5 TERRESTRIAL ECOLOGY

5.1 INTRODUCTION

This chapter assesses the impacts of the Development (**Figure 1.2**) on Terrestrial Ecology (namely habitats, flora, mammals and Kerry Slug). The Development refers to all elements of the application for the construction of Gortyrahilly Wind Farm (**Chapter 2: Project Description**). Where negative effects are predicted, the chapter identifies appropriate mitigation strategies therein. The assessment considers the potential effects during the following phases of the Development:

- Construction of the Development
- Operation of the Development
- Decommissioning of the Development

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

- **Appendix 5.1 Total plant species list for habitats encountered within the site for the proposed wind farm**
- **Appendix 5.2 Plant species list for habitats encountered along forest tracks within the grid connection route**
- **Appendix 5.3 Ecobat tool: Summary tables to enable analysis of the bat activity at each static location**
- **Appendix 5.4 Raw data used for Ecobat Tool**
- **Appendix 5.5 Habitat Enhancement Plan**
- **Appendix 5.6 Gortyrahilly and Inchamore Wind Farms, Bat Survey 2019/2020 Report. Prepared by Fehily Timoney Consulting Engineers**

A Construction and Environmental Management Plan (CEMP) is appended to the EIAR in **Appendix 2.1**. This document will be a key construction contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment, are implemented. For the purpose of this application, a summary of all the mitigation measures for the proposed wind farm project is included in **Appendix 17.1**.

5.1.1 Site Description

The Development, is comprised of 14 No. proposed turbines, one met mast and associated ancillary infrastructure (Turbine Foundations, Site Access Roads, Turbine Hardstands, drainage infrastructure etc.) (**Chapter 2: Project Description**). Each portion of the Site is

connected via existing and proposed Site Access Roads which includes for connection to a substation at the Site. The Site is characterised by relatively complex (hilly) topography with associated elevations ranging between c. 230 to 423 metres Above Ordnance Datum (m AOD) (Carrigalougha peak; 423 m AOD).

The Development will be connected to the national grid at Ballyvouskill Substation. The Grid Connection Route is approximately 27.8 km and comprised of wind farm / forest tracks (20 km), public roads (6.8 km) and ESB access track (1 km). The Grid Connection cable will be buried, with intermittent cable joint bays and other ancillary infrastructure where required.

5.1.2 The Proposed Development

Planning Permission is being sought by the Developer for the construction of 14 No. wind turbines, permanent met mast, on-site substation and all ancillary works and the construction of an underground Grid Connection Route to Ballyvouskill, Co. Cork (a full project description is given in **Chapter 2**).

A 10-year planning permission and 35-year operational life from the date of commissioning of the entire wind farm is being sought. The planning permission will include for a 30-year operational life for a met mast. A permanent planning permission is being sought for the grid connection and substation and will become an asset of the national grid under the management of EirGrid and will remain in place upon decommissioning of the wind farm.

5.1.3 Purpose of the Report

The purpose of the report is to:

- Establish and evaluate the baseline ecological environment, as relevant to the proposed development
- Identify, describe and assess all potentially significant ecological effects associated with the proposed development
- Set out the mitigation measures required to address any potentially significant ecological effects and ensure compliance with relevant nature conservation legislation.
- Provide an assessment of the significance of any residual ecological effects.
- Identify any appropriate compensation, enhancement or post-construction monitoring requirements.

5.1.4 Project Team

The following personnel have been involved in the terrestrial ecology assessment for the proposed Gortyrahilly Wind Farm project.

Dr Brian Madden BA (Mod.), Ph.D, MCIEEM graduated in Natural Sciences from the University of Dublin in 1984 and earned a Ph.D. degree in 1990 from the National University of Ireland for his research on ecosystem processes in raised bogs (research sponsored by Bord na Móna and Royal Irish Academy). Dr Madden is the lead author of this chapter and he also carried out habitat and mammal surveys at the proposed wind farm development site.

Dr John Conaghan BSc., PhD, MCIEEM is an experienced plant ecologist who has worked as a consultant ecologist in Ireland since 1994. He is a specialist in the survey and assessment of wetland vegetation and habitats with bogs and fens his main area of expertise. These surveys and assessments have contributed towards Environmental Impact Assessments of a range of wind farm, power line, road, and gas pipeline developments. John carried out habitat and flora surveys for the project.

John Curtin holds a BSc in Environmental Science from NUI Galway and has been working as a consultant ecologist since 2010. John carried out bat surveys at the proposed Gortyrahilly Wind Farm in 2021.

Dr Patrick Crushell BSc MSc PhD MCIEEM CEcol holds an honours degree in Applied Ecology from UCC, a Masters degree in Environmental Resource Management from UCD and a PhD on peatland ecology from Wageningen University, the Netherlands. Patrick carried out the surveys for Kerry Slug for the project.

Karen Banks (Fehily Timoney Consultants) – bat activity and roost surveys. Karen is an ecologist with 13 years' experience in the field of ecological assessment. She holds a BSc in Environment and Development from Durham University, and is a full member of the Chartered Institute of Ecology and Environmental Management. Karen is an experienced and skilled bat surveyor, first gaining a scientific licence to disturb bats from Natural England, UK in 2008.

Dr Jonathon Dunn (Fehily Timoney Consultants) – bat static detector surveys in 2019/20, Jonathon is an ecologist with over seven years' experience in the environmental sector and holds a BA (Hons) in Natural Sciences (Zoology) from the University of Cambridge, an MSc in Ecology, Evolution and Conservation from Imperial College London and a PhD in Avian Ecology from Newcastle University.

Sinead Clifford *(Fehily Timoney Consultants)* - Sinead holds a BA (Hons) from Institute of Technology Tralee and a Certificate in Ecological Consultancy from Acorn Ecology and is fully trained in sound analysis of bat calls.

5.1.5 Relevant Legislation and Policy

The main pieces of legislation relevant to this chapter are as follows:

- The Wildlife Acts 1976 - 2021
- The Habitats Directive 92/43/EEC
- Birds Directive 2009/147/EC
- European Communities (Birds and Natural Habitats) Regulations 2011 - 2021
- Flora (Protection) Order, 2015

In considering the ecological impacts of the proposed development, regard was made to the following guidance and information documents:

- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.
- Northern Ireland Environment Agency (2021) Guidance on bat surveys, assessment and mitigation for onshore wind turbine developments in Northern Ireland. Belfast: Department of Agriculture, Environment and Rural Affairs (Northern Ireland).
- Scottish Natural Heritage (2019). Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.
- EUROBATS 'Guidelines for consideration of bats in wind farm projects' Revision 2014.
- Bat Conservation Trust 'Bat Survey Good Practice Guidelines' 2012 (BCT Guidelines).
- Bat Conservation Ireland (2012). Wind Turbine/Wind Farm Development Bat Survey Guidelines, Version 2.8 December 2012 Bat Conservation Ireland, www.batconservationireland.org.
- Kelleher, C. & Marnell, F. (2006). Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- England, N. (2014). Bats and onshore wind turbines Interim guidance. Rodrigues, L., Bach, L., Dubourg-Savage, M., Karapandža, B., Kovač, D., Kervyn, T., Minderman, J. (2015).
- Fossitt (2000). A Guide to Habitats in Ireland, Heritage Council, Kilkenny.
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes.
- Smith et al. (2011). Best Practice Guidance for Habitat Survey and Mapping in Ireland.

- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (May 2022).
- European Commission (2017) Environmental Impact Assessment of Projects. Guidance on the preparation of the Environmental Impact Assessment Report. (Directive 2011/92/EU as amended.

5.2 METHODS

5.2.1.1 The Study Area

The principal study area for habitats and flora, terrestrial mammals and Kerry Slug was the actual Site for the proposed wind farm at Gortyrahilly (as shown in **Figure 1.2**). This was considered adequate as the site does not adjoin any designated area or habitat of particular conservation value. However, the study area was extended to a distance of approximately 2 km from the wind farm boundary for the checking of potential bat roosts.

The study area also included the route for the underground grid connection (see **Figure 1.2** in **Chapter 1**). This extends for a distance of approximately 27.8 km from the proposed substation at Gortyrahilly to the existing 220kV GIS substation at Ballyvouskill.

For the turbine delivery route, an assessment was made of locations where physical works are required to facilitate the passing of the vehicles (see **Figure 2.5** in **Chapter 2**).

5.2.1.2 Zone of Influence

The study area is defined by the zone of influence of the proposed development with respect to the ecological receptors that could potentially be affected.

The Zone of Influence (ZoI), or distance over which potentially significant effects may occur, will differ across the Key Ecological Receptors (KERs), depending on the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken has established the habitats and species present within, and in the vicinity of, the proposed development site. The ZoI and study area was then informed and defined by the sensitivities of each of the KERs present, in conjunction with the nature and potential impacts associated with the proposed development.

The ZoI of habitat loss impacts will be confined to within the proposed development boundary.

The ZoI of potential impacts on surface water quality in the receiving environment could extend downstream for up to 15 km (following UK guidance, Scott Wilson et al. 2006) but possibly more.

The ZoI of general construction activities (i.e., risk of spreading/introducing non-native invasive species, dust deposition and disturbance due to increased noise, vibration, human presence and lighting) is not likely to extend more than several hundred metres from the proposed development but could be up to 2 km for bats.

5.2.2 Baseline Data Collection

5.2.2.1 Desk Study

Habitats, flora and terrestrial mammals

A comprehensive desktop review was carried out to identify features of ecological importance within the study area and surrounding region. This included a review of sites designated for nature conservation (European & National) as shown on NPWS website (see www.npws.ie/protected-sites) and protected species datasets held by the National Biodiversity Data Centre (see http://maps.biodiversityireland.ie).

Bats

A data search was carried out by Fehily Timoney & Company on 21/10/2019 to collate existing information from the footprint of the proposed development sites and the surrounding area at each site on bat activity, roosts and landscape features that may be used by bats. The data search comprised the following information sources:

- Collation of known bat records within a 4 km radius of the proposed sites from the National Bat Database held by the National Biodiversity Data Centre (www.biodiversityireland.ie)[1];
- Review of Ordnance Survey mapping and aerial photography of the proposed wind farm boundaries and their environs (i.e., 200 m plus rotor radius of the boundary of the proposed development[2]);
- Records of designated sites within a 15 km radius of the proposed site where bats form part or all of the reason for designation (https://www.npws.ie/protected-sites);
- Collation of lesser horseshoe bat records within a 15 km radius of the proposed site from the National Parks and Wildlife Service lesser horseshoe bat database (https://www.npws.ie);

[1] A specific data request was not made to Bat Conservation Ireland because they regularly update NBDC with their records and it is only judged to provide an additional useful source of data if a location is deigned of high potential for bat roosts.
[2] As per SNH (2019) guidance.

- Collation of data on known caves within a 4 km radius of the proposed site from the Cave Database for the Republic of Ireland, compiled by Trinity College (http://www.ubss.org.uk/search_irishcaves.php); and
- Review of bat survey data from Ecological Impact Assessments from proposed and permitted developments within the wider environs of the site.

Kerry slug

The occurrence of the site for the proposed wind farm within the known range of Kerry Slug (*Geomalacus maculosus*) together with the presence of suitable habitat throughout the site suggested the likely presence of the species.

The Kerry Slug is protected by the Wildlife (Amendment) Act 2000. It is listed under Annex II of the Habitats Directive and seven Special Areas of Conservation (SACs) have been designated for the species with a combined total area of approximately 95,337 hectares. The Kerry Slug is also listed in Annex IV of the Habitats Directive and as such is strictly protected from injury, or disturbance / damage to their breeding or resting place wherever it occurs.

Historically, the Kerry Slug has been considered to be restricted to Devonian Old Red Sandstone areas of Kerry and West Cork where it occurs most commonly in either of three distinct habitats:

- deciduous woodlands in particular those with rocky outcrops or boulders;
- rock outcrops associated with heath or blanket bog; and
- lake shores

Within these habitats, the species tends to only be present if there is outcropping Devonian Old Red Sandstone, humid conditions and lichen, liverwort and / or mosses in which the species shelters and feeds (Platts and Speight 1988)[3].

However, the species has also been recently discovered on both granite outcrops within blanket bog and from a Conifer plantation in County Galway (Kearney 2010)[4]. Further records of the species from Conifer Plantations suggest that this may also be a suitable

[3] Platts, E.A & Speight, M.C.D. (1988) The taxonomy and distribution of the Kerry Slug, *Geomalacus maculosus* Allman, 1843 (Mollusca Arionidae) with a discussion of its status as a threatened species. *Irish Naturalists' Journal* **22** :417-30.
[4] Kearney, J., (2010). Kerry slug (*Geomalacus maculosus* Allman 1843) recorded at Lettercraffroe, Co. Galway. – Irish Naturalists' Journal 31: 68-69.

habitat for the species (McDonnell *et al.* 2013)[5]. A possible explanation put forward to explain the recent discovery of the species in County Galway is an inadvertent introduction (during forestry operations) (McDonnell *et al.* 2013). However, this has not yet been determined (Reich *et al.* 2012)[6].

Like many slug species, Kerry Slug is a crepuscular animal and it takes refuge in crevices under rocks or bark (in woodlands) during daylight hours. The species are also known to be diurnal during and after periods of rain and in saturated conditions. Adult slugs vary in colour from black and white spots to brown with cream spots, brown individuals tend to occur in woodland habitats. The black form is found in open habitat such as bogs and heathland. Studies have shown that the species can be abundant on conifer trees and can recolonise boulder habitat when the wood is clear-felled.

The overall conservation status of the species has been reported as 'favourable and improving' and it is not currently considered threatened within its range (NPWS 2019).

A review of data held by the National Biodiversity Data Centre (September 2021) confirms that the species has previously been reported from the 10 km square that the site intersects (W17). The proposed wind farm is not located within any site designated for nature conservation. The nearest site designated for the protection of Kerry Slug is the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (NPWS Site Code: 0365).

Based on the habitats recorded during the ecological assessment of the proposed wind farm, the following potentially suitable habitats have been identified:

- wet heath / blanket bog and rock outcrop habitat present throughout much of the site.

Results from the habitat and flora assessment in 2020 indicated that the site does not support habitat suitable for Marsh Fritillary (also an Annex II listed species).

5.2.3 Consultation

As part of the study, consultation was made with the following relevant ecological parties:

[5]Mc Donnell, R.J. and Gormally, M.J. (2011a). Distribution and population dynamics of the Kerry Slug, *Geomalacus maculosus* (Arionidae). Irish Wildlife Manuals, No. 54. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

[6] Reich, I., O'Meara, K., Mc Donnell, R.J. and Gormally, M.J. (2012). An assessment of the use of conifer plantations by the Kerry Slug (*Geomalacus maculosus*) with reference to the impact of forestry operations. Irish Wildlife Manuals, No. 64. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

- National Parks and Wildlife Services of the Department of Housing, Local Government and Heritage (response received 20th April 2021 – see **Appendix 1.1** in **Chapter 1**)
- BirdWatch Ireland (no response received)
- An Taisce (no response received)

5.2.4 Field Surveys

5.2.4.1 Habitats, vegetation and flora

The site of the proposed wind farm at Gortyrahilly was visited and a walkover survey was conducted over three days, *i.e.,* 8th July 2020, 28th May 2021 and 4th June 2021. Further survey was carried out on 30th July 2021 to review locations of turbines in areas of blanket bog, as well as the route of the proposed access road into the site. The field survey was mainly concentrated in areas in which it is proposed to site wind farm infrastructure.

The route of the grid connection cable was surveyed in January 2022. This comprised a survey by car, with stops at intervals to review habitats and flora present alongside the roads and tracks. The route passes through open countryside on leaving the proposed wind farm site and at the final stretch before entering the existing substation at Ballyvouskill – these areas were walked to record habitats and flora.

Habitats within the study area were classified after 'A Guide to Habitats in Ireland' (Fossitt, 2000)[7]. The dominant plant species present in each habitat type were recorded during the field surveys. This is considered sufficient to allow accurate classification of the habitats present. The extents and details of classified habitats were recorded and input to a GIS and are shown in **Figure 5.1** accompanying this report. Where relevant, linkages with the EU Habitats Directive classification system[8] are given.

During the site survey particular attention was paid to the possible occurrence of plant species listed in either the 2015 Flora Protection Order or the Irish Red Data Book (Curtis and McGough 1988)[9]. Vascular plant species nomenclature in this report follows Stace (2010)[10] while that of mosses follows Smith (2004)[11].

The mapping of habitats was assisted by the use of aerial photography (OSI Geohive & BING web-sites).

[7] Fossitt (2000) A Guide to the Habitats of Ireland. Heritage Council, Kilkenny. ,
[8] European Commission (2013) Interpretation Manual of European Union Habitats EUR28
[9] Curtis, T.G.F. & McGough, H.N. (1988) *The Irish Red Data Book. 1 Vascular Plants*. Stationary Office, Dublin.
[10] Stace, C. (2010). *New Flora of the British Isles* (3rd edition). Cambridge University Press.
[11] Smith, A.J.E. (2004). *The Moss Flora of Britain and Ireland* (2nd edition). Cambridge University Press.

5.2.4.2 Terrestrial mammals

Terrestrial mammal species were detected by direct observations and by search for signs, such as dwellings (e.g. setts), tracks or feeding signs during the multi-disciplinary walkover survey on 5th and 6th June 2021.

The approach to the badger *Meles meles* survey was developed using '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Scheme*'[12] The extents of the development site was walked and checked for badger signs. Badger signs include setts, latrines, snuffle holes, prints, paths and tree scratching. The coordinates of any signs observed were noted along with details of the signs and any recent activity. Search for badger signs was restricted within the commercial plantations due to problems of access through dense conifer plantation. Mitigation will be provided for the restricted areas (see **Section 5.5.3**).

5.2.4.3 Bats

Bat survey at the proposed wind farm was carried out in 2019/2020 by Fehily Timoney Consulting Engineers. Additional bat survey work (at two (2 No.) turbine locations) was carried out by Mr John Curtin in 2021. Full details of the surveys carried out by Fehily Timoney are contained in **Appendix 5.6**. A summary of the survey methods is presented in the following text:

Surveys

A total of five (5 No.) bat activity and static detector surveys were carried out during 2019 and 2020 (refer to **Table 5.1** for details). The 2021 static detector surveys were carried out over three periods (see **Table 5.2**).

Table 5.1: Bat Surveys 2019/2020

Survey Type	Survey Date	Surveyor
Bat Activity Survey 1 – Dusk	20/05/2019	Karen Banks (BSc, MCIEEM)
Bat Activity Survey 2 – Dusk	27/06/2019	Karen Banks (BSc, MCIEEM)
Bat Activity Survey 3 – Dusk	26/07/2019	Karen Banks (BSc, MCIEEM)
Bat Activity Survey 4 – Dusk	15/08/2019	Karen Banks (BSc, MCIEEM)
Bat Activity Survey 5 – Dusk	22/09/2019	Karen Banks (BSc, MCIEEM)
Static Detector Survey	09/05/2019 – 01/10/2019	Jonathon Dunn (BSc, MSc, PhD) and Sinead Clifford (BSc, CIEEM graduate)

[12] Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Scheme'

Survey Type	Survey Date	Surveyor
Roost Survey	Preliminary appraisal and summer inspection = throughout August 2019; emergence = 16/08/2019, 17/08/2019. Winter inspection = 27/02/2020.	Karen Banks (BSc, MCIEEM) and Cathál MacPartholan (general operative)

Table 5.2: Bat Surveys 2021

Survey Type	Survey Date	Surveyor
Static Detector Survey	07/05/2021 – 16/05/2021	John Curtin (BSc).
	13/07/2021 – 22/07/2021	
	18/08/2021 – 01/09/2021	

Bat activity surveys

Transects through bat favourable habitats within the proposed Gortyrahilly wind farm (see **Figure 5.2)** were either walked or surveyed from a vehicle driven at 15 kph with a detector mounted on the hedge-side of the vehicle. Bat activity was recorded using an Anabat Walkabout detector. The order in which transects were surveyed was randomised to ensure transect number was not confounded with time of day. Transects were undertaken once a month between May to September 2019.

Static detector surveys

Song Meter SM4BAT Full spectrum bat recorders use Real Time recording as a technique to record bat echolocation calls and using specific software, the recorded calls are identified. It is these sonograms (2-d sound pictures) that are digitally stored on the SD card (or micro SD cards depending on the model) and downloaded for analysis. These results are depicted on a graph showing the number of bat passes per species per hour/night. Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species such as the pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat. On the other hand, Leisler's bats tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats.

As per SNH (2019) guidance, static units (Song Meter SM4BAT) were programmed to commence half an hour before sunset and finish half an hour after sunrise to ensure that bat species that emerge early in the evening and return to roosts late are recorded. Detectors were left out for a minimum of 10 consecutive nights across three survey periods

in 2019: spring (April to May), summer (June-mid to August) and autumn (mid-August to October). Across all survey periods, detectors were left out for a mean of 33 days per turbine.

Static units were located in vicinity of the proposed locations of the turbines (at the time of survey). Where possible, units were deployed in the exact turbine locations (SNH, 2019). The location of units differed from those of the indicative turbine locations in the following scenarios:

- Where livestock were present, units were sited back from the indicative turbine location in nearby safe areas to prevent damage to units.
- Where indicative turbine locations were adjacent to public footpaths or roads, units were moved to a more discrete location nearby to reduce the risk of theft.
- Where the densely closed nature of the habitat (e.g., mature conifer plantation) immediately surrounding the indicative turbine location prevented access for surveyors or bats, units were moved to the edge of the closed habitat nearest to the turbine location.

Since the 2019 bat survey, the number of turbines has been reduced and most have been moved and are now at varying distances from the locations of the static detectors used in 2019 (see **Figure 5.3**). For each turbine in the present application, the distance to the nearest static detector used in the 2019 survey varies from 48.7 m (T6) to 188 m (T4, T10, T12). For T11, T13 and T14, surveys using static detectors were carried out in 2021 as these turbines are at distances greater than 250 m from the nearest static detector used in 2019.

Bat roost surveys

Habitats within the site were assessed for their favourability for bats. All structures were surveyed for bat presence either externally via bat detector, or internally by visual inspection or by a combination of both. All structures / suitable trees were inspected for bats and/or their signs using torches.

Preliminary ecological appraisal

Walkover surveys of areas identified as potential roosting habitats during the desk top study were undertaken in August 2019 and February 2020. The proposed site was walked and habitats of potential value to bats were noted and marked on a map. The value of each feature was noted according to its potential for use by bats for roosting. The value of habitat features for bats was defined in accordance with Bat Surveys: Good Practice Guidelines publication (Collins, 2016).

Bat roost inspection survey

Trees

Detailed inspection of the exterior of trees was undertaken in August 2019 and February 2020 to look for features that bats could use for roosting (Potential Roost Features) from ground level. The aim of the surveys was to determine the actual or potential presence of bats and the need for further survey and/or mitigation.

A detailed inspection of each potential tree roost within the site was undertaken. The inspection was carried out in daylight hours from ground level, and information was compiled on the tree, potential tree roosts and evidence of bats.

Structures

Derelict/disused buildings and bridges within the proposed wind farm site boundaries were subject to a visual inspection for evidence of, and potential for, bats in August 2019 and February 2020. The exterior of the structures was visually assessed for potential bat access points and evidence of bat activity using binoculars, a high-powered torch and an endoscope (Explorer Premium 8803 with 9 mm camera). Features such as crevices and small gaps in the bridge or building structure, such as between the brick or stonework, beneath roofing material, at eaves and around window frames which had potential as bat access points into the buildings were inspected. Evidence that these features/ access points were actively being used by bats includes staining within the gaps, urine staining and bat droppings. Indicators that potential access points are not actively used by bats include general detritus and cobwebs within the access point. A note of potential features used by bats was made where present.

Emergence roost survey

Dusk surveys were undertaken in August 2019 for structures identified as being of moderate to high potential for bats during the roost inspection surveys. The purpose of the surveys was to watch and listen for bats exiting from bat roosts to determine the presence or absence of bats at the time of survey. The dusk emergence surveys commenced approximately 15 minutes before sunset and ended approximately 90 minutes after sunset. An Anabat Walkabout detector and a Batbox Duet detector were utilised for the survey.

In order to supplement the information gathered from the emergence survey undertaken at the cluster of buildings present within the site boundary in the townland of Gortyrahilly, a passive monitoring system of bat detection was also deployed using the Anabat Swift bat monitor. One bat monitor was positioned on a fence post to the south of the disused house.

5.2.4.4 Amphibians and reptiles

Incidental sightings of amphibians, namely the common frog *Rana temporaria* and smooth newt *Lisstriton vulgaris,* were recorded during the survey. Habitats within the study area were evaluated for their potential to support breeding amphibians. Suitable breeding habitat include areas of still freshwater such as pond, drainage ditches and wetlands.

Sightings of reptiles, namely the common lizard, were noted during the surveys. Habitats within the study area were evaluated for their potential to support the common lizard. Suitable breeding habitat include bog and heath with exposed rock.

5.2.4.5 Kerry slug

The approach to surveying Kerry slug at the proposed wind farm was live refuge trapping as recommended for use by McDonnell *et al.* (2013) supplemented by targeted diurnal hand searches during site visits. The live refuge trapping method is favoured over other techniques because it enables quantitative sampling (McDonnell and Gormley 2011a[13],b[14]). In addition, it removes the requirement of undertaking searches during wet weather (in the case of diurnal searches as the species is usually only active in daytime during damp weather), and the health and safety risks associated with nocturnal searches (when species is most active) in remote locations. The metric trap method involves the following:

- The metric traps (0.25 m^2), manufactured by De Sangosse (Pont du Casse, France), are made up of absorbent material covered with a reflective upper surface and a black perforated plastic on the underside. They are wetted in advance of being laid out and are baited with Carrot. Traps are secured to rock outcrops (outcrop metric traps) or on surface vegetation (in the case of heath) using stones, tent pegs, or nails as appropriate. They can also be wrapped around tree trunks (banded metric traps) when undertaking surveys at wooded sites (not relevant to current survey as the target habitat at the current site is wet heath / blanket bog and rock outcrops). Traps are checked weekly for a period of up to six weeks. If required, traps are re-wetted during site visits using a watering can.

In addition to checking the metric traps, incidental observations of Kerry Slug were recorded during each site visit following hand searches amongst suitable habitat. A summary of the dates, methods, and weather conditions of each site visit undertaken are presented in **Table 5.3**.

[13] Mc Donnell, R.J. and Gormally, M.J. (2011a). Distribution and population dynamics of the Kerry Slug, *Geomalacus maculosus* (Arionidae). Irish Wildlife Manuals, No. 54. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

[14] Mc Donnell, R.J. & Gormally, M.J. (2011b) Identification of a live trapping method for the protected European slug, *Geomalacus maculosus* Allman 1843 (Arionidae). Journal of Conchology 40: 483-485.

Table 5.3: Kerry Slug assessment: Survey effort at Gortyrahilly

Date	Site	Survey	Weather
23/07/2020	Gortyrahilly	Hand searches and set traps	Dry, warm sunshine, relatively dry ground conditions.
30/07/2020	Gortyrahilly	Hand searches and check traps	Light persistent rain. Mild and calm
13/08/2020	Gortyrahilly	Hand searches and check traps	Light rain. Warm.
03/09/2020	Gortyrahilly	Hand searches, check and remove traps	Light rain. Mild and calm.

After an initial site walkover, the occurrence of suitable Kerry Slug habitat was identified and eight metric traps were deployed amongst wet heath and outcropping rock. Locations were selected based on the presence of representative suitable Kerry Slug habitat. The traps were deployed on the 23rd of July 2020 and subsequently checked on three separate occasions with at least a weekly interval before being removed six weeks later. The location of each trap is summarised in **Table 5.4** and illustrated in **Figure 5.4**.

Plate 5.1: Slug trap on rock outcrop.

Table 5.4: Trap locations and habitats at Gortyrahilly.

Trap	Location (ITM)	Habitat
Trap 1	516286, 572460	Rock outcrop (ER1) in wet heath (HH3) adjacent to a drainage channel (FW4).
Trap 2	516260, 572515	Rock outcrop (ER1) in wet heath (HH3).
Trap 3	516235, 572514	Rock outcrop (ER1) in wet heath (HH3).

Trap	Location (ITM)	Habitat
Trap 4	516174, 572492	Rock outcrop (ER1) in wet heath (HH3).
Trap 5	516138, 572485	Wet heath (HH3).
Trap 6	516017, 572447	Wet heath (HH3).
Trap 7	515991, 572438	Wet heath (HH3).
Trap 8	515962, 572470	Wet heath (HH3).

5.2.4.6 Limitations

Apart from survey for badger (recommended period is in winter), all surveys were carried out within the recommended seasonal time period.

There were no issues of access to the Site. However, detailed search for signs of mammals within the conifer plantation was not feasible due to dense tree growth.

5.2.5 Assessment Approach

The impact assessment and ecological evaluation approach used in this report is based on "Guidelines on the information to be contained in Environmental Impact Assessment Reports" (EPA May 2022).

5.2.5.1 Important Ecological Features

Ecological features can be important for a variety of reasons and the rationale used to identify them is explained in the text. Importance may relate, for example, to the quality or extent of the Site or habitats therein; habitat and/ or species rarity; the extent to which such habitats and/ or species are threatened throughout their range, or to their rate of decline.

5.2.5.2 Determining Importance

The importance of an ecological feature is considered within a defined geographical context. The following frame of reference has been used in this case (based on NRA Guidance 2009), relying on known/ published accounts of distribution and rarity where available, and professional experience:

The following frame of reference has been used in this case:

- International and European
- National (Ireland)
- County (County Cork)
- Local (lower value / higher value)

The above frame of reference is applied to the ecological features identified during the desk study and surveys to inform this report.

The value of habitats has been measured against published selection criteria where available. Examples of relevant criteria include: descriptions of habitats listed on Annex 1 of the Habitats Directive, etc.

In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Reference has therefore been made to published lists and criteria where available. Examples of relevant lists and criteria include: species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive or Annex 1 of the Birds Directive) and Birds of Conservation Concern in Ireland[151].

For the purposes of this report ecological features of Local importance or greater, and/or subject to legal protection, have been subject to detailed assessment. Effects on other ecological features are considered unlikely to be significant in legal or policy terms.

5.2.5.3 Impact Assessment

The impact assessment process involves the following steps:

- identifying and characterising potential impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement.

When describing impacts, reference has been made to the following characteristics, as appropriate:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

[15] Birds of Conservation Concern in Ireland 4: 2020–2026

The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action, e.g., the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or feature, e.g., the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of wet grassland. Example to be changed to one more specific to the project, if required.

Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

5.2.5.4 Significant Effects

The concept of ecological significance is addressed in paragraphs 5.24 through to 5.28 of CIEEM guidelines. Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of ecological impact assessment, a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g., for a designated site) or broad (e.g., national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.

5.2.5.5 Cumulative Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a proposed development results in individually insignificant impacts that, when considered in-combination with impacts of other proposed or permitted plans and projects, can result in significant effects.

5.2.5.6 Avoidance, Mitigation, Compensation and Enhancement

When seeking mitigation or compensation solutions, efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population significant at a county scale should ensure no net loss of the population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved.

Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement.

It is important for the impact assessment to clearly differentiate between avoidance mitigation, compensation and enhancement and these terms are defined here as follows:

- Avoidance is used where an impact has been avoided, e.g., through changes in scheme design;
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact *in situ*;
- Compensation describes measures taken to offset residual effects, i.e., where mitigation *in situ* is not possible.

5.3 BASELINE ECOLOGICAL CONDITIONS

5.3.1 Designated Sites

No part of the study site is within an area with a nature conservation designation or is adjacent to an area with such a designation. Sites with designations within a 15 km distance of the location of the proposed wind farm are listed in the following sections.

5.3.1.1 European designated sites

A total of 11 European designated sites occur within a 15 km distance of the proposed wind farm site (see **Figure 5.5**). These are listed in **Table 5.5**, along with the reasons for designation, the distance from the proposed wind farm site and whether any linkages or connectivity exist between the two locations.

The nearest designated European site to the Development is St. Gobnet's Wood SAC, which is approximately 3.75 km to the northeast of Gortyrahilly. The proposed temporary bridge crossing over the Sullane River at Ballyvourney is within 50 m of the SAC.

Approximately 20 km of the grid connection route is located along the route of an existing forestry road which runs parallel to the Clydagh River, which is within the Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC. The closest distance between the cable route corridor and the SAC is 41 m.

A section of the grid connection corridor also runs close to the Mullaghanish to Musheramore Mountains SPA. The closest distance between the cable route corridor and the SPA is 170 m.

5.3.1.2 National designated sites

A series of Natural Heritage Area (NHAs) occur within a 15 km radius of the site (see **Figure 5.6** and **Table 5.6**). National Heritage Areas are designated under the Wildlife Acts to protect habitats, species or geology of national importance. The nearest designated Natural Heritage Area to the Gortyrahilly wind site is Sillahertane Bog NHA, which is approximately 2 km to the west.

5.3.1.3 Proposed designated sites

A series of proposed Natural Heritage Areas (pNHAs) occur within a 15 km radius of the site (see **Figure 5.6** and **Table 5.6**). Proposed Natural Heritage Areas are sites of ecological interest. A site list was published on a non-statutory basis in 1995 but has not since been statutorily proposed or designated.

Table 5.5 Relevant European sites, reasons for designation, distances from subject site and summary of connectivity.

European Site	Reasons for designation (information correct as of 20th July 2022) (*denotes a priority habitat)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
	SPECIAL AREAS OF CONSERVATION	
Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC (site code 000365)	Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion vegetation* [3260] Northern Atlantic wet heaths with *Erica tetralix* [4010]	The proposed wind farm site at Gortyrahilly is approximately 8.75 km south of the Caragh River component of the SAC. There are no linkages, hydrological or

European Site	Reasons for designation (information correct as of 20th July 2022) (*denotes a priority habitat)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
	European dry heaths [4030] Alpine and Boreal heaths [4060] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Calaminarian grasslands of the *Violetalia calaminariae* [6130] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the *Rhynchosporio*n [7150] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] *Geomalacus maculosus* (Kerry Slug) [1024] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Euphydryas aurinia* (Marsh Fritillary) [1065] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Najas flexilis* (Slender Naiad) [1833] *Alosa fallax killarnensis* (Killarney Shad) [5046] According to this SAC's site Conservation Objectives document (Version 1.0. Department of Culture, Heritage and the Gaeltacht, 23rd October 2017), for each of the listed QIs, the Conservation Objective is to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	otherwise, between the two areas. The proposed wind farm site location is greater than the normal distance that foraging lesser horse-shoe bats would normally fly. McAney (in Lysaght & Marnell 2016) notes that the normal foraging distance is less than 2 km, while Schofield (cited in the NPWS Conservation Objectives for the site) notes that linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species within 2.5 km around each roost. Approximately 20 km of the grid connection route is located along the route of an existing forestry road which runs parallel to the Clydagh River. The closest distance between the cable route corridor and the SAC is 41 m. It is concluded that a hydrological link exists between the Project area and the SAC.
Mullaghanish Bog SAC (site code: 001890)	Blanket bogs (* if active bog) [7130] According to this SAC's site Conservation Objectives document (Version 1.0. Department of Arts, Heritage Regional, Rural & Gaeltacht Affairs, 16th May 2017) for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats and/or the Annex II species for which the SAC has been selected.	The proposed wind farm site is approximately 8.75 km southwest of the SAC. There are no hydrological links between the two areas. While a section of the grid connection corridor runs within a forest track 632 m from the SAC, the SAC is on higher ground to the forest track and there are no connections.

European Site	Reasons for designation (information correct as of 20th July 2022) (*denotes a priority habitat)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
The Gearagh SAC (site code:000108)	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation [3270] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Lutra lutra (Otter) [1355] According to this SAC's site Conservation Objectives document (Version 1.0. Department of Arts, Heritage Regional, Rural & Gaeltacht Affairs, 16th September 2016) for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats and/or the Annex II species for which the SAC has been selected.	The proposed wind farm site is approximately 11 km west of the SAC. The Sullane River, which drains much of the wind farm, enters the River Lee system at the Reservoir and approximately 2 km downstream of the Gearagh SAC. However, the extreme southwest sector of the site drains to the Bunsheelin River, which joins the River Lee at Ballingeery. The Lee flows through Lough Allua and continues towards the Gearagh. Therefore, a hydrological linkage occurs between the application site and the SAC
St Gobnet's Wood SAC (site code: 000106)	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] According to this SAC's site Conservation Objectives document (Version 1.0. Department of Housing, Local Government and Gaeltacht, NPWS 11th January 2022) for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats and/or the Annex II species for which the SAC has been selected.	The proposed wind farm site is approximately 3.75 km southwest of the SAC, while the proposed temporary bridge crossing over the Sullane River is within 50m of the SAC. The wind farm and the SAC are linked hydrologically by the Sullane River.
Blackwater River (Cork/Waterford) (site code 002170)	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]	The proposed wind farm site is approximately 12 km southwest of the SAC, with no hydrological linkages.

European Site	Reasons for designation (information correct as of 20th July 2022) (*denotes a priority habitat)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Margaritifera margaritifera (Freshwater Pearl Mussel) [1029] Austropotamobius pallipes (White-clawed Crayfish) [1092] Petromyzon marinus (Sea Lamprey) [1095] Lampetra planeri (Brook Lamprey) [1096] Lampetra fluviatilis (River Lamprey) [1099] Alosa fallax fallax (Twaite Shad) [1103] Salmo salar (Salmon) [1106] Lutra lutra (Otter) [1355] Trichomanes speciosum (Killarney Fern) [1421] According to this SAC's site Conservation Objectives document (NPWS 31st July 2012, Conservation objectives for Blackwater River SAC [002170]. Version 1.0. Department of Arts, Heritage and the Gaeltacht) for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats and/or the Annex II species for which the SAC has been selected.	
Derryclogher (Knockboy) Bog SAC (site code: 001873)	Blanket bogs (* if active bog) [7130] According to this SAC's site Conservation Objectives document (NPWS 16th May 2017, Conservation objectives for Derryclogher (Knockboy) Bog SAC [001873]. Version 1.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs) for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats and/or the Annex II species for which the SAC has been selected.	The proposed wind farm site is approximately 12 km northeast of the SAC. There are no hydrological links between the two areas.
Glanlough Woods SAC (site code: 002315)	*Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] According to this SAC's site Conservation Objectives document (NPWS 28th September 2018 Conservation objectives for Glanlough Woods SAC [002315]. Version 1.0. Department of Culture, Heritage and the Gaeltacht) for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats and/or the Annex II species for which the SAC has been selected.	The proposed wind farm site is approximately 14 km east of the SAC. There are no hydrological links between the two areas. The proposed wind farm site location is greater than the normal distance that foraging lesser horse-shoe bats would normally fly. McAney (in Lysaght & Marnell 2016) notes that the normal foraging distance is less than 2 km, while Schofield (cited in the NPWS Conservation Objectives for the site) notes that linear features such as hedgerows, treelines and stone walls

European Site	Reasons for designation (information correct as of 20th July 2022) (*denotes a priority habitat)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
		provide vital connectivity for this species within 2.5 km around each roost.
Kilgarvan Ice House SAC (site code 000364)	*Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] According to this SAC's site Conservation Objectives document (NPWS 6th November 2018, Conservation objectives for Kilgarvan Ice House SAC [00364]. Version 1.0. Department of Culture, Heritage, and the Gaeltacht) for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats and/or the Annex II species for which the SAC has been selected.	The proposed wind farm site is approximately 12 km east of the SAC. There are no hydrological links between the two areas. The proposed wind farm site location is greater than the normal distance that foraging lesser horse-shoe bats would normally fly. McAney (in Lysaght & Marnell 2016) notes that the normal foraging distance is less than 2 km, while Schofield (cited in the NPWS Conservation Objectives for the site) notes that linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species within 2.5 km around each roost.
Old Domestic Building, Curraglass Wood SAC (site code 002041)	*Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] According to this SAC's site Conservation Objectives document (NPWS 27th August 2018, Conservation objectives for Old Domestic Building, Curraglass Wood SAC [002041]. Version 1.0. Department of Culture, Heritage, and the Gaeltacht) for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats and/or the Annex II species for which the SAC has been selected	The proposed wind farm site is approximately 11 km southeast of the SAC. There are no hydrological links between the two areas. The proposed wind farm site location is greater than the normal distance that foraging lesser horse-shoe bats would normally fly. McAney (in Lysaght & Marnell 2016) notes that the normal foraging distance is less than 2 km, while Schofield (cited in the NPWS Conservation Objectives for the site) notes that linear features such as hedgerows, treelines and stone walls

European Site	Reasons for designation (information correct as of 20th July 2022) (*denotes a priority habitat)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
		provide vital connectivity for this species within 2.5 km around each roost.
Great Island Channel SAC (site code 001058)	Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] According to this SAC's site Conservation Objectives document (NPWS 6th June 2014, Conservation objectives for Great Island Channel SAC [001958]. Version 1.0. Department of Arts, Heritage and the Gaeltacht) for each of the listed QIs, the Conservation Objective is to maintain the favourable conservation condition of the Annex I habitats and/or the Annex II species for which the SAC has been selected.	The Sullane River, which drains much of the wind farm, enters the River Lee system within the Inishcarra Reservoir downstream of Macroom, (distance of c.14 km from site). The Lee then flows for approximately 40 km before entering Cork Harbour and a further 5 km to the SAC. While there is a total distance of approximately 59 km from the Gortyrahilly site to the SAC, hydrological connectivity does exist. Further, the extreme southwest sector of the site drains to the Bunsheelin River, which joins the River Lee at Ballingeery. The Lee flows through Lough Allua and continues towards the Gearagh and then to Cork Harbour.
	SPECIAL PROTECTION AREAS	
Mullaghanish to Musheramore Mountains SPA (site code: 004162)	Hen Harrier (*Circus cyaneus*) [A082] According to this SPA's site Conservation Objectives document (NPWS 2022, Conservation objectives for Mullaghanish to Musheramore Mts SPA 004162. Generic version 9.0, Department of Housing, Local Government & Heritage), for each of the listed SCIs, the Conservation Objective is to maintain the favourable conservation condition of the species for which the SPA has been selected.	The site of the proposed wind farm at Gortyrahilly is approximately 5 km southwest of the SPA. Habitats suitable for foraging by hen harrier, including bog, heath, wet grassland and scrub, occur fairly widely between the SPA and the wind farm site. The habitats within the wind farm site have potential to support foraging hen harriers.

European Site	Reasons for designation (information correct as of 20th July 2022) (*denotes a priority habitat)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
		A section of the grid connection route is located along the route of an existing forestry road which runs north of the SPA. The closest distance between the cable route corridor and the SPA is 170 m.
The Gearagh SPA (site code: 004109)	A050 Wigeon Anas penelope A052 Teal Anas crecca A053 Mallard Anas platyrhynchos A125 Coot Fulica atra A999 Wetlands According to this SPA's site Conservation Objectives document (NPWS 2022, Conservation objectives for The Gearagh SPA 004109. Generic version 9.0, Department of Housing, Local Government and Heritage), for each of the listed SCIs, the Conservation Objective is to maintain the favourable conservation condition of the species for which the SPA has been selected.	The proposed wind farm site is approximately 11 km west of the SPA. The Sullane River, which drains the wind farm, enters the River Lee system at the Reservoir and approximately 3 km downstream of the Gearagh SPA. However, the extreme southwest sector of the site drains to the Bunsheelin River, which joins the River Lee at Ballingeery. The Lee flows through Lough Allua and continues towards the Gearagh. Therefore, a hydrological linkage occurs between the application site and the SPA. The habitats within the wind farm site do not have potential to support any of the Special Conservation Interests of the SPA.
Cork Harbour SPA (code 004040)	Little Grebe (Tachybaptus ruficollis) [A004] Great Crested Grebe (Podiceps cristatus) [A005] Cormorant (Phalacrocorax carbo) [A017] Grey Heron (Ardea cinerea) [A028] Shelduck (Tadorna tadorna) [A048] Wigeon (Anas penelope) [A050] Teal (Anas crecca) [A052] Pintail (Anas acuta) [A054] Shoveler (Anas clypeata) [A056] Red-breasted Merganser (Mergus serrator) [A069] Oystercatcher (Haematopus ostralegus) [A130]	The Sullane River, which drains much of the wind farm, enters the River Lee system within the Inishcarra Reservoir dowstream of Macroom, (distance of c.14 km from site). The Lee then flows for approximately 40 km before entering Cork Harbour.

European Site	Reasons for designation (information correct as of 20th July 2022) (*denotes a priority habitat)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
	Golden Plover (Pluvialis apricaria) [A140] Grey Plover (Pluvialis squatarola) [A141] Lapwing (Vanellus vanellus) [A142] Dunlin (Calidris alpina) [A149] Black-tailed Godwit (Limosa limosa) [A156] Bar-tailed Godwit (Limosa lapponica) [A157] Curlew (Numenius arquata) [A160] Redshank (Tringa totanus) [A162] Black-headed Gull (Chroicocephalus ridibundus) [A179] Common Gull (Larus canus) [A182] Lesser Black-backed Gull (Larus fuscus) [A183] Common Tern (Sterna hirundo) [A193] Wetland and Waterbirds [A999] According to this SPA's site Conservation Objectives document (NPWS 2014, Conservation objectives for Cork Harbour SPA 004140. Version 1.0, 16th Dec 2014, Department of Arts, Heritage and the Gaeltacht), for each of the listed SCIs, the Conservation Objective is to maintain the favourable conservation condition of the species for which the SPA has been selected	While there is a total distance of approximately 54 km from the Gortyrahilly site to the SPA, hydrological connectivity does exist. Further, the extreme southwest sector of the site drains to the Bunsheelin River, which joins the River Lee at Ballingeery. The Lee flows through Lough Allua and continues towards the Gearagh and then to Cork Harbour.

Table 5.6: Relevant sites designated under Irish legislation, reasons for designation, distances from subject site and summary of connectivity.

[Note re. Proposed Natural Heritage Areas - a site list was published on a non-statutory basis in 1995 but has not since been statutorily proposed or designated]

Site	Reasons for designation (information correct as of 20th July 2022)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
	NATURAL HERITAGE AREAS	
Sillahertane Bog NHA (site code: 0001382)	Peatlands (4)	The pNHA site is located approximately 2 km to the west of the site for the proposed wind farm. There are no ecological or hydrological linkages between the NHA and the wind farm site.
Slaheny River Bog NHA (site code: 000383)	Peatlands (4)	The NHA site is located approximately 11.25 km to the southwest of the site for the proposed wind farm. There is no hydrological linkage between the NHA and the wind farm site.
Conigar Bog NHA (site code: 0002386)	Peatlands (4)	The NHA site is located approximately 10 km to the southwest of the site for the proposed wind farm. There is no hydrological linkage

Site	Reasons for designation (information correct as of 20th July 2022)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
		between the NHA and the wind farm site.
	PROPOSED NATURAL HERITAGE AREAS	
Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment pNHA (site code 000365)	Not Stated.	The proposed wind farm site at Gortyrahilly is approximately 8.75 km south of the Caragh River component of the pNHA. There are no linkages, hydrological or otherwise, between the two areas. Approximately 20 km of the grid connection route is located along the route of an existing forestry road which runs parallel to the Clydagh River. The closest distance between the cable route corridor and the pNHA is 41 m. It is concluded that a hydrological link exists between the Project area and the pNHA.
Mullaghanish Bog pNHA (site code: 001890)	Not stated.	The proposed wind farm site is approximately 8.75 km southwest of the pNHA. There are no hydrological links between the two areas. While a section of the grid connection corridor runs within a forest track xx m of the pNHA, the pNHA is on higher ground to the forest track and there are no connections.
The Gearagh pNHA (site code: 000108)	Not Stated.	The proposed wind farm site is approximately 11 km west of the pNHA. The Sullane River, which drains the wind farm, enters the River Lee system at the Reservoir and approximately 2 km downstream of the Gearagh pNHA. However, the extreme southwest sector of the site

Site	Reasons for designation (information correct as of 20th July 2022)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
		drains to the Bunsheelin River, which joins the River Lee at Ballingeery. The Lee flows through Lough Allua and continues towards the Gearagh. Therefore, a hydrological linkage occurs between the application site and the pNHA.
St Gobnet's Wood pNHA (site code: 000106)	Not stated.	The proposed wind farm site is approximately 3.75 km southwest of the pNHA. The two areas are linked hydrologically by the Sullane River.
Prohus Wood pNHA (site code 001248)	Not stated.	The proposed wind farm site is approximately 8 km east of the pNHA. There are no ecological or hydrological linkages between the two areas.
Lough Allua pNHA (site code: 001065)	Not stated.	The proposed wind farm site is approximately 4 km north of the pNHA. The extreme southwest sector of the site drains to the Bunsheelin River, which joins the River Lee at Ballingeery. The Lee flows through Lough Allua and then continues eastwards towards the Gearagh. Therefore, a hydrological linkage occurs between the application site and the pNHA.
Boylegrove Wood pNHA (site code: 001854)	Not stated.	The proposed wind farm site is approximately 10 km west-northwest of the pNHA. There are no ecological or hydrological links between the two areas.
Ballagh Bog pNHA (site code: 001886)	Not stated.	The proposed wind farm site is approximately 6 km northeast of the pNHA.

Site	Reasons for designation (information correct as of 20th July 2022)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
		There are no ecological or hydrological links between the two areas.
Gouganbarra Lake pNHA (site code: 001057)	Not stated.	The proposed wind farm site is approximately 6 km northeast of the pNHA. There are no ecological or hydrological links between the two areas.
Derryclogher (Knockboy) Bog pNHA (site code: 001873)	Not stated.	The proposed wind farm site is approximately 12 km northeast of the pNHA. There are no hydrological links between the two areas.
Kilgarvan Wood pNHA (site code: 001787)	Not stated.	The proposed wind farm site is approximately 8 km east of the pNHA. There are no hydrological links between the two areas.
Roughty River pNHA (site code: 001376)	Not stated.	The proposed wind farm site is approximately 12 km east-southeast of the pNHA. There are no hydrological links between the two areas.
Kilgarvan Ice House pNHA (site code 000364)	Not stated (but expected to include Lesser Horseshoe bat).	The proposed wind farm site is approximately 12 km east of the pNHA. There are no hydrological links between the two areas. The proposed wind farm site location is greater than the normal distance (less than 2 km) that foraging bats would normally fly (Lysaght & Marnell 2016).
Old Domestic Building, Curraglass Wood pNHA (site code 002041)	Not stated (but expected to include Lesser Horseshoe bat).	The proposed wind farm site is approximately 11km southeast of the pNHA. There are no hydrological links between the two areas The proposed wind farm site location is greater than the normal distance (less than 2 km) that foraging bats would

Site	Reasons for designation (information correct as of 20th July 2022)	Distance from proposed Gortyrahilly wind farm site and summary of connectivity
		normally fly (Lysaght & Marnell 2016).

5.3.2 Habitats and Vegetation

The dominant habitat within the survey area is wet heath (HH3) which has developed on sloping terrain with a relatively shallow peat cover, generally less than 50 cm in depth. This habitat is often found occurring in mosaic with areas of dry heath (HH1) and exposed siliceous (sandstone) rock (ER1). Other habitats which occur include lowland blanket bog (PB3), improved agricultural grassland (GA1), dry humid acid grassland (GS3), wet grassland (GS4), poor fen and flush (PF2), conifer plantation (WD4), scrub (WS1) and eroding/upland river (FW1).

In the following sections, the vegetation composition of these habitats is described and a list of the plant species occurring is presented in **Appendix 5.1**. The habitats which occur at the locations for the turbines and substation are listed in **Table 5.7**. Habitats which occur on the Gortyrahilly site are mapped in **Figure 5.1.**

5.3.2.1 Wet heath (HH3)

Wet heath vegetation, generally dominated by the robust grass species purple moor-grass (*Molinia caerulea*), dominates the survey area. The habitat develops on sloping areas where the peat depth is generally between 10 and 50 cm. The cover of *Molinia* is generally greater than 50% and can be higher in places. The vegetation is relatively species-poor with ling heather (*Calluna vulgaris*), cross-leaved heath (*Erica tetralix*), deer grass (*Trichophorum germanicum*) and tormentil (*Potentilla erecta*) among the more common plant associates. Throughout the site, the cover of heath species such as *Erica tetralix* and *Calluna vulgaris* is generally less than 20% and the moss cover in wet heath areas is generally low in comparison to other peatland habitats with *Racomitrium lanuginosum* and *Sphagnum capillifolium* the main species encountered. The cover of Sphagnum mosses is generally less than 10%. Areas of wet heath are often found occurring in mosaic with areas of dry heath, outcropping bedrock and blanket bog.

The condition of the habitat is generally good as a result of the relatively low levels of livestock grazing evident at present, however some areas of the habitat in the northern half

of the survey area are intensively grazed by sheep and, as a result, there can be localized peat erosion. Wet heath vegetation dominated by purple moor-grass is a very common and widespread habitat in the uplands of counties Cork and Kerry.

Equivalent EU Annex 1 Habitat – Northern Atlantic wet heaths with *Erica tetralix* (4010).

Plate 5.2: General view of wet heath vegetation dominated by *Molinia caerulea*

5.3.2.2 Dry heath (HH1)

Dry heath is a widespread habitat throughout the site however it is best developed in the southern half of the site where grazing levels are lower. Typically, the habitat is most commonly associated with areas of sandstone rock outcrop where the peat depth is less than 30cm. Western gorse (*Ulex gallii*) is generally the dominant species with ling (*Calluna vulgaris*), bell heather (*Erica cinerea*), tormentil and green-ribbed sedge (*Carex binervis*) also frequent. The main mosses occurring in the vegetation are generally *Hypnum jutlandicum, Hylocomium splendens* and *Sphagnum capillifolium*. Often the habitat grades into adjoining areas of wet heath which occurs on slightly deeper peats which occur nearby.

In common with wet heaths the condition of the habitat is generally good in the southern half of the survey area which has relatively low levels of livestock grazing evident at present, however in the northern half of the survey area the habitat has been subject to overgrazing by sheep in places.

Equivalent EU Annex 1 Habitat – European dry heaths (4030).

5.3.2.3 Lowland blanket bog (PB3)

Blanket bog vegetation within the survey area is largely confined to a small number of areas in the southern half of the site where the slope is relatively flat and the peat depth exceeds 50cm. Purple moor-grass generally dominates the vegetation, with a cover of greater than 50% typical. As a result of the *Molinia* dominance the habitat is difficult to separate from *Molinia*-dominated wet heath and the two habitats often intergrade with each other. Other frequent vascular plant species include cross-leaved heath, bog asphodel (*Narthecium ossifragum*), common bog-cotton (*Eriophorum angustifolium*) and hare's tail bog-cotton (*Eriophorum vaginatum*). The moss layer can be well-developed where the cover of purple moor-grass is not too rank with *Sphagnum capillifolium, Sphagnum papillosum, Sphagnum cuspidatum, Racomitrium lanuginosum* and the liverwort *Pleurozia purpurea* among the most conspicuous species.

Equivalent EU Annex 1 Habitat – Blanket bog (7130).

Plate 5.3: Blanket bog dominated by *Molinia caerulea*, with a prominent drain, in the south of the survey area. The peat is just over 1 metre deep in this area. Note the dense tussocks of Molinia present.

5.3.2.4 Cutover blanket bog (PB4)

Areas of cutover blanket bog occur occasionally within the survey area and tend to be located along roads and tracks where access was convenient. Most areas of cutover bog support a type of degraded grassy, wet heath vegetation dominated by purple moor-grass, deer grass, mat grass (*Nardus stricta*) and common bog cotton.

No Equivalent EU Annex 1 Habitat.

5.3.2.5 Poor fen and flushes (PF2)

Poor fen and flush is a relatively infrequent habitat within the survey area. The habitat occurs in sloping wet areas where there is some degree of flushing by base-poor surface waters. Two main types of poor flush vegetation occur. The most frequently encountered type is dominated by soft rush (*Juncus effusus*) and/or sharp flowered rush (*Juncus acutiflorus*) with *Sphagnum fallax* and *Polytrichum commune* dominating the moss layer. Along narrow flushed channels, where there is a greater degree of surface water flow visible, the flush vegetation is lower growing, containing species such as bog pondweed (*Potamogeton polygonifolius*), Greater butterwort (*Pinguicula grandiflora*), bog pimpernel (*Anagallis tenella*) and a range of sedge (*Carex*) species such as carnation sedge (*Carex panicea*), tawny sedge (*Carex hostiana*) and short-stalked yellow sedge (*Carex viridula oedocarpa*).

No Equivalent EU Annex 1 Habitat.

5.3.2.6 Dry humid acid grassland (GS3)

Dry humid acid grassland is a relatively uncommon habitat within the survey area. It occurs on the sloping drier mineral soils in the northern half of the site. Most of the areas are heavily grazed by sheep and the habitat can be considered as semi-improved in places. The vegetation is typically dominated by a range of grass species, especially velvet bent (*Agrostis canina*), sweet vernal grass (*Anthoxanthum odoratum*) and mat grass (*Nardus stricta*). Other frequent species in the low-growing vegetation include heath bedstraw (*Galium saxatile*), tormentil and mosses such as *Rhytidiadelphus loreus, Hylocomium splendens* and *Pleurozium schreberi*. The vegetation is generally tightly grazed by livestock – mostly sheep - which maintains its low-growing appearance.

No Equivalent EU Annex 1 Habitat.

5.3.2.7 Improved agricultural grassland (GA1)

Small areas of improved grassland occur in field systems along the margins on the survey area. The main species in the vegetation are typically Yorkshire fog (*Holcus lanatus*), common meadow-grass (*Poa pratensis*), white clover (*Trifolium repens*) and perennial rye-grass (*Lolium perenne*) and these species are usually accompanied by creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), creeping thistle (*Cirisum arvense*) and common mouse-ear (*Cerastium fontanum*).

The vegetation is heavily grazed by livestock and also probably receives regular fertilizer application.

No Equivalent EU Annex 1 Habitat.

5.3.2.8 Wet grassland (GS4)

Areas of wet grassland dominated by the rush species soft rush (*Juncus effusus*) and sometimes compact rush (*Juncus conglomeratus*), occur on the lower slopes of the site. There are obvious floristic similarities with the closely related poor flush vegetation dominated by *Juncus* and *Sphagnum* however wet grassland vegetation tends to occur in slightly drier areas where peat development limited and there is less flushing surface water. Some areas of wet grassland dominated by soft rush in the north-eastern sections of the survey area appear to have developed as a result of intensive grazing of wet heath by sheep in the past.

No Equivalent EU Annex 1 Habitat.

Plate 5.4: In the north-eastern sections of the survey area there are areas dominated by *Juncus effusus* wet grassland, with wet heath occurring on the rocky knolls.

5.3.2.9 Oak-birch-holly woodland (WN1)

A small area of low-growing Oak-birch-holly woodland occurs on a rocky ridge in the north of the survey area (where proposed access road into site is located) (see **Figure 5.7**). The main tree species are downy birch (*Betula pubescens)* and sessile oak (*Quercus petraea*) with some holly *(Ilex aquifolium*), willow *(Salix aurita* and *S. cinerea oleidolia)* and rowan (*Sorbus aucuparia).* The woodland canopy is between 7 and 10 metres tall and the ground layer is generally dominated by ferns such as hard fern (*Blechnum spicant*), broad buckler fern (*Dryopteris dilatata*) and scaly male fern (*Dryopteris affinis*). Irish spurge (*Euphorbia hyberna*), which has a restricted distribution in Ireland, grows in small openings within the woodland.

Equivalent EU Annex 1 Habitat - 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles.

5.3.2.10 Scrub (WS1)

Small areas of scrub occur scattered through the northern half of the survey area where the habitat is generally associated with well-drained mineral soil on steeply sloping ground. The main scrub species is common gorse (*Ulex europaeus*), with hawthorn (*Crataegus monogyna*) and briar (*Rubus fruticosus*) also frequent.

No Equivalent EU Annex 1 Habitat.

5.3.2.11 Coniferous woodland (WD4)

Conifer plantation is a widespread habitat in the south of the survey area where areas of blanket bog and heath have been planted in the past. The conifer areas vary from areas of immature plantation, which have been recently planted following a conifer clearfell, to tall plantation, greater than 10 metres tall. Sitka spruce and Lodgepole pine are the main species planted and these areas typically have a heavily shaded and species-poor ground layer dominated by conifer needles and mosses such as *Hypnum jutlandicum* and *Rhytdiadelphus loreus*.

No Equivalent EU Annex 1 Habitat.

Plate 5.5: A view of typical conifer plantation in the south of the survey area, dominated by *Picea sitchensis*, with a species-poor ground layer dominated by conifer needles.

5.3.2.12 Exposed siliceous rock (ER1)

Exposed sandstone bedrock is a prominent component of the survey area. Gently sloping bedrock outcrops are frequent throughout and are particularly conspicuous in the southern half of the site. The vegetation of exposed rock surfaces is typically sparse as a result of the scarcity of soil cover although dry heath vegetation can occur on some of the wider cliff ledges. In suitable rock crevices species such as hard fern (*Blechnum spicant*), broad buckler fern (*Dryopteris dilatata*), ling heather and bell heather are characteristic.

Equivalent EU Annex 1 Habitat – Siliceous rocky slopes with chasmophytic vegetation (8220).

Table 5.7: Summary of the main habitats occurring at turbine and substation and borrow pit locations.

Turbine location	Main habitats occurring within turbine footprint
No. 1	Wet heath (HH3)
No. 2	Wet heath (HH3)
No. 3	Conifer plantation (WD4)
No. 4	Wet heath (HH3) and Cutover bog (PB4)
No. 5	Conifer plantation (WD4)
No. 6	Conifer plantation (WD4) and Wet heath (HH3)

Turbine location	Main habitats occurring within turbine footprint
No. 7	Heavily grazed/eroded Wet heath (HH3)
No. 8	Wet heath (HH3) and Cutover bog (PB4)
No. 9	Wet grassland (GS4) and Cutover bog (PB4)
No. 10	Conifer plantation (WD4) (Eastern half of area) and Wet heath (HH3)/Upland blanket bog (PB2) (Western half of area)
No. 11	Upland blanket bog (PB3), Wet heath (HH3) (eastern half of area) and Recently replanted conifer plantation (WS2) (western half of area)
No. 12	Wet grassland (GS4) dominated by soft rush and Wet heath (HH3)
No. 13	Wet grassland (GS4) dominated by soft rush and Wet heath (HH3)
No. 14	Recently reclaimed land developing into Improved grassland (GA1)
Substation area	Heavily grazed Wet heath (HH3)
Borrow pit A	Wet heath (HH3)
Borrow pit B	Conifer plantation (WD4)

5.3.2.13 Grid route corridor description

The route is dominated by forest tracks and public roads. Habitat descriptions follow, along with descriptions of the sections which traverse open countryside at both ends of the corridor.

Forest tracks (BL3)

Forestry tracks (BL3) dominate the proposed cable route between the site for the proposed Gortyrahilly Wind Farm and the existing substation at Ballyvouskill. The forestry tracks along the survey route are dominated by gravel and generally have a very low cover of vegetation (see following photographs). Any vegetation that does occur is patchy and is located in narrow strips along the track margins which are not subject to vehicular movement. The sparse vegetation of forest tracks is dominated by a mixture of ruderal and grassland species (see **Appendix 5.2**). The main species include *Agrostis stolonifera, Juncus articulatus, Juncus effusus, Cirsium palustre, Plantago major, Ranunculus repens, Prunella vulgaris* and *Trifolium repens*.

A notable plant species which was recorded growing along track margins is *Filago minima* (Least cudweed). The species is considered to be Near Threatened in Ireland (Wyse Jackson *et al*. 2016) and is listed in the Flora Protection Order (2015). Approximately 10 flowering heads of the species were noted at two locations in the townland of Derryreagh, where forest track runs through areas of recently felled and replanted coniferous plantation. Although the species is legally protected it has been recently recorded from 55 hectares on the Island of Ireland between 2010 and 2019. In the Republic of Ireland, the species has a

scattered distribution which includes the Killarney region, areas west of Cork city, Co. Wexford, South Wicklow, Co. Cavan and South Mayo.

Plate 5.6: View of typical forest track through recently felled conifer plantation in Derryreag townland.

Plate 5.7: View of forest track through an area of tall conifer plantation in Glashacormick.

Minor roads (BL3)

In the south section of the cable route, between Derree and Inchamore, the proposed route runs along stretches of tarmac minor roads. The adjoining land is generally dominated by either wet heath (HH3) or improved agricultural grassland (GA1). The road margins are dominated by low-growing grassy vegetation which includes typical grassland species such as *Holcus lanatus, Dactylis glomerata, Molinia caerulea, Ranunculus repens, Cynosurus cristatus* and *Cirsium* spp. (see following photograph). Well-developed hedgerows are generally absent along the road margins however there are occasional scattered trees/shrubs of *Betula pubescens, Crataegus monogyna, Sorbus aucuparia*, *Ilex aquifolium* and *Salix cinerea oleifolia*.

Plate 5.8: General view of proposed cabling route along a minor road at Lumnagh more.

To the north-west of Ballyvouskill substation **(see Figure 5.8)** the cable route passes through a field of improved grassland (GA1) with typical vegetation. The proposed route then crosses through an area of wet heath (HH3) on sloping ground. This heath vegetation is dominated by *Molinia caerulea* and *Calluna vulgaris,* with frequent *Erica tetralix, Erica cinerea, Potentilla erecta, Tricophorum germanicum, Carex panicea, Juncus squarrosus* and the moss *Sphagnum capillifolium.* The heath has an uneven surface topography which suggests overgrazing/erosion in the past.

Plate 5.9: View of wet heath vegetation on sloping ground, looking back towards Ballyvouskill substation.

The proposed route then follows an old stony track through wet heath which is dominated by *Juncus effusus, Agrostis capillaris, Juncus articulatus, Polytrichum* sp. and *Nardus stricta* which eventually joins with the main forest road further west.

Plate 5.10: View of old track running through wet heath.

South of the minor road at Derree **(see Figure 5.9)** the proposed cable route passes through an area of undulating rocky ground which is dominated by *Molinia caerulea* wet heath and patchy scrub dominated by *Betula pubescens.* The shrubby heath species *Myrica gale* is also frequent throughout, with the heath species *Calluna vulgaris* and *Erica cinerea* occasional on rocky ledges. Extensive areas of outcropping sandstone bedrock also occur. On the day of survey most of the area was heavily grazed and poached by horses resulting in extensive areas with a high cover of bare peat.

Plate 5.11: View of heath/scrub mosaic to the south of the road at Derree.

5.3.3 Mammals, Amphibians and Reptiles

The open and exposed character of the site results in relatively few mammal species being present.

Irish hare *Lepus timidus hibernicus* was observed on the heath and grassland areas and is expected to breed on site. Deer are widespread throughout the site and especially within the afforested areas. Several sightings indicated Sika deer *Cervus nippon* though fallow deer *Dama dama* and sika/red hybrids could also occur as these are widespread in the south-west.

Whilst there was no evidence of their presence during the surveys, badger *Meles meles* would be expected within the afforested areas of the site, as well as within the more improved land in the north. Pine marten *Martes martes* had been recorded within the local conifer plantations during the 2019/20 surveys. Red squirrel *Sciurus vulgaris* could occur within the afforested areas.

There is no significant habitat on site to support otter *Lutra lutra*. This reflects the small size of the tributary streams and the absence of fish. However, otter occurs widely in the Sullane River system and it is possible that otter might at times travel upstream to the site.

The common frog *Rana temporaria* is widespread on site including within forest drains and in wet bog.

The common lizard *Zootoco vivipara* was recorded in June 2021 on a rock outcrop within the site and is expected to occur at low densities throughout the heath dominated areas of the site.

5.3.4 Bats

The review of existing records of bat species in the area of the sites indicates that seven of the ten known Irish species of bat have been recorded within a 4 km radius of the proposed site. These bats include pipistrelle species (*Pipistrellus pipistrellus sensu lato*), soprano pipistrelle (*P. pygmaeus*) and Nathusius' pipistrelle (*Pipistrellus nathusii*), Leisler's bat (*Nyctalus leisleri*), brown long-eared bat (*Plecotus auritus*), Daubenton's bat (*Myotis daubentonii*) and lesser horseshoe bat (*Rhinolophus hipposideros*) as shown in **Table 5.8**. One species has been recorded as roosting within a 4 km radius of the proposed sites: brown long-eared bat, which has been recorded roosting in the summer at Gortnascarty, c.2.1 km north-east of the Site.

The Cave Database for the Republic of Ireland does not hold any records of caves within a 4 km radius of the Site.

Table 5.8: Desktop results of NBDC and NPWS Bat Records within the 4 km radius of the Site

Bat Species	Legal Protection	Conservation Status (Marnell *et al*. 2019)	Date of Last Record	Known Roost
Brown long-eared bat (*Plecotus auritus)*	EU Habitats Directive Annex IV, Wildlife Acts	Least Concern	25/07/2013	Yes
Common pipistrelle (*Pipistrellus Pipistrellus sensu lato*)	EU Habitats Directive Annex IV, Wildlife Acts	Least Concern	28/07/2014	No
Daubenton's bat (*Myotis daubentonii*)	EU Habitats Directive Annex IV, Wildlife Acts	Least Concern	13/07/2009	No
Leisler's bat (*Nyctalus leisleri*)	EU Habitats Directive Annex IV, Wildlife Acts	Least Concern	28/07/2014	No
Lesser horseshoe bat (*Rhinolophus hipposideros*)	EU Habitats Directive Annex II and Annex IV, Wildlife Acts	Least Concern	14/07/2003	Yes
Nathusius's pipistrelle (*Pipistrellus nathusii*)	EU Habitats Directive Annex IV, Wildlife Acts	Least Concern	27/07/2010	No
Soprano pipistrelle (*Pipistrellus pygmaeus*)	EU Habitats Directive Annex IV, Wildlife Acts	Least Concern	28/07/2014	No

The bat landscape association model (Lundy *et al.,* 2011) suggests that the proposed wind farm sites are part of a landscape that is of low to moderate suitability for bats including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle, brown long-eared, Leisler's, Daubenton's, Natterer's (*Myotis nattereri*), whiskered bat (*M. mystacinus*) and lesser horseshoe bat. The proposed site and its environs are of low suitability for Nathusius' Pipistrelle.

Bat activity surveys undertaken for the permitted Cleanrath Wind Farm (Planning Ref: PL04.246742), located c.6 km to the east of the proposed wind farm at Gortyrahilly recorded five species of bat, namely common pipistrelle, soprano pipistrelle, Leisler's and brown long-eared bat and one potential lesser horseshoe bat (unconfirmed due to poor quality of call recorded). No bat roosts were recorded in the study area for this development[16].

Bat activity surveys undertaken for the permitted Derragh Wind Farm (Planning Ref: 125270) recorded common pipistrelle, soprano pipistrelle and Leisler's bat[17] foraging within the study area. Pre-construction survey undertaken for Derragh Wind Farm confirmed that an abandoned dwelling (c.0.7 km to the south of the proposed wind farm at Gortyrahilly at Grid ref: W 15698 70859) supported a minor roost for common pipistrelle.

5.3.4.1 Bat activity surveys

The results of the bat activity surveys carried out in each month from May to September 2019 are presented in **Figures 5.10-5.14.** Details are given in **Appendix 5.6**. During the surveys, a total of four species of bats were recorded: common pipistrelle, soprano pipistrelle, Leisler's bat and Natterer's bat. Common pipistrelle was recorded most frequently across the site and Natterer's bat the least.

5.3.4.2 Bat static detector surveys

Substantial changes have occurred in proposed turbine locations from static monitoring in 2019 (see **Figure 5.3**). **Table 5.9** below justifies the results from 2019 and 2021 static locations for individual turbines.

[16] MKOS (2015) Environmental Impact Statement: Proposed Wind Farm Development at Cleanrath North and Adjacent Townlands, Co. Cork. McCarthy Keville O'Sullivan.
[17] Fehily Timoney & Co. (2015) Revised Environmental Impact Statement for Derragh Wind Farm Development, Co. Cork.

Table 5.9: Justification for using bat detector data for each turbine location.

Turbine No	Detectors used for assessing impacts	Distance between detector and turbine	Comments
1	G2	125 m	The turbine is located north-west of detector 2 in similar open heath / bog habitats. The turbine is located c. 20 m higher elevation. It is likely activity levels are similar in both locations.
2	G14	51 m	The turbine is located a short distance north-west of the detector in similar habitat. It is likely activity levels are similar in both locations.
3	G5	126 m	Both locations are set within conifer plantation at similar altitudes. G5 is set close to a track providing a landscape feature likely to increase bat activity compared to within a plantation. Given the turbine creation will involve the instillation of roadways it is likely activity levels will be similar.
4	G15	188 m	Both locations are situated at the edge of conifer plantation adjacent to heath / bog with G15 c.10 m higher altitude. Given the similarity in habitats it is likely activity will be similar.
5	G18	185 m	T5 is located to the north of G18 set within conifer plantation. G18 is also situated within conifers although adjacent to an improved field and lies closer to lowland habitats. It is likely bat activity is somewhat higher at G18 than T5.
6	G6	49 m	Given the proximity and similarity of habitats It is likely activity levels are similar in both locations.
7	G3	173 m	This turbine is set adjacent to an existing track located between detectors 3 and 4. It is likely G3 will have slightly higher activity than T7 as it is located somewhat closer to lowland habitats of higher suitability for bat activity.
8	G7	156 m	Although G7 is located c. 20 m higher in elevation it sits closer to landscape features suitable for bat activity such as forestry edge and stream. As such activity is likely to be similar if not slightly higher by G7.
9	G8	169 m	T9 sits c. 10 m lower in elevation to G8. It also contains edge habitat where heath meets improved grassland. Although no high-quality features surround this location it is likely bat activity is marginally higher at the turbine location.
10	G13	188 m	G13 was located c. 30 m lower than the final turbine location, both set within conifer plantation. G13 is located closer to lowland habitats and a stream thus is likely to have higher bat activity.
11	D11	0 m	No detector was set within heath east of the conifer block in 2019 thus a survey was conducted at the turbine location during the 2021 bat activity season.
12	G11	188 m	Landscape features are similar at both locations although a steep bank by G11 may attract marginally higher bat activity.
13	D13	0 m	No detector was set this far east of the site in 2019 thus a survey was conducted at the turbine location during the 2021 bat activity season.
14	D14	0 m	No detector was set this far east in the site in 2019 thus a survey was conducted at the turbine location during the 2021 season.

Detectors G represent 2019 data. Detectors D represent 2021

Nine species of bat were recorded at the Gortyrahilly site, with a total of 28,953 recordings over the 33 nights of surveys[18]. The most commonly recorded species was common pipistrelle, followed by soprano pipistrelle and Nathusius' pipistrelle.

Much lower levels of activity of lesser horseshoe bat, brown long-eared bat, Natterer's bat, and Whiskered Bat were detected on the song-meter. Brown long-eared bat is present on-site, but this species is very quiet and sometimes hunts without echolocating, so it may be under-recorded by the static detectors.

Table 5.10: Results from static detector recordings

Common Name	Species	No. of recordings 2019	No. of recordings 2021
Brown long-eared bat	*Plecotus auritus*	269	99
Common pipistrelle	*Pipistrellus pipistrellus*	20,331	6,923
Daubenton's bat	*Myotis daubentoniid*	737	-
Leisler's bat	*Nyctalus leisleri*	1,661	1,167
Lesser horseshoe bat	*Rhinolophus hipposideros*	51	1
Nathusius' pipistrelle	*Pipistrellus nathusii*	2,176	4
Natterer's bat	*Myotis nattereri*	174	50
Soprano pipistrelle	*Pipistrellus pygmaeus*	3,364	3,257
Whiskered bat	*Myotis mystacinus*	190	-
40 kHz Pipistrelle	-	-	66
Myotis sp	*Myotis sp*	-	196
Whiskered / Daubenton's bat	*Myotis nattereri / Myotis daubentoniid*	-	27
Total		28,953	11,790

Brown Long-Eared Bat

The total number of recordings for brown long-eared bat at Gortyrahilly in 2019 was 269 No. recordings; 0.93% of total recordings for all bats. These were recorded over 33 No. nights which gives an average of 8.15 No. recordings per night. In 2021, 99 brown long-eared bat recordings were identified from the three detectors: 0.84% of that year's total recordings (average of 2.91 passes per night).

[18] Calculated as the mean number of nights deployed per turbine per total survey season. i.e. the total number of nights each detector was deployed for spring, summer and autumn was summed. Then this figure was divided by the maximum number of detectors (or turbine locations) in total across the whole survey season. E.g. for the entire season (spring, summer and autumn), detectors were left out for a total of 629 nights at Gortyrahilly. The maximum number of detector locations was 19 (although 19 detectors were not always deployed simultaneously). The mean number of nights deployed per detector at Gortyrahilly was calculated as 629 / 19 = 33 nights.

Common Pipistrelle

The total number of recordings for common pipistrelle at Gortyrahilly during 2019 was 20,331 No. recordings; 70.29% of total recordings for all bats. These were recorded over 33 No. nights which gives an average of 616.09 No. recordings per night. In 2021, 6,923 Common Pipistrelle recordings were recorded; 58.72% of that year's total recordings (average of 203.62 passes per night).

Daubenton's Bat

The total number of recordings for Daubenton's bat at Gortyrahilly during 2019 was 737 No. recordings; 2.55% of total recordings for all bats. These were recorded over 33 No. nights which gives an average of 22.33 No. recordings per night. Moderate levels of Daubenton's bat were recorded on the Songmeter. During the 2021 survey no definite Daubenton's bat recording was identified. 27 recordings however were registered as either Whiskered or Daubenton's bat, equating to 0.23% of that year's records (average of 0.79 passes per night).

Leisler's Bat

The total number of recordings for Leisler's bat at Gortyrahilly during 2019 was 1,661 No. recordings; 5.74% of total recordings for all bats. These were recorded over 33 No. nights which gives an average of 50.33 No. recordings per night. In 2021, 1,167 recordings were verified equating to 9.9% of that year's total (average of 34.32 passes per night).

Lesser Horseshoe Bat

In 2019 the total number of recordings for Lesser horseshoe bat at Gortyrahilly was 51 No. recordings; 0.18% of total recordings for all bats. These were recorded over 33 No. nights which gives an average of 1.55 No. recordings per night. A single Lesser Horseshoe recording was registered in 2021; 0.01% of the total records (average of 0.03 passes per night). This bat was recorded at 00:09, 2 hours 14 minutes after sunset.

Nathusius' Bat

The total number of recordings for Nathusius' bat at Gortyrahilly in 2019 was 2,176 No. recordings; 7.52% of total recordings for all bats. These were recorded over 33 No. nights which gives an average of 65.94 No. recordings per night.

Nathusius's bat has been previously recorded within the 10 km Biodiversity Ireland grid square (W17) that contains the proposed Gortyrahilly wind farm site (record from 2010). During 2021, 4 records from this species were recorded: 0.03% of the total (average of 0.12

passes per night). In addition, 66 registrations were noted as 40kHz Pipistrelles (these are either Common or Nathusius's Pipistrelle); 0.56% of the recordings (average of 1.94 passes per night).

Natterer's Bat

In 2019 the total number of recordings for Natterer's bat at Gortyrahilly was 174 No. recordings; 0.60% of total recordings for all bats. These were recorded over 33 No. nights which gives an average of 5.27 No. recordings per night. In 2021, 50 recordings from this species were verified; 0.42% of that year's total (average of 1.47 passes per night).

Unidentified Myotis bats

In 2021, 196 unidentified Myotis species were recorded; 1.66% of the year's total (average of 5.76 passes per night).

Soprano Pipistrelle

The total number of recordings of soprano pipistrelle recorded at Gortyrahilly in 2019 was 3,364 No. recordings; 11.63% of total recordings for all bats. These were recorded over 33 No. nights. This gives an average of 101.94 No. recordings per night. This is a very low level of recordings. On a good site for soprano pipistrelles over 1,000 No. recordings per night would be typical (Caroline Shiel, Bat Conservation Ireland pers. comm., 2019). In 2021 3,257 registrations were recorded equating to 27.63% of that year's total (average of 95.79 passes per night).

Whiskered Bat

The total number of recordings for whiskered bat at Gortyrahilly was 190 No. recordings; 0.66% of total recordings for all bats. These were recorded over 33 No. nights which gives an average of 5.76 No. recordings per night.

5.3.4.3 Ecobat

The static data were uploaded and analysed using the Ecobat tool (see tables in **Appendix 5.4**). This analysis was undertaken for each survey period separately. Where groups of detectors were deployed for different dates within a survey period, those that were deployed for the same dates were analysed together (details are provided for each survey period below). The reference range datasets were stratified to include:

- Only records from within 30 days of the survey date.
- Only records from within 100 km^2 of the survey location.
- Records using any make of bat detector.

The Ecobat tool provides a series of summary tables to enable analysis of the bat activity level at each static location. These are presented in **Appendix 5.3**, and categorisation of activity level is based on the following table:

Table 5.11: Percentile score and categorised level of bat activity

Percentile	Bat Activity
81 to 100	High
61 to 80	Moderate to High
41 to 60	Moderate
21 to 40	Low to Moderate
0 to 20	Low

Raw data upon which the Ecobat analyses were based is presented in **Appendix 5.4**.

An overview of bat activity at turbine locations is given in the following:

2019 Survey Period 1

Six of the twelve static locations had at least one night of High Activity during the survey period. No bats were recorded at G8 (169 m from T9 location) during this survey.

The following detector locations are deemed to have a High Bat Activity (for specific bat species) level based on the Percentile Median value: T3 (Leisler's bat), T6 (Common Pipistrelle), T8 (Daubenton's bat and common pipistrelle), T9 (Nathusius' bat and Common Pipistrelle), and T10 (Leisler's bat, Nathusius' bat and Common Pipistrelle).

2019 Survey Period 2

Ten of the twelve static locations had at least one night of High Activity during the survey period.

The following turbine locations are deemed to have a High Bat Activity (for specific bat species) level based on the Percentile Median value: T3 (Common pipistrelle), T8 (Daubenton's bat, whiskered bat, Nathusius' bat, Common Pipistrelle and Soprano Pipistrelle), T12 (Common pipistrelle), T10 (Nathusius' bat, Common Pipistrelle, and Soprano Pipistrelle).

2019 Survey Period 3

Five of the twelve static locations had at least one night of High Activity during the survey period.

The following turbine locations are deemed to have a High Bat Activity (for specific bat species) level based on the Percentile Median value: T1 (common pipistrelle), T12 (common pipistrelle and soprano pipistrelle), T8 (common pipistrelle) and T9 (common pipistrelle, soprano pipistrelle and brown long-eared bat).

2021 Survey Period 1

No detector recorded high activity on any date. Based on the Percentile Median value for the entire ten-night period however these species showed Low activity.

2021 Survey Period 2

Turbines 11 and 13 had high activity for at least one night of during the survey period.

The following Turbine locations are deemed to have a High Bat Activity (for specific bat species) level based on the Percentile Median value: T13 (common pipistrelle).

T13 also showed moderate high bat activity for Soprano Pipistrelle and Leisler's bat during this period. All other species per turbine locations showed moderate or lower activity based on the Percentile Median value.

2021 Survey Period 3

Turbines 12 and 14 had high activity for at least one night during the survey period.

The following Turbine locations are deemed to have a High Bat Activity (for specific bat species) level based on the Percentile Median value: T13 (common pipistrelle). Leisler's activity at T11 was deemed Moderate High over the survey period.

Bat Roost Inspection Survey

Trees

The cover of broadleaved trees at the proposed site at Gortyrahilly is limited to lower lying areas of pasture at the northern and southern extremes of the site. Two trees supporting suitability as roosting habitat for bats were recorded at Gortyrahilly: one Ash (*Fraxinus excelsior*) tree of moderate suitability due to features including broken limbs, a cracked limb and wounds caused by a limb drop; and one Oak (*Quercus robur*) of low suitability for bats

in heavy ivy growth were both recorded at the northern-most tip of the site. The location of these trees is indicated in **Figure 5.15.**

Structures

Two clusters of buildings were identified within the proposed site at Gortyrahilly during the preliminary ecological appraisal; one in the townland of Gortyrahilly at the north of the site and one in the townland of Cahernacaha at the south of the site.

The buildings at Gortyrahilly to the north of the site comprised one disused dwelling and two farm outbuildings.

Disused dwelling (Dwelling G1)

This building is a two-storey house with rendered walls and a slate roof. Two stone outbuildings with a corrugated roof are attached to the house (see images 1 & 2 in Plate 5.12). Potential access points for bats include slipped roof tiles, raised flashing to the chimney and an open downstairs window. There are also gaps in the soffit and ridge tiles at the rear of the house. The attached outbuildings contain gaps around the window shutter and door and there are also small gaps between the stonework of the walls. Neither the dwelling nor outbuildings were accessible for internal inspection. No evidence of bats was observed during the external inspection. This building is considered to be of high suitability as a roosting habitat due to the size, shelter and conditions provided by the structure. The surrounding habitat provides suitable foraging and commuting areas at a treelined local road to the south and pasture bounded by hedgerows/treelines and scrub to the north.

Outbuilding 1

A single storey rendered outbuilding with a corrugated roof (image 5 in Plate 5.12). There were potential access points via gaps around the door and under the roof. This building was not accessible for internal inspection. No evidence of bats was observed during the external inspection. This building is considered to be of moderate suitability for bats due to the size, shelter and conditions provided by the structure.

Outbuilding 2

A single storey outbuilding constructed of stone with a corrugated roof (image 6 in Plate 5.12). There are potential access points for bats via gaps between the stonework and around the doors. Internally, there are potential roosting features within the joints of timber beams. No evidence of bats was recorded during the internal or external inspections. This building is considered to be of moderate suitability for bats due to the size, shelter and conditions provided by the structure.

1. Disused dwelling (G1) and attached stone outbuilding

2. Rear view of dwelling indicating potential access points in raised ridge tiles and soffit

3. Derelict dwelling indicating potential access points via soffit, ridge tiles and gaps in roof tiles and open window (now demolished).

4. Rear and side view of disused dwelling showing exposed stonework

5. Single storey outbuilding

6. Stone barn

Plate 5.12: Photographs of disused farmhouses and associated buildings at the north of the proposed site at Gortyrahilly.

There were two dwellings at Cahernacaha, at the south of the proposed Gortyrahilly Wind Farm. Dwelling C1 was a modern two-storey building with a slate roof. A single storey outbuilding was also present to the west of the house (Plate 5.13). These buildings were

not accessed for an internal inspection. The house and outbuilding were in good repair and no obvious entry points for bats were recorded.

Plate 5.13: Dwelling C1 at Cahernacaha.

Dwelling C2 was a two-storey dwelling with a slate roof (Plate 5.14). There was a potential access point for bats via a raised ridge tile. This building is considered to be of high suitability as a roosting habitat due to the size, shelter and conditions provided by the structure. The surrounding habitat provides suitable foraging and commuting areas within pasture bounded by hedgerows/treelines and scrub located around the house.

Plate 5.14: Dwelling C2 at Cahernacaha.

Bridges

A double arched stone culvert under a local road at Gortnabinna to the south of the proposed site (W 15638 71322) (Plate 5.15) supports moderate suitability for roosting bats in several deep crevices present between the stone slabs forming the arches. No evidence

of roosting bats was recorded at the bridge during the inspection surveys undertaken on 17th August 2019 and 27th February 2020; this culvert is classified as Grade 2[19].

Plate 5.13: Double arch stone culvert with moderate suitability for roosting bats

5.3.4.4 Emergence roost survey

Gortyrahilly Townland

An emergence survey of the buildings in the townland of Gortyrahilly was undertaken on 16th August 2019. One Natterer's bat and seven pipistrelle bats were recorded emerging from the soffit at the rear of the disused house. The bats foraged around the building and also along the treeline to the south of the building. The passive monitor recording adjacent to this building recorded common and soprano pipistrelle, Leisler's bat, Natterer's bat and one brown long-eared bat.

Leisler's bat was also recorded commuting overhead at 21:34 (35 minutes after sunset). No emergent bats or bat roosts were identified at the outbuildings present at the site.

Cahernacaha Townland

An emergence survey of the buildings at Cahernacaha was undertaken on 17th August 2019. Approximately 40 common pipistrelle and ten soprano pipistrelle bats emerged from the roof of Dwelling C2. No other species were recorded during the course of the emergence survey.

No bats were recorded emerging from Dwelling C1 at Cahernacaha.

[19] *0 = no potential (no suitable crevices); 1 = crevices present may be of use to bats; 2 = crevices ideal for bats but no evidence of usage; and 3 = evidence of bats (e.g. bats present, droppings, grease marks, urine staining, claw marks or the presence of bat fly pupae) (Billington and Norman, 1997).

5.3.4.5 Interpretation and evaluation of roost survey results

Gortyrahilly and Gortnabinna Townland

Presence/ absence: Seven pipistrelle (soprano and common pipistrelle) and one natterer's bat were observed emerging from the disused house Dwelling G1 at Gortyrahilly (W 16685 73416).

No evidence of bats was observed within the outbuildings at Gortyrahilly during the external/internal inspections or emergence survey.

Population size class assessment: The disused house at Gortyrahilly supports minor summer roosts, likely a small group of males.

Site status assessment: The disused house Dwelling G1 at Gortyrahilly was considered to be of high suitability for bats due to the size, shelter and conditions provided by the structure. The surrounding habitat provides suitable foraging and commuting areas at a treelined local road to the south and pasture bounded by hedgerows/treelines and scrub to the north. The emergence survey confirmed that the disused house supports a minor summer roost for pipistrelle and natterer's bat.

The outbuildings on site were of moderate suitability for bats. However, no evidence of roosting bats was observed during the inspection or emergence survey.

The bridge located to the south of the site at Gortnabinna was of moderate suitability for bats. However, no evidence of roosting bats was observed during the inspection survey.

In winter bats may roost in parts of buildings such as cavity walls or around window frames in cooler areas with stable temperatures. The potential for bats to hibernate in the buildings to the north of the site at Gortyrahilly or deep within cavities in the bridge at Gortnabinna cannot be excluded. No caves or other underground features are known to exist at the proposed site and its environs.

Two potential tree roosts were recorded at Gortyrahilly.

The locations of the actual and potential roosts at Gortyrahilly are shown in **Figure 5.15**.

Cahernacaha Townland

Approximately 50 pipistrelles (40 common pipistrelle and ten soprano pipistrelle) were observed emerging from Dwelling C2 at Cahernacaha (W 14770 70582).

No bats were recorded emerging from Dwelling C1 at Cahernacaha (W 14821 70509).

Population size class assessment: Dwelling C2 at Cahernacaha supports a common and soprano pipistrelle maternity roost.

Site status assessment: Dwelling C1 at Cahernacaha did not support any obvious entry and exit points for bats and no bats were recorded during the emergence survey.

Dwelling C2 at Cahernacaha was considered to be of high suitability as a roosting habitat due to the size, shelter and conditions provided by the structure. The surrounding habitat provides suitable foraging and commuting areas within pasture bounded by hedgerows/ treelines and scrub located around the house. The emergence survey confirmed that the dwelling supports a common and soprano pipistrelle maternity roost.

The potential for bats to hibernate in the buildings at Cahernacaha cannot be excluded. No caves or other underground features are known to exist at Cahernacaha and its environs. The location of the roost at Cahernacaha is shown in **Figure 5.15**.

5.3.5 Kerry slug

A review of data held by the National Biodiversity Data Centre (September 2021) confirms that the species has previously been reported from the 10 km square that the site intersects (W17). The nearest site designated for the protection of Kerry slug is the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (site code: 000365).

Kerry Slug was recorded at the Gortyrahilly site during each site visit. The numbers recorded within slug traps were relatively low with just 21 individuals in eight traps over the six week period. However, Kerry Slug was frequently recorded within suitable habitat during targeted hand searches. Slugs were most commonly encountered from exposed rock during hand searches. A summary of all records observed at the site is presented in **Table 5.12**. The individuals recorded were largely confined to rock outcrops within wet heath. The total number of slugs recorded at the site was 86 individuals, sixty two of which were from hand searches.

The results from the 2020 survey confirm the presence of Kerry Slug within the proposed wind farm site. These results also suggest a notable preference for exposed siliceous rock. This is in line with previous surveys undertaken amongst similar habitat complexes (McDonnell and Gormley 2011a). The species is thought to be widespread throughout suitable habitat within its known range (NPWS 2019)[20].

Table 5.12: Results of metric trap surveys and targeted hand searches at site for the proposed Gortyrahilly Wind Farm.

Date	Task	Trap 1	Trap 2	Trap 3	Trap 4	Trap 5	Trap 6	Trap 7	Trap 8	Hand Searches	Total
23/07/2020	Set Traps	0	0	0	0	0	0	0	0	16	16
30/07/2020	Check Traps	0	0	3	0	6	4	2	0	29	44
13/08/2020	Check Traps	0	3	0	0	0	2	0	0	13	18
03/09/2020	Check & remove	0	0	0	0	1	0	0	0	7	8
Total		0	3	3	0	7	6	2	0	65	**86**

Plate 5.16: Kerry Slug recorded during targeted hand searches at Gortyrahilly.

[20] NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report.

5.3.6 Summary of Important Ecological Features and Conservation Value of Site

5.3.6.1 Habitats, vegetation and flora

The survey area is generally dominated by wet heath vegetation in which the dense, tussock-forming grass *Molinia caerulea* is prominent. In general, most of the wet heath habitat in the southern half of the survey area is in relatively good condition (reflecting low grazing levels). However, in the northern and western parts of the site the condition of the wet heath is often poor as a result of locally intensive sheep grazing. This has, over time, resulted in a low cover of heath species such as cross-leaved heath and ling heather with localized poaching of the peat soil also seen. Mat grass has a locally high cover in areas of the wet heath which are heavily grazed by sheep. In the west and north of the survey area it would appear that large areas of wet heath habitat have developed in areas of old cutover bog which have been left to regenerate. While wet heath is an Annex I habitat, it is a common and widely distributed habitat in the upland regions of counties Cork and Kerry. However, as there is a substantial resource of wet heath on site (varying from good to poor condition), it is assigned an overall valuation of County Importance.

The Annex I listed habitats Dry heath and Exposed siliceous rock occur throughout much of the site typically in association with each other and/or wet heath. Due to their widespread distribution on site in association with the wet heath, they also are assigned an overall valuation of County Importance.

Areas of blanket bog occur on deeper peat, located mainly in the southern half of the survey area. These areas of blanket bog generally have a high cover of purple moor-grass, i.e. >60% cover, and as a result there is usually a relatively low cover of other bog species, e.g. *Eriophorum* species, *Erica tetralix, Trichophorum germanicum* and Sphagnum moss. There are no extensive areas of intact blanket bog occurring within the survey area with most areas occurring in mosaic with areas of rock outcrop and wet heath. A number of blanket bog areas throughout the site have been recently drained (see Plate 5.2). Blanket bog is an Annex I habitat, with active blanket bog having priority status. While some of the blanket bog can be considered as active, overall blanket bog naturally has a low representation on site and is assigned an overall rating of Local Importance (higher value).

Oak-birch-holly woodland is another Annex I habitat which has a presence on site. However, this has a restricted distribution, being confined to one small area in the north of the site. The example of this habitat on site is rated as Local Importance (higher value).

The other habitats recorded on site are assigned overall ratings varying from Local Importance (lower value) to Local Importance (higher value) – these comprise cutover blanket bog, poor fen and flushes, dry humid acid grassland, wet grassland and scrub. The conifer plantation and improved grassland are habitats managed entirely by man, are relatively species-poor and thus are not of conservation importance.

The project area supports one legally protected plant species (listed on the 2015 Flora Protection Order), *Filago minima*. This occurs along a section of forest track which will support the grid connection cable. The survey area also supports a number of plant species which, in Ireland, are largely confined to the south-west of the country, e.g., Irish spurge (*Euphorbia hyberna*) and great butterwort (*Pinguicula grandiflora*). The habitats which dominate, i.e., wet heath and dry heath dominated by *Molinia* and *Ulex gallii*, generally do not provide suitable habitat for any rare/legally protected plant species (Curtis and McGough, 1988).

5.3.6.2 Terrestrial mammals, amphibians and reptiles

The study site supports a typical mammalian fauna of open bog/heath habitat and conifer plantation.

All mammal species recorded on site are listed (as relevant) as 'Least Concern' on the Irish Red List (Marnell et al. 2019)[21].

The Irish hare, pine marten and all deer species are protected under the Wildlife Acts, as are species expected on site, namely pygmy shrew, red squirrel, and badger.

The common frog and the common lizard are protected under the Wildlife Acts, though both are listed as 'Least Concern' on the Irish Red List (King et al. 2011).

5.3.6.3 Bats

According to the NBDC bat landscape modelling, the landscape in which the proposed wind farm site is situated is of low to moderate suitability for common pipistrelle, soprano pipistrelle, brown long-eared bat, Leisler's bat, Daubenton's bat, whiskered bat, Natterer's bat and lesser horseshoe. It is classed as of low suitability for Nathusius' pipistrelle. Nine species of bats have been recorded as present at the proposed Gortyrahilly wind farm site during 2019 bat surveys while seven to eight species were recorded during 2021

[21] Marnell, F., Kingston, N. & Looney, D. (2009) *Ireland Red List No. 3: Terrestrial Mammals*. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government. Dublin, Ireland.

(Whiskered and Daubenton's were not differentiated - it is possible both were present). Three confirmed summer roosts (two minor and one maternity roost for common pipistrelle, soprano pipistrelle and Natterer's bat) were present at the Gortyrahilly site (all within 500 m of the study site).

All bats recorded are listed as 'Least Concern' on the Irish Red List and protected under the EU Habitats Directive Annex IV and Wildlife Acts. One species, Lesser Horseshoe, is listed as 'Annex II' under the EU Habitats Directive.

5.3.6.4 Kerry Slug

The Kerry slug (*Geomalacus maculosus*) is protected by the Wildlife (Amendment) Act 2000 and is listed under Annex II of the Habitats Directive. The Kerry slug is also listed in Annex IV of the Habitats Directive and as such is strictly protected from injury, or disturbance / damage to their breeding or resting place wherever it occurs.

Historically, the Kerry Slug has been considered to be restricted to Devonian Old Red Sandstone areas of Kerry and West Cork where it occurs most commonly in either of three distinct habitats:

- deciduous woodlands in particular those with rocky outcrops or boulders;
- rock outcrops associated with heath or blanket bog; and
- lake shores

Within these habitats, the species tends to only be present if there is outcropping Devonian Old Red Sandstone, humid conditions and lichen, liverwort and / or mosses in which the species shelters and feeds (Platts and Speight 1988).

The overall conservation status of the species has been reported as 'favourable and improving' and it is not currently considered threatened within its range (NPWS 2019).

Based on the 2020 survey, it is considered that the habitat types "wet heath / blanket bog and rock outcrop habitat" at the Gortyrahilly site support an important population of Kerry Slug, which is rated as County Importance.

5.4 ASSESSMENT OF EFFECTS AND MITIGATION MEASURES

5.4.1 The 'Do-Nothing' Impact

Without the proposed wind farm development proceeding, it is expected that the present main landuses on site, namely livestock grazing and forestry, will continue. It is possible that further afforestation would occur on the site in the future.

The ecology of the site would be expected to remain fairly similar as at present though any increase in grazing pressure could be detrimental to the quality of peatland habitats on site. Also, any further afforestation on heath and bog habitats would be detrimental.

5.4.2 Potential Impacts on European Conservation Sites

The NIS that accompanies this planning application has shown objectively that for nine of the European sites identified within the zone of influence, there are no realistic Source-Pathway-Receptor linkages and hence there is no potential for effects on qualifying interests or Special Conservation Interests as a result of the proposed Gortyrahilly Wind Farm project. These sites are:

- Mullaghanish Bog SAC (code 001890)
- St Gobnet's Wood SAC (code 00106)
- Blackwater River (Cork/Waterford) SAC (code 002170)
- Derryclogher (Knockboy) Bog SAC (code 001873)
- Glanlough Woods SAC (code 002315)
- Kilgarvan Ice House SAC (code 000364)
- Old Domestic Building, Curraglass Wood SAC (code 002041)
- Great Island Channel SAC (code 001058)
- Cork Harbour SPA (code 004030)

However, in the absence of mitigation, likely or possible significant effects could not be excluded during the construction, operational and/or decommissioning stages of the proposed development on the following sites:

- Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (code 000365)
- The Gearagh SAC (code 000108)
- The Gearagh SPA (code 004109)
- Mullaghanish to Musheramore Mountains SPA (code 004162)

Apart from the Mullaghanish to Musheramore Mountains SPA, impacts of potential concern may arise as a result of contaminants originating within the project area reaching the relevant designated site and causing harmful effects on the qualifying interests and/or the Special Conservation Interests of the site. The significance of any effect would be dependent on the magnitude and duration of a pollution event. Mitigation is therefore required to minimise this risk.

The Mullaghanish to Musheramore Mountains SPA is located approximately 5 km to the southwest of the site for the wind farm at Gortyrahilly, while a section of the route for the grid connection cable will pass within 170 m of the SPA. Construction works along the grid connection route carried out during the breeding season could have disturbance effects on hen harriers breeding within the SPA. The significance of an effect is unknown as such would be dependent on the locations of the nesting sites and the foraging ranges of the breeding pairs at the time of the works.

5.4.3 Potential Impacts on National Conservation Sites

There are three Natural Heritage Areas within a 15 km radius of the proposed wind farm site (see **Table 5.6**), namely Sillahertane Bog NHA (2 km distance), Slaheny River Bog NHA (11 km distance) and Conigar Bog NHA (10 km distance). All three sites are designated for 'Peatlands'.

As these sites are geographically separated from the wind farm site, and without any ecological or hydrological connectivity between the sites and the proposed wind farm location, it can be concluded with full scientific certainty that the proposed wind farm project could not have any impacts on these three NHA sites.

5.4.4 Potential Impacts on proposed Natural Heritage Areas

There are 14 No. proposed Natural Heritage Areas within a 15 km radius of the proposed wind farm site (see **Table 5.6**). For seven of these sites, there are substantial geographical separation distances and no ecological or hydrological linkages – these sites are:

- Prohus Wood pNHA (8 km distance)
- Boylegrove Wood pNHA (10 km distance)
- Ballagh Bog pNHA (6 km distance)
- Gouganbarra Lake pNHA (6 km distance)
- Derryclogher (Knockboy) Bog pNHA (12 km distance)
- Kilgarvan Wood pNHA (8 km distance)

- Roughty River pNHA (12 km distance)

It can be concluded that the proposed wind farm project could not have any impacts on these seven pNHA sites.

The Mullaghanish Bog pNHA is located 8.75 km distance from the site for the proposed Gortyrahilly wind farm, and there are no ecological or hydrological linkages. However, the route for the grid connection cable runs within a forest track within a distance of approximately 300 m from the SAC. As the bog site is at a higher level than the forest track, it can be concluded that works along the forest track would not have potential to impact upon the hydrology of the bog.

A further three sites, Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment pNHA, Kilgarvan Ice House pNHA and Old Domestic Building, Curraglass Wood pNHA, are known to support Lesser Horseshoe bat. As these three sites are at respective distance of 8.75 km, 12 km and 11 km from the site for the proposed Gortyrahilly wind farm and taking into account that the normal distance that foraging bats would be expected to fly is 2 km, it can be concluded that the proposed wind farm project could not have any impacts on these three pNHA sites.

For the following four sites, a hydrological linkage exists between the wind farm site and the pNHA:

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment pNHA – as noted in **Table 5.6**, approximately 20 km of the grid connection route is located along the route of an existing forestry road which runs parallel to the Clydagh River. The closest distance between the cable route corridor and the pNHA is 41 m. As there is a hydrological pathway from the wind farm to the pNHA, there is a risk (in absence of mitigation) that contaminants generated on site during the construction and/or decommissioning phases could flow to the pNHA and possibly have adverse effects on water quality and aquatic life within the lake system. Mitigation is therefore required to minimise this risk.

Lough Allua pNHA – the western end of the wind farm drains to the River Lee via the Bunsheelin River tributary. There is an approximate distance of 4 km from the wind farm to the confluence with the main Lee channel. There is then a further 2 km (approximately) of channel before the Lee enters Lough Allua. As there is a hydrological pathway from the wind farm to the pNHA, there is a risk (in absence of mitigation) that contaminants generated on site

during the construction and/or decommissioning phases could flow to the pNHA and possibly have adverse effects on water quality and aquatic life within the lake system. Mitigation is therefore required to minimise this risk.

The Gearagh pNHA – as the Gearagh pNHA occurs downstream of Lough Allua (as discussed above), there is a hydrological linkage from the wind farm site to the Gearagh via the River Lee. After flowing into Lough Allua, there is a channel distance of approximately 13 km to the Gearagh pNHA. While the channel distance from the wind farm site to the pNHA is substantial (approximately 19 km), there is still a risk that contaminants generated on site during the construction and decommissioning phases could flow to the pNHA and possibly have adverse effects on water quality and aquatic life and bird life within the Gearagh system. Mitigation is therefore required to minimise this risk.

St. Gobnet's Wood pNHA – the northern part of the wind farm drains to the upper part of the Sullane River, which flows through the pNHA at Ballyvourney. While there is a channel distance of approximately 6 km from the wind farm site to the pNHA, there is still a risk that contaminants generated on site during the construction and/or decommissioning phase could flow to the pNHA and possibly have adverse effects on water quality of the river within pNHA. Also, the proposed temporary bridge crossing over the Sullane River at Ballyvourney is within 50 m of the SAC. Mitigation is therefore required to minimise this risk.

As four pNHAs have hydrological linkages to the site for the proposed wind farm project, the environmental quality of these pNHAs could be adversely affected should contaminants generated on site during the construction and/or decommissioning phases enter local watercourses and ultimately reach the pNHAs. The significance of the effects would be dependent on the magnitude and duration of any pollution event. Mitigation is therefore required to minimise this risk.

5.4.5 Impacts on Habitats, Vegetation and Flora

The construction of the proposed development will result in the following:

- permanent loss of habitat
- changes to existing habitats
- disturbance to habitat

5.4.5.1 Permanent loss of habitat

The permanent loss of habitat to facilitate the construction of the project is approximately 40.2 ha. The breakdown of the loss between the main habitats on site is shown in Table 5.12.

Table 5.12: Summary of the main habitats occurring at turbine and substation locations.

Main habitats occurring within wind farm footprint	Area (ha)
Wet heath (HH3) dominated by *Molinia caerulea*	8.89
Mosaic of Wet heath (HH3) and Blanket Bog (PB2)	2.93
Mosaic of Wet heath (HH3), Dry heath (HH1) & Outcropping rock (ER1)	13.46
Mosaic of Wet grassland (GS4) and Wet heath (HH3)	2.80
Remnant uncut High Bog (PB2)	0.17
Semi-improved acid grassland (GS3)	0.20
Improved / semi-improved agricultural grassland (GA1)	2.20
Conifer plantation (WD4)	8.70
Immature Conifer plantation (WD4)	0.85

Wet heath is the principal habitat that is affected by the wind farm construction, with a total loss of approximately 28 ha. This includes wet heath occurring in mosaic with dry heath, outcropping rock, blanket bog and wet grassland. As described, wet heath is the most frequent habitat on site, with a total resource estimated at 404 ha (including the other mentioned associated habitats). It is noted that a substantial part of the heath is dominated by *Molinia caerulea* and has low species diversity probably as a result of grazing pressure and/or burning in the past. The wet heath of highest quality is the component which occurs in mosaic with dry heath and outcropping rock (all Annex I listed habitats). The category wet heath and blanket bog has a low representation on site and only a small area is affected by the wind farm development (mainly at T11). Some of the wet heath occurs in association with wet grassland and this component is of relatively low quality due to grazing.

The effect of the loss of 28 ha of wet heath, which includes areas of dry heath, outcropping rock and blanket bog (all Annex I listed habitats), is considered Significant and of Permanent duration.

The effect of the loss of a very small area of uncut blanket bog at T3 location is considered, at most, a Slight effect as this bog is very much a remnant and is not considered active.

The effect by the losses of mature conifer plantation, immature conifer plantation, semi-improved acid grassland and improved/semi-improved agricultural grassland is considered

Not significant as these habitats have low intrinsic ecological interest and are not of conservation importance.

5.4.5.2 Changes to existing habitats

The proposed borrow pit to the north of T2 will involve the removal of 26.3 ha of wet heath dominated by *Molinia caerulea* and with low heather cover. Local peat banks suggests that this area was blanket bog in the past and that the wet heath present has developed since cutting. With mitigation, a heath type vegetation can be reinstated though the quality would not be expected to be the same as the original cover. The effect on habitats by the Development of a borrow pit at this location is considered as Moderate and Short-term in duration.

A second borrow pit is located within conifer plantation. As conifer plantation is a man-made habitat of non-native species, the effect by the loss of 6.5 ha is considered Not significant.

5.4.5.3 Disturbance to habitats

Areas adjoining the infrastructure will be disturbed due to the actual construction works, including the need for construction of a drainage system and for the insertion of the cable ducts. The zone of disturbance will vary, with an estimated average width of 2.75 m from the edge of the permanent built structures across the site.

As well as the area of the disturbance zone varying, the severity of the disturbance will also vary. In general, disturbed areas will naturally re-vegetate over 1-2 growing seasons though for sensitive habitats such as bog and heath the hydrology of the system would be disturbed.

The effect of disturbance on habitats is expected to range from Not significant (in areas of semi-improved / improved grassland) to Significant (in areas of wet heath / blanket bog). The duration of the effect is likely to be mostly Short-term (1-7 years) though for intact wet heath and bog this could be Long-term (15-60 years) due to the slow growth of peatland vegetation.

5.4.6 Potential Impact on terrestrial mammals, amphibians and reptiles

The effect on terrestrial mammal species by the loss and disturbance of habitats due to the proposed development is considered to be Not significant on the basis that the species involved are all widespread species of the countryside which occur in similar habitats in the immediate and wider environs.

Pre-construction survey will be required to determine possible badger presence before any felling of mature conifer plantation occurs. Should a sett be located, appropriate mitigation will be required.

The local otter populations associated with the Sullane River and the River Lee could be affected adversely if there was a water pollution incident that would affect their prey items (fish etc.). With appropriate mitigation to maintain water quality during the construction and operational phases of the proposed development (see CEMP, Hydrology chapter and Aquatic chapter), the risk to the otter population is minimised.

Construction activity may cause larger mammals such as the Irish hare and deer to remain in cover. However, this will be a localised and temporary effect (and not generally relevant to nocturnal mammal activity) and the effect is considered to be Not significant.

The common frog and common lizard populations would be affected by loss of habitat during the construction works and some individuals may be killed.

Mitigation is required for the common frog to minimise destruction of spawn, tadpoles and adult frogs during construction.

The significance of the effect on amphibian and reptile species within the site is rated as Slight.

5.4.7 Impact on bats

Since the 2019 bat activity surveys, the numbers of proposed turbines have been reduced and locations altered. A risk assessment of bats at each turbine location is based on interpreting data from static detectors based on similar habitat proportions and locations. The 2021 survey conducted static monitoring of three locations (turbines 11, 13 & 14) where it was felt proportional activity could not be interpreted from the existing data.

Common, Nathusius's and Soprano Pipistrelle alongside Leisler's bats are high risk species for wind farm collisions (Scottish National Heritage joint guidance document 2019), (Fiona Mathews, 2015), (Bat Conservation Ireland 2012). Northern Ireland Environmental Agency guidance document 2021 states that peaks of bat activity should be accounted for in addition to median levels to appropriately quantify risk. The report also noted the 'Leisler's bat, while fairly rare in Britain, is one of the commonest species found in Ireland.

5.4.7.1 Risk Assessment

A risk assessment has been completed for bats deemed at high risk to wind turbine collision; Leisler's bat, Common, Soprano and Nathusius's Pipistrelle with reference to **Table 5.13**; bats and onshore wind turbine report (2019).

5.4.7.1.1 Initial site risk assessment

An initial risk assessment is based on an assessment of habitats and the size of the development. Habitat suitability is ranked either low, moderate and high while project size is ranked from small, medium and large. Habitats surrounding the subject turbines have low potential roost features and based in upland peatland habitats with coniferous plantations thus ranked as Low. The project size is ranked as high given proposed turbine height is higher than 100 m. In addition, there are other wind developments within 5 km of the application site and a moderate number of proposed turbines (15). The Gortyrahilly Wind Farm thus derives an Initial Site Risk Assessment Value of *3; medium site risk*.

5.4.7.1.2 Overall risk assessment

The output from the initial site risk assessment is used in the below matrix to derive an overall risk assessment based on the activity level of high collision risk species. Both the highest peak of activity and median activity level was assessed by each turbine and an assessment was based off both results.

Note the overall risk assessment results in **Table 5.13** follow the precautionary principle and can be viewed as such. The overall risk assessment for Soprano Pipistrelle and Leisler's bat is moderate – high, while the overall collision risk for Common Pipistrelle is High.

Table 5.13: High Collision Risk Bats Overall Risk Assessment

Species	Initial risk assessment value	Low (1)	Low-moderate (2)	Moderate (3)	Moderate-high (4)	High (5)
Common Pipistrelle	Medium (3)	-	-	-	-	15
Soprano Pipistrelle		-	-	-	12	-
Nathusius's Pipistrelle		-	6	-	-	-
Leisler's bat		-	-	-	12	-

As per SNH guidance there is no requirement to complete an Overall Risk Assessment for low-risk species. During the surveys, *Myotis* spp., Lesser Horseshoe and Brown long-eared bat were recorded. Overall activity levels were low for the above species and no significant collision related effects are anticipated.

5.4.7.2 Potential Impacts on Bats Without Mitigation

5.4.7.2.1 Loss of commuting and foraging habitat.

Large scale construction projects have the potential to disrupt, degrade and result in the loss of commuting/foraging habitat for bat populations. Given the upland nature of the proposed works at Gortyrahilly, predominantly located within upland peatland habitats with coniferous plantations, there will be no significant loss of bat foraging/commuting habitat such as woodland edge associated with the wind farm development. The Gortyrahilly Wind Farm development has the potential to increase the quantity of linear features typically used by bats when grid connection and road corridors are created. No significant effects with regard to loss of commuting and foraging habitat are likely to occur from the proposed development.

5.4.7.2.2 Loss or disruption to bat roosts

The proposed development is predominantly situated within upland heath and peatland habitats alongside conifer plantations. These habitats provide low quality potential roost features for bats. Two bat roosts were recorded during the various surveys, both located to the north of the subject site. These buildings and associated linear features will remain unaffected by the proposed development. There will be no loss of tree roosting potential. The installation of the grid connection along existing roads and tracks will not impact bats. It is noted that the project does not have any impact on bridges.

It is considered that no significant effects with regard to loss or damage to roosts are likely to occur from the proposed development.

5.4.7.2.3 Displacement of local bat populations

The main habitats within the proposed Gortyrahilly Wind Farm site outline (excluding the grid connection) consists of peatland and conifer plantation. It is expected the development will result in an increase in linear features suitable for bat activity by creating additional conifer plantation edge features. The proposed development will not result in a loss of potential roost habitats thus no significant displacement of individuals or populations is anticipated.

5.4.7.2.4 Lighting

In general, artificial light creates a barrier to bats so lighting should be avoided where possible. Construction operations within the wind farm site will take place during the hours of daylight where possible to minimise disturbances to faunal species at night. Where lighting is required to facilitate works during periods of darkness, directional lighting (i.e. lighting which only shines on work areas and not nearby countryside) will be used to prevent overspill. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only (Bennett A.M., 2014).

While the project will require a number of aircraft warning lights on outlying turbines, research conducted by Bennett (Bennett A.M., 2014) shows the red lights typically fixed at the top of turbines do not result in an increase in bat fatalities.

5.4.8 Impact on Kerry slug

The development of the wind farm could potentially impact on the local population of Kerry Slug due to loss and disturbance of suitable habitat. Based on the likely extent of habitat loss (see terrestrial habitats section) throughout the wind farm site, this impact is likely to be minor and localised as only a small proportion of suitable Kerry Slug habitat (primarily the mosaic of heath and outcropping rock) within the site will be impacted. It is noted that the species is known to populate extensive areas of this type of habitat throughout the wider landscape and has a favourable conservation status across its range (NPWS 2019). However, during construction, works could also result in the death of individual Kerry Slugs due to machinery movements in areas of suitable habitat. Mitigation is required to minimise potential loss of individual slugs.

5.4.9 Decommissioning Phase Potential Effects

By the time of the decommissioning of the proposed wind farm project, it is expected that near full recovery of bog and heath vegetation will have taken place around the wind farm infrastructure and that hydrology in adjoining peatland areas will have stabilised to some extent. Should the decommissioning phase of the proposed wind farm project involve removal of hard core material from the turbine bases, hard stands and other infrastructure, this will cause disturbance to areas of heath and bog (Annex I listed habitat) which occur adjacent to the built infrastructure.

Should decommissioning require importation of soil/peat, there would be a risk of introducing alien species to the site.

Run-off from disturbed and bare peat/soil surfaces would be a potential issue to local water quality. This could have effects on aquatic life, including otter populations, of local rivers downstream of the site. Designated sites which are linked hydrologically to the wind farm site (as discussed in this report) could be impacted upon, with potential for adverse effects on Qualifying Interests and Special Conservation Interests.

Mitigation, as used in the main construction phase, will be required to minimise the above identified potential effects on habitats and water quality.

Construction machinery used in the decommissioning process could result in the death of individual Kerry Slugs due to machinery movements in areas of suitable habitat. Mitigation, as used in the main construction phase, is required to minimise potential loss of individual slugs.

5.4.10 Cumulative Impacts

There are 32 wind farms within a 20 km radius of the Development (an area of 1,256 km^2). **Appendix 2.3 of Chapter 2** shows the locations and details of proposed, permitted and operational wind farms within a 20 km radius of the proposed turbines. Of the 32, 21 No. are operational (182 turbines total), 9 No. are permitted (49 turbines) and 2 No. are proposed (23 turbines).

The closest wind farms to the Site are Derragh (189 m to south) and Cleanrath (3.05 km to southeast). Most of the turbines are clustered to the west and north of the Site.

The Development will add a further 14 turbines to the total of 279 turbines. Based on the locations of the 32 wind farms (**Figure 5.16**) it is expected that most are on heath and/or bog habitats and the construction of such projects would have (or will) caused loss and disturbance of peatland habitats. While the proposed wind farm project at Gortyrahilly will contribute to further loss of peatland habitats, the significance of this may be low due to the frequency of heath and, to a lesser extent, bog habitats in the southwest region of Ireland. A detailed inventory of planned and permitted projects within a 3 km radius of the site for the Gortyrahilly wind farm and 50 m either side of the grid connection route has been compiled (see **Appendix 2.5, Chapter 2**). There are mostly domestic scale developments or agricultural related developments (e.g., slatted sheds), and no potential pathways to European sites are identified. Potentially relevant projects which have received planning permission are:

Planning Ref. 194732 - Retention of a meteorological mast for a temporary period of 5 years, located in the townland of Gortyrahilly and approximately 5 km west of Renanirree village. This consists of a 80 m high lattice mast and associated guy wires. Permission granted by Cork County Council 17/05/2019.

Planning Ref. 184184 – A battery energy storage facility and associated works. Facility connects into the adjoining Ballyvouskill ESB substation via underground cable. Permission granted by Cork County Council 23/11/2018.

Planning Ref. 185686 – A battery energy storage facility and associated works. Permission granted by Cork County Council 10/01/2019.

All of the wind farm and other projects will have been, or will be in due course, assessed by the competent authority for potential adverse effects on relevant European sites. The proposed Development, with mitigation in place, will not have adverse effects on the integrity of any designated site (European or National) and therefore there is no pathway for it to act in-combination with other plans and projects to give rise to cumulative effects.

At a local level, the habitats in parts of the Gortyrahilly site have been degraded from grazing and by afforestation. The construction of the proposed wind farm will contribute to an existing and ongoing adverse effect on the peatland resource of the site.

Table 5.14: Wind Farms within 20 km of the Proposed Gortyrahilly project

Wind Farm	Status	No. of Turbines	Approximate Distance to the Site Boundary	Direction from the Development
Barnadivane	Operational	14	17.96km	South East
Barnastooka	Operational	14	6.5km	West
Barrboy	Permitted	5	16.09km	South West
Caherdowney	Operational	4	11.15km	North East
Carriganimmy Macroom (Bawnmore)	Operational	6	14.11km	North East
Cleanrath	Operational	9	3.05km	South East
Clydaghroe, Clonkeen	Operational	4	8.77km	North East
Coolea	Permitted	1	5.02km	North West
Coolknoohil Inchee	Permitted	2	4.3km	North West

Wind Farm	Status	No. of Turbines	Approximate Distance to the Site Boundary	Direction from the Development
Coolknoohil Kilgarvan (Everwind)	Operational	11	3.5km	North West
Coomacheo	Operational	15	11.74km	North East
Coomagearlahy Kilgarvan	Operational	15	5.91km	North West
Cummeennabuddoge	Pre-Planning	17	8.03km	North East
Cummeennabuddoge, Clydaghroe, Cloonkeen	Operational	2	9.55km	North East
Curraglass	Permitted	7	8.62km	South West
Derragh	Operational	6	189m	South
Derreenacrinnig	Permitted	7	18.51km	South West
Drishane Millstreet (Curragh Mountain/Coomacheo 2)	Operational	8	11.82km	North East
Dromleena	Permitted	9	17.66km	South
Garranereagh	Operational	4	19.33km	South East
Glanlee I (Midas)	Operational	6	6.4km	North West
Gneeves	Operational	11	11.68km	North East
Gneeves Milstreet	Permitted	7	11.81km	North East
Gortnakilla, Clonkeen Killarney	Permitted	4	6.76km	North West
Grousemount	Operational	24	4.50km	West
Inchamore	Pre-Planning	6	4.7km	North-West
Inchee, Poulbatha & Foilgreana (Midas	Operational	6	5.44km	North West
Inchincoosh Kilgarvan	Operational	6	8.12km	North West
Knocknamork	Permitted	7	7.28km	North East
Rosseightragh, Lettercannon, Kilgarvan	Operational	7	7.56km	North West
Shehy More	Operational	11	8.31km	South
Sillahertane Kilgarvan	Operational	10	3.89km	East

5.5 MITIGATION MEASURES

5.5.1 Designated sites

The present report has identified pathways between the site of the proposed wind farm project and four European sites and four proposed Natural Heritage Areas. The pathways are via the River Clydagh, River Lee and the Sullane River.

In the absence of mitigation, there is a risk that contaminants generated on site during the construction phase could enter local watercourses and ultimately flow to the designated sites where there could be resultant adverse effects on water quality and aquatic life and relevant qualifying interests within the sites. Mitigation is therefore required to minimise this risk.

The mitigation proposed to maintain water quality in the watercourses which drain the site (as detailed in the CEMP, the Hydrology and Hydrogeology chapter and the Aquatic chapter) will ensure that the quality of the water entering the relevant designated sites is not affected. With such mitigation in place and rigorously enforced, it can be concluded that there would not be any significant effects on the qualifying interests of the identified designated sites as a result of the proposed wind farm project.

5.5.2 Habitats

Mitigation for Habitat Loss

The project will result in the permanent loss of an estimated 40.2 ha of habitat on site. Of this figure, 28 ha comprises various types of heath habitats and communities and is of conservation importance (both wet heath and dry heath are Annex I listed habitats). This loss will be mitigated through a Habitat Enhancement Plan (HEP). The HEP is presented in **Appendix 5.5**. The primary objective is to enhance some unplanted high bog and to rehabilitate areas of wet and dry heath which had been planted to varying degrees or where self-seeded conifers are established. A secondary objective of the HEMP is to create a corridor through forestry which will connect areas of open bog/heath. The total area of the HEP is 9.5 ha.

Mitigation for Disturbance

The construction works will in places cause substantial disturbance to adjoining peatland habitats outside the actual built infrastructure. This will come about by the need for an area to facilitate the works and by the insertion of drains and water pollution control measures (silt ponds etc). To minimise disturbance and to ensure good recovery, as well as to minimise areas of bare peat which would be prone to erosion, a programme of ongoing

monitoring and rehabilitation will be followed during construction phase. Monitoring and rehabilitation of the following peatland categories (see **Figure 5.1**) will take place: (i) mosaic of wet heath, dry heath and outcropping rock, (ii) mosaic of wet heath and blanket bog, and (iii) wet heath dominated by *Molinia caerulea*.

Mitigation for *Filago minima*

As noted, the legally protected species *Filago minima* (Least cudweed) was recorded growing at two locations along a forest track where the grid connection cable will pass. While a protected species with a limited national distribution, this species has been recorded more widely in recent years and especially along tracks in commercial forest plantations.

As further spread of this species can be anticipated in the area where it was recorded at Derryreagh in January 2022 (and possibly at other locations along the sections of the cable route which pass through forestry), a pre-construction survey will take place to map its distribution along tracks in the summer before construction commences.

The areas where the plant occurs will be avoided by the trench excavations and all works in such areas will be supervised by an ecologist with experience in rare plants.

Should the plant occur across an entire width of track, a licence will by sought from NPWS to remove the plants from the required work area and to transplant to a suitable location elsewhere. The application for a licence will be supported by a Management Plan for the species compiled by an ecologist with experience of rare plants and plant translocation schemes.

5.5.3 Badgers

Whilst no signs of badger presence were found on site during the baseline surveys in 2021, their presence within the afforested areas of the site is possible. As required under the Wildlife Acts, mitigation is required to ensure that active setts are not disturbed. Owing to the difficulty of surveying for badgers within closed canopy conifer forest, the following approach will be followed:

Survey for presence of badgers will be carried out at the time of the tree felling operations. This will be by an ecologist with experience of badger survey and working in association with the tree felling contractor. Survey for badger is preferably carried out in the period October to March when vegetation cover is low.

Before any felling commences, the ecologist will survey marginal areas around the plantation for signs of badger presence. Also, any accessible areas within the plantation, such as unplanted gaps, will be searched for signs. Once felling commences, the ecologist will monitor the progression of the works as the required areas are cleared.

Should there be any evidence of a badger sett, all work will cease immediately and a buffer zone will be established where felling works will be restricted. Mitigation will be implemented as considered necessary. This would include application to NPWS for permission to close a sett that could be disturbed by the works. Note that since closure of active setts is prohibited during the badger breeding season (December to June inclusive), scheduling of the tree felling process is important to avoid delays.

5.5.4 Otter

Otters are not expected to occur on site but are present within the river systems to which the site drains.

The mitigation proposed to maintain water quality in the aquatic zones (as detailed in the Hydrology and Hydrogeology chapter, the Aquatic chapter and the CEMP) will ensure that the food supplies for otters are not affected.

5.5.5 Common frog

Areas where construction works are due to commence during the period February to August will be checked by the ECoW for the presence of frog spawn, tadpoles and adult frogs. If present, these will be removed under licence from NPWS and transferred to suitable ponds, drains or wetlands in the vicinity.

5.5.6 Bats

5.5.6.1 Buffer

Bats typically use woodland edge habitats for commuting and feeding purposes. Areas of conifer plantation will be felled in order to discourage bat species from flying close to turbines. Various publications provide guidelines on buffer zones surrounding turbines to reduce the favourability of the site for bat activity. Eurobats 'Guidelines for consideration of bats in wind farm projects' (Rodrigues, et al., 2015) recommend buffer zones of 200 m from turbine base to high potential features, whilst Natural England Bats (England, 2014) recommend 50 m buffers from blade tip to tree. Northern Ireland Environmental Agency (NIEA, 2021) recommends a minimum buffer of 100 m between the turbines at the edge of commercial forestry where wind farms are proposed to be key-holed. Based on the most

up-to date guidance it is proposed to create buffers of 100 m from blade tip to forestry edge for turbines 3, 4, 5 and 10 as these are based within conifer plantation. In other areas treelines and conifer edges will be cut back to a distance of 65 m from blade tip to top of tree (max height of tree at full growth).

The following formula sourced from Natural England's windfarm guidance document (England, 2014) is used to calculate the distance required from the turbine base.

$(65 + bl)^2 – (hh – fh)^2$

Where: bl = blade length, hh = hub height, fh = feature height (all in metres).

Thus turbines 3, 4, 5 and 10 should have a clearing of 152 m.

All other turbines require a setback of 110 m from woodland, treeline, scrub or hedge.

Key-holed wind turbine locations will be cleared of all vegetation. It is important that conifers are not cut and left in situ; appearing like typical recently cut plantation. This habitat type quickly succeeds to scrub, a favourable habitat feature for feeding bats. Instead, land will be cleared and replaced with a low, maintained sward of grassland (mowed once or twice each year) or maintained as bare ground with a hardcore surface for the lifetime of the project.

5.5.6.1.1 Vegetation removal

An ecologist/ECoW will supervise areas where vegetation, scrub and hedgerow removal will occur prior to and during construction.

5.5.6.1.2 Other measures for bats

During construction, relevant guidelines for bats will be implemented as appropriate (e.g. NRA guidelines).

- Where possible construction will take place during daylight hours in order to minimise light disturbance on bats. Should fixed lighting be required these will consist of LED luminaires using warm white colours < than 2700 Kelvins. Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats. Lighting will be directional and avoid lighting key features suitable for bat activity such as treelines or woodland edge. Some works along the cable route and wind farm site

may occur at night but the project ecologist/ECoW shall limit night-time works to sections of the route / site which avoid sensitive features (e.g., mature treelines).

- No upgrade works are proposed on bridges or culverts as part of the proposed works. Should any required works be identified in the future, the bridge shall require a pre-construction survey to assess if a bat roost is present. As necessary, any measures carried out to mitigate the potential impact to bats must be conducted under the terms of an appropriate NPWS wildlife derogation licence.
- All mature broadleaf trees within the site were assessed for their potential to host bat roosts. Two ash trees were noted with potential. These trees however will remain unaffected by the proposed development. Given potential roost features (prf) can develop over time all mature broadleaves that may be affected by the development (felled or trimmed) will be reassessed prior to commencement of felling works. The assessment should consist of a Preliminary Ground Level Roost Assessment carried out between November and March followed by an at height full potential roost feature survey on trees with roost potential. Tree-felling will ideally be undertaken in the period late August to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken. A secondary period of tree felling can be undertaken in February. If bats or a bat roost is present then the NPWS must be contacted and a derogation licence received before the commencement of felling. As part of any derogation licence application an impact assessment, mitigation measures and schedule will be required. Felling will be delayed until the bats have gone or been removed.

5.5.6.2 Bats – Operation Phase Mitigation

5.5.6.2.1 Feathering of Blades

All turbines will enact a feathering protocol when wind speeds are below the cut-in speed of the turbine. Feathering entails pitching turbine blades at 90 degrees or parallel to the wind to reduce their rotation speed while idling to below two revolutions per minute.

5.5.6.2.2 Curtailment

Curtailment refers to the practice of increasing the cut-in speed of wind turbines and feathering the blades to reduce their operation during periods of high bat activity. The typical manufacturer's set cut-in speed is between 3.0 and 4.0 m/s (NatureScot, Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation, 2021).

Increasing the cut-in speed above that set by the manufacturer can reduce the potential for bat/turbine collisions. A study by Arnett *et al*., (2011) showed a 50% decrease in bat fatality can be achieved by increasing the cut-in speed by 1.5 m/s.

(Richardson, 2021) demonstrates Common Pipistrelle has higher activity after construction of wind farms. As such it is proposed to implement the following curtailment from year 1 of the wind farm operation:

- At turbines where high bat activity was recorded during the baseline surveys in 2019 and 2021 (namely T1, T3, T6, T8, T9, T10, T11, T12 & T13), and as updated in pre-construction surveys, cut-in speeds will be increased during the bat activity season (April-October) where temperatures are optimal for bat activity (above 11 degrees) to 5 m/s from 30 minutes prior to sunset to 30 minutes after sunrise at all turbines within the site (Betts, 2020).
- It is noted that it is possible to refine the wind farm's curtailment program to an individual turbine level, allowing turbines of lower collision risk to operate when higher risk turbines are curtailed. Should the operator want to move to this more sophisticated solution, a regime can be implemented on certain times and dates, corresponding with those periods when the highest level of bat activity is expected to occur. In order for this to be achieved a static monitoring program should be completed at each turbine location linking real time bat activity with real time weather data (based from within the wind farm).

5.5.7 Kerry Slug

The following measures will be implemented for Kerry Slug:

- Areas of suitable habitat that occur outside of the footprint of the development will be avoided during the course of construction thereby minimising the loss and disturbance of Kerry Slug habitat.
- Immediately prior to undertaking works in areas of suitable habitat (wet heath / blanket bog / rock outcrop), the project ecologist will check for the presence of Kerry Slug. Should slugs be discovered, then they will be transferred to suitable habitat in the surroundings. Similar on-going monitoring of suitable habitat within works areas will continue throughout the construction phase. Such monitoring will be undertaken during periods of wet weather when slugs are most active and feeding on the surface and therefore at greater risk of impacts by movement of machinery. The transfer of Kerry Slugs will be subject to a derogation licence from the Department of Housing, Local Government and Heritage (which has been applied for at time of writing).

Subject to the above mitigation being implemented it is concluded that impacts of significance on the conservation status of Kerry Slug will not arise. i.e., the effect of the proposed development on Kerry Slug would not be Significant.

5.6 RESIDUAL EFFECTS OF THE DEVELOPMENT

With mitigation measures as presented implemented in full, and specifically preservation of water quality in local watercourses, it is considered that the significance of the effect of the predicted impact on designated sites as a result of the proposed wind farm project will be 'Not Significant'.

With mitigation measures as presented implemented in full, and with the implementation of the Habitat Enhancement Plan, it is considered that the significance of the predicted effect on habitats as a result of the proposed wind farm development can be reduced to a Moderate residual long-term negative effect.

With mitigation measures as presented implemented in full, including preservation of water quality in local watercourses, it is considered that the significance of the predicted impact on terrestrial mammal species as a result of the proposed wind farm development will be Not significant.

As long as the mitigation measures presented are implemented in full, the impact of the proposed development on local bat populations is considered to be a Slight to Imperceptible residual negative effect. The conservation status of each of the local bat species will remain unaffected.

With mitigation measures as presented implemented in full, it is considered that the significance of the predicted impact on the Kerry Slug population as a result of the proposed wind farm development will be Not significant.

5.7 PROPOSED BIODIVERSITY ENHANCEMENT

The Habitat Enhancement Plan is presented in **Appendix 5.5**. The Plan will restore and enhance an area of bog and heath habitats that has been degraded by afforestation. This will provide mitigation for the loss of heath habitats on site as a result of wind farm construction. The total area of the HEP is 9.5 ha.

The objectives of the Plan are as follows:

Objectives - primary

- To enhance existing area of blanket bog (Annex I habitat)
- To enhance and extend areas of wet heath, dry heath and siliceous rock (all Annex I habitats)

Objectives - secondary

- To enhance existing habitats for peatland associated species such as Red Grouse, Meadow Pipit and Kerry Slug.
- To create an open corridor for wildlife through established forest connecting bog/heath to north and south.

The objectives for the Plan are achievable as similar work has been carried out successfully at other afforested sites throughout Ireland, e.g., Castlepook Wind Farm in Co. Cork. The Plan will be underwritten by a detailed monitoring programme, which will allow modifications to ensure that the objectives are being achieved.

5.8 PRE-CONSTRUCTION AND CONSTRUCTION PHASE MONITORING

On-going monitoring during construction

An Ecological Clerk of Works (ECoW) will be on site for the duration of the construction phase and will support the role of the site Environmental Manager. As required, a consultant ecologist with expertise in peatland habitats will assist the ECoW and Environmental Manager. The consultant ecologist will be employed by the client and will be independent of the Contractor.

As ground excavations are opened up, the ECoW will walk the work corridor with a surveyor and within sensitive peatland areas will mark out (with range poles or equivalent) the extremities of the required work area. This will identify the limit of the work area and will prevent unnecessary incursions by the Contractor onto adjoining intact heath or bog.

Re-vegetation of bare surfaces

An ecological objective is to minimise the area of exposed peat surface and to encourage re-vegetation. This will be achieved by the removal and subsequent reuse of the vegetated heath and bog surface (cut out as sods or 'turves') within the work footprint. A two-pronged approach will be followed involving (i) the immediate re-use along road margins, and (ii) the longer-term use around turbine and hardstand margins (this involves storage).

Both approaches are on the basis that the areas of heath and bog have a minimum peat depth of c.20-30 cm, which represents the acrotelm (or living layer) of the bog/heath system. The method involves the removal of the surface layer in sods or 'turves' by a dumper/digger with bucket. Care will be taken to keep the turve as intact as possible and the vegetated side upwards (as far as is feasible).

For the use of the turves on the side casting and marginal strips of the new roads, the procedure will be that the contractor will dig out the surface peat turves and place these immediately on the side-casting and marginal strips in the preceding section (250 – 500 m length) that had been constructed. These will later be bedded in using the bucket of a digger. This approach will provide almost immediate cover of the bare surfaces.

Turves to be used for re-vegetation of areas at the turbines / hardstands will be dug out as above and transported to pre-identified storage areas. The storage areas will be:

(i) located in areas of the site that is not existing heath or bog habitat,

(ii) in parts of the site where disturbance at a later date will not occur.

The turves will be off-loaded from a trailer and placed side by side and vegetation side upwards. They will be placed in single layers, i.e., not piled on top of each other. Should storage be for prolonged periods (months), the turves may need to be watered during dry spells. When ready for placement at turbine/hardstand locations, or in areas where substantial bare surfaces occur due to the works, they will be lifted with a dumper and bucket and taken to their destination. Here they will be off-loaded and laid vegetation side up. Should enough turves be available, they will be packed close together. Otherwise, they can be laid across the bare surface to cover the required area. The turves will be bedded in with the bucket of a dumper.

All of the above will be supervised by the Environmental Manager and will be inspected by the project ecologist at regular intervals during the works.

The above process will be followed at the borrow pit north of T3. The surface here will be striped and the turves stored until the pit is ready for reinstatement. As above, the turves will not be stored on areas of existing heath or bog vegetation. The reinstatement on a peat layer will be monitored by the EcoW and the project ecologist, as required.

Pre-construction bat survey

It is recommended that if three years lapse from between planning-stage surveys in 2019 and installation of the wind turbines, it will be necessary to repeat one full season of surveys during the activity period (EUROBATS, 2014). Future survey work should be completed according to best practice guidelines available. The most current guidance documents for Irish wind farms are from NatureScot (NatureScot, 2021) and Northern Ireland Environment Agency (NIEA, 2021).

Pre-construction badger survey

As it is expected that more than 2 years will have passed since the 2021 baseline survey before construction commences, all work areas will be subject to a pre-construction survey for badger. This survey will give particular focus to the afforested part of site where badger is most likely to occur.

5.9 POST-CONSTRUCTION MONITORING

5.9.1 Habitats

At the end of construction (i.e., when all ground works are complete), a survey on the wind farm site will take place by a qualified ecologist. The extent of bare or disturbed areas will be recorded and a monitoring programme will be set up for vegetation recovery.

Monitoring will be by the use of permanent quadrats – details will be worked out by the ecologist at the time but it is likely that quadrats will be 2 m x 2 m in size and will be geo-referenced and photographed.

Vegetation recovery will be monitored over a period as follows: Years 1, 2, 3, 5, 7, 10, 15, 20.

Particular attention will be given areas of blanket bog and wet heath where vegetation has been disturbed during construction. If significant erosion-related problems are detected, corrective actions will be taken as necessary. Depending on extent and location of the problem areas, such actions could include sodding of bare patches with turves taken from elsewhere (not from a site of conservation interest) or reseeding with suitably sourced seed appropriate for the Site.

An annual report will be prepared for each year of monitoring.

5.9.2 Bat monitoring

The following monitoring programme will take place to establish bat activity within the operational wind farm and the number of bat collision fatalities at each turbine.

- The static survey should be completed during the spring, summer and autumn of each year for a minimum of three years commencing from Year 1 of the operational phase of the wind farm. This will comprise collection of bat activity, fatality and site-specific weather data in each of the three seasons. Each of the turbines will be monitored using trained search dogs.
- The collision monitoring program will require site-specific data on seasonal scavenger removal rates and on the efficiency of detection of animal carcasses by the dogs used for bat searching.
- Modelling / calculation of the level of bat fatality likely to occur over the active season based on the results of the work.
- The production of an annual report detailing the approach to, results and conclusions of the work. Statistical analysis of the relationship between weather and fatality levels will be included. The report will be issued to Cork County Council.

5.10 SUMMARY OF SIGNIFICANT RESIDUAL EFFECTS

From the perspective of terrestrial ecology, the principal residual effect as a result of the proposed wind farm project is the loss of 28 ha of wet heath habitat, which includes areas of dry heath, outcropping silicious rock and some blanket bog (all Annex I listed habitats) – this adverse effect is considered Significant and of Long-term duration. With implementation of mitigation as described in this report, including the implementation of the Habitat Enhancement Plan, the significance can be reduced to a Moderate Effect.

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