construction of the wind farm in October 2003, resulted in peat entering the upper reaches of the Owendalulleegh River and flowing along its length to Lough Cutra (approximately 22 km downstream). At the time of the event a visible plume was observed at the confluence of the Owendalulleegh River with Lough Cutra.

A survey undertaken in July 2004 (Inis Environmental Services, 2004b) to assess the impact of the peat slide on the ecology of Lough Cutra, found that the cormorants were no longer breeding at the lake and that limited, or no breeding activity had been recorded

for a number of years (as per NPWS). A further survey of lakes in the general area of south Galway/ North Clare found a large colony of breeding cormorant had established itself on Illaunmore at Muckanagh Lough, ten kilometres south west of Lough Cutra. It was believed that these birds had relocated to this area from Lough Cutra.

Although the cormorants were not recorded breeding at the site at the time of the peat slide or in the years preceding the event, given that peat material from the slide did enter the lake, a more detailed assessment is required to determine the impact of this on water quality and fisheries within the lake, both of which have the potential to affect the population of cormorants for which the lake is designated.

The assessment of the potential impacts of the operation phase of the project (2006 – 2022) have concluded that any impact on water quality would be minor and temporary to short-term and confined to the small tributary streams immediately draining the wind farm and OHL corridor with little or no impact on main channels of the Owendalulleegh and Boleyneendorrish. There would be no effect on Lough Cutra or watercourses or wetland habitats downstream of the lake, even in the absence of mitigation, given the very large distance along the hydrological pathway between the wind farm and the lake.

No aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for impacts on this SPA.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment and therefore this SPA.

4.6.8 Lough Cutra SAC (000299)

Lough Cutra is a large oligo/mesotrophic freshwater lake lying on limestone, but with much sediment washed down from the sandstone hills above. The lake is relatively large in size (385 ha). A series of connected woodlands on the western side of the lake have been included in the boundary of this SAC as foraging habitat for the lesser horseshoe bats which roost at the site.

The lesser horseshoe roost at Lough Cutra has been monitored since 1987 (60 bats recorded) by National Parks and Wildlife Service staff. Data from the NPWS lesser horseshoe roost database shows that between 1999 and 2001 up to 93 bats were recorded in hibernation at Lough Cutra Castle. A summer nursery roost also occurs here. The data show that in general bat numbers at the roost have either increased or remained stable since the roost was first counted in 1987. The population has remained stable following the construction of the wind farm, with a peak roost count recorded in January 2010 (142 individuals). The most recent count of 129 bats in 2018 indicates that the local population of lesser horseshoe bats has a favourable conservation status which is the same as the national population.

Construction phase / peat slide

The peat slide which occurred during the construction of the wind farm in October 2003, resulted in peat entering the upper reaches of the Owendalulleegh River and flowing along its length to Lough Cutra (approximately 22 km downstream). At the time of the event a visible plume was observed at the confluence of the Owendalulleegh River with Lough Cutra.

Those habitats within range of the lesser horseshoe roost at Lough Cutra would have been unaffected by the peat slide at Derrybrien with the exception of Lough Cutra itself. The principal foraging habitat for lesser horseshoe bats has been shown through radio tracking studies to be woodlands with some use of pasture and wetlands, rarely foraging over open water (Biggane (2004a, 2004b), Bontadina et. al. (2002)).

A survey of bats in the Lough Cutra Castle Demesne was undertaken in March and August 2004 by Inis Environmental Services (2004a) to assess the impact of the peat slide on bats roosting and foraging at the lake. The assessment found the following:

> *Lesser horseshoe bats were noted feeding along the lakeshore in vegetation to the southeast and southwest of the castle and along an inlet of the lake to the southwest. Earlier studies in March 2004 also indicated that bats feed along the woodland paths and in the woods themselves.*
>
> *Activity along the lakeshore and over the lake was most intense on the night of August 8th 2004. During observations in the area of the lake behind the castle, soprano pipistrelle, common pipistrelles, Daubenton's bats and Leisler's were all active at the same time over the lake. It was very clear that insects were abundant in the vicinity of the lake especially where there was vegetation to provide shelter towards the lakeshore.*
>
> *Given that any waterborne peat entered into the lake at the opposite side via the River Owendalulleegh, it is improbable that there has been any significant impact upon the invertebrate fauna that would constitute the prey items of the bat species of the castle and lodges.*
>
> *In summary, bat activity, diversity and abundance was high in the Lough Cutra Estate and on Lough Cutra in August 2004.*

This clearly demonstrates that the slide did not have a significant effect on invertebrates in the lake on which bats feed.

Wilson (2012) also concluded that the peat slide, whilst causing a fish kill and degradation of water quality in the Owendalulleegh River, was not likely to have impacted on local bat populations in particular the lesser horseshoe bats in Lough Cutra Castle.

Given that the lesser horseshoe bat population at Lough Cutra Castle has ultimately remained stable and in some years has increased there would appear to be no effect on this population from the peat slide and subsequent pollution event.

Operation phase (2006 – 2022)

Lesser horseshoe bats are typically associated with broadleaved woodland, and are agile flyers, foraging very close to vegetation (Dietz *et al.*, 2009; Schofield & Mitchell-Jones, 2011). Summer roosts are predominantly in buildings, and winter roosts in caves and mines (Dietz *et al.*, 2009). The commercial plantation and open habitats available in the wind farm site and surrounding area are considered to be of negligible importance to lesser horseshoe bat.

The wind farm is approximately 13.5 km from Lough Cutra Castle. Collins (2023) describes core sustenance zone for different bat species (based on extensive literature reviews). The term core sustenance zone refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost (Collins, 2023). The core sustenance zone for lesser horseshoe bats is given as 2 km. Therefore, bats from the Lough Cutra Castle roost are unlikely to commute to the wind farm to forage, and there is no evidence from any of the previous data sets that the species uses the project area. Research has shown that lesser horseshoe bats were found to travel no more than 4.2 km from maternity roosts (Bontadina *et al.*, 2002).

A minimum of six bat species were recorded at Derrybrien Wind Farm in 2016 and 2021 as a result of a combination of static survey, driven transect work and searches for bat corpses using dogs. Lesser horseshoe bat was not recorded at the site, and effects on the species are therefore considered not likely to have occurred during the operation of the wind farm.

Ceased operation phase (2022 – present)

As described above, bats from the Lough Cutra Castle roost are unlikely to commute to the wind farm to forage due to the distance from between the wind farm site and this SAC (approximately 13.5 km) being substantially greater than the core sustenance zone for lesser horseshoe bat (2 km). In addition, there is no evidence from any of the previous data sets that the species uses the project area.

The only operational impacts identified for the project relate to the risk of bats colliding with rotating turbine blades. Lesser horseshoe bat was not recorded at the site, and effects on the species are therefore considered not likely to have occurred or to have the potential to occur during the ceased operation of the wind farm.

Retained Development (decommissioned phase)

As described above, bats from the Lough Cutra Castle roost are unlikely to commute to the wind farm to forage due to the distance from between the wind farm site and this SAC (approximately 13.5 km) being substantially greater than the core sustenance zone for lesser horseshoe bat (2 km). In addition, there is no evidence from any of the previous data sets (including site surveys) that the species uses the project area.

The Retained Development includes ground level and below ground infrastructure that have been present within the project area since the wind farm was constructed. Whilst it is likely that over time the tracks will be colonised by vegetation the extent of this re-

vegetation in the context of the project area is minimal and unlikely to have an impact on any bat species.

The Retained Development is not likely to have any effect on this SAC.

4.6.9 Kiltartan Cave (Coole) SAC (000286)

Kiltartan cave is a natural limestone cave used as a hibernating site for the lesser horseshoe bat. The site is almost 13 km from the wind farm site, therefore there is no potential for the development to impact directly on the Annex I habitat '*Caves not open to the public [8310]'.*

Bats do not tend to be regularly active or travel long distances during the hibernation season. Even during the breeding season, their most active season, lesser horseshoe bats were found to travel no more than 4.2 km from the maternity roost (Bontadina *et al.*, 2002).

As described above in Section 4.5.8, the commercial plantations and open habitats available in the project area are considered to be of negligible importance to lesser horseshoe bat. Given the nature of the habitats on site and the distance between Kiltartan Cave and the wind farm there would have been no impact on lesser horseshoe bats from this or any other known SACs designated for this species during the construction phase of the project.

Bats can be vulnerable to collision with operational wind turbines, however lesser horseshoe bat has not been recorded at the wind farm site during any of the surveys, and therefore this species is not likely to be impacted during the operation of the project.

The only operational impacts identified for the project relate to the risk of bats colliding with rotating turbine blades. Lesser horseshoe bat was not recorded at the site, and effects on the species are therefore considered not likely to have occurred or to have the potential to occur during the ceased operation of the wind farm..

The Retained Development includes ground level and below ground infrastructure that have been present within the project area since the wind farm was constructed. Whilst it is likely that over time the tracks will be colonised by vegetation the extent of this re-vegetation in the context of the project area is minimal and unlikely to have an impact on any bat species. The Retained Development is not likely to have any effect on this SAC.

4.6.10 Peterswell Turlough SAC (000318)

Peterswell (Blackrock)Turlough is part of a larger complex of turloughs which includes Lough Coy SAC and the Carrowbaun, Newhall and Ballylee Turloughs SAC.

Peterswell Turlough SAC spills over land into Lough Coy Turlough and there are underground connections between Peterswell Turlough and the Ballylee Turlough SAC and also to the Coole-Garryland Turlough complex. The flood levels in Lough Coy and Peterswell Turlough could be slightly influenced by downstream flood levels at Ballylee but generally turlough levels are influenced by the upstream inflow volume and the

groundwater outlet capacity within the turlough itself. Their water quality will not be directly affected by the downstream turloughs

The Kilchreest (Owenshree) River passes through the Peterswells Turlough which is upstream of the Boleyneendorrish River. The Boleyneendorrish River which drains the northwest of the wind farm site joins the Kilchreest River approximately 2.5 km downstream in the Carrowbaun, Newhall and Ballylee Turloughs SAC, which is 22 km downstream of the wind farm.

There is no impact pathway between the Boleyneendorrish River and this SAC. The construction and operation of the project has not had any effect on this SAC. The 2003 peat slide did not affect the Boleyneendoorish River, so this SAC was unaffected. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.11 Lough Coy SAC (002117)

Peterswell Turlough, Lough Coy and the Carrowbaun, Newhall and Ballylee Turloughs are connected via underground and above surface channels. The Kilchreest (Owenshree) River passes along the northern boundary of this site which is upstream of the Boleyneendorrish River. The Boleyneendorrish River joins the Kilchreest River 1.6 km downstream in the Carrowbaun, Newhall and Ballylee Turloughs SAC.

There is no impact pathway between the Boleyneendorrish River and this SAC. The construction and operation of the project has not had any effect on this SAC. The 2003 peat slide did not affect the Boleyneendoorish River, so this SAC was unaffected. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.12 Carrowbaun, Newhall and Ballylee Turloughs SAC (002293)

The site is a Special Area of Conservation (SAC) selected for the Annex I priority habitat [3180] Turloughs. The Carrowbaun, Newhall and Ballylee Turloughs SAC complex is a group of three turloughs which are hydrologically linked in times of high flood. The Ballylee Turlough has groundwater connection to Kiltartan Springs, springs in Coole-Garryland, Caherglassaun and Cahermore.

The Boleyneendorrish River flows into the southern part of this SAC for a distance of approximately 400 m before joining the Kilchreest (Owenshree) River entering from the north. The Kilchreest then flows south for a distance of approximately 440 m before the water sinks into the channel floor and disappears in a tangle of scrub at Pollanoween. The river then flows underground west for a distance of approximately 3 km before emerging in the Coole-Garryland SAC/ SPA.

The Boleyneendorrish drains approximately one third of the wind farm site via 4 small subcatchments (SC1 – SC4, see Figure 6). All four tributary streams coalesce downstream of the wind farm ~450m upstream of where the EPA has its most upstream Q-value monitoring site (Ford W. of Pollboy, RS29B040100, B5 in the present study).

That site, which is usually surveyed every 3 years, returned High Status (Q5 or Q4-5) results before and after the construction of the wind farm and during its operation phase up until 2018, at which time the EPA monitored all three sites on the Boleyneendorrish upstream of the confluence with the Kilchreest River, when all returned High Status results. The following year in 2019 the most upstream site only i.e. Ford W. of Pollboy, RS29B040100, recorded Q4 (Good Status) for the first time since surveys began at the site in 1989. When discussed at the time with the EPA surveyor, the very low water levels were referenced as a possible contributing factor to the decline from High to Good Status between 2018 and 2019. In 2019, just 425 m upstream at the first branch in the river, two sites were monitored for the present study. The northern branch site at B3 returned a High Status (Q 4-5) result, and the southern branch (at B4 in SC1) returned a Q4 (Q4-5) (Good Status verging on High) result. B4 was also monitored in 2022 and 2024 and returned values of Q3-4 (Moderate Status) and Q4-5 (High Status) for each respective year. B5 / EPA B1 was also monitored by the EPA in 2021 and again for the present study in 2024, returning High Status for both: Q4-5 (2021, EPA data), Q5 (2024, present study).

During the construction phase of the wind farm, trees were clear-felled for site preparation and construction operations included track construction, additional drains and trenching for cables etc., which combined would have generated increased nutrient and mineral and/or peat solids in run-off. These factors were adjudged likely to have led to localised slight to moderate, negative impacts of temporary to short-term duration, measured as a reduction of High to Good or Moderate Status (i.e. to Q4 or Q3-4). These impacts would have been largely confined to the 4 minor headwater streams draining the wind farm site and would not have carried over into the main channel at (B5/ “EPA B1”, EPA Forde West of Pollnaboy) or if so only to the upper EPA site referenced above, i.e. in the years between the 3-year EPA survey cycles between 2003 and 2006, noting that the EPA site was rated Q5 (High Status) in both years. The localised nature of the effect would have been assisted by: (i) the relatively gently sloping nature of the wind farm site which would have reduced the opportunity for erosion of exposed sub-soils and peat, (ii) silt control measures employed at the time and (iii) steep and eroding nature of the streams draining the site which would have dispersed and diluted any entrained nutrients and solids exiting the wind farm site. By 2006 at the end of the construction phase all three Boleyneendorrish sites received EPA assigned High Status results, including a Q5 at the monitoring station nearest the wind farm. This adds weight to the contention that (i) any impact would most likely have been confined to the minor tributaries and (ii) any impact on the main channel, in the unlikely event that it occurred, could only have persisted for at most 1-2 years (as monitoring occurs in every third year), and been confined to the upper reaches. For these reasons, combined with the long hydrological pathway between the wind farm and the SAC, the project is considered unlikely to have had an effect on this site during the construction phase.

During the operation phase, when there was relatively few nutrient and silt generating activities undertaken on site, impacts in the Boleyneendorrish catchment would also have been at most minor-negative and again confined largely to the 4 small streams draining that part of the site. There was no evidence in the data to suggest any negative effect on the Boleyneendoorish main channel arising indirectly from wind farm operation

phase activity. This included access road repairs and up-grades undertaken in 2014 and turbulence felling in 2016, each for which specific silt control measures were recommended. The Owendalulleegh River which was impacted by the peat slide does not influence or affect Ballylee turlough.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for impacts on this SAC.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment and therefore this SAC.

The project has not had nor is likely to have any effect on this SAC.

4.6.13 Ballinduff Turlough SAC (002295)

Ballinduff Turlough is situated in a narrow basin in the limestone lowlands of south Co. Galway, 5 km north-east of Gort. It is part of the Coole Lough complex of lakes and turloughs. The hydrology of the site is probably controlled by a complex of swallow holes and subsidence near Coolfin. During floods the turlough drains overland towards Coole Lough. The SAC is located approximately 400 m north of the Coole-Garryland Complex SAC.

The turlough is late-draining and a pool persists into June or July and re-floods easily. There is a marshy hollow in the middle of the southern section which receives an inflow of water from the south.

The M18 motorway and the Galway-Limerick railway line run between Ballinduff Turlough SAC and the Coole-Garryland Complex SAC. This SAC is not affected by the Boleyneendorrish or Owendalulleegh Rivers and there is no impact pathway between the project and this SAC. The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.14 The Coole-Garryland Complex SAC (000252)

The wind farm project is hydrologically linked to this SAC via the Boleyneedorrish and Kilchreest Rivers (c. 25 km hydrologically connection) and the Owendalulleegh / Cannahowna Rivers (c. 36 km hydrological connection). The Boleyneendorrish and the Owendalulleegh flow west of the wind farm site, the latter discharging to Lough Cutra and the former joining a nexus of tributaries and dropping underground into the karst geology just north east of Gort. The outflow from Lough Cutra, the Beagh River drops underground in the Punch Bowl and emerges again as the Cannahowna River which

then flows north to Gort. Thereafter, known locally as the “Gort River” (EPA name still “Cannahowna”), it flows north before dropping underground at Pollatoophil at Castletown and emerges west north west near Kiltartan where it is joined by the combined flows of the Boleyneendorrish and Kilchreest Rivers which drain the northern slopes of the Slieve Aughty Mountains. All these underground watercourses discharge to the sea at Kinvarra Bay.

The Boleyneendornish joins the Kilchreest River in the Carrowbaun, Newhall and Ballylee Turloughs SAC. The Kilchreest then flows underground west for a distance of approximately 3 km before emerging in the northern part of the Coole-Garryland SAC.

The Cannahowna River disappears underground at Castletown and is shown to have underground connection with Kiltartan, Coole, Caherglassaun and Cahermore. The Coole-Garryland Turlough has potential groundwater connections with Caherglassaun Turlough and possibly direct to Galway Bay in the Kinvarra area and possibly Cahermore Turlough. Caherglassaun has through dye tracing been connected to the springs near Dungory in Kinvarra and also to Cahermore Turlough.

The Cannahowna River goes underground for approximately 900 m, emerges briefly and then goes underground again before emerging in the northern part of the Coole-Garryland SAC, joining the Kilchreest and the combined flow travelling due south as the Kilchreest River (surface water channel) before entering Coole Lough.

While the peat slide initiated on October 16th, 2003, the main mobilisation of peat down the river valley didn’t begin until after heavy rainfall on October 30th. In the days immediately following this, beginning on November 1st 2003 and continuing until January 22nd 2004, Galway County Council (GCC) collected and analysed water samples for a range of physico-chemical parameters including suspended solids, turbidity and colour, from the upper reaches of the Owendalulleegh at Black Road Bridge down through the river until the last bridge 1.5 km upstream of Lough Cutra (Killafeen Bridge), and downstream of Lough Cutra in the Beagh River, and the intake for the Gort Water Supply (the Canahowna River). In addition, for a shorter period, from November 3rd to November 10th colour only was also measured in water samples from Kiltartan and the Coole River, and the intake for the Kinvara water supply scheme. These data demonstrated: (i) a pronounced decline in solids concentrations from the upper reaches on the Owendalulleegh in the main impacted tributary between the wind farm site and Flaggy Bridge, down through the 22 km of the river before it enters Lough Cutra and (ii) the very important role that Lough Cutra then played in intercepting suspended solids from the Owendalulleegh before they reached the lake outlet in the Beagh River. For example, on November 1st, while the solids concentration at Flaggy Bridge on the impacted tributary, 3.3 km below the slide, was 1,410 mg/l, the concentration at Killafeen Bridge 1.5 km upstream of Lough Cutra was just 44 mg/l. On November 3rd when the solids concentration was 54 mg/l at the latter site, it was just half that concentration (27 mg/l) at Cahill’s Bridge downstream of Lough Cutra on the Beagh River. By November 5th, the suspended solids concentration at Cahill’s Bridge had risen to 32 mg/l and the turbidity to 45.2 NTU (Nephelometric Turbidity Units), which were the highest concentration of either parameter measured downstream of Lough Cutra over the following weeks. Thereafter, turbidity levels, which were a good proxy for suspended solids in the data, dropped steadily and consistently, and by November 18th they had

fallen to 10.5 NTU. On the four subsequent occasions on which they were measured, up to and including January 22nd 2004, they averaged around 5 NTU which would have been equivalent to even lower suspended solids concentration. On the same occasions the turbidity levels in the Gort Water Supply Intake on the Beagh River were concurrently slightly lower. Turbidity and suspended solids were generally not measured at sites downstream of Gort or in Kinvarra at the same time. However, suspended solids were at their highest downstream of the Beagh River between November 3rd and November 10th colour, which also showed a good correlation with turbidity was measured at Kiltartan, the Coole River and the Kinvarra intake. The concurrent colour levels at the Kiltartan and Coole sites (which are hydrologically very similar) had a colour value roughly half that of the Gort Water Supply intake which clearly demonstrates that the water was being diluted approximately 1:1 by lower colour groundwater and the combined flows of Boleyneendorrish and Kilchreest Rivers, neither of which was impacted by the peat slide. This indicates a further reduction in already low turbidity and suspended solids levels. Finally, at Kinvarra, the colour level was only about 25% of that measured at the Gort Water Supply Intake, pointing to a further significant dilution in turbidity and colour owing to the influence of groundwater influx in the 7-8 km between the Coole-Garrylands wetland complex and Kinvarra. Corroborating the trend in colour, the average turbidity for the period November 5th to November 10th at the same sites were: 38.6, 25.2, 9.6, 7.9 and 2.3 at Cahill's Bridge, Gort Water Supply Intake, Kiltartan, Coole River and Kinvarra respectively. The corresponding suspended solids at all these sites would thus have been significantly lower during the same period. These data, taken as a whole, point to a relatively short period of 2 to 3 weeks when elevated turbidity/suspended solids and colour levels in the Owendalulleegh spilled over into the Gort-Kinvarra system but thereafter resumed more representative seasonal trends in the system for all these parameters. The data also reveals a very rapid decline in the influence from the peat slide from the Black Road Bridge, down through the 22 km of the Owendalulleegh as far as the lake, a subsequent dampening and settlement effect in the lake and thereafter a subsequent decline in all concentrations moving down that system due to additional sedimentation but especially due to the mixing of low solids, low colour groundwater and surface waters from the two other main river systems. The minor increase in suspended solids involved, combined with its very temporary duration and occurrence at the least biologically active time of the year means that the impact of the slide on the Coole-Garrylands Wetland Complex was likely to have been negligible and not resulted in a significant effect on the site.

Assessment of the potential impacts of the operation phase of the project have concluded that any impact on water quality has been minor and temporary to short-term and confined to the minor streams immediately draining the wind farm and OHL corridor with little or no impact on main channels of the Owendalulleegh and Boleyneendorrish. There would be no effect on Lough Cutra or watercourses or wetland downstream of the lake, even in the absence of mitigation, given the very large distance along the hydrological pathway between the wind farm and the lake.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects

on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for impacts on this SAC.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment and therefore this SAC.

It is considered that the project has not had nor is likely to have any significant effect on this SAC.

4.6.15 Coole-Garryland SPA (004107)

This site is of international importance for whooper swan (*Cygnus Cygnus*) which use the site for both feeding and roosting purposes, though the flock also visits other feeding areas outside of the site.

Construction phase / peat slide

The potential for impacts to have occurred on the Coole-Garryland Complex owing to the peat slide in 2003 is described in Section 4.5.14. For the reasons stated above it is considered that the slide would not have resulted in significant effects on the habitats supporting the Special Conservation Interest of this SPA.

Operation phase

The Scottish Natural Heritage Guidance (2016) references a core foraging range for whooper swan from roost sites during the winter season of less than 5 km. The purpose of the guidance is to help identify 'connectivity' between development proposals and SPAs.

Whooper swan is a species that can be vulnerable to collision with operating wind turbines. Whooper swan was not recorded during vantage points watches over the wind farm site during the winter months.

The wind farm site is situated over 13.7 km from this SPA and has never contained nor is likely to contain suitable foraging or roosting habitat for this species.

Whooper swan is not expected to fly through the wind farm with any regularity, therefore it is considered not likely that the project has had any effect on this population of whooper swan.

Ceased operation phase (2022 – present)

At the Derrybrien Wind Farm, there is no collision risk as turbines are in a prolonged non-operational state (subject to maintenance by the turbine supplier). The risk of collision with rotating turbine blades will be completely eliminated at the Derrybrien Wind Farm as a result of the Prospective Development, and conditions will revert to the status prior to construction of the wind farm project.

However, collision with overhead lines is also a concern and a well-documented cause of bird mortality (Bevanger 1998, Ferrer & Janss 1999, Jenkins et al. 2010, SNH 2016).

For the Derrybrien to Agannygal 110kV line, which does not have bird flight diverters as mitigation, the risk of collision still exists for any large bird species. However, any risk of collision with the overhead line will be eliminated by the removal of the line as part of the Prospective Development – thus, conditions will revert to the status prior to construction of the wind farm project, i.e. no power lines, though the line corridor will not be replanted and hence will be of more value to birds than the original forest plantation (notwithstanding the gradual spread of self-seeded conifers).

In addition, whooper swan have not been recorded within the wind farm site during the winter months and the OHL is situated over 16 km from this SPA, substantially beyond the core foraging range for whooper swan of less than 5 km (SNH, 2016).

The ceased operation phase of the project has not had nor is likely to have any effect on this SPA.

Retained Development (decommissioned phase)

As described above, whooper swan have not been recorded within the wind farm site during the winter months and both the wind farm site and OHL are situated substantially beyond the core foraging range for whooper swan of less than 5 km (SNH, 2016).

The Retained Development is not likely to have any effect on this SPA.

4.6.16 Caherglassaun Turlough SAC (000238)

Caherglassaun Turlough SAC (approximately 2 km from Coole-Garryland SAC and 5 km from Kinvara, approximately 17 km downstream of the outfall from Lough Cutra).

Caherglassaun is a large lake located 6 km north-west of Gort and 5 km south-east of Kinvarra in the low-lying farmland of east Co. Galway. Situated in a natural depression just 2 km to the north-west of Coole Nature Reserve, this site comprises a permanent lake at its core, while the rest of the basin functions as a turlough. At times of high water, the site can flood to a depth of 10-15 m. Because of its proximity to sea-level, the lake fluctuates 30 cm or so in a tidal cycle, but it is delayed significantly behind tidal height at Kinvarra.

Caherglassaun Turlough SAC is designated for the Annex I habitats - Turloughs [3180], Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation [3270] and the Annex II Species *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]. A bat roost exists within the site.

The Cannahowna (“Gort”) River disappears underground at Castletown and is shown to have underground connection with Kiltartan, Coole, Caherglassaun and Cahermore. The Coole-Garryland Turlough has potential groundwater connections with Caherglassaun Turlough and possibly direct to Galway Bay in the Kinvarra area and possibly Cahermore Turlough. Caherglassaun has through dye tracing been connected to the springs near Dungory in Kinvarra and also to Cahermore Turlough.

As described in the assessment of the Coole-Garyland SAC (Section 4.5.14) the Owendalulleegh River was impacted during the peat slide. The slide material travelled downstream into the lower reaches of the river, eventually reaching Lough Cutra,

approximately 22 km downstream. The bulk of the escaped material settled out in the approximately 4 km^2 lake area of Lough Cutra. The finer buoyant material is likely to have over time possibly during successive floods been carried through Lough Cutra in the Beagh/Gort River and the suspended solids, diminishing in concentration with distance downstream as described in Section 4.5.14 above, having been discharged through the various downstream turloughs at Castletown, Kiltartan, Coole-Garryland, Caherglassaun, Cahermore and eventually into Galway Bay via submarine springs and shoreline springs at Kinvarra. The impact of this sediment on the flow regime of these turloughs would have been insignificant as it is likely, given its fine nature to be flushed through the system over time and certainly not likely to deposit in the higher flow areas such as at swallow hole outlets.

The minor increase in suspended solids involved, combined with its very temporary duration (2-3 weeks) means that the impact of the slide on this site was likely to have been negligible.

Given the distance between the project and the SAC there is no potential for an effect on the lesser horseshoe bat population within this SAC for reasons discussed in sections 4.5.8 and 4.5.9.

It is considered that the project has not had a significant effect on this SAC following the peat slide. Given the distance between the project and the SAC it is considered that there is no potential for the operation phase of the project to have had any effect on the SAC.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for impacts on this SAC.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment and therefore this SAC.

4.6.17 Cahermore Turlough SAC (002294)

Cahermore Turlough SAC is situated in the limestone lowlands of south Co. Galway, about 5 km north-west of Gort and 5.5 km south-east of Kinvara. The site is designated for the Annex I habitat - Turloughs [3180] and is part of a series of lakes and turloughs in the region. The nearest is Caherglassaun Turlough, the water levels of which are slightly higher than Cahermore.

The turlough is on the dry end of the spectrum, and there is no standing water in summer except for a few small ponds dug for cattle. A few collapse features occur in the drift on the southern side with a regular swallow-hole at the edge of the flooded area. Another hole occurs in the south-east corner. The turlough appears to flood largely from the southern side.

The Cannahowna ("Gort") River disappears underground at Castletown and is shown to have underground connection with Kiltartan, Coole, Caherglassaun and Cahermore. The Coole-Garryland Turlough has potential groundwater connections with Caherglassaun Turlough and possibly direct to Galway Bay in the Kinvarra area and possibly Cahermore Turlough. Caherglassaun has through dye tracing been connected to the springs near Dungory in Kinvarra and also to Cahermore Turlough.

As described in the assessment of the Coole-Garyland SAC (Section 4.5.14) the Owendalulleegh River was impacted during the peat slide. The slide material travelled downstream into the lower reaches of the river, eventually reaching Lough Cutra, approximately 22 km downstream. The bulk of the escaped material settled out in the approximately 4 km^2 lake area of Lough Cutra. The finer buoyant material is likely to have over time possibly during successive floods been carried through Lough Cutra in the Beagh/Gort River and the suspended solids, diminishing in concentration with distance downstream as described in Section 4.5.14 above, having been discharged through the various downstream turloughs at Castletown, Kiltartan, Coole-Garryland, Caherglassaun, Cahermore and eventually into Galway Bay via submarine springs and shoreline springs at Kinvarra. The impact of this sediment on the flow regime of these turloughs would have been insignificant as it is likely given its fine nature to be flushed through the system over time and certainly not likely to deposit in the higher flow areas such as at swallow hole outlets.

The minor increase in suspended solids involved, combined with its short duration means that the impact of the slide on this site was likely to have been negligible.

It is considered that the project has not had a significant negative effect on this SAC following the peat slide. Given the distance between the project and the SAC it is considered that there is no potential for the operation phase of the project to have had any effect on the SAC.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for impacts on this SAC.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment and therefore this SAC.

4.6.18 Galway Bay Complex SAC (000268)

Situated on the west coast of Ireland, this site comprises the inner, shallow part of a large bay which is partially sheltered by the Aran Islands. A diverse range of marine, coastal and terrestrial habitats, including several listed on Annex I of the E.U. Habitats Directive, occur within the site, making the area of high scientific importance.

Galway Bay South holds a very high number of littoral communities (12). They range from rocky terraces, to sandy beaches with rock or sand dunes behind. The intertidal sediments of Galway Bay support good examples of communities that are moderately exposed to wave action.

The Cannahowna ("Gort") River disappears underground at Castletown and is shown to have underground connection with Kiltartan, Coole, Caherglassaun and Cahermore. The Coole-Garryland Turlough has potential groundwater connections with Caherglassaun Turlough and possibly direct to Galway Bay in the Kinvarra area and possibly Cahermore Turlough. Caherglassaun has through dye tracing been connected to the springs near Dungory in Kinvarra and also to Cahermore Turlough.

As described in the assessment of the Coole-Garyland SAC (Section 4.5.14) the Owendalulleegh River was impacted during the peat slide. The slide material travelled downstream into the lower reaches of the river, eventually reaching Lough Cutra, approximately 22 km downstream. The bulk of the escaped material settled out in the 4km^2 lake area of Lough Cutra. The finer buoyant material is likely to have over time possibly during successive floods been carried through Lough Cutra in the Beagh/Gort River and the suspended solids, diminishing in concentration with distance downstream as described in Section 4.5.14 above, having been discharged through the various downstream turloughs at Castletown, Kiltartan, Coole-Garryland, Caherglassaun, Cahermore and eventually into Galway Bay via submarine springs and shoreline springs at Kinvarra. The minor increase in suspended solids involved, combined with its short duration means that the impact of the slide on this site was likely to have been negligible.

It is considered that the project has not had a significant effect on this SAC following the peat slide. Given the distance between the project and the SAC it is considered that there is no potential for the operation phase of the Project to have had any effect on the SAC.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for impacts on this SAC.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment and therefore this SAC.

4.6.19 Inner Galway Bay SPA (004031)

The Inner Galway Bay SPA overlaps with Galway Bay SAC. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Black-throated Diver, Great Northern Diver, Cormorant, Grey Heron, Light-bellied Brent Goose, Wigeon, Teal, Red-breasted Merganser, Ringed Plover, Golden Plover, Lapwing, Dunlin, Bar-tailed Godwit, Curlew, Redshank,

Turnstone, Black-headed Gull, Common Gull, Sandwich Tern and Common Tern. 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 Wetland & Waterbirds.

The Cannahowna ("Gort") River disappears underground at Castletown and is shown to have underground connection with Kiltartan, Coole, Caherglassaun and Cahermore. The Coole-Garryland Turlough has potential groundwater connections with Caherglassaun Turlough and possibly direct to Galway Bay in the Kinvarra area and possibly Cahermore Turlough. Caherglassaun has through dye tracing been connected to the springs near Dungory in Kinvarra and also to Cahermore Turlough.

As described in the assessment of the Coole-Garyland SAC (Section 4.5.14) the Owendalulleegh River was impacted during the peat slide. The slide material travelled downstream into the lower reaches of the river, eventually reaching Lough Cutra, approximately 22 km downstream. The bulk of the escaped material settled out in the 4km^2 lake area of Lough Cutra. The finer buoyant material is likely to have over time possibly during successive floods been carried through Lough Cutra in the Beagh/Gort River and the suspended solids diminishing in concentration with distance downstream as described in Section 4.5.14 above, having been discharged through the various downstream turloughs at Castletown, Kiltartan, Coole-Garryland, Caherglassaun, Cahermore and eventually into Galway Bay via submarine springs and shoreline springs at Kinvarra. The minor increase in suspended solids involved, combined with its short duration means that the impact of the slide on this site was likely to have been negligible.

It is considered that the project has not had a significant effect on this SPA following the peat slide. Given the distance between the project and the SPA it is considered that there is no potential for the operation phase of the project to have had any effect on the SPA.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for impacts on this SAC.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment and therefore this SAC.

4.6.20 Barroughter Bog SAC (000231)

Barroughter Bog is a relatively small raised bog, situated on the shores of Lough Derg in Co. Galway, a few kilometres east of Woodford, and bounded in the north by the Cappagh River, which is downstream of the Duniry River which drains a tiny portion of the footprint of the wind farm to the east of the site. Two sites were surveyed for water quality in the Duniry catchment, which includes a short length of the wind farm access

track, just two turbines and associated peat repositories and a borrow pit. This area of the site required no additional drainage and just a minor amount of tree felling as part of the construction phase. For these reasons the project would have had a negligible impact on water quality in the Duniry River during construction and operation of the wind farm, even in the absence of mitigation. This conclusion is borne out by the High Status (Q5 or Q4-5) that was consistently recorded at EPA Station RS25D070200 DUNIRY - Bridge u/s Ballinasack Br every 3 years by the EPA from 1993 to 2017 (including in 2003 and 2006), while much farther down in the system at Cappagh Bridge (EPA Site RS25C030400 on the Cappagh River - Galway) conditions had been either Good (Q4) or Moderate (Q3-4) over the same period.

Barroughter Bog is over 22 km downstream of the wind farm and for the reasons given above it is considered that the construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC. This is based on the distance between the wind farm and the SAC and the nature of the qualifying feature.

4.6.21 Lough Derg, North-east Shore SAC (002241)

The project is hydrologically linked to this site over a distance greater than 23 km. Given the distance from the wind farm site and the fact that the Duniry River drains a tiny portion of the footprint of the wind farm and there has been no significant impact on water quality in the Duniry River it can be concluded that the construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.22 Pollagoona Bog SAC (002126)

A small section of the Derrybrien to Agannygal 110kV OHL corridor and Agannygal Substation drain to Lough Atorick which is within one of the sub-basins of the Bleach River (35.2km^2 in area) which flows on into Lough Graney which in turn flows into the lower portion of Lough Derg at Scarriff Co. Clare, part of the River Shannon catchment.

Pollagoona Bog is a small blanket bog that shows some features of a raised bog and is located 300 m south-east of Lough Atorick. The bog is situated on a shallow saddle, on flat to gently sloping land surrounded by conifers at an altitude of 150 m. A stream (Pollagoona Mountain) which delineates the southern boundary of the site drains into Lough Atorick.

There is no impact pathway between the Project and this SAC. The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.23 Glendree Bog SAC (001912)

Glendree Bog SAC is designated for the Annex I habitat Blanket bogs (* if active bog) [7130]. This site is within the Bleach River catchment but is over 6 km upstream of the Graney River which flows out from Lough Graney.

There is no impact pathway between the Project and this SAC. The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.24 Loughatorick South Bog SAC (001912)

Lough Atorick South Bog SAC is designated for the Annex I habitat Blanket bogs (* if active bog) [7130]. This site is within the Bleach River catchment but is 9 km upstream of the Graney River which flows out of Lough Graney and ultimately discharges to the River Shannon.

There is no impact pathway between the Project and this SAC. The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.25 Lough Derg (Shannon) SPA (004058)

The Derrybrien to Agannygal 110kV OHL corridor drains mainly to the Owendalulleegh catchment but the lower 2.26 ha flow south to a small unnamed stream which eventually enters the north shore of Lough Atorick. This also receives the drainage from the Agannygal Substation at the southern end of the OHL corridor. Lough Atorick is within one of the sub-basins of the Bleach River (35.2 km^2 in area) which flows on into Lough Graney which in turn flows into the lower portion of Lough Derg at Scarriff Co. Clare, part of the River Shannon catchment.

At the southern end of the OHL corridor, draining to Lough Atorick, there was only a very small amount of tree felling required to prepare the site, including 2.26 ha on the OHL corridor and another 1.6 ha for the Agannygal Substation, amounting to 3.86 ha in total. This land, flowing via a nexus of small drains joins an unnamed 1st order stream (EPA Segment code: 25_1002, catchment area = 2 km^2) which flows more of less due south to the northern shore of Lough Atorick. By the time nutrients and or solids derived from the tree felling would have reached this stream they would likely have been much diminished due to biological uptake and sedimentation, so that no impact on the water quality would likely have been detectable as a result at sample site OHL 2 (see to Figure 3) on the small stream in question during the construction phase.

During the operation phase there would at most have been a requirement for some limited cutting back of tree regrowth along the lower 2.26 ha of the OHL line to maintain clearance. The trees are cut at the base which would have largely prevented the generation of nutrient and suspended solids run-off.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for impacts on this SAC.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment and therefore this SPA.

The project is also hydrologically link to this SPA via the Duniry River which drains a tiny portion of the wind farm footprint. Given the distance from the wind farm site and the fact that there has been no significant impact on water quality in the Duniry River it can be concluded that the construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SPA. The ceased operation phase of the project has not had nor is likely to have any effect on this SPA. The Retained Development is not likely to have any effect on this SPA.

4.6.26 Derrycrag Wood Natura Reserve SAC (000261)

Derrycrag Wood Natura Reserve SAC is designated for the Annex I habitat Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]. This site is situated over 10 km from the project at its nearest point and is within a different river catchment (Woodford River catchment) to the project.

Based on the qualifying feature of this SAC it has been determined that there is no impact pathway between the project and this site.

The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.27 Pollnaknockaun Wood Natura Reserve SAC (000319)

Pollnaknockaun Wood Natura Reserve SAC is designated for the Annex I habitat Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]. This site is situated over 11 km from the project at its nearest point and is within a different river catchment (Woodford River catchment) to the project.

Based on the qualifying feature of this SAC it has been determined that there is no impact pathway between the project and this site.

The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.28 Rosturra Wood SAC (001313)

Rosturra Wood SAC is designated for the Annex I habitat Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]. This site is situated over 13.7 km from the project at its nearest point and within different river catchments to the project. The SAC comprises two separate areas approximately 200 m apart. One site is within the Woodford River catchment and the other within the Moannakeeba River catchment.

Based on the qualifying feature of this SAC it has been determined that there is no impact pathway between the project and this site.

The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.29 Cloonmoylan Bog SAC (000248)

Cloonmoylan Bog SAC is designated for the Annex I habitat Active raised bogs [7110]. This site is situated over 13.7 km from the project at its nearest point and is within a different river catchment to the Project.

Based on the qualifying feature of this SAC it has been determined that there is no impact pathway between the project and this site.

The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.6.30 Ardrahan Grassland SAC (002244)

Ardrahan Grassland SAC is designated for the Annex I habitats Alpine and Boreal heaths [4060], *Juniperus communis* formations on heaths or calcareous grasslands [5130] and Limestone pavements [8240]. This site is situated over 14.6 km from the Project at its nearest point.

Based on the qualifying features of this SAC it has been determined that there is no impact pathway between the project and this site.

The construction (including the peat slide that occurred in 2003) and operation of the project has not had any effect on this SAC. The ceased operation phase of the project has not had nor is likely to have any effect on this SAC. The Retained Development is not likely to have any effect on this SAC.

4.7 Potential cumulative effects

In order to take account of in-combination or cumulative effects, plans and projects that are completed, approved but uncompleted, or proposed (but not yet approved) should be considered in this context (European Commission, updated 2021).

4.7.1 Overview

Based on consideration of the receiving environment existing/approved projects and activities have been identified for cumulative effects assessment.

The assessment of cumulative effects on the Slieve Aughty Mountains SPA is considered in Section 5.7.1 of the NIS. The assessment of cumulative effects on all other SACs and SPAs (including Lough Cutra SPA and other SACs and SPAs with water-dependent Qualifying Interests or Special Conservation Interests that are located downstream of the Owendalulleegh River catchment) are considered below. The findings of the assessment with respect to Lough Cutra SPA are summarised in Section 5.7.2 of the NIS.

The following projects/activities were considered as relevant for cumulative effects assessment.

- Turbary activities
- Wind farms in Slieve Aughty Mountains
- Adjacent coniferous forestry plantations
- Planting in lieu of felling on wind farm site
- Overhead transmission lines
- Gort Regional Water Supply Scheme
- Flood Relief Schemes
- M18 Motorway Project
- Quarries/Sand extraction
- Works to Beagh Bridge
- Prospective Development

4.7.2 Turbary activities

An area of approximately 67 ha of drained turbary land occupies the eastern part of the wind farm site. Turbary lands also extend immediately beyond the site to the east covering an area of approximately 15 ha. There are 136 turbary plots within or immediately adjacent to the wind farm site, 22 are partially or fully outside the wind farm site boundary. Individual plot sites range in area between approximately 0.55 ha and 1.10 ha.

It is not known where the turbary rights were exercised prior to construction. However, the original Phase 1 EISs noted that old and new turf banks and drainage channels could be found throughout the site, that the turbary was used by a small number of local people with turbary rights on the site but at the time (1997), turbary activity was low level.[15]

[15] EIS submitted with GCC Reg. Ref. 97/3470 / ABP Reg. Ref. PL.07.106290 – 'the Phase 1 EIS'

Up until 2012, the extent of turf cutting carried out mechanically is not known but based on observations from wind farm staff on site, turf cutting by hand was carried out on a number of plots, normally in late Spring/early Summer. Since 2012, the level of turbary activity within the site appears to have increased and is currently carried out by hand and mechanical means using an excavator and hopper. Mechanical peat extraction is currently being carried out in approximately 35 of the 136 plots and not all of these are cut each year. The mechanical turf cutting has been mainly carried out using a Difco Bogmiser hopper machine.

A certain amount of turf harvesting is undertaken annually. Some of the turbary activity is close to peat drains while others are more remote. The former is more likely to be the source of some peat solids run-off, although the amounts are likely to be variable depending on weather conditions and the intensity of harvesting in any given year. Monitoring as part of the current study has only occasionally been able to distinguish the impact of turbary from other catchment activities, such as forestry clear felling. These impacts have been discernible as a reduction in Q-rating from expected (at least) Good Status (Q4) to Moderate Status (Q3-4) in some of the small streams draining the southern side of the wind farm toward the Owendalulleegh River but with no evidence of impact in the main channel which has maintained High Status (Q5/Q4-5) from 2009 onwards (after recovery from the 2003 peat slide). Turbary, therefore is not likely to have been exerting a cumulative impact on any of the downstream SACs and SPAs with water-dependent Qualifying Interests or Special Conservation Interests in any of the 3 catchments draining the wind farm during construction or operation as this has coincided with mainly High Status water quality on the main channel of the Boleyneendorrish, Owendalulleegh (except for 2003 following the peat slide) and Duniry Rivers, throughout this period.

In April 2020, a peat disturbance was noticed in the turbary area of the wind farm site. The exact date of the original occurrence of the disturbance is unknown. The disturbance was located in the southern portion of Turbary Plot No 161 which is located south of the central turbary access track in an area between turbines T34, T37 and T38. The area of peat disturbed is approximately 0.25 ha. The peat disturbance mass was heavily saturated with water.

Following inspection by geotechnical specialists, it was concluded that no wind farm related activity could have contributed to the peat disturbance and that it was likely to have been caused by a combination of:

- Concentrated groundwater pressures in the peat within the turbary plot
- Undercutting for the drain along the toe of the slope
- Loading due to the more recent use of mechanical harvesting in the peat involving large hoppers

Further details in relation to this incident are provided in Chapter 8 Lands Soils and Geology of the rEIAR. Following an examination of biological water quality in June 2020 in relation to this incident, the evidence is that this peat disturbance event, while it may have contributed a low-level diffuse, localised addition of peat silt to the affected watercourse over previous months, the effect was barely perceptible and not significant

in terms of biological water quality or aquatic habitat quality. This event has not had a cumulative effect with the wind farm project.

The potential for ongoing impacts from a peat slide due to turbary

As noted in Chapter 8 Soils, Geology and Land of the rEIAR, peat stability impacts will not arise as a direct result of the wind farm decommissioning or from the elements of the wind farm being left in situ after decommissioning (Retained Development); however they may arise from separate and unrelated activities for mechanical peat harvesting in the turbary areas under established turbary rights which are outside the control of Gort Windfarms Ltd. Mitigation measures have been implemented by Gort Windfarms Ltd. and recommended to the turbary rights holders for managing the risk of peat stability during mechanical peat harvesting on the wind farm site. If these recommended mitigation measures are not adopted by the turbary rights holders for mechanical peat harvesting in the turbary areas then the cumulative effect on peat stability could be medium to high or high and moderately significant to significant. If the recommended mitigation measures are adopted by the turbary rights holders then the likelihood of peat failure reduces to medium to low and slight significance.

In the absence of mitigation for turbary activities (which is outside the remit of Gort Windfarms Ltd.) on the wind farm site, a turbary-triggered peat slide could potentially occur. The effect of a peat slide from the turbary area would impact on SC7(a) sub catchment, extending down into SC7(d) and then 22 km downstream into Lough Cutra. Depending on the volume of peat discharged, this could cause a short term spike in Total Phosphorus in Lough Cutra with a concomitant increase in chlorophyll *a*, signifying slight shift in trophic status of the lake, and may cause minor localised reductions in diversity and biomass of benthic macroinvertebrates in both littoral and open water areas if peat deposits were heavy. There is no evidence from the 2003 peat slide that this would affect fish populations in the lake, noting that trout and coarse fish species can tolerate slightly enriched trophic conditions. It is unlikely that these impacts would result in significant effects on Lough Cutra SAC or SPA or any of the SACs and SPAs with water-dependent Qualifying Interests or Special Conservation Interests downstream of Lough Cutra. This is based on the Qualifying Features and Special Conservation Interests of these sites and the findings of the impact assessment of the peat slide which occurred in 2003.

With the implementation of mitigation measures for turbary activities the risk of a peat slide is considered to be low. However, even in the absence of mitigation the cumulative impacts associated with turbary activities on the wind farm site are considered not likely to result in significant effects on any European site(s).

4.7.3 Wind Farms in Slieve Aughty Mountains

The Sonnagh Wind Farm

This wind farm is a small development of 9 turbines situated on high ground immediately east of Lough Belsrah about 3.4 km north west of the Derrybrien Wind Farm. Part of the site drains into the upper tributaries of the Boleyneendorrish River at a point upstream of

B3 and EPA B1 (RS29B040100, Ford west of Pollaboy) the latter coinciding with B5 in the current study (see Figure 3). Biological water quality results at both sites have recorded High Status (Q4-5 or Q5). The EPA B1 site results returning High Status results consistently for over 2 decades up to 2018 with a drop to Good Status (Q4) for the first time in 2019. The same year (2019) a Q rating of Q4-5 was recorded in the present study at B3, i.e. upstream of the EPA B1 site and downstream of the confluence of the Sonnagh Wind Farm tributary indicating that there has been a neutral cumulative impact from this project on aquatic habitats in the Boleyneendorrish during construction and operation of the Derrybrien Wind Farm.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for cumulative impacts on any European site.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment. As such there is no potential for cumulative impacts on any European site.

Keelderry Wind Farm

The site of this proposed wind farm is situated 3.5 km west of the Derrybrien Wind Farm. The project was abandoned in 2007 after the access tracks to the turbine sites were completed. The site drains to a small catchment due west of SC9 (see Figure 6) which joins the main channel of the Owendalulleegh immediately upstream from EPA O3 RS29O010800 (Ford east of Chevy Chase Cottage). Other than 2003 (after the peat slide at Derrybrien) and 2006, Site EPA O3 site has always been at high status, including continuous high status from 2009 to the present, hence there has been a neutral cumulative impact between the current project and Keelderry Wind Farm.

The road construction at Kilderry did not take place until 2007 and therefore there was no cumulative impact with this project during construction of the Derrybrien Wind Farm that could have affected Lough Cutra or any of the SACs or SPAs with water-dependent Qualifying Interests or Special Conservation Interests respectively that are located downstream of Lough Cutra given the distances involved coupled with the very limited extent of the Keelderry development. As the latter was abandoned in 2007, no cumulative impacts have arisen or will arise from the operation and ceased operation phases of the project or the Retained Development.

4.7.4 Adjacent coniferous forestry plantation

Commercial planted coniferous forestry occupies much of the land area of the upper catchments of the Owendalulleegh, Boleyneendorrish and Duniry Rivers. These very extensive areas are drained by a network of small streams which lead down into the valleys of the three rivers and form their main channels. These latter channels have been

monitored for generally 30 or more years by the EPA while the upper channels have not been monitored by virtue of their small size. Generally every year, large tracts of these plantations are clearfelled and/or replanted. Despite this however, water quality in the main channels that receive over 99% of the wind farm drainage, i.e., Owendalulleegh and Boleyneendoorish, have generally remained High Status (Q4-5 or Q5) indicating that forestry management does not appear to be negatively affecting water quality in the main channels, even at upper channel sites close to where the afforested side tributaries join these main channels. An exception to this was on the Duniry, which only receives a tiny fraction ~0.6% of wind farm drainage) where the Q-rating dropped from High to Good between 2003 and 2006 and continued at Good Status until 2017. In that time period, the next EPA site downstream remained High Status from 1993 to 2017 indicating that there was no cumulative impact from forestry plantation and the Derrybrien wind farm detectable in the Lough Derg SAC during construction or operation of the wind farm. It is noted from Google Earth Imagery that a large area of non-project related forestry felling occurred in the Duniry upper catchment area between 2010 and 2011, with further large blocks felled between 2015 and 2018, most of that appearing to have been replanted. It is considered with a high degree of confidence, that the changes in biological water quality in the upper Duniry catchment, while likely influenced by forestry activity are completely unrelated to the wind farm as there has been no project related felling since the early construction period.

The major drop in quality in biological water quality (Q-value) in the Owendalulleegh in 2003 was due to the peat slide, not forestry management. Monitoring work as part of the current study has in some instances attributed localised reductions in water quality in the smaller upland tributaries to ongoing forestry management activities, but these effects have not been detectable in the main channels for a period of 21 years, i.e., 2003-2024. These patterns in water quality monitoring results strongly suggest that project-related forestry management, while locally impactful in some instances in the smaller watercourses immediately draining the plantations, have not negatively impacted the larger watercourses farther downstream on any of the three main river catchments and therefore no cumulative negative impacts are likely to have occurred during the construction and operation phases of the wind farm. In the case of the Agannygal Substation and southern end of the OHL, a total of just 3.38 ha of forestry was felled during construction in an otherwise very large area of forestry in the catchment of Lough Atorick into which these lands drain. Cumulative impact from small areas of project-related forestry felling would have been imperceptible on the receiving waters of Lower Lough Derg given the very large distance between Anannygal in the upper catchment and Lough Derg. This would also have been the case, to an even lesser extent given the minimal source area and complex pathways, during the operation phase of the project.

4.7.5 Planting in lieu of felling on wind farm site

Coillte planted forestry in Counties Roscommon and Tipperary in order to compensate for the forestry felled on the Derrybrien Wind Farm site. These comprised six planting areas, three in Co. Roscommon in the Upper River Shannon Catchment and three in Co. Tipperary in the Lower Shannon Catchment (see Figures 10 and 11). Those areas in the Upper Shannon Catchment are not situated in any European sites, nor are they close

enough to any designated sites downstream to have an effect on one. The Co. Tipperary sites are either in or very close to the Lower River Shannon SAC (code: 002165) and all three sites are located within the now designated Slievefelim to Silvermines Mountains SPA (code: 004165) (notice of designation was in 2007). As the Slievefelim to Silvermines Mountains SPA is designated for hen harrier the assessment of cumulative effects on this site is discussed under the assessment of cumulative effects on the Slieve Aughty Mountains SPA, also designated for hen harrier, in Section 5.7.1.

All of the Co. Roscommon plantings are on or adjoining 1st order streams and two flow into channels that have been extensively drained/straightened downstream (Oldtown and Brackloon). Moreover, one of the plantings, Ardcocoran, is almost 3.8 km from the 1st order channel that it most likely eventually drains to. The drains around that plot seem to blind-end after short distances and it is difficult to be certain of the direction of eventual flow but based on contours on the OSI Discovery series maps and EPA online mapping, it seems to be into Lough Gara in Co. Sligo. All three plantings are on mineral soils so the risk of phosphorus leaching as a result of planting is likely to have been low. Moreover, the flat terrain also reduced the risk of solids erosion. Overall impact from these works is assessed as having been imperceptible or slight in terms of water quality and imperceptible in terms of fisheries.

Two of the three Co. Tipperary plantings (Folimahonmore and Coonmore) are either bordering (Folimahonmore) or partly overlapping with the Lower River Shannon SAC boundary (Coonmore), while the Knocknabansha plot is 2.4 km upstream of the SAC boundary. The Lower River Shannon SAC is designated for the Annex II species freshwater pearl mussel (*Margaritifera margaritifera*), sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*), brook lamprey (*Lampetra planeri*), otter (*Lutra lutra*) and Atlantic salmon (*Salmo salar*). Of these, the pearl mussel does not occur in the Bilboa and it is less likely that either river lamprey or sea lamprey occur that far up the system or are scarce there due to barriers to migration farther downstream. Salmon are the most plentiful Annex II species in the main channel of the Bilboa adjoining the Coonmore forestry plots, with brook lamprey also likely to occur. Salmon are almost certainly absent from the 1st order stream adjoining the other two plots, but brook lamprey could be present.

Knocknabansha and Folimahanmore plantings are adjoining or bordering 1st order streams, while the Coonmore planting (both plots) are bordering a 4th order river (the Bilboa) one set back 10-15 m from the edge the other with a 35 m broadleaf edge. One of the Coonmore plots (the larger one) has 20% of its area over blanket peat, which would have resulted in increased leaching of soluble phosphorus if fertilisation occurred during planting time. However, the fact that any drainage arising would have entered a 4th order channel, means that it would have had minimal impact on the ecology of that channel, which was High Status at the time. The first order stream bordering Folimahonmore plot flowed a further 0.25 km to join a second order stream which flowed a further 0.31 km to reach the main 4th order channel of the Bilboa, 0.7 km upstream of the smaller and more upstream Coonmore plot. It would have had no negative impact on the main channel of the Bilboa and no more than imperceptible to slight impacts on the water quality of the two lower order streams given that there was only a low risk of phosphorus leaching during the planting, as the soils are mineral. The Knocknabansha planting is over 90% mineral soil and 10% blanket peat. The 1st order stream within the site was Poor Status (Q3)

before the planting and the adjoining 1st order stream was Moderate Quality (Q3-4), so any impact arising would be expected to have been slight at worst and more likely would have been masked by the existing impaired quality. It would have had no impact on the SAC, a further 2.2 km downstream.

Neither set of plantings can have any cumulative impacts on the Derrybrien Wind Farm project. The Roscommon sites are more than 128 km upstream of the northern end of the Lough Derg (Shannon) SPA (004058) and 135 km upstream of where the Duniry River reaches North East Shore Lough Derg SAC (002241), as well as 185 km upstream of where the Bleach River eventually joins the Lower Shannon in Lough Derg. The Co. Tipperary sites in the Bilboa River catchment discharge to the Lower River Shannon via the Mulkear River which at that point is more than 35 km downstream of where the Bleach River (Lough Atorick catchment) eventually joins Lough Derg near Scarriff and 53km downstream of where the Duniry River eventually joins the Lough Derg NE Shore SAC, and 19 km downstream of the Lough Derg (Shannon) SPA (004058). Thus, while all the sites are connected eventually to the River Shannon catchment, they are all too far from each other to possibly have a discernible cumulative effect.

4.7.6 Overhead Lines

Moneypoint – Oldstreet 400 kV Line

This line was constructed prior to the Derrybrien Wind Farm Project so that no cumulative impact could have occurred during construction. The ground below the line had to be lowered between structure 28A and 29 to facilitate the stringing of the Derrybrien – Agannygal 110kV OHL which required localised earth movements. This is addressed in the Impacts Section (see OHL and Agannygal Substation and associated works). The line was refurbished in 2020 and 2021 when the structures were repaired and repainted. The concrete shear blocks, which are the above-ground concrete structures holding the feet of the pylons, were re-capped, the structure foundations were not be touched. The two structures nearest the OHL corridor are 120 m and 280 m respectively away from the small stream that drains to the Owendalulleegh River from the central part of the OHL corridor. Moreover, they are readily accessible from nearby forest tracks which minimised the potential for ground damage causes by tracking of works vehicles. Overall, the likelihood is that this operation will have negligible impacts on surface waters and no cumulative impacts with the Derrybrien Wind Farm Project.

The potential for cumulative impacts on the Slieve Aughty Mountains SPA owing to collision risk with OHLs is discussed in Section 5.7. The Derrybrien to Agannygal 110kV OHL is not considered a risk to the Special Conservation Interests from any other SPA and these species have not been recorded in the project area during surveys between 2004 – 2024. Therefore there can be no cumulative impacts between the project and the Moneypoint – Oldstreet 400 kV OHL.

Ennis – Shannonbridge 110 kV Overhead Line

The Ennis – Shannonbridge 110 kV OHL was installed in 1952 with some further structures installed in 1968. Maintenance works were carried out on the Ennis –

Agannygal 110 kV OHL in 2023 and 2024 and on the Agannygal-Shannonbridge 110 kV OHL in 2024. The refurbishment works have no perceptible cumulative impact with respect to hydrology or hydrogeology.

These works occurred during the ceased operation phase of the Agannygal Substation of the project within the Bleach/Lough Atorick catchment and given the absence of any activities in the substation likely to have a discernible impact on receiving waters during the operation phase, combined with the extensive area of the overall catchment and the very long intervening distance to the Lower Lough Derg SPA, no cumulative impact is anticipated to affect that site. As the works on the Ennis-Shannonbridge OHL will be completed beforehand, the cumulative impact of the decommissioning of the substation is not relevant in this instance.

The potential for cumulative impacts on the Slieve Aughty Mountains SPA owing to collision risk with OHLs is discussed in section 5.7. The Derrybrien to Agannygal 110kV OHL is not considered a risk to the Special Conservation Interests from any other SPA and these species have not been recorded in the project area during surveys between 2004 – 2024. Therefore there can be no cumulative impacts between the project and the Ennis – Shannonbridge 110 kV Overhead Line.

4.7.7 Gort Regional Water Supply Scheme

The water supply from Gort is derived from a combination of both groundwater supplies and surface water sources, which at the time of the peat slide were in the ratio of approximately 3:7 groundwater to surface water. The surface water supply came from the Cannahowna River which emerges from a subterranean cavern (Polldouagh) on the west side of Gort. The Cannahowna River is a continuation of the Beagh River, Lough Cutra and the Owendalulleegh River. In the period after the peat slide the colour of the treated water in the supply increased, although the supply periodically registered very high colour levels at that time of year in any case. Galway County Council also reported an increase in the frequency of the back-wash cycle for the rapid sand filters in the treatment plant which was probably due to an increase in suspended solids in the surface water source caused by the peat slide. This persisted at the time for several weeks. However, at no time was the supply interrupted. The raw water sources currently supplying the town remain essentially the same as in 2003. The effect on the water supply treatment process was a slight negative of temporary duration.

4.7.8 Proposed Gort Lowlands Flood Relief Scheme

The proposed Gort Lowlands Flood Relief Scheme is examining options of providing flood overflow pathways from several turloughs (Lough Coole to Caherglassaun to Cahermore and an overland spill to the Galway Bay at Dungory Castle at Kinvarra). This is currently at preliminary engineering and feasibility stage and will be the subject of a planning permission stage assuming that a feasible scheme can be achieved. Flood relief solutions for the Gort Lowlands are being progressed by the Office of Public Works (OPW) and Galway County Council to protect vulnerable properties, farms, communities and roads in the Gort Lowlands area. The preferred flood relief option is to reduce turlough levels to

identified target levels through engineering overland spill channels between successive turloughs until eventually reaching the sea at Dungory Kinvarra.

With regards to the Retained Development, there is no increase in the risk of flooding arising from the decommissioned wind farm in the locality of the wind farm itself. Similarly, on the broader regional scale, any change in flood risk associated with the Project is deemed imperceptible given the broader extent of the Boleyneendorrish and Owendalulleegh catchments.

As such, it is understood based on the likely proposals that the flood relief scheme shall have no perceptible cumulative impact with the wind farm with respect to hydrology or hydrogeology on any of the SACs or SPAs with water-dependent Qualifying Interests or Special Conservation Interests respectively that are located downstream of Lough Cutra.

4.7.9 Quarries/Sand extraction

Sand Extraction at Cloghvoley

Cloghvoley quarry is situated 4.5 km to the south-east of the wind farm and was granted planning permission in May 2008 after the wind farm was already commissioned, so there could have been no cumulative impact between it and the wind farm during construction. The quarry is within the catchment of the very upper reaches of the main channel of the Owendalulleegh River about 4 km upstream of Site O7C on the main channel of the Owendalulleegh (see Figure 3). However, there is no direct stream or drain connection between the quarry and the river. Even in the low likelihood of some solids contamination in overflow water from the quarry during times of very heavy rainfall, the significant distance between it and the nearest point in the Owendalulleegh which receives drainage from the wind farm (i.e. at the base of SC6, 2.5 km downstream), would strongly suggest that there has been no cumulative impact between the two projects on any SACs or SPAs with water-dependent Qualifying Interests or Special Conservation Interests downstream of Lough Cutra or Lough Cutra itself during the operation phase of the wind farm, by virtue of the significant intervening hydrological pathways. Furthermore, the Owendalulleegh River has maintained high status (Q5/Q4-5) since 2009 to the present indicating no negative cumulative effects of sand extraction at Cloghvoley.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for cumulative impacts on any European site.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment. As such there is no potential for cumulative impacts on any European site.

Coillte Quarry

The Coillte quarry is situated just east of the junction between the R353 and the Black Road, to the south-east of the Derrybrien Wind Farm site. It is a relatively small, 1.8 ha aggregate quarry, with an extraction area of 1.3 ha, the aggregate being used for forest road repairs. The area where the quarry is situated shows no surface drainage channels on the 6inch:1mile map for the area nor is there any indication from aerial photos of the area. The downslope over-ground distance between the quarry and the nearest stream, SC7(a) between sites O3 and O6A (see Figures 4 and 7), is just over 500m through forestry and damp grassland/blanket peat. Given that the material being quarried was predominantly coarse, the likelihood of any suspended solids from the site reaching any of the wind farm drainage streams is considered to have been extremely low. For that reason, it is considered extremely unlikely that there would have been any cumulative impacts between the quarry and the wind farm either during the construction or operation phases of the wind farm and therefore no cumulative impact on any of the SACs or SPAs with water-dependent Qualifying Interests or Special Conservation Interests downstream. As the quarry is now exhausted, the issue of cumulative impacts during the ceased operation phase of the project and Retained Development no longer arises.

Ballinakill Quarry

Ballinakill Quarry is within the drainage area of the Ballinlough Stream (River Waterbody Code: IE_SH_25B150300) draining ultimately to Lough Derg in the River Shannon catchment. The most downstream EPA Q-value monitoring site on the Ballinlough Stream (Bridge u/s Cappagh River, RS25B150500) has returned a High Status value (Q4-5) on each sampling occasion from 1999 to 2023 inclusive, so there is no evidence that there has been a cumulative impact between the quarry and the wind farm with regard to water quality and habitats within the Lough Derg, North-east Shore SAC or Lough Derg (Shannon) SPA at any stage.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for cumulative impacts on any European site.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment. As such there is no potential for cumulative impacts on any European site.

4.7.10 M18 Motorway Project

The M18 motorway project was planned and constructed after the Derrybrien Wind Farm Project was developed and so there could not have been any cumulative impact between the projects during the construction phase of the wind farm. Furthermore, as the operation phase of the wind farm has coincided with mainly High Status water quality on the main channel of the Boleyneendorrish and Owendalulleegh Rivers, no cumulative impacts

could have occurred between it and the subsequent motorway scheme at any of the SACs or SPAs with water-dependent Qualifying Interests or Special Conservation Interests downstream of Lough Cutra.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for cumulative impacts on any European site.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment. As such there is no potential for cumulative impacts on any European site.

4.7.11 Beagh Bridge

The privately owned four-span Beagh Bridge at the outlet of Lough Cutra underwent a structural assessment by ESB International (ESBI) in August 2004. This followed on from the temporary erection of straw filter barriers on the upstream face of the bridge in the aftermath of the peat slide to capture and filter any suspended sediment that may have transported from the peat slide area. Evidence of damage and deterioration to two of the three intermediate piers was highlighted although it was deemed by ESBI engineers at the time that the peat slide most likely could not have caused or contributed to this damage. ESBI recommended in their assessment report that all river flow be diverted away from these piers. The recommendations were addressed in January 2005 and left the pier foundations in what was deemed by ESBI as being in better condition than it was prior to the initial assessment.

Given the nature and scale of the remedial works at Beagh Bridge and the fact that they were undertaken in 2005, the potential for cumulative effects with the wind farm project is considered not likely to have occurred. As a consequence of the distance between Beagh Bridge and the European sites downstream the potential for significant cumulative effects is not likely to have occurred.

4.7.12 Prospective Development

As described in section 1.1, the proposed “Derrybrien Wind Farm Development Decommissioning Project” comprises two elements:

- The carrying out of physical works to decommission specific features of the existing development (the “Prospective Development”); and,
- The proposed retention in situ of other specific features of the existing development (the “Retained Development”).

The Prospective Development will not involve any significant excavations. The majority of the at-ground and below-ground infrastructure (e.g. access roads, hardstands, turbine, substation, pole set and angle mast concrete foundations, electrical cabling) as well as the naturalised peat repository areas will remain in-situ as part of the Retained Development. In addition, the offsite development constructed in response to the 2003 peat slide will also remain in-situ, including the barrages located along the Derrybrien North stream (a tributary of the Owendalulleegh River). Borrow pits on the site will not be re-opened and small volumes of aggregates that will be used for the widening works, where required, will be imported from nearby quarries. As such (as described in Chapter 8 Land, Soils and Geology of the EIAR) the Prospective Development may only result in slightly significant impacts with regards to peat instability of which the risk is very low to low.

The Prospective Development will interact with a number of watercourses and drainage ditches within the wind farm site and along the OHL corridor (including its access routes) and may result in potential impacts on aquatic environment as a result of increased levels of sedimentation and/or potential release of pollutants during decommissioning activities (as described in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the EIAR submitted as part of the Prospective Development). However, any potential hydrological impacts are only likely to have an effect on the local sub-catchments. The Prospective Development, with all recommended mitigation measures implemented, will have slightly negative, temporary and not significant effects on biological water quality and fisheries - confined, if/where they do occur, within localised upper reaches of small tributaries, but with neutral effects on high ecological status of the main receiving rivers: Owendalulleegh and Boleyneendoorish. There will be imperceptible to neutral effects on the Duniry and Lough Atorick / Bleach catchment streams. As such there is no potential for impacts on European sites hydrologically connected to the Prospective Development but at a substantial instream distance (approximately 14.2 km or greater).

With regards to the Retained Development, the main issue for water quality and the downstream environment is the level of peat stability. A low to negligible residual risk of peat failure associated with the Retained Development was identified and as such a low risk of impacts on the downstream aquatic environment (as outlined in Chapter 8 Soils, Geology and Land and Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR). As such it was concluded that there is no potential for significant effects on any downstream European site (including Lough Cutra SAC/SPA) as a result of a peat slide (see Sections 4.6.7 and 4.6.8 for more details) and therefore there is no potential for cumulative impacts on the downstream aquatic environment or on any aquatic Qualifying Interests of any European site.

In absence of mitigation, the Prospective Development has the potential to impact on SCI bird species of the Slieve Aughty Mountains SPA as a result of temporary loss and disturbance of habitat, increased levels of disturbance and the removal of the turbines and overhead line. These potential impacts will be fully mitigated to ensure the Prospective Development will not adversely affect the integrity of the Slieve Aughty Mountains SPA or any other European site, either alone or in combination with any other plans and projects. When the impacts on birds by the Retained Development are

considered with the Prospective Development, there are no significant cumulative impacts. This is due to the following reasons:

- While the Retained Development will result in a permanent loss of cutover bog habitat of some value to birds. The Prospective Development will not result in any additional permanent loss of bog habitat. Hence, there is no cumulative loss of habitat when both Developments are considered.
- The Retained Development is a passive development and will not result in any disturbance to birds.
- The Retained Development will not result in any additional changes to habitats used by birds when considered with the Prospective Development.

4.8 Screening Assessment Conclusion

This screening assessment was completed based on best available scientific data and in line with the relevant European Commission and national guidelines to determine the significance of effects, if any, on the relevant European site(s) which have occurred or which are occurring or which can reasonably be expected to occur because of the Derrybrien Wind Farm Project and Derrybrien Wind Farm Development Decommissioning Project – Retained Development.

This screening process has examined the details of the project. It has considered the potential impacts and significance of effects on 30 European sites identified within the Zone of Influence of the project. Based on the findings of the screening assessment, it has been determined that the project has not had nor is likely to have, either alone or in-combination with other plans and projects, significant effects on 28 out of the 30 European sites assessed.

As the project is entirely within the Slieve Aughty Mountains SPA, the assessment has identified the potential for significant effects to have occurred on the habitats and associated birds within the SPA at the time of construction (prior to SPA designation) and during the operation phase up to 2022. The assessment has also identified the potential for significant effects on the Slieve Aughty Mountains SPA arising from the ceased operation phase of the project (2022 to present) and Retained Development and decommissioning, individually or in combination with other plans or projects. Further assessment is provided in Section 5 – NIS.

The assessment has also identified the potential for significant effects to have occurred on Lough Cutra SPA, as a result of the peat slide which occurred during the construction phase of the project. This is further assessed in Section 5 – NIS.

Therefore, it is considered that an Appropriate Assessment under the Habitats Directive is required for the Derrybrien Wind Farm Project Decommissioning Project – Retained Development.

5 Remedial Natura Impact Statement

The Appropriate Assessment Screening in Section 4 of this report, identified two European sites as having the potential to have been or to be significantly affected by the project, namely the Slieve Aughty Mountains SPA and Lough Cutra SPA.

The remedial Natura Impact Statement presents the information required by the competent authority to undertake an Appropriate Assessment.

The purpose of the Appropriate Assessment is to assess the implications of the project, either alone or in-combination with other projects or plans, on the integrity of European sites in view of the site's conservation objectives.

5.1 Effects on site integrity defined by the conservation objectives

This section of the report sets out the effects of the Derrybrien Wind Farm Project (either alone or in combination with other projects or plans) on the integrity of the Slieve Aughty Mountains SPA and Lough Cutra SPA with respect to the conservation objectives for both sites. The focus is on demonstrating, with supporting evidence, that the project has not and will not adversely affect the integrity of these European sites.

The integrity of a European site is defined as the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified.

5.2 Description of European Sites

5.2.1 Slieve Aughty Mountains SPA

5.2.1.1 Status of hen harrier within the Slieve Aughty Mountains SPA

Hen harrier breeding territories within 5 km radius of wind farm

It is noted that hen harriers have not been recorded nesting within the wind farm site since monitoring of the wind farm commenced in 2004 nor were there any previous known attempts dating to at least the late 1990s (latter based on information supplied by NPWS).

Based on the results of the recent 2022 and 2024 vantage point surveys, there was no evidence of an occupied hen harrier territory within at least a 2 km radius of the project area. There was one sighting of an adult male hen harrier hunting over bog to north of Coppanagh (M6208) on 28th April 2022 (this bird was observed whilst in transit to site), approximately 4 km north-east of the wind farm. During the 2024 vantage point surveys, there were two hen harrier sightings within approximately a 2 km distance of the wind farm as follows:

- 15th April: female flying in area from Bohaboy to within c. 500 m of northern boundary of wind farm
- 16th April: ringtail circling over forest near Knocknarebana c. 2 km south-west of wind farm

In addition to the records described above for the period 2006-2018 and the recent 2022 and 2024 surveys, two *ad-hoc* sightings of hen harrier within the wind farm were made by John Curtin (bat ecologist) in 2020 as follows:

- 30th June 2020 - female perched on a stump in clear-fell in the western sector of site, then flew
- 8th September 2020 – ringtail near substation

Since the start of the monitoring surveys for breeding territories in 2004, up to 14 breeding territories have been identified within an approximate 5 km radius of the wind farm. Most of these would have been traditional territories dating to at least the late 1990s. However, in any one year occupancy varied, with some territories showing no evidence of occupancy or perhaps being abandoned early in the season. Also, within each territory the exact location of the nest site will often vary between years.

Table 4 shows a summary of the number of territories occupied in various years since 2004 within a 5 km radius of the wind farm. Data from the respective National Hen Harrier Surveys for 2005 and 2010 are also given to supplement the years when monitoring did not take place at the wind farm. Two categories of breeding are given – confirmed (where nesting actually took place though breeding may not have been successful, i.e. young not fledged) and possible (where territory was apparently occupied early in season only).

Table 4 Summary of the number of territories occupied in various years from 2004 to 2018 within a 5 km radius of the wind farm.

	2004	**2005**	**2006**	**2007**	**2009**	**2010**	**2011**	**2015**	**2018**
Confirmed	9	14	11	12	11	8	6	2	2
Possible	1	-	2	2	2	4	4	4	3
Total	**10**	**14**	**13**	**14**	**13**	**12**	**10**	**6**	**5**

Since monitoring commenced in 2004, there have been two regular territories within a 1-2 km distance of the Derrybrien Wind Farm site. In 2011, the only successful nesting (i.e. young birds fledged) by the 10 pairs within the 5 km radius of the wind farm was from one of these territories, and this territory was still occupied in both the 2015 and 2018 surveys (though no young were known to be produced).

The monitoring of hen harrier territories within the 5 km radius of the wind farm shows that the number of confirmed nesting attempts was fairly constant between 2004 and 2009 but there then followed a decline in 2011, which continued more markedly into 2015 and 2018 (with only 2 confirmed nesting attempts in each year). Between 2010 and 2018, the total number of pairs (confirmed and possible) dropped from 12 to 5.

Factors potentially affecting hen harrier breeding population within the Slieve Aughty Mountains

The population decline of hen harrier which had been recorded within the 5 km radius of the Derrybrien Wind Farm during the monitoring period was reflected in the Slieve Aughty Mountains SPA as a whole.

Survey results of the estimated population within the SPA in various years are presented in Table 5. Data are from the National Hen Harrier Surveys (Norriss *et al*. 2002, Ruddock *et al*. 2012, 2016, 2024) and from the Hen Harrier Project (2020, 2021).

Table 5 Comparative population data from the national hen harrier surveys in 1998-2000, 2005, 2010, 2015 and 2022 for the Slieve Aughty Mountains, and from Hen Harrier project for 2020 and 2021. Figures are total estimated pairs.

1998-2000	2005	2010	2015	2020	2021	2022	Change % (2005-2022)
10-21	24-27	16-24	8-14	7	8	3-5	-67%

Note: Survey effort in 1998-2000 survey was less than in subsequent surveys.

A detailed study of hen harriers in three areas (Slieve Aughty Mountains, Ballyhoura Mountains and West Clare hills) by researchers from University College Cork showed population declines in all three areas between 2007 and 2011 and also that the numbers of young fledged at successful hen harrier nests was quite low compared to other populations (Irwin *et al*. 2012).

The cause(s) of the marked population decline and low productivity within the Slieve Aughty Mountains SPA, and indeed in areas such as the Ballyhoura Mountains and the West Clare hills and several other SPAs, remain largely unknown but are expected to be due to a number of reasons, perhaps in combination, including the following (after Ruddock *et al*. 2016):

- Habitat change (largely forest management affecting prey availability)
- Predation
- Persecution
- Access and recreation (walking paths, cycling tracks etc)
- Non-intensive grazing
- Wind energy and Utility and service lines

From the available data on the hen harrier population in the Slieve Aughty Mountains SPA, it is concluded that the population has undergone a substantial decline (>67%) since the designation of the SPA in 2007.

From an analysis by Moran & Wilson-Parr (2014), the SPA has between 33.4% and 37.4% suitable nesting habitat and 50.0% to 54.0% suitable foraging habitat. At the time of analysis, there were 31,744 ha in forest/woodland cover (equating to 53.4% of total SPA area) of which 5,789.5 ha to 8,173.9 ha was classed as suitable for nesting hen harriers.

Habitat change

Open moorland (heath/bog) is the natural nesting habitat for hen harriers in Britain and Ireland (Watson 1977). Since the middle of the last century, commercial forest expansion

across traditional bog and heath habitats in the upland of Ireland and the UK has been associated with Hen Harrier population declines in these areas (Bibby & Etheridge 1993, Ruddock *et al.* 2016). However, the population in Ireland has readily adapted to nesting within young conifer plantation, as highlighted by Norriss *et al.* (2002) in the first National Hen Harrier Survey. Indeed, Wilson *et al.* (2009) have shown pre-thicket conifer plantations to be the most frequently used nesting site throughout Ireland. This trend is particularly prevalent in the Slieve Aughty Mountains and in the 2015 national survey, all confirmed nesting pairs were in conifer plantation (Ruddock *et al.* 2016). Foraging activity, however, continues to indicate a preference for open habitats (bog-heath-grassland) though pre-thicket second plantation is also used extensively.

It can be assumed that over time the proportions of the main landuses within the Slieve Aughty Mountains SPA will remain fairly constant, which is roughly as follows: forestry 50%, bog/heath 30%, grassland 20% (NPWS, 2015).

Within the forestry component, however, there is continuous change as trees mature over the (average) 40 year cycle, are clearfelled and then replanted. As only the pre-thicket or open canopy phase of the forest cycle (usually forest not more than 10-12 years of age) provides useful nesting and foraging habitat for hen harriers, it follows that the status of the age cohorts of the forest in any one area at a given time is likely to have an important effect on the local hen harrier population. This trend was shown quite well in the 2005 National Hen Harrier Survey when a marked increase was recorded in the Hen Harrier population in the Ballyhoura Mountains since the 1998-2000 survey (Barton *et al.* 2006). The authors of the survey report considered that the increase in the amount of pre-thicket second rotation forest was a main reason for the increase in the number of birds.

In the 2010 National Hen Harrier Survey, Ruddock *et al.* (2012) wrote (page 55 of report) as follows: *'Forest maturation may be partly responsible for regional decreases in breeding hen harriers, as a shift in age structure of plantations was recorded between the two surveys with a general increase in older classes of suitable forest breeding habitats'*. In discussing significant population declines in three of the six SPAs designated for hen harrier, they noted further (page 57 of report): "*There has been a decrease in the forest age-classes suitable for hen harrier nesting and a decline in afforestation across all the SPAs which may have affected distribution. Afforestation in all SPA areas appears to have dramatically increased during 2006, immediately prior to SPA designation in 2007 and has since declined annually. The quality of open habitats for hen harriers may need to be improved in order to compensate for decreased availability of young forest habitats due to the changing age profile of forest plantations in these areas.*"

In discussing the decline in the population in the Slieve Aughty Mountains SPA between the 2010 and 2015 national surveys, Ruddock *et al.* (2016) wrote that surveyors observed that forest maturation is likely to have reduced the availability of suitable habitat since the previous survey and they suggest that this may have led to a redistribution of some breeding pairs from the Slieve Aughty Mountains to areas south of the SPA as some increases were recorded in the Slievefelim – Silvermines Mountains complex. From analyses carried out on forest age structure within all six SPAs selected for hen harriers in Ireland, Ruddock *et al.* (2016) predicts that the extent of usable forest habitat (i.e. open canopy up to c.12 years) for nesting and foraging purposes will decline over the next 10 years.

In addition to habitat loss, forest management activities, including new forest road construction and felling works, can have considerable impacts on breeding birds of prey. In an analysis of anthropogenic activities recorded during the 2015 National Hen Harrier Survey that could potentially impact on breeding hen harriers, the most frequently recorded pressure recorded was forest management and use (13% of occurrences) followed by the category 'paths, tracks & forest roads' (11%) (Caravaggi *et al.* 2020a).

Predation

Compared to open habitats, the increase and maturation of commercial forest plantations has led to an increase in potential predators of hen harrier nests due to the provision of cover and breeding sites. Avian predators include hooded crow, raven, magpie and more recently jay, while mammalian predators include fox, pine marten, mink and rat. O'Donoghue (2010) attributed 55% of all nest failures in south and west Ireland in 2007 and 2009 to predation events. In the 2015 National Hen Harrier Survey, Ruddock *et al.* (2016) identified the main predators as fox, pine marten, hooded crow and mink.

While there is little direct evidence of predation in the Slieve Aughty Mountains SPA, other than a nest being predated by a fox in 2008 (recorded by nest camera), all the key predators are widespread throughout the SPA as well as in the Derrybrien area. Indeed, populations of species such as pine marten and fox have increased in the past decade or so.

Persecution

Persecution or illegal killing of hen harriers has been recorded in some parts of the country (including Kerry and west Clare) (Ruddock *et al.* 2016). While there has been no evidence of such events in the Slieve Aughty Mountains, this does not necessarily rule out the possibility of persecution occurring.

Access and Recreation

Ruddock *et al.* (2016) identified disturbance to hen harriers from human presence as being widespread throughout the species range and probably responsible for nest abandonment in some cases. This category included dedicated walking and cycling tracks, quad bikes, as well as local paths. Disturbance can occur particularly when users leave the dedicated routes.

In the 2015 National Hen Harrier Survey, surveyors in the Slieve Aughty Mountains identified access tracks and cycling tracks, including use of non-paved forest roads, as a pressure on the hen harrier population.

Non-intensive grazing

Appropriate grazing levels to optimize habitat conditions for hen harrier can be difficult to achieve and will vary in any one area over time. While under-grazing may facilitate development of tall stands of heather suitable for nesting, the absence or near-absence of grazing may lead to scrub encroachment which may not be suitable for either nesting or foraging. Similarly, over-grazing can lead to unsuitable conditions for both nesting and foraging.

While Ruddock *et al.* (2016) does not identify grazing levels as an issue in the Slieve Aughty Mountains, they do note uncontrolled burning (which may be related to local grazing) as a pressure on the hen harrier population.

Wind energy & Utility and service lines

For the Stacks Mountains complex in Kerry and Cork, Ruddock *et al.* (2016) cited wind energy production as one of the most frequently recorded pressures on the hen harrier population. The effects of the presence of wind farms are considered mainly through loss of suitable habitat and disturbance to breeding during the construction phase. For the Slieve Aughty Mountains SPA, they note that there are 77 turbines located within the SPA boundary and no others within 500 m of the boundary. Wind energy was not reported as a main pressure on the hen harrier population within the SPA.

Of relevance to power lines within the Slieve Aughty SPA, Ruddock *et al.* (2016) wrote the following:

> "*There appeared to be a positive association, although this was not statistically tested, and supported by behavioural observations, that habitat management (i.e. clearance) for power line infrastructure may provide corridors for movement and foraging by hen harriers within the forested landscape. The use of such corridors could prove useful to increasing connectivity with suitable nesting and foraging areas and particularly linking forested areas with open habitats which are shown to be used more frequently in Ireland."*

For the Slieve Aughty Mountains SPA, the 2020 Hen Harrier Project report noted the following:

> *"A number of potential pressures were noted in the SPA. These include forestry operations and recreational and vehicle traffic on access roads and tracks near nest sites. Turf cutting and pine marten were noted regularly near nest sites."*

The 2021 Hen Harrier Project report noted the following in relation to the Slieve Aughty Mountains SPA:

> *"A significant pressure on Hen Harrier in this SPA is the direct and indirect effects of habitat loss and fragmentation. The extent and age profile of the forest plantations in the SPA may be leading to an increased vulnerability top predation. Forestry activities along with recreational traffic are regularly observed near nest and pose an ongoing risk of disturbance".*

Following a further significant decline in the breeding population of the Slieve Aughty Mountains in 2022, Ruddock *et al.* (2024) wrote the following:

> *"The Slieve Aughties region (Co. Galway and Co. Clare), which is larger than the Slieve Aughty Mountains SPA, has had its population decline by around two thirds since 2015 and now holds fewer than six pairs of breeding hen harrier. The extent of declines here since previous surveys is severe, with an 82% decline when compared to the peak population recorded in 2005 (27 breeding pairs). The extent of losses of breeding hen harrier in the region are widespread and substantial in the national context. The range of pressures and threats recorded by surveyors*

include a predominance of coniferous forest plantation and the associated forest and plantation management and use, forest clearance (clear-cutting, removal of all trees) and wind energy developments and associated utility and service lines (e.g. power-lines, pipelines). There was also a spectrum of grazing levels across the region, from intensive grazing by sheep and deer to non-intensive grazing. In some areas, a notable abandonment of pastoral systems, and lack of grazing provided excellent suitable habitat but was countered by totally unsuitable habitat in other areas. The extent of turf cutting, including both hand-cutting of peat and mechanical removal of peat, is widespread, across large areas of supporting peatland habitat, and the associated impact includes human and machinery disturbance at key temporal periods during the breeding season. Various recreational activities including paths, tracks, cycling tracks, outdoor sports and leisure activities, recreational activities such as walking, horse-riding and various off-road vehicles were also recorded by surveyors. In addition, extensive and uncontrolled burning (e.g. widespread unmanaged and/or malicious burning) was reported by surveyors across the region which is likely contributing to the loss and/or poor condition of supporting habitats for both breeding hen harrier and their prey."

From the available data on the hen harrier population in the Slieve Aughty Mountains SPA, it is concluded that the population has undergone a substantial decline (-67%) since the designation of the SPA in 2007.

5.2.1.2 Status of breeding merlin in wind farm project area

Merlin is a scarce breeding bird within the Slieve Aughty Mountains, with the Site Synopsis for the Slieve Aughty Mountains SPA (NPWS, 2015) noting that "*The population size is not well known but is likely to exceed 5 pairs*".

There were no sightings of merlin during any of the 2022 or 2024 vantage point surveys either within the wind farm site or in the hinterland. Similarly, there were no sightings of merlin within the wind farm project area during the various breeding bird surveys between 2004 and 2018. A single sighting was made in the hinterland area several kilometers from the wind farm on 10th May 2011 during a search for hen harrier territories which probably indicated local breeding.

As merlin is a difficult species to survey due to its discrete breeding behaviour (Lusby *et al.* 2011), there is some chance that one or more pairs could breed in the hinterland of the wind farm and remain unnoticed. However, it is undoubtedly a rare breeding bird within the Slieve Aughty Mountains.

5.2.2 Lough Cutra SPA

5.2.2.1 Status of breeding cormorant colony within the Lough Cutra SPA

Lough Cutra SPA is located approximately 10 km south west of the project and approximately 20 km from the wind farm hydrologically. Lough Cutra is a large

oligo/mesotrophic freshwater lake lying on limestone but with much sediment washed down from the sandstone hills above. The Owendalulleegh River is the main in-flowing river. Woodland occurs around much of the lakeshore. While much of this is planted, wet woodland with willows (*Salix spp*.) and Alder (*Alnus glutinosa*) is also represented. The lake has a number of islands, some of which are wooded (NPWS, 2009).

Historical data for Lough Cutra show that it was once a long-established breeding site for Cormorant (166 pairs in 1985), with birds recorded breeding on Parsons Island and appearing to commute to the coast for feeding (NPWS, 2009). However, declines were reported in 1996 (34 pairs) and a survey of the colony on 2004 (Inis Environmental Services, 2004b) found that the cormorants were no longer breeding at the lake and that limited, or no breeding activity had been recorded for a number of years (as per NPWS consultation).

Monitoring conducted in 2010 as part of a study undertaken by Tierney *et al.* (2011) revealed that the colony at Lough Cutra had been recently abandoned. More recent counts undertaken in May 2017 showed that cormorants were present at the site, but no breeding activities were recorded (Data provided by NPWS in 2018).

5.3 Describe the elements of the project or plan (alone or in combination with other projects or plans) that are likely to give rise to significant effects on the environment

The potential impacts associated with the construction (including the peat slide and associated works that occurred in 2003), operation and ceased operation phases of the project and Retained Development are identified in this section. The impacts identified below are those which are likely to have occurred, which are occurring or which can reasonably be expected to occur based on the nature and scale of the project and of the Special Conservation Interests of the Slieve Aughty Mountains SPA and Lough Cutra SPA.

5.3.1 Slieve Aughty Mountains SPA

The elements of the project identified as having the potential to affect the Slieve Aughty Mountains SPA are as follows:

Potential impacts due to construction activities

- Loss of habitat (including subsequent alteration / change of habitat)
- Disturbance of birds due to presence of personnel/machinery

Potential impacts due to peat slide and associated activities

- Loss of habitat (including subsequent alteration/change of habitat)
- Mortality of individual birds
- Disturbance of birds due to presence of personnel/machinery.

Potential impacts due to operation and maintenance activities

- Collision risk to birds associated with operating turbines.
- Collision risk from overhead powerline
- Displacement of birds due to operation of turbines.
- Disturbance to birds associated with maintenance activities on site e.g. removal of self-sown conifers, road and drain maintenance
- Impacts on reproductive output in relation to wind turbine proximity.
- Barrier effects

Potential impacts due to ceased operation

- Collision risk to birds with overhead powerline
- Habitat change due to spread of self-seeded conifer trees in areas where they were managed during operation
- Habitat change due to re-wetting of bog arising from the absence of any drain maintenance

Potential impacts due to Retained Development

- Loss of cutover bog habitat due to retention of concrete turbine foundations, hardstand areas, the substation foundations, and constructed roads within the unplanted eastern sector of the site
- Habitat change due to retention of naturalised peat repository areas previously covered in conifer plantation
- Establishment of wet grassland and scrub habitats in the offsite barrages and repository areas that were previously occupied by conifer plantation.

5.3.2 Lough Cutra SPA

The elements of the project identified as having the potential to affect Lough Cutra SPA are as follows:

Potential impacts due to construction activities

- Pollution of surface waters and impact on fisheries owing to an increase in runoff of inorganic and peat solids, combined with increased nutrients from clearfelling.

Potential impacts due to peat slide and associated activities

- Pollution of surface waters and impact on fisheries owing to siltation with peat solids.

Potential impacts due to operation and maintenance activities

- Collision risk to birds associated with operating turbines.
- Pollution of receiving waters with siltation due to maintenance activities.

Potential impacts due to ceased operation

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no aspect of the ceased operation stage with the potential to affect this SPA.

Potential impacts due to Retained Development

- Reduction in surface water pollution due to reduced efficiency of the drainage network and the retention of a new culvert along the Coillte forest access track that will replace an existing collapsed/subsided culvert (as part of the Prospective Development)
- Increase in surface water pollution in the Derrywee East stream at Crooked Bridge due to the release of low level suspended solids associated with the road widening during rainfall events.
- Reduction in the quality of fisheries habitat in the Owendalulleegh River due to the reduction of finer substrate[16] mobilisation downstream associated with the retention of barrages 3 and 4 on the Derrybrien North stream.

5.4 Set out the Conservation Objectives of the Site

5.4.1 Slieve Aughty Mountains SPA

Site-specific conservation objectives for the Slieve Aughty Mountains SPA are available on NPWS website: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004168.pdf (Citation: NPWS 2022, Conservation Objectives: Slieve Aughty Mountains SPA 004168. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage).

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest.

The maintenance of habitats and species within European sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

The favourable conservation status of a species is achieved 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

[16] Finer substrates are required to provide suitable downstream habitat for fish species.

- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The site-specific conservation objectives for the Slieve Aughty Mountains SPA (NPWS, 2022), which were published in December 2022 (during the ceased operation phase of the project), are as follows (see Table 6 for full details, including the corresponding attributes and targets):

- To restore the favourable conservation condition of hen harrier in Slieve Aughty Mountains SPA.
- To maintain the favourable conservation condition of merlin in the Slieve Aughty Mountains SPA.

Table 6 Site Specific Conservation Objectives for the Slieve Aughty Mountains SPA (NPWS, 2022)

A082 Hen Harrier *Circus cyaneus*		
To restore the favourable conservation condition of hen harrier in Slieve Aughty Mountains SPA, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Population size	Number of confirmed breeding pairs	Restore numbers to at least 14-24 confirmed breeding pairs
Productivity rate	Number of fledged young per confirmed pair	Restore to at least 1.0–1.4 fledged young per confirmed pair
Spatial utilisation by breeding pairs	Percentage	Restore the spatial utilisation of the SPA by breeding pairs to at least 68–92%
Extent and condition of heath and bog and associated habitats	Hectares; condition assessment	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
Extent and condition of low intensity managed grasslands and associated habitats	Hectares; condition assessment	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
Extent and condition of hedgerows	Kilometres; condition assessment	Maintain at least the length and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
Age structure of forest estate	Percentage	Achieve an even and consistent distribution of age-classes across the forest estate
Disturbance to breeding sites	Level of impact	Disturbance occurs at levels that does not significantly impact upon breeding hen harrier
[A098] Merlin *Falco columbarius*		
To maintain the favourable conservation condition of merlin in the Slieve Aughty Mountains SPA, which is defined by the corresponding list of attributes and targets below:		
Population size	Number of occupied territories	The breeding population is stable or increasing
Productivity rate	Number of fledged young per breeding	Sufficient to at least maintain population

	attempt with known outcome	
Distribution: extent of available nesting options within the SPA	Numbers and spatial distribution	Sufficient availability of suitable nesting sites throughout the SPA to maintain the population
Extent and condition of suitable open habitats for foraging	Hectares; condition assessment	Sufficient availability of suitable foraging habitat across the SPA to support the targets relating to population size, productivity rate and range
Disturbance to breeding sites	Level of impact	Disturbance occurs at levels that does not significantly impact upon breeding merlin

5.4.2 Lough Cutra SPA

Site-specific conservation objectives for the Lough Cutra SPA are available on NPWS website:https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004056.pdf (Citation: NPWS (2025) Conservation Objectives: Lough Cutra SPA 004056. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.).

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest.

The maintenance of habitats and species within European sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

The favourable conservation status of a species is achieved 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.

The site-specific conservation objectives for Lough Cutra SPA SPA (NPWS, 2025) are as follows (see Table 7 for full details, including the corresponding attributes and targets):

- To restore the favourable conservation condition of cormorant in Lough Cutra SPA.

Table 7 Site Specific Conservation Objectives for Lough Cutra SPA (NPWS, 2025)

A017 Cormorant *Phalacrocorax carbo*		
To restore the favourable conservation condition of cormorant in Lough Cutra SPA, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Breeding population size	Number of Apparently Occupied Nests (AON)	Long term SPA population trend is stable or increasing

Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population
Distribution: extent of available nesting options within the SPA	Numbers and spatial distribution	Sufficient availability of suitable nesting sites throughout the SPA to maintain a stable or increasing population
Forage spatial distribution, extent, abundance and availability	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Disturbance at the breeding site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on birds at the breeding site
Disturbance at areas ecologically connected to the colony	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on breeding population
Barriers to connectivity	Number, location, shape, and area (ha)	Barriers do not significantly impact the population's access to the SPA or other ecologically important sites outside the SPA

5.5 Describe how the project has or will affect key habitats and key species

5.5.1 Slieve Aughty Mountains SPA

5.5.1.1 Construction phase impacts, 2003 – March 2006

Construction works on site commenced in June 2003 with tree felling operations which were undertaken by a contractor on behalf of Coillte. Civil engineering works commenced in July 2003 with road construction and excavations at turbine locations. The works were stopped on 16th October 2003 due to a peat slide on site (the impact of this on birds is considered in Section 5.5.1.2). Construction works re-commenced in June 2004, including work on the Derrybrien to Agannygal 110kV OHL and Agannygal Substation, and were complete by March 2006. The entire construction phase of the project was undertaken prior to the designation of the SPA in 2007.

The principal impacts on birds which occurred or had the potential to have occurred during the construction of the project were:

- Loss of habitats (including. subsequent alteration/change of habitat),
- Disturbance to birds (noise, human presence etc.)

The assessment is focused on the hen harrier, as this species occurs in the wind farm area and is considered by McGuinness *et al.* (2015) to be highly sensitive to wind farm developments. However, the issues considered could also apply to merlin, though the species has not been recorded within the wind farm and there are no known breeding territories within the 5 km hinterland (though a territory may well occur).

Loss of habitats

Wind farm site

At the time of wind farm construction, the main habitats on the Derrybrien Wind Farm site were conifer plantation and cutover (blanket) bog. The conifer plantations were planted between 1963 and 1996 on areas dominated by blanket bog. At the time of construction, the plantations were largely in the closed canopy state though the trees planted in the 1993 to 1996 period (located in the south-southwestern section of the site and measuring approximately 42 ha in total) still had open canopy in 2003. The cutover bog, which at the time comprised areas of active turbary, is located within the eastern section of the site.

Conifer plantation forest is an non-native habitat and is of low value for birds. As noted by Caravaggi *et al.* (2020b), commercial forest expansion across traditional open heath and blanket bog hen harrier habitats in the uplands of Ireland and the UK has been associated with population declines in these areas. Furthermore, in an upland landscape, conifer plantation presents a threat to adjoining unplanted bog and heath habitats from spread of self-seeded conifer trees. While the pre-thicket phase is useful for supporting a range of small bird species (passerines) and also provides useful foraging and nesting habitat for hen harrier, it is a transient habitat that loses its value from about 10-12 years of age onwards.

The removal of approximately 222 ha of conifer forest (total of approximately 263 ha) as a habitat for birds due to the construction works is a positive impact of long-term duration because of the non-native status of the habitat. With the clearance of conifer plantation and without replanting, bird species more typical of blanket bog (the natural habitat of the area) have had an opportunity to become re-established on the regenerating open habitats outside of the construction footprint. This is considered to have had a significant positive effect for the local bird populations including meadow pipit (Red-listed), skylark (Amber-listed) and hen harrier (Annex I species).

At the time of felling, however, some stands (measuring approximately 42 ha) were still in the pre-thicket phase and would likely have provided suitable habitat for foraging hen harriers for perhaps another 5 years. While the loss at the time of this 42 ha is a negative impact, the significance of the effect on birds is considered slight and of short-term duration. It is noted that the subsequent creation of open habitat across the 42 ha would have been more valuable for birds such as hen harrier in the medium to long term as the area developed into regenerating bog/heath and scrub after several years (as shown by vegetation surveys), whereas the trees upon attaining closed canopy status would have been of little or no use for hen harriers.

Within the 222 ha of plantation forest which was cleared, the construction footprint, including turbine bases, hardstands, roads and the Derrybrien Substation, measured 13.6 ha. While built surfaces are not of significant value to birds, it is noted that species such as meadow pipit and skylark and occasionally red grouse, will utilise the road surfaces and hardstand areas, and especially the margins which adjoin the regenerating areas, for feeding and perching/resting purposes. On warm days, birds may also use the hard surfaces for dust bathing. When hunting, hen harriers will often follow linear features including embankments, tracks and road margins and therefore the wind farm roads/tracks can be considered of some value to foraging hen harriers. Of the 13.6 ha of conifer plantation that was removed to facilitate the wind farm infrastructure, the majority (11 ha) was closed canopy forest planted between the 1960s and 1980s. Without the wind farm development, it is expected that this would have been clear-felled and replanted at

some stage up to the 2020s. The replanted pre-thicket forest phase would have provided potential foraging habitat for hen harrier from the age of approximately 3 years to 10-12 years (depending on growth rate). It is noted that the felling and replanting of the 11 ha would have taken place at different times across the wind farm and the later plantings (1980s) would have remained as closed canopy forest into the 2020s. While the loss of up to 11 ha of future pre-thicket second rotation forest is considered as a negative impact, the effect is considered slight and of medium-term duration (i.e. potentially available to harriers for up to 10 years before canopy closes).

The construction works in the cutover bog in the eastern section of the site resulted in the loss of an estimated 0.7 ha of cutover bog (the tracks through the bog were already in place for forestry purposes). This occurred prior to the Slieve Aughty Mountains SPA being classified as a SPA in March 2007 and prior to it becoming formally designated by Statutory Instrument in March 2012. While mostly in a cutover state, the bog is well vegetated and apparently supported (at time of construction) species typical of upland bog habitats such as skylark, snipe and meadow pipit. While this is a negative impact, the area of loss is minor in the context of the overall amount of cutover bog within the wind farm site (i.e. amounting to less than 1% of the area of cutover bog habitat). Overall, the loss of 0.7 ha of cutover bog as a habitat for birds is rated as a long-term negative slight effect at the International level of importance.

Overhead line corridor and Agannygal Substation

The OHL linking the wind farm to the Agannygal Substation extends for approximately 7.8 km along a corridor of up to 45 m width. The line comprises 34 double wood pole structures, two end masts (one within Derrybrien Substation), six angle masts and one intermediate mast. There are two additional masts within Agannygal Substation associated with the connection to the National Grid on the Ennis-Shannonbridge 110kV line.

Much of the line corridor was within commercial conifer plantation and required the removal of approximately 33.1 ha of forest. Only a small fraction of this was built on (i.e. polesets and angle masts) with the majority of the corridor allowed to regenerate to a mix of habitats including low scrub, wet grassland and regenerating bog vegetation. Overall, it is considered that the removal of the conifer plantation from along the overhead line corridor and without replanting is a positive long-term impact as conifer plantation is alien to the landscape and of low value for birds. This is considered to have had a significant positive effect for local bird populations, including hen harrier.

The Agannygal Substation includes a control room in a palisade fenced compound. The base platform measures 72 m x 52 m (3,744 m^2). At time of construction, the location for the substation was closed canopy conifer plantation. A total of 1.6 ha of forest was cleared to facilitate the substation construction. Without the wind farm development, the conifer plantation would have been clear-felled and replanted at some stage up to the 2020s. The replanted pre-thicket forest phase would have provided potential foraging habitat for hen harrier from the age of approximately 3 years to 10-12 years (depending on growth rate).

Considering the amount of conifer forest within the Slieve Aughty Mountains SPA (c. 50% of total area) the loss of approximately 1.6 ha of future pre-thicket forest at the substation

site is a negative impact of slight significance and of medium-term duration (i.e. potentially available to harriers for up to 10 years before canopy closes).

Disturbance to birds

Construction works can cause disturbance to birds within surrounding areas. This arises from noise and the physical presence of humans, machinery etc. Potential disturbance is of most concern for breeding birds as nests could be deserted or at the least left unattended for prolonged periods and subject then to predation. Foraging birds, including hen harriers, may be displaced from suitable habitats during the period of construction. In a review of potential displacement effects on birds at twelve wind farm sites in Britain, Pearce-Higgins *et al.* (2012) reported that observed negative effects of wind farms on bird species occur principally as a result of disturbance by high levels of activity during the construction phase rather than the operational phase.

While there is no evidence to suggest that hen harriers were nesting within the wind farm site or its immediate environs at the time of construction, it can reasonably be expected that foraging hen harriers could have been displaced from suitable foraging habitats within the site during the construction works. Such an effect is rated as significant but of temporary duration.

5.5.1.2 Peat slide impacts

The peat slide which occurred in October 2003 affected an area in the southern part of the wind farm and extended to Flaggy Bridge on the R353. Emergency works which were carried out immediately after the slide involved the construction of barrages to contain the displaced peat and debris. The area affected was conifer plantation, both pre-thicket and closed canopy phases. Following the slide, the area comprised bare peat and exposed mineral soil with isolated vegetated islands which continued to support individual conifer trees and typical bog-heath species. The total affected area was estimated at 25 ha.

Survey of the peat slide area in 2011 showed almost full recovery of vegetation and habitat structure throughout the area (P. Crushell & B. Madden personal observations). The area was mapped as a mosaic of heath and scrub, with a well-developed herb and shrub layer dominated by ling heather (*Calluna vulgaris*) and purple moor-grass (*Molinia caerulea*). Soft rush (*Juncus effusus*) was common where mineral soil predominated. The tree layer supported scattered pine and spruce of varying ages, many of which appeared to be self-sown since the peat occurred. Willow was also common.

The impacts on birds as a results of the peat slide are considered to be the following:

Mortality

As the slide occurred in October, it would not have impacted any nests. Adult birds present in the area would not have been affected due to their mobility and capacity to move away from the area.

Habitat loss

The area of the slide included both closed canopy and pre-thicket phase forest. The closed canopy forest is of low value to foraging hen harriers. As already noted, conifer forest is a non-native habitat and the impact due to its removal without replanting is considered as a positive impact of long-term duration resulting in no significant effects.

The pre-thicket phase forest, which occurred in the slide area within and below the wind farm, would have been suitable for foraging by hen harriers for perhaps a further five years before the canopy would have closed. While the loss of pre-thicket forest is a negative impact, the significance of the effect is slight and of short-term duration. Also, the removal of the forest plantation resulted in the development of open habitat of considerably more value to hen harrier and other bird species in the short to long-term.

Habitat regeneration

Regeneration of the peat slide area to a mix of scrub and heath, with occasional conifer trees still standing and self-seeded trees becoming established provides excellent habitat for birds including hen harriers. The revegetation of the peat repository areas at the barrages was mainly rushes – this provides low quality habitat for birds. The effect for birds including hen harrier by the development of suitable vegetation in the slide area after a short number of years is a significant positive effect of long-term duration.

5.5.1.3 Operation phase impacts (2006 – 2022)

The principal potential impacts on birds within the SPA as a result of the operation of the project are:

- collision,
- displacement,
- impacts on reproductive output in relation to wind turbine proximity,
- barrier effects,
- development of habitats

In addition, maintenance works include maintenance and periodic upgrade of access tracks and drains, and substation inspections and maintenance.

On one occasion in 2018, the cutting back of self-seeded tree growth to a 10 m width was required along four sections of track to allow crane access. Also in 2018, self-seeded tree growth beneath the overhead line was cut back where required.

Potential collision impact

Collision risk posed to bird species is one of the main environmental concerns associated with wind energy developments (Drewitt & Langston 2006, Band *et al.* 2007, Drewitt & Langston 2008). However, bird species differ widely in their susceptibility to collision mortality. Essentially, birds are at risk of collision only when their flight path overlaps with the rotor blade sweep area of a turbine, and birds whose flight heights coincide with the height of turbine rotor blade sweep are most at risk. Previous studies have reported low flight heights for hen harriers (Whitfield & Madders 2006, Madden & Porter 2007, Ruddock *et al.* 2012), with low proportions (5-15%) of observations at rotor sweep height (Garvin

et al 2011). In general, when hen harriers are engaged in hunting behaviour they are outside of the area of greatest risk of collision with wind turbines, i.e. below the rotor sweep zone. However, courtship displays such as sky dancing occur at heights of up to 100 m or more, overlapping with the rotor sweep of most modern wind turbines.

In a study of flight behaviour of adult and juvenile hen harriers at various wind farms in Ireland, Wilson *et al.* (2015) found that adult hen harriers spent most of their time (82.8%) flying below the reach of turbine blades. The study also showed that the time spent flying at heights with risk of collision (25m – 125m) was similar between wind farms and control sites, which suggests that hen harriers do not modify their flight height in areas where wind turbines have been installed. Of particular interest is that the study showed that recently fledged hen harriers (< 5 weeks) spent almost all of their time (99.1%) below 25 m and thus not within the collision risk zone.

It is important to note that there appears to be very few documented cases of hen harrier collision mortality from turbines in the literature (Johnson *et al.* 2001, Smallwood & Thelander 2004, Whitfield & Madders 2006, Scott & McHaffie 2008). At the Altamont Pass Wind Resource Area in the United States, which is the largest concentration of wind turbines anywhere in the world and is located on a busy bird migration route, only seven collisions by northern harriers (the US equivalent of the hen harrier) were documented over a 17 year period between 1989 and 2007 (Smallwood & Karas 2008).

At the Derrybrien Wind Farm, there were no documented collisions during the various surveys for the period of 2006 to 2019, though it is noted that carcass search was not part of the routine monitoring. During the hen harrier summer surveys at Derrybrien between 2006 and 2018, hen harriers were observed within the wind farm site for a total of 2,457 seconds. The time spent by birds flying within the rotor sweep of the turbines was 637 seconds or 28.2% of the total, with the remainder (71.8%) of the time below 25 m height (and much of that below 10 m height). While the time spent within the rotor sweep area is somewhat higher than the figure of 18.2% given by Wilson *et al.* (2015), it is still relatively low and reflects the typical low flying behaviour of the hen harrier.

Bird fatality monitoring was undertaken at 32 turbine locations at Derrybrien Wind Farm from July to October 2020 and again from April to October 2021, a total of 200 days of searches (Eire Ecology, 2022). This monitoring involved dog lead corpse searches within the wind farm site. Only one bird fatality was discovered over the period of the corpse searches – a sparrowhawk at T69 on the 30th September 2021.

Collision with overhead power lines is a well-documented cause of bird mortality (Bevanger 1998, Ferrer & Janss 1999, Jenkins *et al.* 2010, SNH 2016b). Species at most risk are large birds such as eagles, vultures, storks, herons, swans and geese. While the birds may be able to maneuver around large objects such as turbines or masts, their eyesight is rather poor at detecting thin horizontal objects ahead of them. In a review of 16 investigations of bird collision with power lines globally, Bevanger (1998) recorded collisions among hawks, vultures, eagles and falcons but did not list harriers. However, in a review of collision casualties with overhead lines for all bird species based on recovery data from the long-term BTO Ringing Scheme, Rose and Baillie (1989) recorded over 100 recoveries for hen harrier. The hit wire index (i.e. system to standardise the recovery samples) for hen harrier was particularly high relative to body size. They noted that hen

harrier inhabits open moorland areas and may hunt at heights which make them particularly vulnerable to collisions with OHLs.

For the Derrybrien to Agannygal 110kV OHL (which does not have bird flight diverters, the risk may be highest in the stretch at Knockavana where there is a traditional hen harrier breeding territory. However, nesting was confirmed at this territory in each of the survey years 2006 to 2011 and by 2018 (when no birds were present) it was considered that the local habitat was no longer suitable for breeding due to conifer maturation.

Taking into account the findings from the various surveys at Derrybrien since 2006 (commencement of operation) (including the findings of the bird fatality monitoring undertaken in 2020 and 2021), the detailed study of hen harrier flight behaviour at Irish wind farms by Wilson et al (2015), and also the studies from the international literature, it can be demonstrated that hen harriers are at low risk of collision with wind turbines as a result of their typically low flight height. However, in the absence of mitigation, the risk of collision with the OHL is considered a potential negative impact, the effect of which could be significant.

Potential displacement impact

Displacement of birds from otherwise suitable habitat as a result of the presence of wind turbines has been reported as a potential indirect impact of wind turbines (Drewitt & Langston 2006, de Lucas *et al.* 2007, Pearce-Higgins *et al.* 2009). The displacement occurs as a result of behavioural responses that prevent or decrease the use of an area for activities such as nesting or foraging. However, the results of studies on potential displacement have varied widely and in an overall review of the literature Madders & Whitfield (2006) concluded that displacement effects of wind turbines on raptors, and hen harrier in particular, are negligible for the most part. In a review of potential displacement effects on birds at twelve wind farm sites in Britain, Pearce-Higgins *et al.* (2009) reported an avoidance area of 250 m from turbines for hen harrier. In a further review (but not including hen harrier), Pearce–Higgins *et al.* (2012) reported that observed negative effects of wind farms on birds occur principally as a result of disturbance by high levels of activity during the construction phase. Various studies have also reported hen harriers breeding within a few hundred metres of turbines (Whitfield & Madders 2006).

Wilson *et al.* (2015) studied the movement of adult hen harriers at wind farm and control sites in Ireland using GPS tags and data collected during vantage point watches. The study aimed to determine whether habitat use by foraging hen harriers differed at wind farm and control sites. The study found that at wind farm sites hen harriers favoured open habitats over afforested areas. Hen harriers at control sites foraged preferentially over peatland and young forest plantations, while those at wind farm sites foraged preferentially over natural and semi-natural open habitats (i.e. scrub, rough grassland) and to a lesser extent over peatland. While the authors noted that the selection of the somewhat different foraging habitats between the wind farm and control sites is difficult to explain, the study demonstrated that wind farms were actively used for foraging purposes.

At the Derrybrien Wind Farm, since 2006 hen harriers have been recorded both foraging and flying through the wind farm in all surveys (Biosphere Environmental Services 2006,

2007, 2009, 2011, 2015, also see Madden & Porter 2007). Birds were often seen flying close to wind turbines (<50 m) and on one occasion within 10 m of the base. The habitats within the wind farm, which comprise a mix of cutover blanket bog, regenerating bog/heath vegetation, scrub and stands of mature conifer, are considered as optimum for foraging by hen harriers. While breeding is not known to have been attempted within the wind farm, there are two traditional territories approximately 1 – 2 km distance from the wind farm and it can be assumed that most, or at least a significant proportion, of the sightings within the wind farm involve birds from these territories. Research on the spatial ecology of hen harriers has shown that foraging females spend most of their time within 1 km of the nest, while males hunt mostly within 2 km of the nest (Irwin *et al.* 2011, Arroyo *et al.* 2014).

While there is conflicting evidence from the literature on displacement of foraging hen harriers from close to wind turbines, there is overwhelming evidence that hen harriers have continued to forage within the Derrybrien Wind Farm since its operation in 2006. Taking this into account, as well as the results of research by Wilson *et al.* (2015) and reviews such as Madders & Whitfield (2006), it is considered that displacement of hen harriers from areas near turbines at Derrybrien has not been a significant impact. On the available evidence, it is considered that the operation phase of the Derrybrien Wind Farm has not had a significant displacement effect on the hen harrier population of the Slieve Aughty Mountains SPA.

Impact on reproductive output in relation to wind turbine proximity

Wilson *et al.* (2015) studied the breeding performance of hen harriers in relation to wind farm sites across Ireland (also see Fernandez-Bellon *et al.* 2015). The results showed that there were no significant differences between the breeding outputs of hen harrier nests located at different distances from wind turbines. However, non-statistically significant lower nest success rates and productivity were observed within 1 km of wind turbines. Of the nine nests monitored in the 0-1 km band during the study, 33.3% were successful, while nest success in all other distance bands was 56.0% (n = 75). It was noted that hen harrier nest success rates vary considerably throughout their range and are influenced by many external factors. No trend was observed in fledged brood size with increasing distance from wind farms in their study, suggesting that potential impact of wind turbines on hen harrier breeding output is mediated through nest success rather than clutch or brood size.

At the Derrybrien Wind Farm, since 2006 hen harriers have been recorded nesting within a 1-2 km distance of the wind farm boundary, with one or two of territories occupied in each year of survey. In all of the survey years, breeding was confirmed at one of the two territories, and in 2009 and 2011 both territories were occupied (possible and confirmed categories).

While there have been no breeding attempts or known historic territories within the 0-1 km distance band of the wind farm, there is no evidence to suggest that the wind farm has had any impacts on the reproductive output of the two regular hen harrier territories within a 1-2 km distance band.

Barrier effect due to turbines

The potential impact of lines of wind turbines creating a barrier effect to passing birds is mostly relevant to locations where migratory species pass regularly. Rees (2012) cites eight published studies of flight behaviour which reported changes in flight lines for swans or geese initially seen heading towards turbines, at distances ranging from a few hundred metres to 5 km (the larger distances were by birds on migration); 50-100% of individuals/groups avoided entering the area between turbines, but in some cases the sample sizes were small. Commenting on studies to assess the barrier effect, Rees writes "*Avoidance of turbines should be related to whether or not flights were initially in line with the wind farm, rather than in relation to all bird movements in the area, as including the latter artificially boosts sample sizes used for calculating avoidance rates*."

As the Derrybrien Wind Farm Project area is not used by migrating birds of prey, the issue of a possible barrier effect created by the turbines is not considered relevant to the current assessment.

Development of habitats in felled areas

As already noted, the removal of much of the plantation forest on site (c. 222 ha) without replanting has allowed the subsequent development of habitats that are suitable for a range of bird species including species typical of unplanted upland areas (such as meadow pipit and red grouse). While the regenerating bog/heath vegetation is prone to invasion by self-seeded conifers, this is localised within the site and is occurring at a relatively slow rate. From aerial images, it appears that approximately 69 ha of the original felled area had been colonised by self-seeded conifers up to 2021.

The replacement of non-native conifer plantation with open habitats (albeit prone to colonisation by self-seeded conifers) is a positive impact of long-term duration for birds including hen harrier, resulting in a significant positive effect.

Maintenance activities during operation phase

The main activities undertaken on site which are not specifically related to the operation of the turbines were the maintenance and periodic upgrading of access tracks and drains, and substation inspection and maintenance. As outlined in section 4.2.5.2, self-seeded tree growth along four sections of track (to 10 m width either side of the track) and beneath the overhead line was cut back on one occasion in 2018-2019.

Maintenance and upgrading of access tracks within the wind farm is an occasional activity. Such works, which are assessed in advance for potential environmental impacts (including the issue of peat stability), are relatively minor and localised within the site and largely confined to the original road footprint. Also, routine works such as this would usually be carried out outside of the bird nesting season. It is considered that track maintenance and upgrading works would not have any measurable effect on the foraging potential of the site for the local hen harrier population and would not affect the breeding of birds in the hinterland of the wind farm site.

Since the clearing of conifer plantations within the wind farm site and along the overhead line corridor between 2003 and 2005, self-seeded conifer trees, mostly lodgepole pine, have become established throughout the site, though their distribution and density varies. These trees have now reached 4 m or more in height and in places the trees are encroaching along the access tracks. A programme to remove these trees from along four identified sections of tracks (to 10 m either side) was undertaken in autumn 2018. Removal of trees from within the overhead line corridor was also undertaken in 2028-19. The works in each year were carried out outside of the bird breeding season and as not to cause disturbance to nesting birds. Overall it is considered that the removal of any conifer trees is a positive impact of long-term duration for birds such as hen harrier which naturally forage over open habitats such as bog, heath and low scrub.

Of particular relevance is the harvesting and replanting of the forest area immediately to the southwest of the wind farm (46.2 ha) by Coillte between 2016 and 2018 to optimise productivity of the wind farm. This area had been scheduled for felling as part of Coillte's routine tree felling programme. This area will provide suitable second rotation foraging habitat for hen harriers from about 2020 onwards to at least 2030 – birds foraging here and in other replanted areas around the wind farm would be expected to also use the habitats within the wind farm.

Maintenance works at the wind farm substation and the Agannygal Substation would not be expected to have any impacts on local bird populations or species such as hen harrier which nest in the hinterland of the wind farm as they are confined to the substation compounds.

Impact on winter bird species

While hen harrier was observed in the hinterland of the wind farm in October 2019, December 2024 and February 2025 and at times could roost locally during the winter period (though no roosts were located during any of the three winter), it is not expected that the feeding or roosting behaviour of this species in autumn or winter (if present) would be affected by the presence of the wind farm. Similarly, the wind farm project would not be expected to impact upon merlin which may occur in the hinterland during the winter period (one recorded *c*. 2.5 km from the wind farm in October 2019).

5.5.1.4 Ceased operation phase impacts, 2022 - present

In February 2022, the wind farm ceased operation and all maintenance works on site have been suspended since.

Collision risk posed to bird species is one of the main environmental concerns associated with wind energy developments.

At the Derrybrien Wind Farm, there is no collision risk as turbines are in a prolonged non-operational state (subject to maintenance by the turbine supplier). The risk of collision with rotating turbine blades will be completely eliminated at the Derrybrien Wind Farm as a result of the Prospective Development, and conditions will revert to the status prior to construction of the wind farm project. It is noted, however, that in the case of hen harrier

the risk of collision with wind turbines was considered low (for reasons described in section 5.5.1.3 above).

However, collision with overhead lines is also a concern and a well-documented cause of bird mortality (Bevanger 1998, Ferrer & Janss 1999, Jenkins et al. 2010, SNH 2016). For the Derrybrien to Agannygal 110kV line, which does not have bird flight diverters as mitigation, the risk of collision still exists for hen harrier and other large bird species. However, any risk of collision with the overhead line will be eliminated by the removal of the line as part of the Prospective Development – thus, conditions will revert to the status prior to construction of the wind farm project, i.e. no power lines, though the line corridor will not be replanted and hence will be of more value to birds than the original forest plantation (notwithstanding the gradual spread of self-seeded conifers).

The cessation of maintenance works will allow self-seeded conifer trees to spread along the road edges (see Plate 4), where the slightly drier conditions may be more suitable for growth, and also within the overhead line corridor. However, the spread will be at a slow rate and the landscape will retain a largely open character. The potential effect on hen harrier by the spread of trees in areas where otherwise they might have been controlled by cutting is rated as a non-significant negative effect at an international level of importance.

With the absence of any drain maintenance, the effectiveness of the site drainage may be reduced over time and this could lead to a gradual increase in the extent of wet bog in some parts of the site. Blanket bog and heath, even in a degraded state, provides optimum breeding habitat for passerine species such as meadow pipit and skylark. As these small birds are principal prey species of hen harrier and merlin, there is expected to be a positive effect of long-term duration, at an international level of importance.

Plate 4 Spread of self-seeded conifers in occurring in parts of site, including along road edges where slightly drier conditions exist – view is along southern road between T32 and T35, looking eastwards. April 2024.

5.5.1.5 Impacts of Retained Development – Decommissioned Phase

Wind farm

For convenience, the site is divided into the main habitats existing in 1998, unplanted cutover bog and afforested bog.

Unplanted cutover bog

The retention of concrete turbine foundations, hardstand areas, the substation foundations, and constructed roads within the unplanted eastern sector of the site is a negative impact as the original cutover bog which was lost would have been of value for a range of bird species associated with peatland habitats, including hen harrier, merlin and red grouse.

Whilst the area of these built surfaces is relatively small (0.7 ha), any loss of bog habitat (including cutover) is of some importance and the potential effect on hen harrier is rated as a long-term negative slight effect, at an international level of importance. It should be noted however that this habitat loss occurred prior to the Slieve Aughty Mountains SPA being classified as a SPA in March 2007 and prior to it becoming formally designated by Statutory Instrument in March 2012. In addition, the physical removal of these built surfaces would result in a high level of ground disturbance and potentially could give rise to substantive negative effects on to the environment (see Chapter 3 Reasonable Alternatives of the rEIAR).

The retention of underground cabling within the bog is rated as a neutral impact on birds as negative effects from the existence of the buried cables are unlikely, i.e. whether the cables are present or not does not have impacts on any bird species.

The naturalized peat repository areas are now fully vegetated mainly with bog vegetation species. From the perspective of birds, their present value for nesting and/or foraging would be similar to the value of the original cutover bog. The retention of the repositories is rated as a neutral impact.

Some small sections of drains were constructed within the bog area. These are unlikely to have had any effects on bird species, as the entire bog had at the time a network of drains associated with peat cutting. The retention of the constructed drains is rated as a neutral impact.

Planted bog

From the perspective of birds, commercial conifer plantation is a non-native habitat that has limited value for birds. When in the pre-thicket stage (c. 3-12 years) of the rotation, the open character of the forest is useful for both breeding and feeding for a range of bird species, including hen harrier. However, for the greater part of the rotation cycle the closed canopy forest provides low opportunities for birds other than conifer specialists such as jay, siskin and crossbill. Also, the forest can support nesting species such as

sparrowhawk (present in wind farm site) and merlin (not recorded during any of the studies). Generally, the edges of the closed canopy conifer stands are of most value to birds. Also, areas of planted forest which have failed or grown poorly can be useful habitat for birds.

The retention of concrete turbine foundations, hardstand areas, the substation foundations, the 2 no. mast foundations and constructed roads within the planted area of the site is rated as a neutral impact on the basis that the limited value to birds of the retained structures is comparable to the limited value of the conifer habitat that was present in 1998.

The retention of underground cabling within the previously planted areas is rated as a neutral impact on birds as negative effects from the existence of the buried cables are unlikely, i.e. whether the cables are present or not does not have effects on any bird species.

The naturalized peat repository areas are now fully vegetated mainly with bog vegetation species. From the perspective of birds, their present value for nesting and/or foraging is greater than the value of the original forest habitat. The retention of the repositories is rated as a positive impact of moderate significance and of permanent duration at the international level of importance.

Drains were constructed within the afforested area and were in addition to the existing forest drains. As these drains are of some value to local birds, their retention is rated as a positive impact of moderate significance and of permanent duration.

Borrow pits

There are three borrow pits within the wind farm site which were used during construction to extract rock and clay for use in the construction of access tracks and hardstanding areas. The borrow pits have been closed since the completion of construction activities in 2005. All three borrow pits will be retained as part of the Retained Development. The presence and retention of these borrow pits is of value of local bird species (e.g. grey wagtail has been recorded at the borrow pit 3 located near the site entrance), however their retention is unlikely to result in any impact on SCI species hen harrier or merlin.

OHL and Agannygal Substation

Conifer plantation occurred along the entire length of the overhead line corridor and at the site for the Agannygal Substation. As already noted, conifer plantation is a non-native habitat and is generally of low value for birds.

The concrete and reinforced concrete foundations for the polesets and masts are now largely overgrown with scrub vegetation and are of some limited value to birds. The concrete foundation for the structures within the substation will develop as an open area with sparse vegetation, which will be of some value to birds

The retention of these structures is rated as a neutral impact on the basis that the limited value to birds of the retained structures is comparable to the limited value of the conifer habitat that was present in 1998.

Off-site features related to peat slide

The habitats affected by the various features constructed in response to the peat slide were conifer plantation and wet grassland (semi-improved). The barrages and repository areas were colonised by wet rushy grassland and gradually by scrub.

The replacement of conifer plantation by wet grassland and scrub is rated for birds as a positive impact of moderate significance and of long-term duration at an international level of importance. The replacement of former wet grassland areas by the present wet grassland/scrub habitat is rated as a neutral impact.

5.5.2 Lough Cutra SPA

As outlined in section 4.6.7 above, no aspect of the operation or ceased operation phases of the wind farm, the OHL line or the Agannygal Substation has had, or is known to be giving rise to, nor has potential to cause, any significant negative effects on surface water quality or the downstream aquatic environment. As such there is no potential for impacts on this SPA. Similarly there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment and therefore this SPA (for reasons outlined in section 4.5.6 above). The only potential source of impact on this SPA is in relation to the peat slide.

The peat slide which occurred on the south-central section of the wind farm in October 2003 (during construction), impacted water quality and fisheries in the Owendalulleegh River, a tributary of Lough Cutra. The slide material travelled downstream into the lower reaches of the Owendalulleegh River, eventually reaching Lough Cutra, approximately 22 km downstream.

A survey undertaken in July 2004 (Inis Environmental Services, 2004b) to assess the impact of the peat slide on the ecology of Lough Cutra, found that the cormorants were no longer breeding at the lake and that limited, or no breeding activity had been recorded for a number of years (as per NPWS consultation). The abandonment of the Lough Cutra site does not necessarily indicate that the conservation status of the species is unfavourable. A further survey of lakes in the general area of south Galway / North Clare found a large colony of breeding cormorants had established itself on Illaunmore at Muckanagh Lough, ten kilometres south west of Lough Cutra. It was believed that these birds had relocated to this area from Lough Cutra (Inis Environmental Services, 2004b).

The peat slide did not affect the breeding colony of cormorants at Lough Cutra as the colony was abandoned at the time of the slide and had been for a number of years predating the event. The peat slide did however affect water quality in the Owendalulleegh River and had a profound impact on fisheries in the upper reaches of the river, with material from the slide also impacting Lough Cutra. The slide therefore had the potential to adversely affect the food source of the Special Conservation Interest of Lough Cutra and the integrity (i.e. structure and function) of the SPA. The likely effects of the project on the integrity of Lough Cutra are discussed in section 5.6.2.

5.6 Describe how the integrity of the site is likely to have been or to be affected by the project

5.6.1 Slieve Aughty Mountains SPA

The project is entirely within the Slieve Aughty Mountains SPA. The SPA had not been publicly notified at the time of the planning and construction of the project (classified as a SPA in March 2007 and formally designated by Statutory Instrument in March 2012 (S.I. No. 83 of 2012)).

National surveys of breeding hen harriers have shown that the overall hen harrier population of the Slieve Aughty Mountains SPA has declined markedly between 2005 and 2022 (Ruddock *et al.* 2024). This decline is in line with population trends between 2005 and 2022 for four of the other five SPAs selected for hen harrier, with increases registered at only one of the sites, as follows:

SPA	**% Change 2005-22**
Slieve Aughty Mountains SPA	-67%
Stack's to Mullaghareirk Mts, West Limerick Hill & Mount Eagle SPA	-53%
Mullaghanish to Musheramore Mountains SPA	-80%
Slieve Beagh SPA	-25%
Slievefelim to Silvermines Mountains SPA	-20%
Slieve Bloom Mountains SPA	12%

As discussed in section 5.2.1.1, analysis of data from the 2015 survey suggests that the long-term decline may be due to a number of reasons, with the categories 'forest management and use' and 'paths, tracks & forest roads' being the most frequently recorded anthropogenic pressures recorded across all the survey areas in the country (Caravaggi *et al.* 2020a). The authors write:

> "*Hen Harriers cannot use closed canopy forests for breeding or foraging, therefore the maturation of the existing forest estate threatens to deprive Hen Harriers of already scarce breeding habitat, while further increases in forest cover could also lead to increased habitat fragmentation and subsequently reduce the capacity of the landscape to support breeding pairs*."

While it is accepted that wind energy development could have implications for breeding hen harriers in Ireland, Ruddock *et al.* (2016) did not report it as a main pressure on the hen harrier population within the Slieve Aughty Mountains SPA.

Interestingly, despite the substantial hen harrier population decline within the SPA from 2011 onwards, it is noted that the only successful nesting (i.e. young birds fledged) by the 10 pairs within the 5 km radius of Derrybrien Wind Farm was from one of the territories located within a 1-2 km distance of the wind farm, and this territory was still occupied in both the 2015 and 2018 surveys (though no young were known to be produced).

The effects on birds as a result of the Derrybrien Wind Farm Project are summarised as follows:

- Loss of approximately 42 ha of pre-thicket conifer plantation suitable for foraging at the construction stage (2003 to 2006) is considered a negative effect of slight significance, of short-term duration.
- Loss of approximately 13.6 ha of commercial conifer plantation for construction footprint (including Agannygal Substation 1.6 ha) which would have provided suitable hen harrier foraging habitat when clear felled and replanted for a period of up to 10 years (in absence of wind farm development) is considered a negative effect of slight significance, of medium-term duration.
- Loss of approximately 0.7 ha of cutover bog for construction footprint (2003 to 2006) and the retention of the concrete turbine foundations, hardstand areas, substation foundations and constructed roads (as part of the Retained Development) is considered a negative effect of slight significance, of long-term duration.
- Potential disturbance to foraging hen harriers during construction works (2003 to 2006) is considered as significant but of temporary duration.
- Loss of pre-thicket forest as a result of the peat slide (2003) is considered a negative effect of slight significance and short-term duration.
- Potential collision by hen harriers with the Derrybrien to Agannygal 110kV line during operation and ceased operation is considered a potential negative effect which could be of significance.
- Regeneration across the wind farm site and along the Derrybrien to Agannygal 110kV OHL corridor of a mix of bog and scrub vegetation (as shown by vegetation survey) where conifer plantation had been cleared to facilitate the project. This has provided approximately 255 ha of suitable foraging habitat for hen harriers and will be maintained for the life time of the project. This is considered as a significant positive effect of long-term duration.
- Removal of any risk of collision with rotating turbine blades as part of the Prospective Development will result in conditions reverting to the status prior to construction of the wind farm project.
- Removal of potential collision by hen harriers with the Derrybrien to Agannygal 110 kV line as part of the Prospective Development will result in conditions reverting to the status prior to construction of the wind farm project.
- Spread of self-seeded conifer trees along the road edges and also within the OHL corridor (albeit at a slow rate) due to the cessation of maintenance works is considered a non-significant negative effect.
- Re-establishment of peatland habitats due to the reduced effectiveness of site drainage over time as a result of the cessation of drain maintenance is considered a positive effect and of long-term duration.
- Habitat change (due to retention of naturalised peat repository areas previously covered in conifer plantation and the establishment of wet grassland and scrub habitats in the offsite barrages and repository areas that were previously occupied by conifer plantation) is considered a positive effect and of long-term duration.

The overall permanent loss of habitat as a result of the project is approximately 15.2 ha of commercial conifer plantation which could have been used by hen harriers for foraging purposes whilst in pre-thicket stage, as well as approximately 0.7 ha of cutaway bog which

would provide continuous foraging potential for the birds. The latter occurred prior to the Slieve Aughty Mountains SPA being classified as a SPA in March 2007 and prior to it becoming formally designated by Statutory Instrument in March 2012.

As already noted, the removal of much of the plantation forest on the wind farm site and along the OHL corridor (c.255 ha) without replanting has allowed the subsequent development of habitats that are suitable for a range of bird species including species typical of unplanted upland areas (such as meadow pipit and red grouse). While the regenerating bog/heath vegetation is prone to invasion by self-seeded conifers, this is localised within the site and is occurring at a relatively slow rate. From aerial images, it appears that approximately 69 ha of the original felled area within the wind farm site(c. 222 ha) had been colonised by self-seeded conifers up to 2021. The cessation of maintenance works will allow self-seeded conifer trees to spread along the road edges, where the slightly drier conditions may be more suitable for growth, and also within the overhead line corridor. However, the spread will be at a slow rate and the landscape will retain a largely open character. The potential effect on hen harrier by the spread of trees in areas where otherwise they might have been controlled by cutting is rated as a non-significant negative effect.

The replacement of non-native conifer plantation with an open sward (albeit prone to colonisation by self-seeded conifers) is having a positive impact of long-term duration for hen harrier, resulting in a significant positive effect. In addition, the absence of any drain maintenance following the cessation of operation could lead to a gradual increase in the extent of wet bog in some parts of the site. Blanket bog and heath, even in a degraded state, provides optimum breeding habitat for passerine species such as meadow pipit and skylark. As these small birds are principal prey species of hen harrier and merlin, there is expected to be a positive effect of long-term duration.

While there is no evidence to indicate that the Derrybrien - Agannygal 110kV OHL has resulted in any collision casualties, it is acknowledged that such lines pose a risk of collision to large birds of prey such as hen harriers and hence this is considered a potential negative impact which could be of significance. However, any risk of collision with the overhead line will be eliminated by the removal of the line as part of the Prospective Development – thus, conditions will revert to the status prior to construction of the wind farm project, i.e. no power lines, though the line corridor will not be replanted and hence will be of more value to birds than the original forest plantation (notwithstanding the gradual spread of self-seeded conifers).

The retention of underground cabling, concrete turbine foundations, hardstand areas, the substation foundations, the 2 no. mast foundations and constructed roads as part of the Retained Development will not result in any significant effects on hen harrier or merlin, i.e. whether the cables are present or not does not have effects on any bird species and that the limited value to hen harrier and merlin of the retained structures is comparable to the limited value of the conifer habitat that was present in 1998.

The naturalised peat repository areas, which were previously covered in non-native conifer plantation, are now fully vegetated mainly with bog species and provide foraging habitat for hen harrier and merlin. These areas will be retained as part of the Prospective Development. Similarly the establishment of wet grassland and scrub habitats in the

offsite barrages and repository areas that were previously occupied by conifer plantation may also provide foraging habitat. This habitat change is considered to be a positive effect and of long-term duration.

It is considered that the evidence presented in this report has demonstrated that the construction, operation and ceased operation phases of the Derrybrien Wind Farm project as well as the Retained Development, has not had and will not have a significant negative effect on the integrity of the SPA. While some negative impacts or potential impacts on the habitat of the hen harrier have been identified, it is also noted that the replacement of the non-native conifer plantation with an open sward (albeit prone to colonisation by self-seeded conifers) is having a positive impact of long-term duration for hen harrier, resulting in a significant positive effect. In addition, the identified potential impact of collision with overhead lines will be eliminated by the removal of the OHL as part of the Prospective Development.

The potential for the project and the Retained Development to adversely affect the integrity of the Slieve Aughty Mountains SPA has been completed in view of the site's conversation objectives, as presented in Table 6 in section 5.4.1.

5.6.2 Lough Cutra SPA

Impact of peat slide on fisheries

A study undertaken in 1996 of breeding sites within the South Galway area noted that the cormorants on Parsons Island on Lough Cutra were still carrying twigs to the nests but no bird was observed to feed on the lake. The author noted that the birds were likely to fly to the coast to feed (Biosphere Environmental Services, 1997). An earlier study by West *et al.* (1975) found that the cormorants were feeding on eel at the site - "*Only one small sample was obtained from this lake-colony. It contained three eels which were probably from the lake where many of the parent birds were seen fishing*".

There are records of eel being surveyed in Lough Cutra in 1974, 1975 and in 1984 (Moriarty 1975, 1986) but the densities of other fish present, namely pike, roach, perch and trout have never been surveyed. The main fisheries interest in the lake currently is as a pike fishery but other species including perch and brown trout are also occasionally taken in this private fishery. In their second report (Anon, 2004) on the peat slide of October 2003 the Shannon Regional Fisheries Board (now Inland Fisheries Ireland) highlighted the large scale of the fish mortalities in the Owendalulleegh River, including species of cyprinid fish in the lower reaches of the river however they do not refer to any fish mortalities in Lough Cutra. Indeed, according to Mr Michael Fitzsimons Chief Environmental and Fisheries Officer (at the time) at the Shannon Regional Fisheries Board there were no reports of fish mortalities on the lake at the time and they observed no floating fish on the lake when fisheries personnel were on the lake in a boat in the immediate aftermath of the peat slide.

Invertebrate kick samples undertaken by the EPA just 17 days after the main peat slide (EPA 2004) noted only a modest decline in biological water quality (Q4-5 to Q4) at the lowest monitoring site on the Owendalulleegh River, situated just 1.6 km upstream of

Lough Cutra, and the following day on the Beagh River at the outlet from the lake, there was no decline in the water quality compared to that recorded at the same site in the two previous surveys in 1997 and 2000, i.e. Q4 (Good Status). The relatively large size of the lake (approximately 383ha) would have facilitated the sedimentation of the peat silt washed into the lake from the Owendalulleegh, much of which would be expected to have deposited in the area around the inflow. While this deposited silt may have smothered benthic invertebrates within the sediment in this area, that impact is likely to have been very localised and temporary in terms of duration. Moreover, the timing of the slide, effectively at the beginning of the winter season, coincided with the annual period when biological activity and productivity on the lake would have been low, which would have also reduced any potential impacts. Taken together these observations indicate that the bulk of the impact from the peat slide occurred in the 22 km of river channel between the peat slide and Lough Cutra and that the impact on fisheries in the lake was not likely to have been significant.

Cormorants eat a very wide range of fish and their diet composition differs from location to location depending on the dominant species mix at a given site. They will also vary their diet at the same site over the course of a year if the relative dominance of the fish present also changes seasonally. Each of the species present in Lough Cutra are known to be eaten by cormorant and it is very unlikely that the diet of birds at the lake was ever confined exclusively to eels. Moreover, eels are one of the most resistant fish to deteriorations in water quality and because it does not spawn in freshwaters, eel is less vulnerable to water quality challenges than several other freshwater species for that reason.

Recovery of the fish population

The impact on fisheries in the main channel of the Owendalulleegh River can be classified as Profound to Significant (depending on location in catchment), negative and of short-term duration, i.e. taking at least 3 – 5 years to fully recover.

Based on the information above, the evidence shows that the impact on the fish population within Lough Cutra was at worst slight, negative and of temporary to short-term, duration, especially considering the sheer size of the water body as a whole (383 ha). Any impact in terms of direct fish mortalities that would have occurred is likely to have been localised to the immediate inlet area of the Owendalulleegh River. Also supporting this assessment is suspended solids data from Galway County Council for water samples taken down along the Owendalulleegh on Saturday November 1st 2003 that showed a very strong decline in concentrations from Black Road Bridge downstream to the lower reaches of Kilafeen Bridge.

Apart from the very significant impacts to the Owendalullegh River following the peat slide, the EPA river monitoring records, i.e., looking at the Boleyneendoorish River which was not affected by the peat slide, shows that on their own the effects on water quality as a result of construction activities involving clear-felling and installation of wind farm infrastructure would have been insignificant and High status would have been maintained. As it was, the peat slide caused a short term decline in status, with High status regained within 3 to 6 years.

It is not possible to categorically measure the level of impacts on the fish population as little or no quantitative fish population data is available for Lough Cutra from before or immediately after the peat slide. However, the late seasonal occurrence of the event and the likelihood that impacts on benthic invertebrate biomass were probably minor in effect and that the following annual spring/summer coarse fish spawning season would not have been disrupted suggests that the impact on fisheries can be classified as neutral or slight negative and temporary to short-term in duration.

For these reasons and the fact that no fish mortalities were noted at the time in Lough Cutra, the integrity of Lough Cutra SPA is not likely to have been adversely affected by the peat slide or any aspect of the Project. The conditions at the site have remained favourable for cormorant. Moreover, it is noted that few cormorants would have been present on the lake at the time of the slide in October and November as breeding birds would have departed to wintering grounds by then. In winter bird surveys at Lough Cutra in 1995/96 and 1996/97, it was noted that "*The Cormorants which breed at the lake do not winter in any numbers*". Winter surveys of Cormorants at Lough Cutra from November 1995 to March 1996 recorded the following (data from: BioSphere Environmental Services, 1997):

Nov	Dec	Jan	Feb	Mar
0	1	10	20	20

Further counts in September and October 1996 and January 1997 recorded respective totals of 0, 0 and 2 birds.

The potential for the project and the Retained Development to adversely affect the integrity of the Lough Cutra SPA has been completed in view of the site's conversation objectives, as presented in Table 7 in section 5.4.2.

5.7 Cumulative effects

5.7.1 Slieve Aughty Mountains SPA

The following projects/activities have been considered in the assessment of cumulative effects on the Slieve Aughty Mountains SPA. It is noted that not all projects/activities are considered relevant to all ecological features of interest: due to the nature of potential impacts that may arise from the Retained Development alone (along with the associated potential impact pathways and its Zone of Influence, as described in section 4.3). Those that are considered relevant include.

- Other wind farms
- Overhead power lines
- Forestry activities
- Turbary/peat extraction
- Planting in lieu of felling on wind farm site
- Derrybrien Wind Farm Development Decommissioning Project – Prospective Development
- Adjacent coniferous forestry plantations

5.7.1.1 Other wind farms

The Sonnagh Old Wind Farm is the only other wind farm within the Slieve Aughty Mountains SPA. This wind farm is located approximately 3 km to the northwest of Derrybrien. It comprises nine Vesta turbines each of 0.85 MW capacity and was commissioned in 2004. This wind farm was constructed within a conifer plantation. The EIS (Corr na Gaoithe Teo, 2000) for the Sonnagh project did not record hen harriers nesting within the site though foraging birds were recorded in the hinterland area (within 1 km). Monitoring for hen harriers has not been required at the Sonnagh Old Wind Farm since the commissioning of the project.

It is concluded that there is no evidence to suggest that there is a cumulative effect on birds, and hen harrier in particular, by the operation of the two wind farms in the area or by the operation of Sonnagh Old Wind Farm and the Retained Development.

5.7.1.2 Overhead power lines

In addition to the OHL connecting Derrybrien Wind Farm to the Agannygal Substation, there are three further OHLs within the SPA (excluding medium and low voltage OHLs on the distribution system), as follows:

- 38 kV OHL which runs from Sonnagh Old Wind Farm northwards towards Loughrea. Some minor maintenance works took place on this line in 2020. These works, which were subject to AA Screening, took into account the sensitivities of the area in respect of SPA designation, with all required works taking place after August 15th when hen harriers, if present, would have completed breeding.

- Ennis to Shannonbridge 110kV OHL which runs across the central part of the SPA and includes the Agannygal Substation. This OHL has been in place since the 1970s. Maintenance works were carried out in 2023 and 2024.

- Moneypoint-Oldstreet 400kV OHL which runs across the central part of the SPA. Refurbishment works commenced on this project in February 2020 and were finished in 2021. Work included vegetation clearance for access to towers but without any tower replacements. As part of this project was within an SPA an NIS was prepared as part of the planning application for the project. Significant effects have been ruled out in the NIS with the implementation of mitigation measures.

Hen harrier, as well as merlin, could be expected to utilise the OHL corridors at times for hunting or for moving between areas. Indeed, as already noted, in respect of the OHL within the Slieve Aughty Mountains SPA, Ruddock *et al.* (2016) wrote the following:

> *"There appeared to be a positive association, although this was not statistically tested, and supported by behavioural observations, that habitat management (i.e. clearance) for power line infrastructure may provide corridors for movement and foraging by hen harriers within the forested landscape. The use of such corridors could prove useful to increasing connectivity with suitable nesting and foraging*

areas and particularly linking forested areas with open habitats which are shown to be used more frequently in Ireland."

As already discussed, collision with unmarked OHLs is a well-documented cause of bird mortality. For hen harrier, the 38kV and 110kV lines within the SPA would pose the most risk as these are within the usual flight height range of the birds. For merlin, the risk of collision with power lines is low due to the flight height of the species which is invariably close to ground level.

It is considered that the Derrybrien to Agannygal 110kV OHL contributes with the other OHLs present to a source of collision risk for birds including hen harrier. While there is no evidence to indicate that there have been bird casualties as a result of the overhead lines within the SPA site, on a conservative basis the effect of this potential cumulative impact is rated as of moderate significance. This potential collision risk will be eliminated by the removal of the Derrybrien to Agannygal 110 kV OHL as part of the Prospective Development.

5.7.1.3 Forestry activities

The planting of very substantial areas of the Slieve Aughty Mountains has resulted in a significant loss of blanket bog and heath habitats of high value for upland bird species. While species such as hen harrier will also utilise conifer plantation for breeding and foraging purposes, the value of conifer plantation for birds is low compared to the natural open bog.

As already referred to in section 5.2.1.1, the age structure of the commercial forestry plantations in the hinterland of the wind farm is an important factor in the amount of habitat available to hen harriers in any one period. The importance of forestry as an influencing factor on the size of the hen harrier population in the Slieve Aughty Mountains SPA (as well as other SPAs selected for hen harrier) was highlighted by Ruddock *et al.* (2016). Since monitoring for hen harrier at Derrybrien commenced in 2004, there have been marked changes in the age structure of the forest plantations in the surrounding areas. Since 2016, large areas along the wind farm entrance road have been clear felled and replanted by Coillte and will provide suitable foraging habitat for hen harriers in the coming years. Of particular relevance is the harvesting and replanting of the forest area immediately to the south-west of the wind farm (53.4 ha) by Coillte between 2016 and 2018. This area will provide suitable second rotation foraging habitat for hen harriers until at least 2030 – birds foraging here and in other replanted areas around the wind farm would be expected to also use the habitats within the wind farm site.

As the Retained Development had caused the removal of a small area of cutover bog (0.7 ha) which would have provided suitable foraging habitat for hen harrier, merlin and other peatland bird species, there will be a minor cumulative negative effect in the loss of bog habitat when considered with the loss of bog habitat as a result of forestry in the surrounding areas of the site. However, this small area of cutover bog, which would have been removed during construction over 20 years ago prior to when the SPA was classified and formally designated, would only have equated to a tiny proportion of the overall suitable hen harrier foraging resources in the SPA (as identified by Moran and Wilson-

Parr (2015)) – i.e. approximately 0.005% of these resources. When determining significance, the loss of this small area of cutover bog should also be considered in the context of the project resulting in the removal of 222 ha of conifer plantation[17], which was removed to facilitate the construction of the wind farm site and resulted in the re-generation of bog/heath habitats. These habitats are more favourable to hen harrier compared to the conifer plantation that existed on the site prior to construction. It should also be noted that the physical removal of these built surfaces within the cutover bog habitat would result in a high level of ground disturbance and potentially could give rise to substantive negative effects on to the environment (see Chapter 3 Reasonable Alternatives of the rEIAR).

Therefore, based on these considerations, it is concluded that the Derrybrien Wind Farm Project and the Retained Development are not contributing to an in-combination significant negative effect with forestry within the Slieve Aughty Mountains SPA as a result of habitat loss/alteration.

5.7.1.4 Turbary/peat extraction

An area of approximately 67 ha of drained turbary land occupies the eastern part of the wind farm site. Turbary lands also extend immediately beyond the wind farm site to the east covering an area of approximately 15 ha. There are 136 turbary plots within or immediately adjacent to the wind farm site, 22 are partially or fully outside the wind farm site boundary. Individual plot sites range in area between approximately 0.55 ha and 1.10 ha. Turbary can remove suitable breeding and foraging habitat for bird species such as hen harrier, and can also cause disturbance to local breeding birds.

It is difficult to know precisely how much peat was and is extracted in any given year. In 1998 prior to the project construction, it is understood that the turf cutting activities on the turbary lands within the wind farm site were low level. Over the intervening period until circa 2012, turf cutting by hand was carried out on a small number of plots, normally in late Spring/early Summer. The level of turbary activity within the site appears to have increased in recent years and is currently carried out by hand and mechanical means using an excavator and hopper. Mechanical peat extraction is currently being carried out in approximately 35 of the 136 plots and not all of these are cut each year.

Caravaggi *et al.* (2020a) considered the significance of anthropogenic pressures within the breeding range of hen harriers in Ireland. The data analysed had been collected by surveyors during the 2015 National Hen Harrier Survey. While the mechanical removal of peat was not recorded as a pressure in survey areas with confirmed hen harrier territories, it accounted for 11% of 'pressure occurrences' in survey squares where there were no hen harrier territories (but potential foraging habitat). They note that pressures such as

[17] While the re-generated bog/heath habitats is prone to invasion by self-seeded conifers, this is localised within the wind farm site and is occurring at a relatively slow rate. From aerial images, it appears that approximately 69 ha of the original felled area had been colonised by self-seeded conifers up to 2021.

peat extraction or illegal burning may not occur until after egg laying and, hence, can impact on parental care and, ultimately breeding success. Such activities can essentially sterilise breeding habitat in the longer-term. Ruddock *et al.* (2024) had noted that at Slieve Beagh SPA the pressures observed were primarily degradation of habitat through extensive, mechanised turf-cutting.

Ruddock et al. (2024) noted that in the Slieve Aughty Mountains SPA:

> "*Turf cutting, including both hand-cutting of peat and mechanical removal of peat, is widespread, across large areas of supporting peatland habitat and the associated impact includes human and machinery disturbance at key temporary periods during the breeding season*".

While turf cutting by hand at the Derrybrien site had not resulted in a significant loss of habitat or a high level of disturbance, the recent mechanised cutting is of some significance in respect of both loss of foraging habitat and potential disturbance to foraging birds. It is concluded that mechanised peat cutting at Derrybrien, which is unrelated to the wind farm project, is contributing to an in-combination impact within the SPA. While the actual effect of peat cutting on the Special Conservation Interests of the SPA is not known (Ruddock *et al.* 2024), there may be some localised effects on breeding territories.

The Retained Development will contribute (albeit to a very minor extent – 0.7 ha) to a cumulative negative effect on birds, including hen harrier and merlin, due to the loss of peatland habitat. However, for the same reasons outlined above under forestry activities, this effect is not considered to be significant. Therefore, it can be concluded that the operation of the Derrybrien Wind Farm project (including the Retained Development) has not or will not contribute to an in-combination significant negative effect when considered with turbary and peat extraction activities within the Slieve Aughty Mountains SPA.

5.7.1.5 Planting in lieu of felling on wind farm site

Felling Licence FL3983 issued in 2003 granted permission by the Minister under Section 40 of the 1946 Forestry Act to fell or uproot trees at Derrybrien as part of the wind farm development. The felling was to take place on lands owned by Coillte, comprising 263 ha of lodgepole pine and Sitka spruce. The Licence also required that where the felling or uprooting took place the Licensee (the Landowner) must within 12 months after the date on which the authority conferred by the licence ceases to be exercisable or any extended period granted by the Minister, plant 119.3 ha, comprising 55% Sitka spruce, 30% Diverse Conifers and 15% Broad leaved species, in the townlands indicated in the Schedule to the Felling Licence.

Data provided by Coillte indicate that 119 ha of trees were planted in a total area of 150.81 ha at locations in Counties Tipperary and Roscommon between 2003 and 2008. Of relevance to the present assessment is that parts of the planted lands selected by Coillte were located within the now designated Slievefelim to Silvermines Mountains SPA (code: 004165) (notice of designation was in 2007).

However, within the SPA the selected plots located within the townlands of Foilmahonmore (8.16 ha) and Knocknabansha (51.6 ha) had been already planted for a

Christmas tree crop and thus there was no change in habitat, i.e. land already classified as conifer plantation (WD4, after Fossitt 2000) at time of planting. A single plot at Coonmore (24.43 ha) was grassland (presumably wet grassland) prior to the planting of conifers in 2003.

For the Coonmore plot, the impact of the planting from the perspective of usage by hen harrier was a change in habitat from open grassland to afforestation. While the planted Coonmore plot still provided suitable habitat for hen harrier, this was only for a number of years until the canopy closed (probably by c.2015) after which the plantation would be of little value to hen harrier until clear felled and replanted (issue of afforestation already discussed in this report). In contrast, open habitats such as rough grassland provide permanently available habitat for the birds. The Site Synopsis (NPWS, 2015) for the Slievefelim to Silvermines Mountains SPA notes that approximately 50 % of the land area is afforested, with roughly a quarter of the land bog and heath and the remainder grassland used mainly for hill farming. With the total area of the SPA at 20,922 ha, the extent of afforestation at the time of designation would have been approximately 10,460 ha (which included the 24.43 ha at Coonmore), with approximately 5,230 ha of rough grassland. The impact by the planting at Coonmore was the removal of 0.46% of the total grassland component that would have been included within the SPA had the planting not occurred (i.e. grassland included within the SPA would have amounted to 5,254 ha approximately if the planting had not occurred).

In the context of the now designated Slievefelim to Silvermines Mountains SPA, the significance of the effect of the impact by the replacement of 24.43 ha of open grassland habitat (potentially available to hen harrier for foraging all the time) with plantation forest (potentially available to hen harrier for foraging and nesting for roughly 10 years out of a 40 year cycle) is considered as slight negative.

It is noted that in the period 2005 to 2015, the Slievefelim to Silvermines Mountains SPA is one of only two of the six designated SPAs for hen harrier where the population has increased (Ruddock *et al.* 2016). However the population subsequently decreased in 2022 (Ruddock *et al.* 2024). The numbers of hen harrier territories (probable & confirmed) recorded in the SPA during the four national surveys are as follows:

- 2005 5 territories
- 2010 7 territories
- 2015 10 territories
- 2022 4 territories

While a change in habitat (24.43 ha) from grassland to conifer plantation occurred as a result of planting in lieu of felling on the wind farm (rated as a slight adverse effect) prior to the designation of the Slievefelim to Silvermines Mountains SPA, it is considered that the Derrybrien project has not contributed to any adverse in-combination effect on the hen harrier population of Slievefelim to Silvermines Mountains SPA.

5.7.1.6 Prospective Development

When the impacts on birds by the Retained Development are considered with the Prospective Development, there are no significant cumulative effects on the Slieve Aughty Mountains SPA. This is in consideration of the following:

- While the Retained Development will result in a permanent loss of cutover bog habitat of some value to birds. The Prospective Development will not result in any additional permanent loss of bog habitat. Hence, there is no cumulative loss of habitat when both Developments are considered.
- The Retained Development is a passive development and will not result in any disturbance to birds.
- The Retained Development will not result in any additional changes to habitats used by birds when considered with the Prospective Development (as discussed in Section 5.6.1).

5.7.2 Lough Cutra SPA

The following projects and activities were identified as having the potential to impact water quality in the Owendalulleegh River catchment and potentially contribute with the project to effects on Lough Cutra SPA. The assessment of the cumulative impacts of these project and activities with the Derrybrien project is presented in Section 4.6. The findings of the assessment relating to Lough Cutra SPA are summarised below.

– Turbary activities

– Keelderry Wind Farm

– Adjacent coniferous forestry plantations

– Quarries/Sand extraction

A peat stability risk assessment (refer to Chapter 8 Soils, Geology and Land of the rEIAR) of turbary activities (not related to the wind farm project) on and adjacent to the wind farm site concluded that the likelihood of these activities alone, in the absence of mitigation, resulting in a peat failure in the turbary plots ranged from Possible to Likely to Possible to Very Likely depending on the plots involved. This is due in part to an increase in turbary activity since 2012 and the loading of peat due to the more recent use of mechanical harvesting involving large hoppers.

Activities associated with the decommissioning (Prospective Development) therefore have the potential to act cumulatively with the turbary activities with regard to peat instability. This has been assessed in full as part of the Prospective Development EIAR and NIS.

Cormorants have not been recorded in the project area during bird surveys from 2004 to 2024 and given the upland nature of the area are considered not likely to occur with any regularity. In the past cormorants from Lough Cutra were recorded traveling to the coast

to feed. The risk of collision with the Derrybrien to Agannygal 110kV OHL is considered negligible and therefore not likely act cumulatively with the other OHLs in the area.

The cumulative effects assessment found that none of the projects/activities listed above have resulted in cumulative effects on Lough Cutra SPA during the construction or operation phases of the Derrybrien project.

As outlined in Chapter 7 Biodiversity (Aquatic Ecology and Fisheries) of the rEIAR, no aspect of the ceased operation of the wind farm, the OHL line or the Agannygal Substation is known to be giving rise to, nor has potential to cause, any negative effects on surface water quality or the downstream aquatic environment. There have been no changes to the recorded high ecological status (Q5/Q4-5) of the main rivers draining the site (Owendalulleegh and Boleyneendoorish) between 2021 and 2024. As such there is no potential for cumulative impacts on Lough Cutra SPA.

For the reasons outlined above in Section 4.5.6, there is no potential for the Retained Development to result in significant negative effects on the downstream aquatic environment. As such there is no potential for cumulative impacts on Lough Cutra SPA.

5.8 Mitigation measures

This section outlines measures which were implemented on the project during construction (including the peat slide) and operation to avoid or reduce the potential for adverse effects on European sites.

5.8.1 Slieve Aughty Mountains SPA

Monitoring of the hen harrier population in the vicinity of the project has been on-going since 2004. This allowed for maintenance activities during the operational phase of the wind farm (2006 – 2022) to be undertaken without causing disturbance to nesting birds in the area surrounding the wind farm.

In addition, any required significant maintenance works, such as track repairs or cutting of trees (as in 2018-2019), were done outside of the bird breeding season so as to avoid disturbance to nesting birds.

As negative impacts are not predicted by the retention of the off-site features (i.e. the Retained Development), mitigation measures for birds are not required.

5.8.2 Lough Cutra SPA

5.8.2.1 Measures that maintained peat stability

Effective and proven risk mitigation measures were put in place at Derrybrien Wind Farm to reduce the likelihood of a peat failure and potential impacts to water quality to a low or negligible level.

Chapter 8 Soils, Geology and Land of the rEIAR sets out detailed mitigation measures which have been implemented during the operation of the wind farm. The measures were of a nature routinely adopted on similar sites on upland blanket bogs across Ireland and the UK.

Mitigation measures range from preventing cranes from stopping on floating roads, to ensuring that all lifting operations were undertaken from hardstanding areas in order to avoid unnecessary loads on floating roads.

The following mitigation measures have been implemented by Gort Wind Farms Ltd to reduce the likelihood of a peat failure occurring:

- The peat stability risk assessment and the associated mitigation measures have been shared with the turbary rights holders whose plots have been or are proposed to be harvested by mechanical means, and the turbary rights holders have been made aware of the potential site stability risks associated with mechanical peat harvesting methods in the absence of mitigation.
- Warning signs have been erected at the site by Gort Windfarms Ltd. to raise awareness of the peat stability risks associated with mechanical peat harvesting in the turbary area and to highlight the recommended mitigation measures.
- Where possible, communication has been established between the turbary plot owners, turf cutting contractors and the windfarm site manager for Gort Windfarms Ltd. to give notice of mechanical peat harvesting activities and to report any peat instability on the site.
- Gort Windfarms Ltd. have implemented the recommended remedial drainage works and survey monitoring in the failed area at the south end of Turbary Plot 161 to ensure that the peat there is stable.
- Any further maintenance that is required to maintain the existing drainage network will only be carried out during the drier months of May to September.
- Periodic inspections of the mechanical peat harvesting are being carried out by the wind farm site manager for Gort Windfarms Ltd.

Mitigation required for turbary activities

The following is a summary of mitigation measures that are recommended in Chapter 8 Soils, Geology and Land of the rIEAR and which specifically relate to turbary peat harvesting and which are recommended to be implemented by the turbary rights holders:

- No mechanical peat harvesting should be carried out by saw cutting in any of the turbary plots.
- No mechanical peat harvesting should be carried out in the turbary plots where the likelihood of a peat failure without appropriate mitigation measures is interpreted as Very Possible to Likely (L=4.0 to 5.0). Manual turf cutting can be carried out but should be done during the drier months between May and September.

- Limitations on the type and size of equipment that can be used for machinal peat harvesting in the turbary plots is recommended where there is a risk of peat instability.
- The operational control measures recommended should be implemented by the turbary plot owner and their turf cutting contractor to manage the stability of peat excavations and to prevent excessive damage to the integrity of the vegetated surface of the peat;
- No mechanical peat harvesting should be carried out in the turbary area during the decommissioning stage of the wind farm project.

However, even in the absence of these measures it is considered that the project (and Prospective Development), along or in-combination with other projects and activities, have not or will not adversely effect the integrity of Lough Cutra SPA during the operation, ceased operation or Retained development phases.

5.8.2.2 Measures to protect water quality

Construction phase

Across the wind farm site in general, silt traps in the form of in-stream sumps and straw bales were installed in existing drains where there was potential for pollution of watercourses from runoff from works. The fact that the site as a whole is relatively flat or gently sloping helped facilitate the effectiveness of these control measures. Details on mitigation measures to prevent and/or minimise a reduction in water quality during the construction phase are presented in Chapter 9 Hydrology and Hydrogeology of the rEIAR.

Peat slide

Emergency measures were undertaken to address impacts arising from the peat slide in 2003. These emergency measures, which mainly involved the installation of barrages and creation of repositories for peat debris, largely related to the safeguarding of downstream water quality and reducing the risk of further peat slides. Details on mitigation measures to prevent and/or minimise a reduction in water quality during the peat slide are presented in Chapter 9 Hydrology and Hydrogeology of the rEIAR.

Operation

In order to minimise potential impacts on the local aquatic environment, water quality protection measures were undertaken in relation to the wind farm project operational phase maintenance. Details on mitigation measures to prevent and/or minimise a reduction in water quality during the operational phase are presented in Chapter 9 Hydrology and Hydrogeology of the rEIAR.

5.9 Consideration of findings

The rNIS has considered the likely significant effects of the existing Derrybrien Wind Farm Project and Retained Development, if any; that have occurred (during the construction,

peat slide, operational and ceased operation phases), that are occurring (during the ceased operation phase) or can reasonably be expected to occur in the future (as part of the Retained Development); that would adversely affect the integrity of any European site(s).

Two European sites were identified at screening stage as having the potential to have been or to be significantly affected as a result of the project.

The assessment undertaken in the rNIS has been informed by project-specific field surveys and specialist reporting with reference to the ecological communities and habitats potentially affected by the project, in order to provide a scientific basis for evaluations.

The overall permanent loss of habitat as a result of the project is approximately 15.2 ha of commercial conifer plantation which could have been used by hen harriers for foraging purposes whilst in pre-thicket stage as well as approximately 0.7 ha of cutaway bog which would provide continuous foraging potential for the birds. The loss of cutaway bog occurred prior to when the SPA was classified and formally designated. However, the removal of conifer planation as part of the project construction created approximately 255 ha of suitable open upland foraging habitat for hen harrier in the Slieve Aughty Mountains SPA. The original felled area within the wind farm site (222 ha) has been partly colonised by self-seeded conifers (approximately 69 ha up to 2021). The cessation of maintenance works will allow self-seeded conifer trees to spread along the road edges, where the slightly drier conditions may be more suitable for growth, and also within the overhead line corridor. However, the spread will be at a slow rate and the landscape will retain a largely open character. As plantation forest maturation has been quoted as being partly responsible for the regional decreases in breeding hen harriers, the alteration of mature forestry to open habitat has the potential to have significantly positively affected hen harrier population within the Slieve Aughty Mountains SPA.

While there is no evidence to indicate that the Derrybrien - Agannygal 110kV OHL has resulted in any collision casualties, it is acknowledged that such lines pose a risk of collision to large birds of prey such as hen harriers. This risk will be eliminated by the removal of the OHL as part of the Prospective Development - thus, conditions will revert to the status prior to construction of the wind farm project, i.e. no power lines, though the line corridor will not be replanted and hence will be of more value to birds than the original forest plantation (notwithstanding the gradual spread of self-seeded conifers).

The assessment has shown that there is no evidence that the construction, operational or ceased operation phases of the project or the Retained Development have had or will have adverse effects on the integrity of Slieve Aughty Mountains SPA.

The effects of the project, in particular the peat slide, on Lough Cutra SPA were assessed and the findings were that the project did not adversely affect the integrity of the site. The ceased operation phase of the project and the Retained Development will also not affect the integrity of the SPA.

It is therefore concluded beyond all reasonable scientific doubt that, following the implementation of the mitigation measures set out above:

- The construction, operation and ceased operation of project did not have an adverse impact on the integrity of any European site, in light of its conservation

objectives, either individually or in combination with other plans and / or projects; and,

- The Retained Development will not have an adverse impact on any European site, in light of its conservation objectives, either individually or in combination with other plans or projects.

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