

7 ORNITHOLOGY

7.1 INTRODUCTION

This Chapter considers the potential effects of the proposed Development (**Figure 1.2**) on ornithology. It details the methods used to establish the bird species and populations present, together with the process used to determine their Nature Conservation Importance. The ways in which birds might be affected (directly or indirectly) by the construction and operation of the proposed Development are explained and an assessment is made with regards the significance of these effects.

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 7.1 - VP Summer 2017 - Survey Details**
- **Appendix 7.2 - VP Winter 2017/2018 - Survey Details**
- **Appendix 7.3 - Bird Survey VP Flight Line Data, 2017-2018**
- **Appendix 7.4 - VP Summer 2018 - Survey Details**
- **Appendix 7.5 - VP Winter 2018/2019 - Survey Details**
- **Appendix 7.6 - Bird Survey VP Flight Line Data, 2018-2019**
- **Appendix 7.7 - Additional Bird Survey Data, 2018 - 2019**
- **Appendix 7.8 - VP Winter 2020/21 - Survey Details**
- **Appendix 7.9 - VP Summer 2020 - Survey Details**
- **Appendix 7.10 - Bird Survey VP Flight Line Data, 2020/21**
- **Appendix 7.11 - Hinterland Survey Data, Summer 2020**
- **Appendix 7.12 - VP Summer 2021 - Survey Details**
- **Appendix 7.13 - Bird Survey VP Flight Line Data, Summer 2021**
- **Appendix 7.14 - Hinterland Survey Data, Summer 2021**
- **Appendix 7.15 - Vantage Point Flight Lines for Surveys 2017 - 2021**

- **Appendix 7.16 - List of Birds Recorded within Gortyrhilly site during Surveys 2017-2021**
- **Appendix 7.17 - Collision Risk Modelling Report, July 2022**
- **Appendix 7.18 - First Year Ornithological Surveys – Inchamore/Gortyrhilly Wind Farm Summer 2017 and Winter 2017 / 18. Prepared by Fehily Timoney & Company**
- **Appendix 7.19 - Second Year of Ornithological Surveys – Inchamore/Gortyrhilly Wind Farm Summer 2018 and Winter 2018 / 19. Prepared by Fehily Timoney & Company**

An Outline Construction and Environmental Management Plan (CEMP) is appended to the EIAR in **Appendix 2.1**. The CEMP includes an emergency spillage plan, a peat and spoil management plan, a surface water management plan, a traffic management plan and a waste management plan. The CEMP will include all of the mitigation recommended within the EIAR. A summary of the mitigation measures is included in **Appendix 17.1**.

7.1.1 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.

7.1.2 Details of the Proposed Development

Planning Permission is being sought by the Developer for the construction of 14 wind turbines, permanent met mast, on-site substation and all ancillary works and the construction of an underground grid connection to Ballyvouskill, Co. Cork.

A 10-year planning permission and 35-year operational life from the date of commissioning of the entire Development is being sought. The planning permission will include for a 35-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 Development.

7.1.3 Purpose of the Chapter

To include a clear statement of the purpose of the report, e.g. (delete/amend as appropriate):

- To describe the baseline data collection and assessment methods used;
- To summarise the baseline ecological conditions;
- To identify and describe all potentially significant ecological effects associated with the proposed development;
- To set out the design, mitigation and compensation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- To identify how mitigation and compensation measures will/could be delivered;
- To provide an assessment of the significance of any residual effects in relation to the effects on biodiversity and the legal and policy implications;
- To identify appropriate enhancement measures and how these will/could be delivered; and
- To set out the requirements for post-construction monitoring.

7.1.4 Project Team

The chapter has been prepared by Dr Brian Madden of BioSphere Environmental Services. The baseline ornithology surveys between 2017 and 2020 were carried out by Fehily Timoney ecologists. Baseline surveys in April and May 2021 were carried out by BioSphere Environmental Services.

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). Since then, he has carried out botanical surveys and habitat assessments for most terrestrial habitats which occur on the island of Ireland. Brian is an experienced ornithologist, with particular interests in birds of prey and wetland birds. Brian is the principal ecologist with BioSphere Environmental Services. The consultancy specialises in energy related developments, including wind farms, solar farms, overhead power lines and substations.

Joe Adamson B.Sc., M.Sc., MCIEEM is a consultant senior ornithologist with BioSphere Environmental Services. He is highly experienced, having worked in the field of ornithology and ecology since 1988 and has extensive knowledge of Irish birds and their habitats. Joe has been involved in baseline bird surveys on the Bord na Móna cutaway bogs since 2014 and carries out winter and summer bird surveys. Joe carried out baseline ornithological surveys for the project.

Aidan Duggan has more than 30 years of bird surveying experience in Ireland and abroad and is an active member of the Cork branch of Birdwatch Ireland. Aidan has worked on a variety of projects throughout Ireland and is proficient in Vantage Point surveys, Transect Surveys, Hinterland surveys, Merlin surveys and Red grouse surveys. Clients include Fehily Timoney & Co. Consultants, BioSphere Environmental Services, and Kelleher Ecology Services. Aidan carried out baseline ornithological surveys for the project.

7.2 METHODS

7.2.1 Study area

The principal study area was the actual site for the Development (as shown in **Figure 7.1**). However, this extended to a distance of approximately 10 km from the Site Boundary for the hinterland surveys.

The study area for the assessment of collision risk is the 'flight activity survey area' or 'FASA' which refers to a polygon around the outermost turbines plus an additional 500 m strip around that polygon.

7.2.2 Field Surveys

Baseline field surveys reported here were carried out between April 2017 and June 2021. A detailed methodology for all surveys is provided in **Appendices 7.18 & 7.19**, and is briefly summarised here. The surveys carried out comprised the following:

- Flight Activity (Vantage Point) Surveys
- Breeding Moorland Survey;
- Breeding & Winter Bird Transect Survey;
- Hinterland Survey;
- Merlin Survey
- Red grouse Survey

Flight activity (vantage point) surveys

Flight activity surveys were carried out by Fehily Timoney & Company over a 24 month period from April 2017 to March 2019 following the methods described in NatureScot (formerly SNH guidelines ¹). The locations of the vantage points used from April 2017 to March 2019 are given in **Table 7.1**, with viewsheds shown in **Figure 7.1**.

Table 7.1: Grid References for VP locations used from April 2017 to March 2019 at the proposed Gortyrhilly Wind Farm

Vantage Point	Location (ITM)
VP6	518270 572901
VP7	515686 572534
VP8	515184 574573
VP9	516014 570969

Further Vantage Point surveys were carried out at the proposed Development site over an eight month period from May 2020 to May 2021. The vantage point locations used during this survey period were different as the Development boundary had been changed. The locations for the vantage points for May 2020 to May 2021 are given in **Table 7.2**, with viewsheds shown in **Figure 7.2**.

Table 7.2: Grid References for VP locations used from May 2020 to May 2021 at the proposed Gortyrhilly Wind Farm.

Vantage Point	Easting, Northing (ITM)
VP5	513621, 570521
VP6	517630, 571373
VP7	515742, 572699
VP8	516454, 571749

The vantage points were chosen to cover a specific viewshed of the proposed development site.

The main purposes of vantage point survey watches are to collect data on *target species* that will enable estimates to be made of:

- a. The time spent flying over the defined survey area;
- b. The relative use of different parts of the defined survey area; and

¹ Scottish Natural Heritage (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2*, March 2017.

- c. The proportion of flying time spent within the upper and lower height limits as determined by the rotor diameter and rotor hub height.

In line with recommended best practice (Scottish Natural Heritage 2017, Band *et al.* 2007²), viewshed analysis was undertaken using ARCMAP 10.3, to calculate a theoretical zone of visibility from each vantage point.

Following Scottish Natural Heritage guidance, watches were conducted to sample diurnal, crepuscular and nocturnal activity of target species. The method of observing was via constant search effort mostly through binoculars and/or a telescope.

Data recorded included flight activity of target species (flight height, duration, directionality) in addition to metrics such as flock size and time of observation. Flight activity was annotated onto field maps.

As per Scottish Natural Heritage guidance (2017) thirty-six hours of vantage point effort was carried out at each vantage point during each winter period and each breeding period from April 2017 to March 2019 inclusive. The watches generally comprised 2 x 3 hour sessions at each VP every month. The proportion of survey time that activity was recorded inside and outside the Site Boundary was used as part of the overall analysis and assessment of target species usage of the study area. Surveys were conducted during suitable weather conditions and a proportion of surveys spanned dawn and dusk periods.

Breeding Moorland Surveys

Survey transects to assess the presence of moorland breeding bird species were completed in 2017 (May-July), 2018 (May-June) and 2021 (April-May). Breeding birds were surveyed using methodology of the breeding wader survey and breeding moorland survey, following Bibby *et al.* (2000)³ and Gilbert *et al.* (1998)⁴. Four transects, of approximately 1 km each, were used within the site (see **Figure 7.3**).

All species encountered (seen or heard) on the transect were recorded and their abundance noted. Survey details are given in **Appendices 7.18 & 7.19**.

² Band, W., Madders, M. and Whitfield, D.P. (2007). *Developing field and analytical methods to assess avian collision risk at wind farms*. In: *Birds and wind power: risk assessment and mitigation*. M. De Lucas, G.F.E. Janss and M. Ferrer, Eds.: 259-275. Quercus, Madrid.

³ Bibby, C. J., Burgess, N. D., Hill, D. A. & Mustoe, S. H. (2000). *Bird census techniques (second edition)*. Academic Press, London.

⁴ Gilbert, G., Gibbons, D.W. & Evans, J., 1998. *Bird Monitoring Methods – a manual of techniques for key UK species*. RSPB, Sandy.

Hinterland Surveys

Hinterland surveys were undertaken to establish populations of target species that could potentially cross the Site whilst moving to and from roosting and feeding grounds. Survey following methodology followed that of Bibby *et al.* (2000). The surveys were carried out in suitable wetland habitats over a distance of approximately 10km radius from the site. Surveys were carried out from October 2017 to March 2018, from April 2018 to March 2019, and from May 2020 to May 2021. The sites surveyed are listed below, with locations of sites shown in **Figure 7.4**.

- Lough Nabuddoga
- Inchigeelagh
- Grousemount
- Gearagh
- Lough Allua
- Sillahertane Windfarm entrance
- Lee Valley
- Ballyvourney North
- Ballyvourney South
- Gortyrhilly
- Gougane Barra
- Kilgarvan North
- Roughty River
- Toon Valley/Killeens

Hinterland I-WeBS style surveys were carried out following a 'look-see' methodology as outlined in BirdWatch Ireland/NPWS's counter manual⁵. Full details of the surveys are given in **Appendices 7.18 & 7.19**.

Breeding and Wintering Bird Transect Surveys

Breeding bird transect surveys were carried out in 2017, 2018 and 2020. The method utilised was based on the British Trust for Ornithology Breeding Bird Survey (Bibby *et al.*, 2000). A total of 4 no. c. 1 kilometre transects were selected and centred on different habitats present within the subject site (see **Figure 7.3** for the location of transects). Birds were counted over two visits, each timed to coincide with the early part of the breeding season (April to mid-May) and later part of the season (mid-May to late June) with visits at

⁵ <https://birdwatchireland.ie/app/uploads/2019/03/IWeBS-Counter-Manual.pdf>. Accessed 26/06/2021.

*Location approximate – hen harrier roost counts conducted at numerous points in vicinity – locations withheld due to sensitivity.

least four weeks apart. Surveyors recorded all birds seen or heard as they walked methodically along the transect routes. Birds were noted in four distance categories, measured at right angles to the transect line (within 25m, between 25m-100m and over 100m from the transect line) and those seen in flight only. Recording birds in distance bands gives a measure of bird detectability and allows relative population densities to be estimated if required (BTO, 2018). Full details of the breeding bird transect surveys are presented in **Appendices 7.18 & 7.19**.

The winter transect survey followed the same routes as the breeding surveys, with details given in **Appendices 7.18 & 7.19**.

Merlin Survey

Merlin *Falco columbarius* surveys were carried out in order to assess the presence of the species within the proposed development site. Survey methods followed Gilbert et al. (1998)⁶, with use of transects. Four visits of potential Merlin habitat were completed between May and July 2017, while three visits were completed between May and July 2018, and two in April and May 2021. Potential habitat types included areas of moorland, forestry plantation edges, young conifer plantations and open woodland below 600m in altitude. Within all suitable areas within the subject site, signs of presence of Merlin were recorded. **Figure 7.3** displays the location of the Merlin survey transect, with details of surveys in **Appendices 7.17 & 7.18**.

Red Grouse Survey

A Red Grouse survey was carried out in February 2019 (under licence no. 27/2019). This followed standard methodology (Bibby, C. J. *et al.*, 2000; BWI, 2007⁷; Cummins, S. *et al.*, 2010⁸), using the line transect method with tape lures across sample each 1 km² survey squares. The survey locations and transects for the Red Grouse surveys are shown in **Figure 7.5**. Survey details are presented in **Appendices 7.18 & 7.19**.

7.2.3 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, 2022).

⁶ Gilbert, G., Gibbons, D.W. & Evans, J., 1998. *Bird Monitoring Methods – a manual of techniques for key UK species*. RSPB, Sandy.

⁷ BWI, (2007), 'Red Grouse Survey, Survey Protocol for counters using the Tape-lure Transect Method' BirdWatch Ireland https://birdwatchireland.ie/Portals/0/pdfs/RGS_FieldSurveyMethods.pdf [Online], Accessed on the 26th of May 2019.

⁸ Cummins, S., Bleasdale, A., Douglas, C., Newton, S., O'Halloran, J. & Wilson, H.J. (2010) *The status of Red Grouse in Ireland and the effects of land use, habitat and habitat quality on their distribution*. Irish Wildlife Manuals, No. 50. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

7.2.4 Sensitivity of Receptors

In line with the recommendations of CIEEM guidelines, only ornithological receptors that are considered to be important i.e. Valued Ornithological Receptors (VORs) and potentially affected by the project should be subject to detailed assessment. It is not necessary to carry out detailed assessment of receptors that are sufficiently widespread, unthreatened and resilient to project impacts and would remain viable and sustainable.

Ornithological receptors should be considered within a defined geographical context and for this project the following geographic frame of reference is used (following NRA Guidance, 2009):

- International;
- National
- County
- Local (higher value / lower value).

For designated sites, importance should reflect the geographical context of the designation. For example, an SPA would be considered internationally important while a Natural Heritage Area (NHA) would be considered nationally important.

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 Annex I of the Birds Directive); and
- species Red-listed⁹ in Ireland under the relevant lists of Birds of Conservation Concern Ireland (BoCCI), e.g., Gilbert *et al.* 2021¹⁰.

Where appropriate, the value of species populations has been determined using the standard '1% criterion' method (e.g., Holt *et al.*, 2012). Using this, the presence of >1% of the international population of a species is considered internationally important; >1% of the national population is considered nationally important; etc.

⁹ As per current NatureScot (SNH, 2017) guidance, care has been exercised when considering red-listed species for inclusion as a VORs. For example, it is generally considered that passerines are not significantly impacted by wind farms and so red-listed passerines are not considered as VORs here.

¹⁰ Gilbert, G, Stanbury, A. & Lewis, L. (2021) *Birds of Conservation Concern in Ireland 4: 2020-2026*. Irish Birds 43: 1-22.

7.2.4.1 Assessing Impacts and the Significance of Effects

The terms impact and effect are defined by CIEEM (2018) as:

- Impact – Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow (CIEEM, 2018).
- Effect – Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow (CIEEM, 2018).

CIEEM (2018) guidelines state that when describing ecological impacts and effects, reference should be made to the following characteristics as required: positive or negative; extent; magnitude; duration; frequency and timing and reversibility.

Following the characterisation of impacts, an assessment of the ecological significance of their effects is made. The guidelines promote a transparent approach in which a beneficial or adverse effect is determined to be significant or not, in ecological terms, in relation to the integrity of the defined site or ecosystem(s) and/or the conservation status of habitats or species within a given geographical area, which relates to the level at which it has been valued. The decision about whether an effect is significant or not, is independent of the value of the ecological feature; the value of any feature that will be significantly affected is then used to determine the implications, in terms of legislation and / or policy (CIEEM, 2018).

Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of this assessment, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features'. A significant effect is simply an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. The EclA guidelines (CIEEM, 2018) state that "*A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission. For example, many projects with significant negative ecological effects can be lawfully permitted following EIA procedures as long as the mitigation hierarchy has been applied effectively as part of the decision-making process*". The assessment of significance is based on professional judgement.

7.3 BASELINE DESCRIPTION

7.3.1 Data Presentation

There follows a summary of observations from the various surveys between 2017 and 2021. Data for the species recorded during the surveys are presented in **Appendices 7.1 – 7.14**. Flight lines are shown for each target species recorded during vantage point surveys in **Appendix 7.15**.

An overview of the status on site for each species of conservation importance based on the surveys from 2017 to 2021 is then presented.

7.3.2 Flight Activity Surveys - Breeding Season

Kestrel was the most frequently recorded target species in each of the summer periods. Most of the observations were from the southern, eastern and western sectors of the site, with regular observations off-site to the west. The majority of records were of birds hunting and involved both male and female birds. There was no evidence of nesting within the site.

Sparrowhawk was a scarce species on site, with single records in summers 2020 and 2021. There were off-site records in summers 2017, 2020 and 2021, all involving single birds to the south and west of site.

Merlin was recorded during vantage point watches only in summer 2018 when there were seven records from along the eastern, south-western and north-western boundaries of the site. As one of the records involved a pair on 26th July 2018, it is possible that breeding occurred or was at least attempted locally in that year

A single Peregrine was observed to the south-west of site in May 2021. There are no known Peregrine breeding territories within the vicinity of the wind farm.

Buzzard was recorded in summer 2020 only. Records involved three off-site flightlines to the south-west in 2020. Individuals were observed mainly hunting. Buzzard is considered a scarce species in the area.

Golden Plover was recorded on 16th April 2021 involving a flock of up to 9 birds in the north-west sector. These were considered birds on migration.

Lesser Black-backed Gull was recorded within the site three times over the 2020 summer season, all in May and involving groups of 5-9 individuals.

7.3.3 Flight Activity Surveys – Non Breeding Season

Kestrel was recorded both on and off site in each of the three survey winters. The species is expected to be resident in the area and at times hunts within the study site.

Sparrowhawk was observed occasionally through the winter period though most records were off-site.

Merlin was recorded in winter 2017/18 (1 record) and winter 2018/19 (2 records). All records involved birds off-site.

A single Peregrine was observed on one occasion in the north-east sector of the site in winter 2017/18.

Hen Harrier was recorded on site in each of the three survey winters. There were ten observations over 5 dates in winter 2017/18 (22nd January, 2nd & 21st February, 13th & 27th March). Seven of the records involved a male and the remaining three a ringtail (1st year birds). Several of the records are considered to refer to the same individuals. The flightlines were both within the site and off-site to the north-west and to the east.

There were only two observations in the 2018/19 winter (17th October and 16th January), both just north of VP 7 and both involving a single male bird hunting.

There were four records in winter 2020/21 (16th October, 3rd, 6th & 12th December). Three observations were of single males and one sighting involved two males (recorded as two observations). Most of the records involved birds hunting. From the pattern of records, it is considered that Hen Harrier is an occasional winter visitor to the site and its environs. There was no evidence to indicate that Hen Harriers roost within the site.

There were two observations of White-tailed Eagle within the site. A single juvenile individual was observed on two occasions from VP 9 on 13th February 2019. On both occasions it spent over 120 seconds flying within the site, being mobbed by corvids.

Golden Plover was recorded from within the site in each of the winter surveys. Most records were within the north-west part of the site. Winter 2017/18 produced the most records, with

birds present on five dates from 27th October (30 birds) to 2nd March (18 birds). Highest count was a flock of 35 on 17th November 2017. In winter 2018/19, Golden Plover were recorded on five dates between 22nd November (2 birds) to 26th February (peak of 48). There was only one record of Golden Plover in winter 2020/21, involving a single bird on 17th October.

There were eight observations of Chough in the Gortyrhilly study site in winter 2017/18. These records were within the north-west sector of the site as well as off-site to the north-west and involved up to four birds from October to December.

7.3.4 Breeding Wader Surveys

There were no waders recorded breeding on the proposed Development site during the various moorland surveys (see **Appendix 7.7**).

However, Snipe was recorded drumming in wet heath, suitable breeding habitat for the species, on 4th June 2021 approximately 200 m west of proposed T6 location. This record, as well as several observations during vantage point surveys (from VP 6) in May 2017, confirms that Snipe breeds on site.

7.3.5 Merlin Surveys

There was no evidence recorded of breeding merlin during any of the focused merlin surveys. However, as already noted, merlin activity (a pair) was recorded near VP 6 in July 2018 suggesting that breeding may have taken place in the local area (though not necessarily on site).

7.3.6 Red Grouse Surveys

The Red Grouse survey in February 2019 recorded a single male bird as well as evidence of grouse presence in the form of pellets and droppings (see **Table 7.3**). In addition, several grouse were flushed during the habitat surveys.

Table 7.3: Red Grouse Transect Square results

Transect Square	Transect No.	Site	Record No.	Record Type	Record Details
3	T6a	Gortyrhilly	1	Sighting	Male adult flew off with no call
3	T6a	Gortyrhilly	2	Droppings	Pellets, fresh
4	T4b	Gortyrhilly	1	Droppings	Pellets, fresh
5	N/A	Gortyrhilly	N/A	No Grouse detected	N/A

7.3.7 Breeding Bird Transect Surveys

The results of the breeding bird transect surveys at Gortyrhilly for summers 2017 and 2018 are presented in **Appendices 7.7**. A total of twenty-eight species were recorded along the transects.

Meadow Pipit (Red list) was a widespread species on site. A further Red-listed species, Grey Wagtail, was recorded (a pair) in 2017 and would be expected to breed on the larger watercourses within the site.

Amber-listed species recorded during the breeding surveys were Goldcrest, Skylark, Swallow, Wheatear, Willow Warbler and Linnet.

A total of twenty-three species were recorded along the transects in the winter surveys. Three Red-listed species was recorded, namely Kestrel (two records in October 2020), Snipe (one record) and Meadow Pipit. Two Amber-listed species were recorded: Goldcrest and Linnet.

7.3.8 Breeding Raptor Searches

For site-specific hinterland survey results see **Appendices 7.7, 7.11 and 7.14**.

During the summer season, 52 bird species were recorded in total across hinterland surveys including 23 target species. Of the target species recorded, three are Red-listed (dunlin, kestrel, and snipe). Little Egret, Peregrine, Ruff and Whooper Swan, which are listed on Annex I of the Birds Directive, were also recorded.

White-tailed Eagle was recorded on five occasions during hinterland surveys. These observations, all in 2018, were noted at the Sillahertane Wind Farm and Grousemount area. Three of the five observations concerned a sub-adult in its primary moulting stage. These observations occurred on 11th July, 22nd August and 13th September 2018. The remaining two observations consisted of a single individual being mobbed on the 10th & 24th May 2018. These observations show that while White-tailed Eagle is rare within the Site, it does have a presence in the wider area.

The target species were recorded at three principal hinterland sites: the Gearagh, Gougane Barra and Lough Allua.

7.3.9 Swan and Goose Feeding Distribution Surveys

Winter hinterland surveys were carried out from October 2020 to March 2021. These surveys were for wintering target species. Species recorded during the winter surveys are listed in **Appendices 7.7, 7.11 and 7.14**.

During the winter season, 65 bird species in total were recorded including 31 target species. Of these target species seven are Red-listed (curlew, dunlin, golden plover, kestrel, lapwing, snipe and woodcock), Barnacle goose, golden plover, hen harrier, little egret, merlin, peregrine and whooper swan, which are listed on Annex I of the Birds Directive, were also recorded.

A single Hen Harrier observation arose from a hen harrier roost watch carried out at VP 6 in early December 2020. A male was seen circling over suitable roost habitat, but it flew out of sight and was not observed landing.

Whooper Swan was observed during the months of November, February and March across three of the hinterland survey sites (The Gearagh, Lough Allua and Lee Valley). Observations of Whooper Swan, an Annex I listed species, were typically joined by those of Greylag Goose and Mute Swan during hinterland surveys.

7.3.10 Evaluation of Ornithological Receptors

The following species, which were recorded in the on-site surveys, are species of European conservation importance (as listed on Annex I of the Birds Directive) and/or are species of national conservation importance (Red- or Amber-listed after Gilbert et al. 2021). A summary of the status of each species follows.

Table 7.4: Conservation status of species recorded within the area of the proposed Gortyrhilly Wind Farm.

Species	Annex I	Red list	Amber list
White-tailed Eagle	Y	Y	
Hen Harrier	Y		Y
Kestrel		Y	
Merlin	Y		Y
Peregrine	Y		
Red Grouse		Y	

Species	Annex I	Red list	Amber list
Golden Plover	Y	Y	
Snipe		Y	
Curlew		Y	
Lesser Black-backed Gull			Y
Chough	Y		Y
Goldcrest			Y
Skylark			Y
Swallow			Y
Willow Warbler			Y
Starling			Y
Wheatear			Y
Grey Wagtail		Y	
Meadow Pipit		Y	
Linnet			Y

Red Grouse – Red List

Red Grouse is resident on site. The amount of suitable habitat for grouse would indicate capacity for several territories.

White-tailed Eagle – Red List; Annex I

White-tailed Eagle was observed on site on one date involving two sightings (immature bird on 19th February 2019).

There was also a series of off-site records outside the site (hinterland). Most of these (listed below) were recorded from the Sillahertane/Grousemount area, c.5 km west of Gortyrhillly:

April 2017: one c.3 km west of site (south of The Coom)

January 2018: adult flew west of Grousemount towards Sillahertane

February 2018: one feeding on dead sheep c.3 km west of site

March 2018: adult flew east from Lough Nabuddoga towards Sillahertane

10th May 2018: one in Sillahertane/Grousemount area

24th May 2018: one in Sillahertane/Grousemount area (probably same as previous)

11th July 2018: sub-adult in primary moult stage, Sillahertane/Grousemount area

22nd August 2018: sub-adult in primary moult stage, Sillahertane/Grousemount area

13th September 2018: sub-adult in primary moult stage, Sillahertane/Grousemount area.

From the pattern of records, it is considered that while White-tailed Eagle has a presence in the wider area, it is rare within the Site.

Hen Harrier – Amber List; Annex 1

Hen Harrier was recorded on-site and in the surrounding area during the winter survey periods (October-March). Both sexes, as well as ringtails (immatures) were observed, with birds either foraging or merely flying. There was no evidence of winter-roosting on site or in surrounding areas.

From the pattern of records, it is considered that Hen Harrier is an occasional winter visitor to the Site and the hinterland. The presence of hunting birds in winter in areas such as the Site is consistent with their dispersal from breeding areas such as the Mullaghanish to Musheramore Mountains SPA.

Sparrowhawk – Green List (former Amber-listed species)

Sparrowhawk, now a Green-listed species in Ireland, was observed in both summer and winter. Habitats suitable for breeding and foraging occur within the Site and in surrounding areas.

Kestrel – Red List

Kestrel was the most frequently encountered bird of prey, both in summer and winter, with individuals regularly observed hunting within the site.

The level of activity recorded for this species is indicative of a breeding territory in the vicinity of the site.

Merlin – Amber List; Annex I

Merlin has a presence in the area during summer 2018, with local breeding considered likely. However, there were no sightings at all in the 2020-21 surveys.

From the pattern of records, it is considered that Merlin is a rare species within the Site.

Peregrine Falcon – Green List; Annex I

A single Peregrine was observed flying in the north-east sector of the site in winter 2017/18. Single birds were also recorded off-site in May 2020 and May 2021.

Golden Plover – Red List; Annex I

This Red-listed and Annex I species was noted primarily during winter surveys in 2017/18 and 2018/19. Winter records (peak of 35 birds) were concentrated in the north-west sector of the site.

From the pattern of records, it is considered that Golden Plover is an occasional visitor to the Site in winter and at times of spring and autumn migrations.

Snipe – Red List

Snipe breeds on site, with at least one pair recorded in 2021. Much of the wet heath habitat is considered suitable for supporting breeding Snipe. Snipe was recorded on site in small numbers (singles) during winter.

Curlew – Red List

Curlew was recorded on three occasions during winter vantage point surveys in 2018/19. All were of the species heard calling (i.e., birds not seen). Two of these records occurred at VP 6, with the remaining one at VP 8, all in October 2018.

Lesser Black-backed gull – Amber List

Lesser Black-backed Gull was recorded during summer vantage point surveys in 2017 and in summer 2020. Gulls are expected to forage occasionally in farmland in surrounding lowland areas but are unlikely to be regular visitors to the site. There are no known breeding sites in the vicinity of the site.

Chough – Amber List; Annex I

Chough was observed primarily during winter vantage point surveys in 2017/18 (minimum of 4 birds) and in March 2019 (birds only heard). On the basis of the observations, Chough is considered an occasional visitor to the area.

Grey Wagtail - Red List

Regular on site and considered to breed either on site or along streams downstream of the site.

Meadow Pipit – Red List

A widespread species on heath, bog and grassland habitats. Breeds on site and also present in winter (though scarcer then). Post-breeding flocks often seen in late summer and autumn.

Goldcrest – Amber List

A widespread breeding species within the conifer plantations on site. Scarce in winter.

Skylark – Amber List

A widespread breeding species of the open heath, bog and grassland habitats. Largely absent in winter.

Swallow – Amber List

Recorded feeding over site regularly in summer. Expected to nest in local farm buildings.

Willow Warbler - Amber List

A widespread breeding species within the conifer plantations on site and in areas of scrub.

Wheatear – Amber List

Scarce passage migrant, mainly in spring.

Starling – Amber List

Observed mainly in winter, with flocks of several hundred flying over. May breed in local farm buildings.

Linnet – Amber List

May breed on site. Scarce in winter.

7.3.11 Overview of conservation importance of the Site for birds

The study site supports a number of bird species characteristic of peatland habitats. Principal amongst these are Red Grouse, Snipe and Meadow Pipit (all Red listed), all of which breed and forage within the site. A further Red-listed species, Kestrel, utilises the site on a regular basis for hunting, while Golden Plover (Red listed & Annex I species) occurs within the site at times in winter and when on passage.

Merlin, an Annex I species, appears to have nested locally in 2018 and would use the resources of the site for breeding. However, it appears a genuinely rare species as apart

from in 2018 it was not recorded in any of the other surveys (though it is accepted that Merlin is a particularly difficult species to census and may be under-recorded using traditional survey methods - Lusby et al. 2011)¹¹.

Hen Harrier (Annex I species) is an occasional winter visitor to the site, with suitable foraging habitat available within the site and the surrounding areas. While the origin of the birds is unknown, it is possible that the birds may be associated with the breeding population in the Mullaghanish to Musheramore Mountains SPA. The population in the SPA had undergone a serious decline (1-2 pairs in 2015-2019 period) until a recovery in 2020 (5 confirmed pairs fledging 10 young).

White-tailed Eagle (Red list & Annex I) was recorded within the site on one date and has a presence in the wider area (series of sightings between 3-5 km from site).

Chough (Annex I species) is an occasional winter visitor to the site – whilst widespread in suitable habitat along the western seaboard, Chough is relatively scarce inland.

A range of Amber-listed species also occur on site, including Skylark, Willow Warbler and Linnet.

On the basis of providing breeding and foraging habitat for several Annex I listed and Red-listed species, the site is rated as of County Importance for birds (following NRA 2009 Guidance).

7.4 ASSESSMENT OF POTENTIAL EFFECTS

7.4.1 Do Nothing Impact

Without the Development proceeding, it is expected that the existing main land uses on site, namely livestock grazing and forestry, will continue. It is possible that further afforestation would occur on the site in the future.

The value of the site for birds 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 which could affect species such as Red Grouse. Also, any further afforestation on heath and bog habitats would be detrimental to peatland bird species, including Red Grouse, Snipe, Meadow Pipit and Skylark.

¹¹ Lusby, J., Fernandex-Bellon, D., Norriss, D. & Lauder, A. (2011) Assessing the effectiveness of monitoring methods for Merlin Falco columbarius in Ireland: the Pilot Merlin Survey 2010. Irish Birds 9: 143-154.

7.4.2 Construction Phase Potential Effects

7.4.2.1 Habitat loss

The permanent loss of habitat to facilitate the construction of the project is approximately 40.2 ha. The largest component is wet heath (28 ha), which is habitat for bird species such as Red Grouse, Kestrel, Snipe and Meadow Pipit (all Red-listed). As wet heath is a widespread habitat within the site (estimated total resource of 404 ha) and in upland areas throughout much of the south-west region, the significance of the effect on birds by the loss is considered to be a Slight Adverse Effect of Long-term duration.

Taking the amount of potentially suitable heath and bog habitat within the site and surrounding areas into account, it is expected that viable populations of the bird species which were recorded during the baseline surveys will remain on site after the project is complete.

7.4.2.2 Disturbance to breeding birds during construction

The construction phase for the Development will last approximately 18 months, with commissioning taking a further three months. In this period, work during the breeding season is likely to have potential disturbance effects on breeding birds of conservation importance, namely Red Grouse, Merlin, Snipe and Hen Harrier (latter only along part of grid connection cable route). Passerine species, or species which use the site only for foraging, such as Kestrel, are unlikely to be affected, i.e. Effect Imperceptible.

Red Grouse

Studies in the United Kingdom have suggested that while Red Grouse densities declined significantly at wind farms during the construction phase, they appeared to recover by the first year of operation (Pearce-Higgins *et al.* 2009¹², Douglas *et al.* 2011¹³, Pearce-Higgins *et al.* 2012¹⁴). In fact, the analysis of species distribution highlighted a positive association between Red Grouse occurrence and turbine and track proximity. Reasons for the association between grouse and wind farms are likely to include the following: 1. birds attracted by good growth of heather for feeding along the margins of tracks, 2. birds attracted by supplies of grit on tracks which they need to ingest to aid digestion, and 3. birds

¹² Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W., Bainbridge, I.P., & Bullman, R. (2009) The distribution of breeding birds around upland wind farms. *Journal of Applied Ecology* 46: 1323-1331.

¹³ Douglas, D.J. Bellamy, P.E. & Pearce-Higgins J.W. (2011) Changes in the abundance and distribution of upland breeding birds at an operational windfarm. *Bird Study* 58: 37-43.

Pearce-Higgins, J.W., Stephen, L., Douse, A. & Langston, R.H.W.. 2012. Greater impacts of wind farms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. *Journal of Applied Ecology* 49: 386-394.

attracted by the actual tracks to dust bathe so as to maintain their plumage. Based on available information, it is considered that grouse is likely to be disturbed from areas of the site where construction works are ongoing but are expected to become re-established in these areas of the site when works are complete and the turbines are operational. The potential disturbance effect on Red Grouse is considered to be a Significant Adverse Effect of Short-term duration.

Hen Harrier

A section of the grid connection route is located along the route of an existing forestry road which runs north of the Mullaghanish to Musheramore Mountain SPA. The closest distance between the cable route corridor and the SPA boundary is 170 m (chainage 9,600 m). Construction works carried out during the breeding season could cause disturbance to displaying, nesting and/or foraging Hen Harriers (Special Conservation Interest) within the sector of the SPA closest to the work area. The potential disturbance effect on Hen Harrier is considered to be a Significant Adverse Effect of Short-term duration.

Merlin

Ruddock & Whitfield (2007)¹⁵ note that expert opinions differ widely on disturbance distances for Merlin, with an upper limit of 500 m given in one study. For disturbance by forestry operations, Currie & Elliot (1997)¹⁶ gave a distance range of 200 m to 400 m for

Merlin. The potential disturbance effect on Merlin is considered to be a Significant Adverse Effect of Short-term duration.

Snipe

Pearce-Higgins et al. (2009) identified Snipe as one of the species showing significant avoidance at wind farms and cited a disturbance distance extending to 400 m. Critically, the authors also found that Snipe population densities did not recover after the construction period. The significance of the effect of disturbance to breeding Snipe is rated as a Slight Adverse Effect of Short-term duration.

As there is potential for significant disturbance effects on these species, i.e., Red Grouse, Snipe, Merlin, Hen Harrier, mitigation will be implemented to avoid or minimise such effects.

¹⁵ Ruddock, M. & Whitfield, D. (2007) A review of disturbance distances in selected bird species. A report for Natural Research Ltd. to Scottish Natural Heritage. 182 pp.

¹⁶ Currie, F. & Elliott, G. (1997) *Forests and Birds: A Guide to Managing Forests for Rare Birds*. Forest Authority, Cambridge and Royal Society for the Protection of Birds, Sandy, UK.

7.4.2.3 Nest Damage or Destruction

Damage to, or destruction of, active nests could contravene Section 22 of the Wildlife Acts 1976 to 2021. However, good practice measures will be employed to reduce the possibility of damage and destruction (and disturbance in the case of sensitive species such as breeding raptors and waders), to occupied bird nests during the construction phase. These measures are 'embedded' as part of the proposed Development and potential effects are therefore assessed on the basis that these measures will be implemented.

The good practice measures outlined above would avoid the likelihood of damage, destruction or disturbance to occupied bird nests during the construction phase. As such, no significant effects, and no contravention of the relevant legislation, are likely for any species due to nest damage or destruction during construction.

7.4.1 Operational Phase Potential Effects

The principal potential impacts on birds by the operation of a wind energy project are:

1. collision,
2. displacement,
3. barrier effects,

Disturbance from secondary operations, such as road maintenance, are also considered.

7.4.1.1 Collision

Collision risk posed to bird species is one of the main environmental concerns associated with wind energy developments (Drewitt & Langston 2006¹⁷, Band et al. 2007¹⁸, Drewitt & Langston 2008¹⁹). However, bird species differ widely in their susceptibility to collision mortality. Essentially, birds are at risk of collision only when their flight path overlaps with the rotor blade sweep area of a turbine. It follows that birds whose flight heights coincide with the height of the turbine rotor sweep are most at risk. The assessment of potential impacts considers all scenarios within the range of turbine parameters proposed for the Development as shown in **Table 7.5** below.

¹⁷ Dewitt, A.L. & Langston, R.H. (2006) Assessing the impacts of wind farms on birds. *Ibis* 148: 29-42.

¹⁸ Band, W., Madders, M., & Whitfield, S.P. (2007) Developing field and analytical methods to assess avian collision risk at wind farms. In de Lucas, M., Hanss, G. & Ferrer, M (eds) *Birds and Wind Farms: Risk assessment and mitigation*. Quercus.

Dewitt, A.L. & Langston, R.H. (2008) Collision effects of wind power generators and other obstacles on birds. *Annals of the New York Academy of Sciences* 1134: 233-266.

Table 7.5: Turbine Parameters

Turbine Parameter	Assessment Envelope
Turbine Blade Tip Height	179 m to 185 m
Rotor Diameter	149 m to 155 m
Hub Height	102.5 m to 110.5 m

Collision Risk Modelling (CRM) is a method to estimate the number of birds likely to collide with turbines at the Site. This method uses vantage point data to calculate the risk of collision. In this case, the vantage point data collected over the two years 2017-2019 (two breeding seasons and two winter seasons) at the Site was used. There are three potential turbine models which may be used at the proposed wind farm, where appropriate calculations were run separately for each of the three models. Two stages are involved in the model:

Stage 1: Vantage point observations of birds flying within the study area are used to calculate the number of birds likely to fly through areas swept by the proposed turbine blades.

Stage 2: Calculation of the probability of a bird strike occurring.

Full details of the collision risk modelling method are given in the **Appendix 7.17**.

At the Site, species of conservation importance identified as being potentially at some risk of collision are White-tailed Eagle, Hen Harrier, Sparrowhawk, Kestrel, Peregrine, Merlin and Golden Plover. Passerine species, as well as Red Grouse which typically flies in short bursts at a low height, are less susceptible to collision with turbines.

White-tailed Eagle

The White-tailed Eagle Reintroduction Programme (www.goldeneagle.ie) released 100 young White-tailed Sea Eagles into the wild in the Killarney National Park between 2007 and 2011 (Mee et al. 2016²⁰). Typically, eagles take about 4-6 years before they are mature enough for breeding.

²⁰ Mee, A., Breen, D., Clarke, D., Heardman, C., Lyden, J., McMahon, F., O'Sullivan, P. & O'Toole, L. (2016) Reintroduction of White-tailed Eagles to Ireland. Irish Birds 10: 301-314.

Due to the slow maturation to adulthood, low mortality is a key factor in establishing a viable wild population. The diet of the White-tailed Eagle consists of carrion and small to medium sized fish, as well as small birds and mammals.

There are now at least 15 breeding territories established at coastal areas and at large lakes in Counties Kerry, Cork, Clare and Galway. By 2020, 8 to 10 pairs of eagles successfully fledged 31 chicks across the counties of Cork, Kerry, Clare, Galway and Tipperary.

A further 21 eagles were released in August 2021 as part of Phase 2 of the Reintroduction Programme.

Immature eagles tend to disperse widely during their pre-breeding stage, roosting at communal roost sites that can be used on a relatively consistent or more transient basis. The roosts are usually in mature trees, often in commercial conifer plantations.

White-tailed Eagle is a species that is prone to collision with turbines (see May et al. 2010²¹ & Dahl et al. 2011²² for details of casualties at the Smøla wind farm in Norway). Of relevance to the proposed Gortyrhilly development, there have been three known White-tailed Eagle fatalities in wind farms at Sillahertane and Lettercannon-Coomagearlahy (all in 2011 and 2012 – see Mee et al. 2016). Birds killed in 2011 were an adult and sub-adult female, while the 2012 mortality was a second calendar year female. All mortalities took place in spring and early-summer. In addition, an adult male was killed in 2014 apparently in collision with a powerline in west Kerry.

For White-tailed Eagle, the collision risk modelling has calculated a rate of 0.05 collisions per year (or 1 bird every 20 years) for the Siemens Gamesa and Vestas turbine models and 0.04 collisions per year (or 1 bird every 25 years) for the Nordex turbine model. While these rates are relatively low, the risk to this Annex I species is considered Significant in the context of the national population, with a breeding population of only 12 breeding pairs in the 2013 -2018 period (Crowe et al. 2021)²³.

²¹ May, R., Hoel, P.L., Langston, R., Dahl, E.L., Bevanger, K., Reitan, O., Nygård, T., Pedersen, H.C., Røskaft, E. & Stokke, B.G. 2010. Collision risk in white-tailed eagles. Modelling collision risk using vantage point observations in Smøla wind-power plant. – NINA Report 639. 25 pp. Trondheim, Norway.

²² Espen Lie Dahl a,b,† , Kjetil Bevanger b , Torgeir Nygård b , Eivin Røskaft a,c , Bård G. Stokke (2011)

Reduced breeding success in white-tailed eagles at Smøla windfarm, western Norway, is caused by mortality and displacement. Biological Conservation, 2011.

²³ Crowe, O, Tierney, D., & Burke, B. (2021) Status of Rare Breeding Birds across the island of Ireland, 2013-2018. Irish Birds 43: 29-38.

Hen Harrier

Studies have reported low flight heights for hen harriers (Whitfield & Madders 2006a, b²⁴, Madden & Porter 2007²⁵, Ruddock et al. 2012²⁶), with low proportions (5-15%) of observations at rotor sweep height (Garvin et al. 2011)²⁷. In general, when hen harriers are engaged in hunting behaviour, they are outside of the area of greatest risk of collision with wind turbines. However, courtship displays in the early phase of the breeding season, such as sky dancing, occur at heights of up to 100 m or more, overlapping with the rotor sweep of most modern wind turbines. It is noted that Site is not close to any Hen Harrier breeding territory, with a distance of approximately 5 km to the Mullaghanish to Musheramore Mountain SPA where breeding occurs.

In a study of flight behaviour of adult and juvenile hen harriers at various wind farms in Ireland, Wilson *et al.* (2015)²⁸ found that adult hen harriers spent most of their time (82.8%) flying below the reach of turbine blades.

It is important to note that there appears to be very few documented cases of hen harrier collision mortality in the literature (Smallwood & Thelander 2004²⁹, Whitfield & Madders 2006b, Scott & McHaffie 2008³⁰).

The proposed Development is not close to any Hen Harrier breeding territory and is approximately 5 km from Mullaghanish to Musheramore Mountain SPA which is the closest SPA classified for the species. However, Hen Harrier is an occasional visitor to the site outside of the breeding season.

²⁴ Whitfield, D.P. & Madders, M. (2006a) Flight height in the Hen Harrier and its incorporation in wind turbine collision risk modelling. Natural Research Information Note 2. Natural Research Ltd., Banchory, UK.

Whitfield, D.P. & Madders, M. (2006b) A review of the impacts of wind farms on Hen Harriers. Natural Research Information Note 1 (revised). Natural Research Ltd., Banchory, UK. 32pp.

²⁵ Madden, B. & Porter, B. (2007) Do wind turbines displace Hen Harriers *Circus cyaneus* from foraging habitat? Preliminary results of a case study at the Derrybrien wind farm, County Galway. *Irish Birds* 8: 231-236.

²⁶ Ruddock, M, Dunlop, B.J., O'Toole, L., Mee, A., & Nagle, T. (2016) *The 2015 National Survey of Breeding Hen Harrier in Ireland*. Irish Wildlife Manual No. 93. NPWS, Dublin.

²⁷ Garvin, J.C., Jennelle, C.S., Drake, D. & Grodsky, S.M. (2011). Response of raptors to a windfarm. *Journal of Applied Ecology* 48: 190-209.

²⁸ Wilson, M., Fernandez-Bellon, D., Irwin, S., & O'Halloran, J. (2015) The Interactions between Hen Harriers and Wind Turbines. WINHHARRIER. Final Project Report. January 2015. School of Biological, Earth & Environmental Sciences, University College Cork, Ireland.

²⁹ Smallwood, K.S. & Thelander, C.G. (2004) Developing methods to reduce bird mortality in the Altamont Pass Wind Resource Area. Final Report by BioResource Consultants to the California Energy Commission, Public Interest Energy Research Environmental Area. Contract No. 500-01-019.

³⁰ Scott, D. & McHaffie, P. (2008) Hen Harrier killed at windfarm site in County Antrim. *Irish Birds* 8: 436-437.

The collision risk modelling for the proposed Development has calculated a rate of 0.003 collisions per year (or 1 bird every 333 years) for the Siemens Gamesa and Vestas turbine models and 0.0026 collisions per year (or 1 bird every 384 years) for the Nordex turbine model. This predicted collision rate is not significant in the context of the county and national Hen Harrier population.

Sparrowhawk

Sparrowhawk is a relatively scarce species within the site for the proposed Gortyrachilly wind farm though from the occurrence of records it is expected that a pair breeds locally. Sparrowhawk may be prone to collision especially when birds are displaying. Cullen and Williams (2010)³¹ reported two collisions of Sparrowhawk in April 2010 at a wind farm in Co. Tipperary. Both birds had been in display mode prior to the collision.

As the species was not recorded flying at the potential collision risk height during the vantage point surveys, collision risk modelling cannot be carried out. While the risk of collision for Sparrowhawk cannot be ruled out (as casualties have been recorded at wind farms elsewhere), the effect on the species is expected to be Not Significant.

Kestrel

Kestrel is a regular species throughout the year at the Site. Based on the frequency of records, it is expected that a pair breeds locally.

Kestrel is a Red list species in Ireland due to a severe decline (>50%) in breeding population size over 25 years (Gilbert et al. 2021).

Kestrel, as well as Lesser Kestrel *Falco naumanni* and American Kestrel *Falco sparverius*, is a genus that is prone to collision (see for instance Barrios & Redrigues 2004³², Hotker et al. 2006³³, Hotker 2008³⁴, Lucas et al. 2008³⁵, Marques et al. 2014³⁶). This is expected to be due to the hovering behaviour of the species. While birds are hunting and focusing on ground prey, they might lose track of the turbine position or may suddenly change their

³¹ Cullen, C & Williams, H. (2010) Sparrowhawk *Accipiter nisus* mortality at a wind farm in Ireland. *Irish Birds* 9: 125-126.

³² Barrios, L. and Rodriguez, A. (2004) Behavioural and Environmental Correlates of Soaring-Bird Mortality at On-Shore Wind Turbines. *Journal of Applied Ecology*, 41, 72-81. <https://doi.org/10.1111/j.1365-2664.2004.00876.x>

³³ Hotker, H., Thomsen, K-M. & Jeromin, H. (2006) Impacts on biodiversity of exploitation of renewable energy sources: the examples of birds and bats. NABU Michael-Otto-Institut.

³⁴ Hotker, H. (compiler) (2008) *Birds of Prey and Wind Farms: Analysis of Problems and Possible Solutions*. Documentation of an international workshop in Berlin, 21st and 22nd October 2008.

³⁵ LUCAS, M. D., JANSSE, G. F. E., WHITFIELD, D. P. & FERRER, M. (2008): Collision fatality of raptors in wind farms does not depend on raptor abundance. *Journal of Applied Ecology* 45: 1695-1703.

³⁶ Marques, A.T., Batalha, H., Rodrigues, S., Costa, H., Pereira, M., Fonseca, C. (2014) [Understanding bird collisions at wind farms: An updated review on the causes and possible mitigation strategies](#). *Biological Conservation* 179, 40-52

position due to a sudden gust of wind. The hovering height level is often within the rotor sweep of the turbines. Of eight casualties recorded at a wind farm in Cadiz Province, Spain, all were juveniles.

For Kestrel, the collision risk modelling has calculated a rate of 0.87 collisions per year for the Siemens Gamesa and Vesta turbine models and 0.77 collisions per year for the Nordex turbine model. These rates (<1 bird per year) are low in the context of the estimated national population of 13,500 birds (Lewis et al. 2019). However, an annual loss of close to one bird could have a detectable effect on the local Kestrel population.

As the species is presently of high conservation concern, the effect of the collision risk is rated as a Long-term Slight to Moderate Negative effect. Mitigation is provided to minimise the risk of collision for Kestrel.

Merlin

Merlin is a scarce species at Gortyrahilly though it is expected that a pair may have bred within or close to the site in 2018.

There appears to be few recorded Merlin casualties with turbines, with only one cited in Germany by Hotker et al (2006) in their review of all bird casualties at wind farms in Europe up to July 2004. Merlin is a falcon species that flies close to the ground though may at times fly over conifer plantation. However, it is not a species that would normally be expected to be hunting or flying at the height of a rotor sweep of a turbine.

For Merlin, the collision risk modelling has calculated a rate of 0.025 collisions per year (or 1 bird every 33 years) for the Siemens Gamesa and Vesta turbine models and 0.02 collisions per year (or 1 bird every 50 years) for the Nordex turbine model.

While these rates are very low, Merlin is an Annex I listed species and a scarce breeding species in Ireland (probably little more than 100 pairs). Furthermore, Merlin is a particularly difficult species to census and the traditionally used methods may not provide a true indication of the abundance, densities or distribution of the species (Lusby et al. 2011)³⁷. The significance of the effect of risk of collision to Merlin as a result of the project is given as a Slight, Negative, Long-term Effect.

³⁷ Lusby, J., Fernandex-Bellon, D., Norriss, D. & Lauder, A. (2011) Assessing the effectiveness of monitoring methods for Merlin Falco columbarius in Ireland: the Pilot Merlin Survey 2010. Irish Birds 9: 143-154.

Peregrine

Peregrine was recorded on one occasion within the Site with two further records off-site. Peregrine is an Annex I listed species though the population in Ireland is at the least stable or increasing (Green list).

For Peregrine, the collision risk modelling has calculated a rate of 0.0006 collisions per year for the three turbine model types. This predicted collision rate is Not Significant in the context of the national Peregrine population.

Golden Plover

Golden Plover is a winter and passage visitor to the Site. Numbers recorded varied considerably between winters, with birds recorded on 5 different dates in each of the 2017/18 and 2018/19 winters, but on only one date (single bird) in winter 2020/2021. There was one record of migrating birds in April 2021.

Golden Plover is an Annex I listed species and a Red-listed species in Ireland. Burke *et al.* (2019)³⁸ gave the All-Ireland wintering population at 92,060 birds for period 2011-12 to 2015/16, which is a 43.6% decline since the 1994/95-1988/99 period.

Hotker *et al.* (2006) cited four casualties (Netherlands, Sweden, Germany) in their review of all bird casualties at wind farms in Europe up to July 2004. In a study of collisions with turbines on the German island of Fehmarn, Grunkorn (2010) recorded 3 Golden Plover casualties during autumn 2009.

For Golden Plover, the collision risk modelling has calculated a rate of 16.16 collisions per year for the Siemens Gamesa turbine models, 14.26 collisions per year for the Nordex model, and 15.73 collisions per year for the Vesta turbine model.

While these rates are relatively low in the context of the estimated All-Ireland wintering population, the significance of the effect of the collision risk is rated as Long-term Moderate Negative due to the high conservation importance of the species and the significant long-term decline in the wintering population.

Chough

Chough is an occasional visitor to the area of the wind farm and mainly in winter.

³⁸ Burke, B., Lewis, L.J., Fitzgerald, N., Frost, T., Austin, G. & Tierney, D. (2019). Estimates of waterbird numbers wintering in Ireland, 2011/12 – 2015/16. *Irish Birds* 41: 1-12.

Chough is an Annex I listed species and an Amber-listed species in Ireland. The national population is estimated at 838 pairs (Gray et al. 2003)³⁹.

There appears to be no recorded collisions with wind turbines, which may reflect the breeding distribution of the species largely in extreme coastal areas with only a small proportion (5.1%) of the population nesting > 1 km from the coastal fringe.

For Chough, the collision risk modelling has calculated a rate of 0.23 collisions per year (or 1 bird every 4.34 years) for the Siemens Gamesa and Vesta turbine models, and 0.20 collisions per year (or 1 bird every 5 years) for the Vesta turbine model.

While these rates are relatively low in the context of the estimated All-Ireland population, the effect of the collision risk is rated as a Long-term Slight Negative effect due to the high conservation importance of the species and the long-term decline in the population.

7.4.1.2 Displacement effect due to turbines

Displacement of birds from otherwise suitable habitat as a result of the presence of wind turbines has been reported as a potential impact of wind turbines (Drewitt & Langston 2006, de Lucas et al. 2007, Pearce-Higgins et al. 2009). The displacement occurs as a result of behavioural responses that prevent or decrease the use of an area for activities such as nesting or foraging. However, the results of studies on potential displacement have varied widely and in an overall review of the literature Madders & Whitfield (2006) concluded that displacement effects of wind turbines on raptors, including Hen Harrier, are negligible for the most part. Further evidence that Hen Harrier may not be displaced by the presence of turbines is from a study at the Derrybrien Wind Farm, Co. Galway (Madden & Porter 2007), where birds were observed flying close to wind turbines (<50 m) and on one occasion within 10 m of the base.

In a review of potential displacement effects on upland breeding bird densities at twelve wind farm sites in Britain, Pearce-Higgins et al. (2009) reported an avoidance area of 250 m from turbines for Hen Harrier, and a distance of 400 m for Snipe, with no evidence of turbine avoidance by Red Grouse.

For the Gortyrally Wind Farm, it is considered that Snipe (Red-listed) is the species of most concern, as a breeding bird was recorded in 2021 within approximately 200 m of the

³⁹ Gray, N., Thomas, G., Trewby, M. & Newton, S. (2003) The status and distribution of Choughs *Pyrrhocorax pyrrhocorax* in the Republic of Ireland 2002/03. *Irish Birds* 7: 147-156,

location of a proposed turbine. While Snipe may well be displaced within a distance of up to 400 m from turbines at Gortyrhilly, the species is expected to continue to have a presence on heath habitats elsewhere within the site. The significance of the effect of the displacement of breeding Snipe is rated as a Slight Adverse Effect of potentially Long-term duration.

Hen Harrier, an occasional visitor to the site in autumn and winter, would still be expected to forage within the site, while Red Grouse is not expected to be adversely affected by the presence of turbines.

7.4.1.3 Barrier effect due to turbines

The potential impact of lines of wind turbines creating a barrier effect to passing birds is mostly relevant to locations where migratory species pass regularly. Rees (2012) cites eight published studies of flight behaviour which reported changes in flightlines for swans or geese initially seen heading towards turbines, at distances ranging from a few hundred metres to 5 km (the larger distances were by birds on migration); 50-100% of individuals/groups avoided entering the area between turbines, but in some cases the sample sizes were small.

As the Site has not been identified as being along a migration route for birds such as wetland species (swans, geese etc.) or birds of prey, the issue of a possible barrier effect does not arise.

7.4.1.4 Other wind farm activities impact

Other wind farm activities during the operational phase include turbine servicing are the maintenance and periodic upgrading of access tracks and substation inspection and maintenance.

Maintenance of access tracks within the wind farm would be an occasional activity and would be relatively minor in terms of construction. It is considered that track maintenance works would not have any measurable effect on the foraging potential of birds within the site, including species of high conservation value such as Red Grouse, Hen Harrier and Kestrel.

Maintenance works at the turbines and the wind farm substation would not be expected to have any impacts on local bird populations.

7.4.1.5 Potential impacts on birds of the hinterland

While the hinterland surveys recorded a range of species of conservation importance, including wetland birds such as Whooper Swan at sites such as The Gearagh, Lough Allua and Gougane Barra Lough, none of these species were recorded in the vicinity of the site during the baseline surveys from 2017 to 2021.

It is concluded that the operational phase of the project, as well as the decommissioning phase, would not have impacts, including risk of collision, on birds associated with any of the hinterland sites surveyed.

7.4.2 Decommissioning Phase Potential Effects

During the decommissioning works there is a risk of disturbance and subsequent displacement to sensitive breeding species such as Red Grouse, Merlin and Snipe. As for the construction phase, appropriate mitigation will be required to ensure that disturbance to these species, as well as any other species which may have a high conservation status at the time of decommissioning, is minimised.

7.5 MITIGATION MEASURES

7.5.1 Construction Phase

7.5.1.1 Measures for loss of habitat

The implementation of the Habitat Enhancement Plan will provide open bog and heath habitat for bird species associated with peatland habitats, including Red Grouse and Meadow Pipit (both Red listed). This Plan, which provides for the enhancement of approximately 9.5 ha of habitat, will mitigate for the loss of breeding habitat for birds.

7.5.1.2 Measures to prevent disturbance to breeding hen harriers

A section of the grid connection route is located along the route of an existing forestry road which runs north of the Mullaghanish to Musheramore Mountain SPA, with the closest distance between the cable route corridor and the SPA being 170 m. To prevent any potential disturbance to nesting and/or foraging Hen Harriers, works will be restricted along the identified section to the period outside of the breeding season (March-August). This will ensure that the breeding Hen Harrier population within the SPA is not disturbed by the proposed wind farm project.

7.5.1.3 Measures to minimise potential disturbance to sensitive bird species

The study has identified Red Grouse and Snipe (both Red-listed) as the species most sensitive to disturbance that are known to nest within the site. In addition, Merlin is considered to have nested in the vicinity of the eastern boundary of the site in 2018 and could breed within the site in the future.

Should any of these species be recorded breeding within 500 m of the works area (as established through monitoring during construction), a buffer zone shall be established around the expected location of the nest and works will be restricted until it can be demonstrated by an ecologist that the species has completed breeding in the identified area. Any restricted area that is required to be set up will be marked clearly using hazard tape fencing and all site staff will be alerted through toolbox talks.

7.5.2 Operational Phase

7.5.2.1 Measures for White-tailed Eagle

The present assessment has shown that the Site is within the known area of distribution for White-tailed Eagle. As White-tailed Eagle is vulnerable to collision with wind turbines, mitigation is required to minimise this risk.

While the Site does not offer potential nesting sites to eagles, foraging birds could be attracted to the site to feed on carrion (as happened close to Sillahertane Wind Farm where two eagle casualties occurred).

Once operational, a programme will be put in place to remove carcasses (mainly of sheep) from the site. This will involve search of the wind farm infrastructure area by site management for the presence of dead and/or injured animals (mostly lame sheep or animals caught in wire fencing). It is noted that such animals are usually identified by a concentration of corvids (ravens and hooded crows). Search would be on a weekly basis.

Should a carcass be located, this will be removed at the earliest opportunity by an appointed representative following standard practice for the disposal of carcasses (subject to Health and Safety issues). Injured or trapped animals will be reported to local landowners.

With mitigation in place, the significance of the effect of collision risk to White-tailed Eagle as a result of the project is reduced to a Slight, Negative, Long-term Effect.

7.5.2.2 Measures for Kestrel

Kestrel is regular at the Site, with birds using it for hunting purposes. As discussed in the impact section, Kestrel is a species at risk of collision, as birds will be attracted to the ground around the turbines where prey items inhabit the low scrub type vegetation. As Kestrel is a Red list species, mitigation is proposed to avoid collisions.

Should monitoring identify more than one Kestrel casualty at a specific turbine(s), proactive measures will be taken to discourage the birds from hunting in the area of the relevant turbine(s).

This will involve clearing rank vegetation from around the relevant turbine(s) to make it less suitable for supporting prey items such as small mammals (mice, shrews, voles) and birds (meadow pipit, skylark etc). Vegetation clearing can be achieved by mowing and/or strimming. This approach has proved highly effective at several wind farms in central-eastern Spain where the number of collisions with Lesser Kestrel decreased by 75% to 100% after the ground was superficially tilled to a distance of 80m from the turbine base (Pescador *et al.* 2019)⁴⁰.

With mitigation in place, the significance of the effect of collision risk to Kestrel as a result of the project is reduced to a Slight, Negative, Long-term Effect.

7.5.2.3 Monitoring

Construction monitoring

During the breeding season (March-August) bird monitoring surveys will take place to a distance of 500 m from the development area. The purpose of the monitoring will be to identify the presence of sensitive breeding species of conservation importance so that mitigation can be taken to avoid impacts on the breeding activities from the works. The key species of concern at this site are Red Grouse, Snipe and Merlin. The monitoring surveys will be undertaken by a suitably qualified ornithologist.

Should the presence of any of these species be confirmed, the location of the nest will be identified (as far as is possible without causing disturbance to the birds) and a buffer zone of 500 m will be observed where works are restricted until after breeding is complete.

⁴⁰ Pescador, M., Gomez Ramirez & Peris, S. (2019) Effectiveness of a mitigation measure for the lesser kestrel *Falco naumanni* in wind farms in Spain. *Journal of Environmental Management* 231: 919-925.

Post-construction monitoring

Post-construction bird monitoring is required to establish possible effects on bird species as a result of the project. The monitoring programme will comprise the following:

Flight activity surveys

Flight activity surveys will be undertaken using the Vantage Point method (Scottish Natural Heritage 2017). This will use the same 4 no. VPs as used for the baseline EIAR surveys in 2020-2021. The surveys will be undertaken monthly in Years 1, 2, 3, 5, 10 and 15 of the lifetime of the project (in accordance with Scottish Natural Heritage Guidance 2009). Usage of the site by White-tailed Eagle, Hen Harrier, Merlin, Kestrel and Golden Plover will be of particular interest.

Distribution and abundance surveys

Distribution and abundance surveys will be undertaken to monitor short-term and long-term effects on bird populations within the site. Survey methodology will be similar to methods employed for baseline EIAR surveys which will allow a comparison of data to be made for each monitoring year. Surveys will be undertaken in the same monitoring years as the vantage point surveys.

Red Grouse survey

Repeat of the pre-construction Red Grouse survey (under licence) in Years 1, 2, 3 and 5 of operation. This will establish whether Red Grouse maintain a presence on site in the area of the wind farm infrastructure. Surveys will follow the standard methodology as used in the baseline EIAR survey.

Collision searches

The objective of collision monitoring and corpse search is to establish whether bird fatalities are occurring as a result of collision with turbine blades.

Carcass search was traditionally completed by human observers whose efficiency is influenced by several factors including carcass type, environmental conditions and observer competence. Numerous studies have been conducted demonstrating that dogs have a superior ability to detect bird and bat carcasses than humans, particularly with small carcasses or in dense vegetation (see for example Bernardino 2012⁴¹, Reed 2011⁴², Mathews 2013⁴³).

⁴¹ Bernardino, A. (2012) Are we properly assessing bird and bat mortality at onshore wind farms? IAIA12 Conference Proceedings.

⁴² Reed, S.A. (2011) Dogs as a tool to improve bird-strike mortality estimates at wind farms. *Journal for Nature Conservation* 19: 202-208.

⁴³ Mathews, F.M. (2013) Effectiveness of search dogs compared with human observers in locating bat carcasses at wind turbine sites: a blinded randomized trial. *Wildlife Society Bulletin* 37: 34-40.

A standard plot size will be selected at each turbine location where search will occur. At the start of each survey, data recorded will include meteorological and ground cover information. The locations of any carcasses found will be recorded by GPS and will be photographed in-situ. The state of each carcass will be recorded on a corpse record card, using the following categories (after Johnson 2003⁴⁴):

- Intact - a carcass that is completely intact, is not badly decomposed, and shows no sign of being fed upon by a predator or scavenger
- Scavenged - an entire carcass which shows signs of being fed upon by a predator or scavenger, or a portion(s) of a carcass in one location such as wings, legs, skeletal remains or pieces of skin
- Feather Spot - ten or more feathers at one location indicating predation or scavenging. If only feathers are found, 10 or more total feathers or two or more primaries must be discovered to consider the observation a casualty.

Searcher efficiency and predation tests will be carried out at the commencement of the programme in order to calibrate the results to account for the search dog's ability to find bird corpses and to also account for scavenging of corpses by animals.

The collision searches will be carried out on a monthly basis in Years 1, 2, 3, & 5 of the operational phase of the wind farm.

7.5.3 Cumulative Effects

There are 32 wind farms within a 20 km radius of the Development (an area of 1,256 km²). **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 upland locations of the 32 wind farms, 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

⁴⁴ Johnson, G.E. (2003) Avian and Bat Mortality During the First Year of Operation at the Klondike Phase 1 Wind Project, Sherman County, Oregon, Northwestern Wind Power

disturbance of peatland habitats which may support bird species such as Red Grouse and Snipe. The construction of the Development will contribute to an existing and ongoing (unquantified) adverse effect on bird species associated with peatland habitats.

All of the 32 wind farms are within the range of the White-tailed Eagle population and present (or will present when built) some risk of collision for this species. The operation of the proposed Development will contribute to an existing collision risk for White-tailed Eagle. However, with implementation of the mitigation as presented in this report, the risk from the Gortyrhilly Project is minimised.

All of the 32 wind farms are within the range of the Kestrel and present (or will present when built) some risk of collision for this species. The operation of the Development will contribute to an existing collision risk for Kestrel. However, with implementation of the mitigation as presented in this report, the risk from the proposed Gortyrhilly development is minimised.

All of the 32 wind farms are within the range of the Merlin, Golden Plover and Chough and present (or will present when built) some risk of collision for these species. The operation of the proposed development will contribute to an existing collision risk for these three species.

7.6 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT ON BIRDS

With mitigation measures as presented in this report implemented in full, and specifically construction phase mitigation for breeding birds of peatland habitats, as well as measures for White-tailed Eagle and Kestrel (as required) during operation phase, it is considered that the significance of the predicted effects on birds as a result of the proposed Development will range from Imperceptible to Moderate.

Whilst loss of peatland habitat will reduce the area of suitable breeding habitat available for Red Grouse, Snipe and Meadow Pipit (species of high conservation importance), as well as Merlin which may have bred on site in 2018, it is not expected that this will have an adverse residual effect as the loss is a relatively small amount of the available peatland habitat on site. Also, the Habitat Enhancement Plan will mitigate to some extent the loss of peatland habitat. Similarly, the relatively small amount of habitat loss as a result of the development is not expected to have any residual impact on species which use the site for feeding and/or roosting, including Hen Harrier and Kestrel.

The construction phase of the project may result in disturbance to breeding birds within a distance of up to 500 m of the works boundary. This could have adverse effects on scarce

species such as Red Grouse, Snipe and Hen Harrier (latter along grid connection route). With mitigation in place, comprising the use of work restrictive zones around identified nests areas and a seasonal restriction on work for hen harrier, the development is not expected to have any residual impact on these species.

During the operational phase of the project, birds may show some avoidance of suitable habitat as a result of the presence of turbines. Breeding snipe is of most concern as the avoidance zone could be up to 400m from the turbines. While substantial amounts of suitable breeding habitat for Snipe will still exist within the study site, a potential adverse residual impact is identified for Snipe.

During the operational phase of the project, birds will be at some risk of collision with turbines. With mitigation in place, the significance of residual effects will range from Slight (for White-tailed Eagle, Kestrel, Merlin, Chough) to Moderate (Golden Plover).

The baseline surveys did not identify any regular migration routes or local movements of wetland bird species through the site. The project is not expected to have any residual impact on migrating species or local wetland bird populations.

With mitigation in place to prevent pollutants leaving the site during the construction phase (as detailed in the Natura Impact Statement), the development is not expected to have any residual effects on the Special Conservation Interests of The Gearagh SPA or any other Special Protection Area.