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Cummeennabuddoge Wind Farm

Chapter 9: Ornithology (Resubmitted)

Cummeennabuddoge Wind (DAC)

March 2026

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Glossary of Terms

Term	Definition
The Applicant	Cummeennabuddoge Wind Designated Activity Company (DAC)
The Agent	Atmos Consulting Limited
Environmental Advisors and Planning Consultants	Atmos Consulting Limited
Environmental Impact Assessment	A means of carrying out, in a systematic way, an assessment of the likely significant environmental effects from a development
Environmental Impact Assessment Regulations	Schedule 6 of the Planning and Development Regulations 2001(as amended)
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations
The Proposed Development	Cummeennabuddoge Wind Farm
The Proposed Development Site	The land enclosed by the red line shown on Figure 1-1a
The Planning Act	Directive 2011/92/EU (as amended by Directive 2014/52/EU, the EIA Directive).

List of Abbreviations

Abbreviation	Description
BoCCI	Birds of Conservation Concern Ireland
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CRM	collision risk modelling
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
IOF	Important Ornithological Features
IWEA	Irish Wind Energy Association
NIS	Natura Impact Assessment
SAC	Special Area of Conservation
SHD	Strategic Housing Development
SID	Strategic infrastructure development
SPA	Special Protection Areas
VP	Vantage point

9 Ornithology

9.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) describes and evaluates the significance of the effects of Cummeennabuddoge Wind Farm (the Proposed Development) on the ornithological receptors on and in the vicinity of the Proposed Development and study areas. Hereon, in relation to the red line encompassing the site access, turbines and infrastructure, and grid route to Ballyvouskill, the term 'the Site' will be used (as shown in Figure 1-2).

This section of the EIAR comprises results of baseline surveys undertaken between 2018-20 with desk study data compiled in 2022. Further surveys were carried out between December 2023 – August 2024. Technical Appendix 9-1: Ornithology should be read in conjunction with the EIAR.

9.1.1 Statement of Authority

This Chapter and associated Technical Appendices has been prepared by Jenny Bell (BSc Hons), Technical Director Ornithology and Habitats Regulations Appraisal for Atmos Consulting. Jenny has more than 25 years' experience in ornithology. This has included both carrying out and managing ornithology surveys in support of wind farm developments as well as other development types. She has also undertaken a large number of impact assessments and produced EIA chapters for wind farms and other development types. She is an expert in the subject matter and in the species regularly encountered in the area.

9.2 Methodology and Approach

9.2.1 Legislation and Guidance

Relevant planning policy is summarised in the Planning Statement. This section focuses solely on policy/guidance which is relevant to Ornithology.

The following are the key legislative provisions applicable to ornithological receptors in Ireland:

- Wildlife Acts 1976 - 2023
- The European Communities (Birds and Natural Habitats) Regulations 2011 as amended(transposes EU Birds Directive 2009/147/EC and EU Habitats Directive 92/43/EC).
- The International Convention on Wetlands of International Importance 1971.
- Planning and Development Act 2000 (as amended) – Part XAB

In the absence of specific national ornithological survey guidance, the guidance documents published by NatureScot (NS: formerly known by SNH and under which name a number of guidance documents have been published) have been followed to inform this assessment:

- SNH (2000). Wind farms and birds: calculating a theoretical collision risk assuming no avoidance action. SNH Guidance Note.
- SNH (2009). Monitoring the impact of onshore wind farms on birds. Scottish Natural Heritage.

- SNH (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments. Scottish Natural Heritage.
- SNH (2016). Assessing Connectivity with Special Protection Areas (SPAs). Scottish Natural Heritage.
- SNH (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage.
- SNH (2018) Avoidance rate information & guidance note: Use of avoidance rates in the SNH wind farm collision risk model. Scottish Natural Heritage.
- SNH (2018). Assessing Significance of Impacts from Onshore Windfarms on Birds Outwith Designated Sites. Scottish Natural Heritage.
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

In addition the following national guidance or nature conservation assessment was used:

- Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544
- Percival, S.M. (2003). Birds and wind farms in Ireland: A review of potential issues and impact assessment. Ecological Consulting.
- McGuinness, D., Muldoon, C., Tierney, N., Cummins, S., Murray, A., Egan, S. & Crowe, O. (2015). Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland. Guidance Document. Birdwatch Ireland.
- DoEHLG (2018). Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment. Department of the Environment, Community and Local Government.
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.

9.2.2 Appropriate Assessment

The Proposed Development has been the subject of a Natura Impact Statement (NIS) (Atmos Consulting, 2022), which assesses the presence of source-receptor connectivity between the Proposed Development and Natura 2000 sites up to 20km of the Proposed Development for ornithological receptors. The 20km study accounts for core geese foraging ranges as per SNH 2016.

9.2.3 Consultation

The assessment process has been informed by informal scoping with stakeholders regarding the Proposed Development.

Table 9-1 lists the organisations contacted in August 20201 and notes that no meaningful responses in relation specifically to Ornithology were received.

Table 9-1: Consultation

Consultee	Responded	Commented
Cork County Council	Y	Not in relation to Ornithology
Kerry County Council	Y	Not in relation to Ornithology
Department of Agriculture, Food and the Marine Environment	Y	N
Environmental Protection Agency	Y	N
Irish Raptor Study Group	Y	N
Irish Wildlife Trust	Y	N
Bird Watch Ireland	N	N

9.2.4 Assessment

Desk study

A desktop search of designated sites in proximity to the Proposed Development was undertaken using the following criteria:

- Any nationally/internationally designated site with an avian designation (e.g., Natura sites, Natural Heritage areas) within 10km of the Proposed Development boundary; and
- Any internationally designated site with geese as a qualifying feature within 20km of the Proposed Development.

Criteria were chosen based upon likely connectivity of selected receptors (SNH, 2016).

For bird species listed on Annex I of the EU Birds Directive the presence and absence of records was investigated within the National Biodiversity Data Centre to a maximum distance from the Proposed Development (grid square W28) of 10 km.

Field surveys

Figures 9-1a – 9-7 should be consulted in tandem with TA 9-1: Ornithology for further detail relating to the survey methodology synopsis provided below.

Vantage Point Surveys

Vantage point (VP) surveys were undertaken between 30 March 2021 22 and October 2023 and then a further set of surveys was carried out between December 2023 – August 2024. The VPs followed the methodology described in SNH (2017) and consisted of watches of up to three hour duration from fixed vantage points chosen to provide optimal visual coverage of the Site. As per the standard guidance requiring a minimum of 36 hours of observation to be carried out per vantage point for each set of six summer and six months of winter surveys amounting to 72 hours each.

Target species constituted non-passerine species listed under Annex I of the Birds Directive and species on Schedule 4 of the 1976 Wildlife Act.

These were carried out to:

- Determine which birds were present
- Characterise their flight behaviour with respect to their risk of collision

Hen harrier Roost Survey

Eight vantage points were selected for observations, at dawn or dusk, of the land within a 2km buffer of the proposed development area with a view to identifying the presence of Hen harrier roosts in the area. These surveys were conducted over three consecutive winters, 2018-19, 2019-20 and 2020-21 with a total of 699.9 hours observation time spread across spread across the vantage points.

Breeding Raptor Survey

Breeding raptor surveys were carried out within a buffer of 5km around the proposed development site and consisted of a mixture of static vantage point observations from six different locations and transects walked along public rights of way, predominantly roads.

In 2019 four visits were carried out but in 2020 April surveys were not carried out due to covid 19 restrictions on travel to site. A further set of five visits were carried out between March – August 2024.

Breeding Bird Survey

In 2019 four visits were carried out but in 2020 April surveys were not carried out due to covid 19 restrictions on travel to site. Methodology was broadly based on methods described in Bibby *et al*. (2000) and Brown & Shepherd (1993). The survey area extended 500m beyond the site boundary as recommended by SNH, 2017.

A further set of breeding bird surveys was carried out between April – July 2024.

Wintering Bird Survey

Methodology was broadly based on methods described in in Bibby *et al*. (2000) and Gilbert *et al*. (1998). Target species were raptors, waterbirds, gulls, and ground birds of conservation interest. Surveys were carried in in the winter of 2018-2019 and the winter of 2019-2020. There were four survey periods carried out in each winter, in October, December, January and March.

Breeding Red grouse Survey

Red grouse surveys were accomplished by the tape-luring method described in (Cummins *et al.* 2010), under license from the National Parks and Wildlife Service and in suitable habitat within 500m of the site boundary. Four different transect routes were worked in March of 2019 and 2020.

Breeding Woodcock Survey

Woodcock surveys followed the methodology outlined by Gilbert *et al.* (1998) with dusk survey undertaken in forested areas of suitable habitat extending to 500m from the site boundary where access was possible. Surveys involved the slow walking of transects which began one hour before sunset and continued for one hour after sunset or until it was too dark to see.

Three visits were made with two different transect routes for woodcock surveys conducted between 16th March 2019 and 28th June 2019.

Limitations

During Vantage Points surveys the following methodological changes occurred:

- In Dec 2018 VP2 was missed due to poor conditions and access issues. An additional survey were completed in March 2019. Guidance requires 36 hours of survey per season (breeding/non-breeding) and so this is not considered a limitation.

- In May 2019 VPs 1 and 2 were missed due to poor visibility. Additional surveys were carried out in in June 2019 to ensure 36 hours of survey were carried out across the season.

Three hours of VP1, 3 days of breeding walkovers and 5 days of breeding raptor surveys missed in April 2020 due to time constraints caused by COVID restrictions. Given the low activity overall, across most species, these aspects are not considered to be limiting although there is a chance that some failed breeding attempts would have been missed as a result.

Two different collision risk height bands were used during VPs. To rationalise these different approaches to data collation, and because the dimensions for the turbines under consideration are 36.5m at the bottom end and 200m at the top end we have assumed a worst-case scenario for collision risk modelling (CRM) wherein all flights within the height bands between 25-200m are considered to be at collision risk. This is not considered to be limiting but comprises a conservative estimate of collision risk, taking account of the precautionary principle.

With respect to the 2023 – 2024 surveys, the limitations are described in Confidential Appendix 2-6-1 of the RFI report. The main limitation was that due to safety reasons, vantage point surveys which were due to commence in September 2023 were unable to start until December 2023. This may mean that some bird activity in the autumn period may have been missed; given this was the third year of such surveys being undertaken, the implications of this are more limited but have been considered particularly when comparing activity levels between different survey years.

9.2.5 Significance Criteria

The CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018) ("CIEEM guidelines") form the basis of the impact assessment presented in this Chapter. These guidelines set out a process of identifying the value of each ecological receptor and then characterising the "effects" that are predicted, before discussing the effects on the integrity or conservation status of the receptor, proposed mitigation, and residual effects.

The initial stage for assessment of effects is to determine which features should be subject to detailed assessment. The ornithological receptors carried forward for detailed impact assessment should be of sufficient value that effects upon them may be significant in EIA terms. This typically means receptors which have a nature conservation value of greater than local. Where ornithological features have special legal protection (i.e., listed within the EU Birds Directive Annex I) then further consideration may also be given to ensure protection is in place to prevent unlawful acts such as disturbance arising from the Proposed Development.

All designated nature conservation sites, bird species and communities that occur within the "zone of influence" of the Proposed Development are defined as potential ornithological features (as described below). The zone of influence is defined for individual receptors based upon the potential effects and if there is any research showing the range of those effects and guidance such as NatureScot (2018).

Determining Value

The CIEEM guidelines recommend that the value of ornithological features is determined based on a geographic frame of reference. For this project the following geographic frame of reference is used:

- International (populations of species of international importance, e.g., a Special Protection Area (SPA) or significant numbers of a designated population outside the designated site);
- National (populations of species of Irish importance, a nationally important population/assemblage of a species listed on Annex I of the Birds Directive);
- Regional (populations of species of Cork/Kerry Council Area importance combined, e.g., a site/population that meets NHA designation criteria but has not been designated due to better examples being present in the regional area or a regionally important population). Regular or sustained use by important populations of Annex I or species listed as red on BoCCI;
- County (*i.e.*, Kerry) (a population of high conservation birds which represent an important part of the county population of that species);
- Local (*i.e.*, within 5 km) (a population of any species which is important at the local level); and
- Less than local (a population of birds which has little or no intrinsic nature conservation value).
- When assigning value, the usage of the Proposed Development will also be taken into account and will be used to adjust the nature conservation value accordingly. A species can be of high conservation value but may make only incidental or occasional use of the Proposed Development; as such the Proposed Development site has little importance or value to the species in those circumstances.

Predicting and Characterising Effects

In accordance with the CIEEM guidelines, when describing effects, reference is made to the following, where appropriate:

- Magnitude – the size of an effect in quantitative terms where possible;
- Extent – the area over which an effect occurs;
- Duration – the time for which an effect is expected to last;
- Reversibility – a permanent effect is one that is irreversible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A temporary effect is one from which a spontaneous recovery is possible; and
- Timing and frequency – i.e., whether effects occur during critical life stages or seasons.

Both direct and indirect effects are considered. Direct ornithological effects 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 ornithological effects are attributable to an action which affects ornithological resources through effects on an intermediary ecosystem, process, or receptor.

Significant Effects

In accordance with the CIEEM guidelines, a significant effect in EcIA terms, is defined as;

> *"is an effect that either supports or undermines biodiversity conservation objectives for 'important ornithological features' or for biodiversity in general"*

The approach adopted here aims to determine an effect to be significant or not on the basis of a discussion of the factors that characterise it, i.e., the significance of an effect is not dependent on the value of the ornithological feature in question but also considers the magnitude of the effect on the feature. Typically, geographic scale would also be considered and identified for those effects considered significant. This in turn is used to determine the implications in terms of legislation, policy and/or development control.

Any significant effects remaining after mitigation (the residual effects), together with an assessment of the likelihood of success of the mitigation, are the factors to be considered against legislation, policy and development control when determining the application.

Assessment Areas

The bird surveys cover a wide area (Figures 9-1a – 9-7) therefore effects have been assessed within the zone of influence appropriate for each receptor.

9.2.6 Collision Risk Modelling

Methodology for collision risk modelling (CRM) followed the method developed by NatureScot (SNH 2000). It was carried out for the following species that showed sufficient levels of flight activity over the Site during the survey period:

- Greylag goose *Anser anser*;
- Pink-footed goose *Anser brachyrhynchus*;
- Curlew *Numenius arquata*;
- Lapwing *Vanellus vanellus*;
- Golden eagle *Aquila chrysaetos*;
- Whooper swan *Cygnus cygnus*;
- Golden plover *Pluvialis apricaria*;
- Dunlin *Calidris alpina*; and
- Hen harrier *Circus cyaneus*.

A model (Forsythe et al., 1995) was used to calculate the daytime length as a function of latitude (51° 59' 40" N for the centre of the proposed development site) and date (2018 - 2020). Table 9-2 presents the turbine parameters used for the CRM. These were based on the turbine parameters outlined in Chapter 4: Description of Development but using the minimum and maximum turbine blades possible. For the other parameters, these are based on what is typical for turbines of this size (chord, pitch and rotation period), since the model isn't known exactly at this time then typical measures have been used and what has been observed operationally (operational proportion). Increasing the chord and pitch and reducing the rotational period would theoretically increase collision risk further, but are considered unlikely to occur in practice as they could potentially reduce generation capabilities.

The data for the vantage point flight data was collected assuming a minimum swept height of 25m. For model 2, the minimum swept height is 51m; this means that there will be some birds recorded at collision risk height which would actually have been between 25m and 51m in height, so should have been excluded from model 2. However, it is not possible to identify which birds these are. There are two ways to handle this; one is to include all birds which will overestimate collision risk by an unknown amount. The other is to scale flight activity proportionately to the volume of air space removed; however it is known that the relationship between flight activity and flight height is not linear and so this could lead to an underestimate of collision risk. As such, the precautionary approach is to treat all birds as though they were at collision risk height and so this approach has been adopted.

Table 9-2: Turbine parameters used in CRM

Turbine parameter	Value	
	Model 1	Model 2
No. of turbines	17	17
Blades per turbine	3	3
Hub height (m)	118	125.5
Rotor radius (m)	81.5	74.5
Maximum Chord (m)	4.6	4.6
Pitch (degrees)	15	15
Rotation Period (seconds)	4	4
Proportion operational	0.85	0.85

The random CRM was used for all species as they exhibit more random flight patterns as opposed to regular linear flight paths.

In summary, the following steps were followed for random bird movements in this assessment:

- Digitise all flight lines and record relevant characteristics (including species, number of birds, start time of flight and time within each height band) in a database;
- Review the flight line data, which in this instance indicated that a random collision analysis should be conducted for each species;
- Identify all flights for each species that are at any point within the "at risk" height band and sum the total "at risk" flight duration for each VP, multiplying any flight at risk time by the number of birds observed, where more than one bird is recorded per flight line;
- Calculate an "occupancy rate" for each VP, defined as the observed "at risk" activity levels divided by total observation time and area observed, giving the occupancy per unit time and unit area for each VP;
- Average the occupancy rate across the VPs using an un-weighted mean approach;
- Apply the average occupancy rate to the proposed development site, based on the proposed development site area, risk volume and total turbine rotor volume, applying a factor to estimate the total time that the birds could theoretically be active during the year, based on an algorithm for calculating day length (Forsythe et al., 1995), thus determining the total predicted time spent by the individual species within air space that could be swept by turbine blades;

- Run the collision model with relevant turbine and ornithological parameters to calculate the theoretical probability of transits resulting in a collision assuming no avoidance action; and
- Multiply the number of transits by the collision rate, avoidance factor and operating parameters of the proposed wind farm to estimate the theoretical number of collisions per year.

Avoidance rates used were in accordance with current NatureScot guidance on default values (SNH, 2017).

The predicted mortality through collision is dependent on a number of variables, including flight activity within the turbine envelope, using data gathered via surveys, the species' physiology, nocturnal flight behaviour and flight velocity, weather conditions, the predicted avoidance rate, the number, rotational speed and dimensions of the turbines, and the proportion of the time that the turbines are operational throughout the year.

The following assumptions were made for the species included for CRM:

- A daylight calculator was used to produce figures for the total daylight period at the Proposed Development site;
- Biometric data (bird length and wingspan) for the various species was obtained from the BTO webpage; and
- Flight speed data taken from Alerstam *et al*. (2007).

9.3 Baseline Conditions

9.3.1 Desk study

Statutory Designated Nature Conservation Sites

Statutory Designated Sites were searched within 10km of the Proposed Development, extended to 20km for sites with geese due to the fact some geese species will commute up to 20km (SNH 2016). Designated sites for avian interests falling within these categories are shown in Table 9-3. Three designated sites fulfil these criteria.

Figure 8-1 shows the location of designated sites in relation to the Proposed Development.

Table 9-3: Statutory designated sites for avian interests within 10km or, for geese, within 20km of the Proposed Development

Site Name	Special Conservation Interests	Distance from the Proposed Development (including the route used for turbine delivery)
Cork Harbour SPA	Little grebe *Tachybaptus ruficollis* Great crested grebe *Podiceps cristatus* Cormorant *Phalacrocorax carbo* Grey heron *Ardea cinerea* Shelduck *Tadorna tadorna* Wigeon *Mareca Penelope* Teal *Anas crecca* Pintail *Anas acuta*	400m It should be noted this is 400m from associated works along the turbine development route; the distance from the Proposed Development Site is beyond the 20km search area.

Site Name	Special Conservation Interests	Distance from the Proposed Development (including the route used for turbine delivery)
	Shoveler *Anas clypeata* Red-breasted merganser *Mergus serrator* Oystercatcher *Haemotopus ostralegus* Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Lapwing *Vanellus vanellus* Dunlin *Calidris alpina* Black-tailed godwit *Limosa limosa* Bar-tailed godwit *Limosa lapponica* Curlew *Numenius arquata* Redshank *Tringa tetanus* Black-headed gull *Chroicocephalus ridibundus* Common gull *Larus canus* Lesser black-backed gull *Larus fuscus* Common tern *Sterna hirundo* Wetland and Waterbirds	
Mullaghanish to Musheramore Mountains SPA	Hen harrier *Circus cyaneus*	0.17km (1.51km from nearest turbine)
Killarney National Park SPA	Greenland white-fronted Goose *Anser albifrons flavirostris* Merlin *Falco columbarius*	19km

Whilst the Cork Harbour SPA is the closest designated site to the Proposed Development at 400m this is in relation to discrete areas of existing junctions of the TDR which require upgrades to accommodate infrastructure arriving at Cork Harbour. These areas are dominated by asphalt and urban planting (amenity grassland and street trees) unrelated to that used by qualifying features of the Cork Harbour SPA. Works will be carried out in a heavily disturbed urban environment. As such, this SPA is not considered further.

The Mullaghanish to Musheramore Mountains SPA is very close to the Proposed Development and is designated for a species with the potential to nest within young plantation that is present. For this reason, the potential to influence the viability of this SPA population is considered further in section 9.3.2.

Killarney National Park SPA was identified because it lay within 20km of the Proposed Development which is within the ranging distance for some goose species. However, Greenland White-fronted goose will only range up to 8 km from roost (Pendlebury, et al., 2011). The other species for which the SPA is designated has a maximum ranging distance of 5 km from nest sites. As such, since both individuals from the SPA populations will not make use of the Proposed Development, despite its international importance, it is not considered further.

For designated sites relating to Non-avian Ecology see EIA Chapter 8: Biodiversity.

NBDC records

For all Annex I bird species documented on maps at the Biodiversity Ireland website record distribution data, as accessed on 24/10/2022, and refreshed on 30/10/2023 was examined to see how many 10km grid squares within the search area of up to 10km contained records for each species. These were the categorised into bands of distance from the Site (Table 9-4). This tally does not give an indication of the density of records within each grid square or of how recently they've occurred.

Species that are qualifying features for SPAs listed in Table 9-4 are highlighted.

Table 9-4: Presence of Annex I bird species in the data of the National Biodiversity Data Centre at varying distances from the Site

Species	Scientific name	Site (W28/W18)	Within 10km	Considered to be at risk from windfarms (SNH 2018)[1]
Avocet	*Avocetta recurvirostra*	0	1	
Chough	*Pyrrhocorax pyrrhocorax*	0	6	
Corncrake	*Crex crex*	1	7	1
Dunlin	*Calidris alpina*	0	5	1
Golden plover	*Pluvialis apricaria*	0	5	1
Great northern diver	*Gavia immer*	0	1	1
Great white egret	*Egretta alba*	0	1	
Greenland White-fronted goose	*Anser albifrons flavirostris*	0	2	1
Hen harrier	*Circus cyaneus*	12	38	1
Kingfisher	*Alcedo atthis*	2	35	
Little egret	*Egretta garzetta*	0	14	
Mediterranean gull	*Larus melanocephalus*	0	1	
Merlin	*Falco columbarius*	7	15	1
Montagu's harrier	*Circus pygargus*	0	1	
Nightjar	*Caprimulgus europeaus*	0	1	
Peregrine	*Falco peregrinus*	6	15	1
Ruff	*Calidris pugnax*	0	1	
Short-eared owl	*Asio flammeus*	1	3	1
Smew	*Mergus albellus*	0	1	
Storm petrel	*Hydrobates pelagicus*	1	0	
White-tailed eagle	*Haliaeetus albicilla*	0	4	1
Whooper swan	*Cygnus cygnus*	1	23	1

[1]Taken from NatureScot's guidance which identifies species considered to be at risk from windfarms.

Hen harrier and Greenland white-fronted goose are both special conservation interests of SPAs found within the search area, the former from the nearby Mullaghanish to

Musheramore Mountains SPA and the latter from Killarney National Park SPA. Merlin is also a special conservation interest of Killarney National Park SPA. As already identified, for both Merlin and Greenland White-fronted goose the distance between the SPA and the Proposed Development is greater than the distance those species will range.

None of the species in the list above are strongly associated with mature plantation forestry of the type that forms the dominant habitat of the Proposed Development although Hen harrier, Merlin and Short-eared owl will nest in young plantation and Merlin and Hen harrier will both breed along woodland edge. These species, along with Golden plover and Dunlin, breed on moorland habitat such as surrounds the Site. Nightjar, which was recorded in one 10km square adjacent to the 10km square which holds the Proposed Development can make use of mature plantation but was not present in the grid squares which hold the Proposed Development.

Eight species only had one record and so are considered to be non-resident in these areas. The most frequently recorded species were Hen harrier, Kingfisher and Whooper swan.

Corncrake, Kingfisher and Storm petrel, although recorded in the 10 km grid square which holds the Proposed Development are scoped out of further consideration due to the lack of suitable habitat and records of these species during the survey work.

9.3.2 Species Accounts

TA 9-1 Ornithology and Figures 9-1a – 9-7 should be viewed in conjunction with the following accounts.

There was some variance in how flight heights of birds were classified between the two survey periods, which means care must be taken when directly comparing 'at height' activity between the two rounds of survey.

Hen harrier

Hen harrier are a qualifying species of the Mullaghanish to Musheramore Mountains SPA, as well as being listed as an Annex I species of the EU Birds Directive and red-listed on Birds of Conservation Concern Ireland (BoCCI). The most recent estimate of the number of pairs forming the SPA population is five based on data from 2020 (NPWS, 2022).

One flight in 2024 was recorded in August, and was of a juvenile bird. All other observations across all four survey periods occurred in the non-breeding season.

Table 9-5: VP Flight activity of Hen harrier

Year	Max no. of birds (per flight)	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2018/2019	2	6	193	130
2019/2020	1	2	143	0
2020/2021	0	0	n/a	n/a
2023/2024	1	3	255	120

In total, eight individual Hen harrier were recorded during winter roost surveys; seven during the 2018/19 surveys and one during the 2019/2020 surveys. There were no winter roosts identified within the 2 km search area around the Proposed Development or within the Proposed Development in either survey period.

In July 2019 during raptor surveys, a male Hen harrier was seen to the southwest of the Proposed Development and in July 2020 a Hen harrier was seen over the Mullaghanish to Musheramore Mountains SPA, approximately 5km to the southeast of the Proposed Development. The bird was observed flying east, away from the Proposed Development. Surveys indicate that the Proposed Development Site is not regularly used for foraging because only two flights were recorded, during all survey activity, within the Proposed Development boundary and those were on the southern periphery.

In 2024, at the end of the breeding season, there was a sighting of a juvenile (i.e. a bird which had hatched during that breeding season) along with a male bird. The juvenile was recorded during VPs and there was another sighting of a juvenile – potentially the same individual – and the male during the raptor surveys. Peak fledging time occurs between late June to mid July (Hardey, 2013). The absence of any other sightings of Hen harrier during the breeding season shows that the territory this bird came from was not on or close to the area being surveyed. Young birds will move around the area following fledging, moving further and further from the nest site as their skills and independence develop. The observation of this juvenile is considered to be of a bird undergoing this kind of post breeding dispersal.

The most common habitat on the Proposed Development Site – mature plantation forestry – has low suitability for foraging and breeding Hen harrier and this is likely reflected in the recorded low usage by the species. More activity was recorded around the Proposed Development Site during the non-breeding season and there was no evidence of birds using it during the main breeding season, although one juvenile was present at the end of the breeding season. The Proposed Development Site therefore provides limited resources for Hen harrier, but there was some use during the winter months, which may have involved individuals from the internationally important SPA population. However only one flight was recorded over the Proposed Development Site, with all others in the vicinity of the Site. Given this, and the low habitat suitability across much of the Site, but also the possible presence of internationally important individuals, the Site would be assessed as being of county importance.

Merlin

Merlin are listed on Annex I of the Birds Directive and are amber listed on BoCCI. Merlin are considered at risk from wind farms (SNH 2018).

This species has been recorded historically within the 10km grid square which contains the Proposed Development, but incidence during the surveys was very limited. There were three incidental Merlin records from the winter Hen Harrier roost surveys, all of which were outside the Proposed Development Site and no other observations. As such, this species appears to forage occasionally in the wider area during the non-breeding season, but there is no evidence for breeding.

There was no recorded use of the Proposed Development Site by Merlin. As such, it is evaluated as being at less than local for this species due to absence from the Proposed Development and low suitability of habitat present.

Greenland white-fronted goose

Greenland white-fronted goose were not observed during field work. The maximum commuting range for this species is 8km (SNH 2016) and as the Site is approximately 19 km from Killarney National Park SPA it lies beyond the core foraging distance for this species.

As a result of the lack of occurrence of this species, the distance between the SPA population and the Proposed Development and the lack of suitable habitat for this species the Proposed Development Site is assessed as being less than local.

Golden plover

Golden plover are listed on Annex I as well as being red listed on BoCCI. They are considered at risk from wind farms (SNH 2018).

Flocks of up to 175 birds were seen during winter VP surveys and, to a lesser extent, during winter walkover surveys. No activity was observed during any breeding season (April – September) period. Winter activity between 2018 - 2021 was focused on high, open moorland surrounding the Proposed Development Site, including on Mullaghanish Bog SAC, Knocknagowan to the north and Gneeves to the northeast, with only a small amount of activity over the south of the Proposed Development (Figure 9-5b). However if flight activity was observed, it involved larger numbers of birds which resulted in the highest at risk flight activity for any target species.

In 2023/2024 activity was largely seen from VPA; activity appears more limited in previous years but did include only one of the migration periods when Golden plover are likely to occur. A comparison of the data from the 2023/24 spring data with the spring data from previous years shows it falls within the range of data from the previous three years (Table 9-6). There may be a decline in activity occurring over time, however.

Table 9-6: VP Flight activity of Golden Plover

Year	Max no. of birds (per flight)	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2018/2019	175	12	73,094	61,140
2019/2020	85	10	77,584	69,750
2020/2021	66	6	3,762	4,038
2023/2024	20	6	4,890	2,790
Data between December - March only				
2018/2019	175	7	40,744	30,540
2019/2020	25	4	8,430	7,150
2020/2021	n/a	0	n/a	n/a
2023/2024	20	6	4,890	2,790

The smaller national breeding population is supplemented in the winter months by birds that breed most likely in the Arctic and so the wintering Irish Golden plover population is larger. This is reflected in the flocks of birds which were present during the winter, making use of wetland habitat in the environs of the Proposed Development. However, the Proposed Development Site itself has limited use for this species due to the coverage of plantation forestry. Nevertheless, the presence of a wintering population in the environs of the Proposed Development would indicate the area is of county importance for this species.

Peregrine

Peregrine are a species listed on Annex I of the Birds Directive and which are considered to be at risk from wind farms (SNH 2018). A single flight at risk height was recorded during a winter VP survey in 2019. This was to the east of the Proposed Development where the proposed access track joins the larger, main site (Figure 9-1a).

During Breeding Raptor surveys Peregrine was seen on nine occasions. In 2019 there were three records including vocalising birds in the vicinity of Claragh Mountain approximately 5km northwest of the Site. In 2020 all records of Peregrines were around 4.5km away from the site boundary where birds were watched attending a nest on 21/07/2020 and are believed to have fledged two young.

Table 9-7: VP Flight activity of Peregrine

Year	Max no. of birds (per flight)	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2018/2019	n/a	0	n/a	n/a
2019/2020	1	1	74	74
2020/2021	n/a	0	n/a	n/a
2023/2024	n/a	0	n/a	n/a

A Peregrine territory was identified within the wider survey area, although 4.5km from the Proposed Development. However, although the Proposed Development lies within the ranging distance of birds from this territory (Pendlebury, et al., 2011), flight activity was observed on one occasion only and this was a non-breeding season flight. Given that, the Proposed Development appears to offer habitat of low suitability for foraging Peregrine. Therefore, while the territory is of importance at the country scale, the use of the Proposed Development by the species suggests that it is of local importance.

White-tailed eagle

White-tailed eagle are an Annex I species, are red-listed for breeding on BoCCI and are considered at risk from wind farms (SNH 2018).

A juvenile bird was spotted high over the summit of Knocknagown to the north of the Site during the 2019 breeding season VP season. A juvenile was also spotted once during winter walkover surveys, approximately 600m from the northeast of the Site at its closet point and flying away from the Site 5-10m above ground over open bog.

Table 9-8: VP Flight activity of White-tailed eagle

Year	Max no. of birds (per flight)	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2018/2019	1	1	360	0
2019/2020	n/a	0	n/a	n/a
2020/2021	n/a	0	n/a	n/a
2023/2024	n/a	0	n/a	n/a

White-tailed eagle were re-introduced to Ireland between 2007-2011; the first successful breeding occurred in 2012, with an estimated 8-10 breeding pairs by 2020. As such, any individual carries a high conservation value due to the small and still fragile re-establishing population.

Juvenile White-tailed eagles range greatly during the initial years of their life, before settling into areas of suitable habitat that they then use as the base for their territory. Young birds were seen on two occasions and it is likely these represent occasional occurrence of young birds which are ranging widely. As such, the Proposed Development Site does not provide regular supporting habitat and there is no evidence to suggest any breeding will be attempted; the current habitat present is not suitable for eagle foraging, although they can and do nest in trees.

Because of this, the Proposed Development Site is considered to be of less than local importance to this species.

Whooper swan

Whooper swan are listed on Annex I and are amber listed on BoCCI. They are considered to be at risk from wind farms (SNH 2018).

Whooper swan has been recorded from W28, the 10 km grid square which contains the Proposed Development and some surrounding grid squares. However there were no records of this species during surveys and the Proposed Development holds little suitable habitat for this species. As a result, the Proposed Development is assessed as less than local for this species.

Short-eared owl

Short-eared owl are listed on Annex I of the Birds Directive and they are amber-listed on BoCCI for breeding. They are considered to be at risk from wind farms (SNH 2018).

Short-eared owl has been recorded from W28, the 10 km grid square which contains the Proposed Development and some surrounding grid squares. However there were no records of this species during surveys and the Proposed Development holds little suitable habitat for this species. As a result, the Proposed Development is assessed as less than local for this species.

Buzzard

Buzzard are green-listed on BoCCI. Three flights were recorded across both winter VP seasons (Table 9-9) with all flight seconds at risk height. Four records were observed during Breeding Raptor surveys across the survey area but no evidence of breeding was recorded.

In 2023/24, Buzzard were recorded 'occasionally' as a secondary species. At least one territory was identified within the survey area but there was little activity within the Proposed Development Site.

Table 9-9: VP Flight activity of Buzzard

Year	Max no. of birds (per flight)	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2018/2019	1	2	136	136
2019/2020	2	1	730	730
2020/2021	n/a	0	n/a	n/a

Given the only occasional occurrence of the species, with no evidence of breeding, and the increasing population and range of this species which has seen population expansion into the west over the past 20 years, usage of the Proposed Development was limited. As such, it would be assessed as being of local value.

Kestrel

Kestrel are red-listed on BoCCI for breeding. This species is not considered to be at risk from wind farms (SNH 2018).

There were 25 records across all VP surveys (Table 9-10) between 2018-2021, 20 of which were during winter periods (see TA 10-1, Appendix A). Flights included use of the Proposed Development Site. There were 16 records of Kestrels distributed across the

raptor survey area but with no evidence of breeding. A small number of localised flights were also recorded during Breeding Bird surveys.

In 2023/24 the usage changed with all flights recorded during the breeding season. Two territories were identified, one on the boundary of the Proposed Development, where fledged young were observed and one approximately 200m south of the Proposed Development (RFI Confidential Appendix 2-6-1). Despite this, there was relatively little activity of the species within the Proposed Development Site, probably due to the largely unsuitable habitat present within the boundary.

Table 9-10: VP Flight activity of Kestrel

Year	Max no. of birds (per flight)	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2018/2019	1	12	403	58
2019/2020	1	13	2197	170
2020/2021	n/a	0	n/a	n/a
2023/2024	2	27	1,850	1,180

Kestrel are generally widespread although populations have been declining recently. The species was recorded relatively frequently; given the activity levels across all surveys, breeding attempts may have gone unnoticed in the 2018 – 2021 period. Breeding was recorded during the 2023/24 surveys. However given usual population densities suggested for this species (between 0.85 – 1.79 birds per km^2) (Crowe, 2014) activity levels do not suggest a local population which is of county importance; as such it is assessed as being of local importance for Kestrel.

Little egret

Little egret are listed on Annex I. They are a species which has recently recolonised Ireland, with first breeding in 1997, but since that time have spread nationally. Their risk from wind farms has not been assessed.

Three birds were observed passing through the Site during the survey programme on one occasion (Table 9-11). There are suitable watercourses for this species to make use of – for example the one that runs adjacent to the northern boundary – but with only one observation it appears they do not make regular use of the Proposed Development.

Table 9-11: VP Flight activity of Little egret

Year	Max no. of birds (per flight)	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2018/2019	3	1	84	84
2019/2020	n/a	0	n/a	n/a
2020/2021	n/a	0	n/a	n/a
2023/2024	n/a	0	n/a	n/a

As such the Proposed Development would be assessed as being of less than local value to this species.

Snipe

Snipe are red-listed on BoCCI. They are not considered at risk from wind farms, although wind farms have been found to have an effect on breeding density (Pearce-Higgins J.

S., 2012), with reduced density during construction, but also lower densities found on operational wind farms, suggesting that effects of disturbance and displacement could both be at play. The breeding population is supplemented by migrants likely from the Arctic during the non-breeding season.

No activity was recorded at collision risk height during VP surveys and all flight activity was recorded during the non-breeding season. During the winter walkovers, there was a concentration of this species around Lough Carrignamork and Lough Gal southwest of the Proposed Development and within the Proposed Development adjacent to these waterbodies. There were also several records from the area east of the Proposed Development. One territory was present as one bird was heard drumming in March during the last of the winter walkover surveys.

In 2023/24 a single Snipe was recorded during vantage point surveys flying along the watercourse to the north of the Proposed Development in March.

Table 9-12: VP Flight activity of Snipe

Year	Max no. of birds (per flight)	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2018/2019	3	6	272	0
2019/2020	n/a	0	n/a	n/a
2020/2021	n/a	0	n/a	n/a
2023/2024	1	1	30	0

Although there was some evidence for breeding, it appeared most activity for this species occurred during the non-breeding season, with birds using the waterbodies outside the Proposed Development boundary. Activity was greater in the area adjacent to the Proposed Development than within the Proposed Development.

Snipe are generally widespread, Although there was evidence of breeding, only one territory was recorded. Higher levels of activity were recorded around the waterbodies to the southwest of the Proposed Development Site but although birds were persistently present, the most recorded at any one time were two. As such, there does not appear to be any evidence for a concentration of birds which would be evaluated as greater than local importance.

Red grouse

Red grouse are red-listed on BoCCI for breeding.

There were low numbers of records from both VP (Table 9-14) and bespoke Red grouse surveys (Table 9-13) which demonstrated that they are present around the Proposed Development but in small numbers.

Table 9-13: Red grouse survey results

	Transect 2		Transect 3	
Row Labels	Number of records	Number of birds	Number of records	Number of birds
March 2019	1	1		
March 2020	7	7	2	2

Table 9-14: VP Flight activity of Red grouse

Year	Max no. of birds (per flight)	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2018/2019	2	2	45	0
2019/2020	2	1	20	0
2020/2021	n/a	0	n/a	n/a
2023/2024	n/a	0	n/a	n/a

The Proposed Development contains little suitable habitat for this species with most records coming from the surveys' buffers. At the same time given the number of records from the March 2020 Red grouse survey, and given the generally localised and low population for this species, a precautionary evaluation of county is given for this species; this would relate to the population in the immediate environs of the Proposed Development rather than the Proposed Development Site itself which has limited value for this species.

Woodcock

Woodcock are red-listed on BoCCI for their declining breeding population. The breeding population is highly localised and they are strongly associated with forestry.

Small numbers of Woodcock were recorded during transects on forestry tracks within or close to the Proposed Development (Table 9-15). All records are of birds displaying over woodland indicating that Woodcock breed in small numbers within the plantation.

Table 9-15: Breeding Woodcock survey results

	Transect 1 Clydaghroe East	Transect 1 Clydaghroe West	Transect 2 Clydaghroe East	Transect 2 Clydaghroe West	Grand Total
May	**1**	**1**	**1**	**1**	**4**
16-May	1	0	1	0	2
30-May	0	1	0	1	2
Jun	**1**	**1**	**0**	**1**	**3**
10-Jun	0	1	0	1	2
20-Jun	1	0	0	0	1
Grand Total	**2**	**2**	**1**	**2**	**7**

Due to the localised nature of the distribution of this species in the south-west of Ireland, where they are only recorded in a handful of locations, and the number present during breeding surveys, it is considered that the Proposed Development is of regional importance for this species.

Sparrowhawk

Sparrowhawk is green-listed on BoCCI. Observations were made in both breeding and winter surveys with all records, with the exception of one VP flight, occurring outwith the Proposed Development Site. Most flights were limited in length and duration. Sparrowhawk was not considered a target species during the 2023/24 surveys, but flights were recorded occasionally and it was considered there was at least one territory present in the survey area, in part due to the occurrence of suitable habitat within the Proposed Development Site.

Table 9-16: VP Flight activity of Sparrowhawk

Year	Max no. of birds (per flight)	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2018/2019	1	5	137	48
2019/2020	1	1	20	0
2020/2021	1	1	7	0

Sparrowhawk has an estimated population density of between 0.86 - 2.21 birds per km^2 (Crowe, 2014). Given that, the number recorded during surveys does not suggest that the population present is of any greater importance than local.

9.3.3 Receptors Brought Forward for Further Assessment

Following CIEEM guidance, further assessment is not required where there is no possibility of significant adverse effects upon the ecological feature. Given the potential impacts likely to occur on ornithological features as a result of a wind farm development, it is highly unlikely that that any receptor which has been evaluated as having a value of local or lower would result in a significant adverse effect. As a result, only receptors of county or higher are considered further.

The following receptors are therefore brought forward for assessment:

- Mullaghanish to Musheramore Mountains SPA;
- Hen harrier;
- Golden plover;
- Red grouse; and
- Woodcock.

9.4 Assessment of Effects

The assessment of effects takes into consideration that birds are mobile species. The baseline data is a snapshot in time which does not capture the full variability in how birds may move around the area. Additionally, the application is for a range of turbine parameters.

For collision risk modelling, the maximum and minimum swept areas were modelled; the relationship between swept area and collision risk is not simple or intuitive but is affected. In addition, the methodology does not fix the turbines to any particular locale, but instead considers them to be present within the viewshed only. As such, any movement of the turbines would not change the collision risk estimates.

9.4.1 Construction Effects

The following effects may arise during construction:

- Direct and/or indirect habitat loss - This is likely to be a continuous process, with effects carrying over into the operational phase as well; and
- Disturbance and displacement as a result of human activity associated with the construction phase of the Proposed Development. Although disturbance and displacement are different processes, there is also overlap between where a regular source of disturbance becomes functional displacement with birds avoiding the disturbance source; as a result they are considered together.

These potential effects are addressed for each receptor brought forward for assessment.

Mullaghanish to Musheramore Mountains SPA

Potential effects on Hen harrier from the SPA are considered in the separate assessment of effects upon Hen harrier (see the following section).

The Proposed Development lies 500m from the SPA; at that distance there will be no significant effects upon the habitats present within the SPA and no adverse effects on the SPA itself.

Hen harrier

The area of forestry will be reduced within the Proposed Development, while open habitats will be increased due to the need to open the forest canopy to facilitate the construction of the wind turbines and associated infrastructure. This would benefit Hen harrier as they make only limited use of mature plantation (Madders, 2000), even allowing for the loss of pre-pricket forestry in the forestry rotation due to the area being removed from the rotation. But it will also increase the ratio of boundary edge between forest and open ground which has been implicated in reduced breeding success for Hen harrier in second rotation forestry (Wilson, Fernandez-Bellon, Irwin, & O'Halloran, 2015) (Fernandez-Bellon, Irwin, Wilson, & O'Halloran, 2015).

However, since Hen harrier made no use of the Proposed Development during the breeding season this would have a negligible effect on the habitat quality for the species which would not be considered significant.

Similarly there would be no disturbance/displacement effects on breeding Hen harrier during the construction phase; no breeding Hen harrier were identified. Given the absence of the species during surveys, any usage of the Proposed Develoment would be at most very occasional and so unlikely to occur during the construction period. There was limited use during the non-breeding season, with no roosts detected and very few flights recorded.

As such, while there could be some disturbance as a result of the increased human activity in connection with the Proposed Development the low level of bird activity recorded and the short term nature of the disturbance where it would extend across two non-breeding seasons at the most would mean the effect would be considered minor and not significant.

There will be no significant effects upon Hen harrier, either of the SPA and of the wider countryside during the construction phase.

Golden plover

Golden plover were present only in the non-breeding season, using moorland around the Proposed Development. As such, there would be no effect upon habitat or habitat quality for this species and it would therefore be considered not significant.

Similarly, due to the areas which the wintering birds are foraging being in the vicinity of the Proposed Development rather than within it, there is limited potential for disturbance effects as the birds are already removed from areas where the greatest disturbance will occur. Because of this, and the short term nature of construction, disturbance effects are therefore assessed as minor, which would result in a not significant effect.

There would therefore be no significant effects upon the Golden plover population during the construction phase.

Red grouse

Most records for this species have come from the moorland surrounding the Proposed Development rather than within the Proposed Development itself. The creation of additional open ground habitats within the Proposed Development could be beneficial to this species although increased predation potentially associated with edge effects could reduce the benefit gained by this species.

As such, habitat changes associated with the Proposed Development are unlikely to have an adverse effect on this species, but they may result in no improvement either. However this would mean there was no significant adverse effect as a result of habitat changes.

Most breeding is likely to occur outwith the Site due to habitat suitability and as such, effects such as those identified in studies (Pearce-Higgins J. S., 2012) which found fewer birds present during construction are unlikely to occur. Even if this were to occur, the effect is short term, as the same study showed recovery of the population following construction.

As a result, there will be no significant effects on disturbance on Red grouse during the construction phase.

Woodcock

In total approximately 30 ha of forestry plantation will be felled and the canopy opened where trees are felled for the Proposed Development. Woodcock are a species that breed in forest so this will represent a loss of habit for this species. The forest is already commercially managed under rotation so to some extent, the population is habituated to a mixture of closed and open canopy forestry. The habitat loss will be scattered (from an ecological viewpoint) in small patches across the landscape, rather than as one large block of loss.

Although Woodcock are a species that breed in forest, they do also make use of open areas for foraging/and or nesting within that forest (Hoodless, 2007) so a more diverse structure to the forest with more ground vegetation which is used for foraging and brood rearing could be advantageous.

Due to the uncertainty around the ecology of this species, a precautionary effect of minor is assessed for the loss/change in habitat but it is considered to be not significant.

Woodcock is a secretive species and as a result little is understood about effects of disturbance on this species. However, given the population is breeding in a commerical forest they appear able to adapt to some degree of human disturbance. The species is known to have a relatively small home range (c. 60 ha) but can move between different locales while foraging. It is considered that there would be temporary localised disturbance of the species during construction.

There would therefore be no significant effects upon the Woodcock population during the construction phase.

9.4.2 Operational Effects

The following effects are considered for the operational phase:

- Disturbance/displacement including barrier effects; and
- Additional mortality as a result of collision risk.

Mullaghanish to Musheramore Mountains SPA

Operational effects upon Hen harrier are considered under the assessment for that species. There would be no other operational effects upon the SPA due to the distance between the Proposed Development and the SPA. As a result there would be no significant effects.

Hen harrier

There is contradictory evidence for displacement effects of Hen harrier around wind farms. A study on Scottish wind farms (Pearce-Higgins, 2009) showed a 53% reduction in foraging activity within 500m of turbines during the breeding season; however this has not been replicated on more detailed long running studies of individual wind farms in Scotland (e.g. Edinbane wind farm (Fielding, 2015); also (Haworth, 2013)). Concerns have also been raised over studies from Ireland which appeared to show a reduction in breeding productivity within 1km of wind farms (Fernandez-Bellon, Irwin, Wilson, & O'Halloran, 2015) (Wilson, Fernandez-Bellon, Irwin, & O'Halloran, 2015). These results were not statistically significant however, so the result could indicate a negative relationship, but it could also be a stochastical chance and not be indicative of the effect of wind farms.

However, in this situation, the contradictions that arise from the results of other studies are simplified by the fact that Hen harrier did not make use of the Proposed Development during the breeding season. There cannot be a displacement effect if the resource is not used or is not used in a way which is measurable.

Hen harrier was only recorded during surveys in the non-breeding season. However during the non-breeding season Hen harrier can range widely (for example, birds have been seen making use of at least two roosts, more than 10km apart (O'Donoghue, 2010)) and so can forage more widely than territorial pairs which are linked to having to return repeatedly to a nest location. Displacement effects, where they have been identified during the breeding season, have been on a very small scale which if they were to occur during the winter months would not be considered significant to a species with large winter ranges and which was recorded with only a low level of usage.

As such, any effect would be at most minor and would be not significant.

Because flight activity was recorded within the Site during the non-breeding season, collision risk was calculated for this species. The results are shown in **Error! Reference source not found.**. This shows that over the 35 year lifetime of the wind farm, less than one Hen harrier would be expected to collide. It is predicted there would be one death over 729 years of operation; while there is a chance for one death, it is extremely low. This level of additional mortality is low enough that it would not have a significant effect on the Hen harrier population.

Table 9-17: Estimated collision risk for Hen harrier

Period	Corrected Annual Risk Model 1 / Model 2		No. of years per collision Model 1/Model2		No. of birds colliding over 35 years Model 1/Model 2	
Non-breeding	0.001	0.001	729.6	737.2	0.048	0.047
Breeding	0.000	0.000	0.0	0.0	0.000	0.000
Annual	0.001	0.001	729.6	737.2	0.048	0.047

Golden plover

While there is evidence of displacement effects on breeding Golden plover from wind farms, the population present around the Proposed Development is a wintering population and there is little readability from the situation on breeding grounds to wintering grounds. Additionally, any displacement effects would be reduced by the fact that Golden plover are present in the vicinity of the Site, not within the core of the Site itself.

As such, given the larger population present during the winter months and the unsuitable habitat present within the Proposed Development Site, which would lead to a reduction in both the likelihood of this occurring and the strength of any effect if displacement does occur.

As such, the effect would not be considered to be greater than minor, and therefore would not be significant.

Golden plover flights were observed over the Proposed Development. As a result, collision risk was calculated for this species (**Error! Reference source not found.**). This shows a predicted mortality of approximately two birds per year, amounting to around 78 birds over the 35 year lifetime of the Proposed Development.

Table 9-18: Estimated collision risk for Golden plover

Period	Corrected Annual Risk Model 1 / Model 2		No. of years per collision Model 1 / Model 2		Number of birds colliding over 35 years Model 1 / Model 2	
Non-breeding	2.197	2.236	0.5	0.45	76.887	78.251
Breeding	0.000		0.0		0.000	
Annual	2.197	2.236	0.5	0.45	76.887	78.251

This is set against the observed wintering population where flocks of up to 175 birds were recorded at any one time. This level of mortality would not be sufficient to have a noticeable effect on the population; it is also likely that birds using the site come from a number of different breeding populations and so the mortality would be dispersed across several breeding populations.

As such, the effect would be considered minor and not significant.

Red grouse

There is limited evidence for displacement effects of wind farms on Red grouse populations; studies have found no reduction in density in proximity to turbines (Pearce-Higgins J. S., 2009) and that while poplations can decline during the construction phase they recover on operational developments (Pearce-Higgins J. S., 2012).

Any displacement effects would be limited by the fact that most Red grouse were recorded on surrounding moorland, rather than within the forestry of the Proposed Development. As such, displacement effects would be highly limited given the limited use grouse appear to make of the Proposed Development and lack of evidence for long term effects. The effect would therefore be considered negligible and not significant.

No flight activity was recorded for this species at collision risk height which means that while there may be collision risk associated with this species, it is so low as to not be detectable. Grouse do typically fly at low level though and would likely be below collision risk height.

As such, effects of collision mortality would be negligible and not significant.

Woodcock

There is limited evidence for the effects of wind farm developments on Woodcock. It is known they are not displaced by increased disturbance as a result of simulated hunting (Ferrand, 2013) although some behaviour changes were observed. As a secretive woodland species, which relies on camouflage to escape notice the assumption is that that behaviour is likely to tend to be a species which is relatively resilient to disturbance and displacement effects.

However, it has been found that there is a reduction in Woodcock vocalisations on sites with wind farms present (Engler, *et al*., 2025); this does suggest there is an effect of developments on Woodcock, although the study did not look at pre development populations, to establish if this was an effect that did not exist before the wind farm was constructed. It is also not clear if the reduction is due to displacement or birds roding less to avoid competition with the noise from wind farm generation. The study did demonstrate that Woodcock can co-exist alongside wind farm developments so if there are displacement effects, they are not displaced entirely. At the same time, displacement effects cannot be ruled out, and given the regional value of this population, displacement due to this could rise to the level of a significant effect.

It therefore cannot be ruled out that the Proposed Development would have a significant adverse effect on the population at the regional level. However, the geographical limitation on the scale of effect would mean the effect would not be considered significant with respect to disturbance/displacement having regard to the objectives of the Birds Directive, given the limited geographical effect.

No flight activity was observed at collision risk height during flight activity surveys. Woodcock do carry out an aerial display, known as 'roding' at dawn and dusk and into the night. Additionally birds will leave forests to feed on nearby pasture at night and so flight activity might have been under-recorded for this species. However, certainly for roding, the flight height is relatively low, typically less than tree top height which would be less than collision risk height.

As such, their exposure to collision risk would be limited which would keep any additional mortality negligible and not significant.

9.4.3 Decommissioning Effects

Decommissioning effects are considered to be a reduced version of those already assessed during the construction stage and as such, have already been assessed.

9.5 Mitigation and Monitoring Measures

The following mitigation measures and good practice will be applied to the project to ensure that any effects on the Important Ornithological Features (IOFs) are reduced.

Additionally, the monitoring programme, which runs alongside the mitigation measures during construction and in the post construction environment allow some of the described mitigation (such as nest protection) to be put in place.

9.5.1 Construction

Full details of all construction mitigation measures, including those identified as part of the process for providing biodiversity mitigation are provided in Technical Appendix 4-1 CEMP. These documents include detailed information on the following ecology related activities which will also be involved in delivering and overseeing the ornithological programme of mitigation and monitoring:

- Works will be overseen by an Ecological Clerk of Works (ECoW) and their role and responsibilities are detailed in the CEMP.
- An ECoW will be present during construction to undertake regular Site inspections and oversee the monitoring/mitigation programme to ensure that effects on birds are managed to as low as reasonably possible and wildlife legislation is complied with.

In addition, the ECoW will

- Where possible, vegetation clearance will be undertaken outwith the breeding season (mid-March – August inclusive) which will protect active nests. However, if vegetation is required to be removed within the breeding season it will be searched by a suitably qualified ecologist no more than 24 hours before removal to check for the presence of nests. This will involve ecologists doing detailed and intensive surveys and hand searches of the vegetation in the area to be removed, checking it thoroughly, watching it over periods of time for any evidence of breeding activity Should any nests be identified, a no-disturbance buffer will be put in place by the ECoW within which no works will occur unless supervised by the ECoW. This buffer will be no less than 5m and will remain in place until the nest is no longer in use;
- Put in place nest protection of any nests identified as part of the ongoing surveys described in section 9.4.3. Disturbance buffers will use the distances identified in (Goodship & Furness, 2022) for those species listed in that document. For all other species, the nest shall be protected by at least a 5m buffer. The location and nature of buffers will be communicated to site staff as part of the updates on environmental protection measures. Once breeding has ended, the ECoW will confirm this and document the removal of the buffer;
- It is unlikely, given the historic pattern of breeding for Hen harrier, that any Hen harrier breeding should occur. However, should any breeding Hen harrier be identified then in line with published guidance on disturbance distances (Goodrow & Furness) a buffer of 500-750m will be established within which no access will occur until the nest is no longer active. The exception to this is use of access tracks, which

can be used if the nest established while the track was already in use. If the track was not in use, then the full buffer will apply.

9.5.2 Do-Nothing Scenario

The Site is dominated by commercial forestry plantation and high open ground, some of which is clear-felled plantation. An alternative land-use option to the development of a renewable energy project would be to leave the Site as it is, with no changes made to existing land-use practices. Commercial forestry operations would continue at the Site.

The existing surrounding commercial forestry operations can and will continue in conjunction with the Proposed Development.

See Chapter 3: Design Evolution and consideration of Alternatives for further information.

9.5.3 Monitoring

Pre-construction surveys

During construction, surveys and pre-construction checks will be carried out to enable any protected or sensitive breeding or roosting locations to be identified within the Proposed Development and measures detailed below put in place to protect them.

Breeding raptor surveys will be carried out to monitor for the presence of Hen harrier in the vicinity of the Proposed Development in the breeding season before construction commences. These will be carried out between April – July, following published methodology (Hardey, 2013) to inform the identified mitigation for this species by updating existing knowledge on the species' distribution on the Site.

Surveys should take the form of breeding raptor surveys, with four surveys carried out monthly between April – July as per guidance (Hardey, 2013).

During the breeding season when construction is occurring, a programme of ongoing surveys and checks will be carried out across the Site to check for the presence of breeding birds. These will focus on areas where construction is occurring, but also for Hen harrier, survey for any Hen harrier activity which may indicate the presence of breeding within the Proposed Development.

- Should any nests be identified then where possible, a no-disturbance buffer will be put in place by the ECoW within which no works will occur unless supervised by the ECoW. This buffer will be no less than 5m and will remain in place until the nest is no longer in use.

Woodcock

The following measure has been identified to enhance the understanding of Woodcock's response to wind farms, given the uncertainty and lack of understanding on this subject. The Proposed Development would provide an opportunity to investigate the ecology of the species further, identifying the response to the wind farm and with potential to identify management practices which could support the species either within this woodland or elsewhere.

Given the lack of knowledge of the species' response to wind farms, a Woodcock monitoring programme will be instigated, aiming to provide more information on how the Woodcock on the Site respond to the Proposed Development.

This will involve targeted woodcock surveys prior to works commencing on Site to update the baseline data prior to carrying out a targeted programme of monitoring with a view to comparing levels of breeding woodcock activity pre and post construction to see if there is any spatial change in use of the Site pre and post construction, both in relation to the wind farm but also forestry use of the Site. Ideally this would involve use of a control site, if a suitable site can be identified, to enable conclusions about any identified changes in activity to be referenced to activity in other locales not subject to development. Surveys would take the format of repeated Woodcock activities prior to construction on both sites, and then following construction on both sites.

Outcomes for this programme will look to identify if there is a displacement effect upon Woodcock, as has been predicted during operation, as a result of the development, enabling better assessment of the implications of wind farm development on this species.

9.6 Assessment of Residual Effects

9.6.1 Construction Effects

Mullaghanish to Musheramore Mountains SPA

There were no significant adverse effects identified on the Mullaghanish to Musheramore Mountains SPA prior to the consideration of mitigation. Therefore the residual effect will be no significant adverse effects on the SPA.

Hen harrier

No significant adverse effects upon Hen harrier, either of the SPA or of the wider countryside population which will occur during the construction phase were identified as a result of the impact assessment. Because of this the residual effect is also that there will be no significant adverse effects on Hen harrier during the construction phase.

Golden plover

No significant adverse effects upon Golden plover which will occur during the construction phase were identified as a result of the impact assessment. Because of this the residual effect is also that there will be no significant adverse effects on Golden plover during the construction phase.

Red grouse

No significant adverse effects upon Red grouse which will occur during the construction phase were identified as a result of the impact assessment. Because of this the residual effect is also that there will be no significant adverse effects on Red grouse during the construction phase.

Woodcock

No significant adverse effects upon Woodcock which will occur during the construction phase were identified as a result of the impact assessment. Because of this the residual effect is also that there will be no significant adverse effects on Woodcock during the construction phase.

9.6.2 Operational Effects

Mullaghanish to Musheramore Mountains SPA

Operational effects upon Hen harrier are considered under the assessment for that species. There would be no other operational effects upon the SPA due to the distance between the Proposed Development and the SPA. As a result there will be no residual significant effects.

Hen harrier

No significant adverse effects upon Hen harrier, either of the SPA or of the wider countryside population which will occur during the operational phase were identified as a result of the impact assessment. Because of this the residual effect is also that there will be no significant adverse effects on Hen harrier during the operational phase.

Golden plover

No significant adverse effects upon Golden plover which will occur during the operational phase were identified as a result of the impact assessment. Because of this the residual effect is also that there will be no significant adverse effects on Golden plover during the operational phase.

Red grouse

No significant adverse effects upon Red grouse which will occur during the operational phase were identified as a result of the impact assessment. Because of this the residual effect is also that there will be no significant adverse effects on Red grouse during the operational phase.

Woodcock

A precautionary significant effect was assessed due to displacement during the operation of the Proposed Development as a result of there being some evidence of reduced vocalisations from Woodcock in wind farms in Europe. It is not clear what causes this difference so a precautionary significant effect has been assessed in case this is a displacement effect of wind farms. There is no known mitigation which would reduce the potential for this impact, so the residual effect would remain as significant. Monitoring has been proposed which would allow any effects to be identified and better understood.

Additional mortality as a result of collision risk was assessed as not significant.

9.6.3 Decommissioning Effects

Decommissioning effects are considered to be a reduced version of those already assessed during the construction stage and as such, have already been assessed.

9.6.4 Cumulative Effects

Cumulative effects can occur where low level effects from one development combine with the effects from other developments to result in significant effects across a wider area. For ornithological receptors this typically means greater effects of disturbance/displacement and also increased collision mortality. Effects can arise during the construction phase, both if construction is carried out simultaneously or

consecutively. Simultaneous effects mean the area of effect is greater. Consecutive construction means the timescale of any effect is longer which can result in greater effect.

A planning search was carried out to identify permitted and constructed projects in the wider receiving environment. Projects in the wider area within 10km of the Proposed Development were identified using various online resources including:

- Kerry County Council planning viewer https://www.kerrycoco.ie/planning/online-planning-enquiry/;
- Cork County Council planning viewer http://planning.corkcoco.ie/ePlan/SearchTypes;
- An Bord Pleanála (Strategic infrastructure development (SID) applications, Strategic Housing Development (SHD) applications and major project applications including wind farms) https://www.pleanala.ie/en-ie/home;
- Irish Wind Energy Association (IWEA) https://www.iwea.com/; and
- Department of Department of Housing, Local Government and Heritage's EIA Portal https://www.gov.ie/en/publication/9f9e7-eia-portal/.

This list of projects and plans was reviewed and the potential for cumulative effect on ornithology receptors was assessed. In particular other wind farm developments were considered.

Table 9-19 and subsequent paragraphs, regard projects that were deemed to have greatest potential to act cumulatively or in combination with the proposed wind farm project.

All stages of projects, except those which have been refused and are not subject to appeal, are considered.

Table 9-19: Cumulative Wind Farm Developments

Site Name	Planning reference	Tip Height	No of Turbines	Distance from SITE	Status
Coomacheo	031997	121	17	Adjacent	Operational
Gneeves	99616	91	13	Adjacent	Operational
Curragh	0710105	121	8	Adjacent	Operational
Caherdowney	033079	100	4	Adjacent	Operational
Clydaghroe	04/3152 07/306	100	5	Adjacent	Operational
Clydaghroe Ext.	10/1302	109.5	1	Adjacent	Approved
Gortyrahilly	314602-22	179-185	14	8km	Approved but subject to JR
Inchamore	235145	177-185	5	5km	Approved
Knocknamork A second application has been made to increase the tip height for this development	194972 234455	150 175	7	Adjacent	Approved In planning

Site Name	Planning reference	Tip Height	No of Turbines	Distance from SITE	Status
Carrignaima Community	074102	120	6	3km	Operational
Kilgarven	021241	125	15	9km	Operational
Midas	031188	78	6	9.8km	Operational
Midas Ext.	089120	80	2	10km	Approved

No environmental information was available on the CCC portal or found from a search online for Coomacheo, Gneeves, Curragh and Caherdowney Wind Farms. These sites are already operational so any potential effects they are already having will be incorporated into the baseline description and as such, if the effects of the Proposed Development are considered to be not significant, this resolves many of the concerns around cumulative effects.

Clydaghroe Wind Farm is adjacent to the Proposed Development. No ecological information was available from documents on the KCC planning portal. Reference 04/3152 comprised two turbines and service roadway and 07/306 one turbine and a roadway. These small-scale projects are not likely to significantly affect the existing or future baseline in respect of the Proposed Development.

Clydaghroe Wind Farm Extension is adjacent the Site. No significant effects were identified on any IOF given the small scale of this single turbine development and the limited range of species recorded during surveys.

Knocknamork Wind Farm was consented in 2020 although an application for an amended tip height has now been submitted. Data from that application (planning references 234455) has been used to inform this in-combination assessment.

Species which were assessed for that application as well as the Proposed Development were Hen harrier, Golden plover and Red grouse.

Of these only Golden plover was assessed for collision mortality, with an estimated 7.316 birds per year from Knocknamork.

For Hen harrier, no significant effects were found. The species was only recorded a few times during the winter months with no evidence for breeding. Long term not significant imperceptible effects were identified for direct habitat loss and operational displacement, with short term imperceptible but not significant effects identified for disturbance during the construction phase.

For Golden plover no significant effects were found. Short term imperceptible but not significant effects were identified for construction direct habitat loss and disturbance during construction. No operational habitat loss effects were identified, but long term slight negative effects were found for operational displacement.

No significant effects were identified for Red grouse, but a short term slight habitat loss effect was identified during the construction phase. A short term slight effect was also assessed for disturbance during the construction phase. This became a long-term slight effect during the operational phase but there were no habitat effects or collision risk effects identified.

No environmental information was available on the CCC planning portal nor found online in relation Carrignaima Community Wind Farm.

Inchamore estimated a collision risk rate of 22.9 birds per year for Golden plover, resulting in a long -term adverse effect of moderate significance.

Gortyrahilly lies 8 km from the Proposed Development, and so for most species there would be no connectivity. A review of the NIS identified that mitigation for Hen harriers was related to the timing of construction works for the grid connection. If this mitigation is adopted there would be no adverse effect on Hen harrier and as such, no potential for in-combination effects.

Kligarven, Midas and Midas Extensions Wind Farms are between 9-10km from the Site. Given the species range present on the Proposed Development this would mean there was no connectivity for effects on particular species between the two developments.

This means that the greatest likelihood of adverse cumulative effects arises from Knocknamork wind farm and its proximity to the Proposed Development. Given that the construction stages of the two developments will not occur simultaneously due to the temporal spacing between the two projects, there would be no in-combination cumulative effects for the construction phase, but there may be for operational effects. These are assessed in turn for each of the three species recorded as IOFs for both developments.

There is the possibility that both the Proposed Development in combination with Knocknamork wind farm could offer an increased displacement on wintering Hen harrier, reducing potential foraging habitat. However, given displacement effects on foraging Hen harrier are limited (Haworth, 2013) and given the limited use by this species, the absence of any roosts in proximity to either development and the ranging distances which individuals can have during the winter months (O'Donoghue, 2010) then the cumulative effect would also be assessed as at most minor and not significant.

Collision risk was not estimated for Knocknamork wind farm for Hen harrier, leaving the in-combination estimate that for the Proposed Development which has already been assessed as not significant.

For Golden plover, the in-combination effects of displacement is limited. Firstly it should be noted that Golden plover were recorded during surveys to the northeast of the Proposed Development, in proximity to the cluster of existing wind farms to the northeast, suggesting that while displacement could still occur, Golden plover can still make use of the area around wind farms in winter. The other locus of activity recorded during surveys was to the southeast, which is not in proximity to Knocknamork wind farm, but is to the constructed Clydaghroe wind farm. This would suggest that the ability for birds to continue to use this area would remain and that displacement would be assessed as being negligible given the proximity of observations on and around the existing wind farms.

In addition to Knocknamork, Inchamore wind farm had an estimated collision risk of 22.9 Golden plover per year. Combined with the estimate from the Proposed Development this means a total estimate of 32.456 per year, falling particularly on the wintering/migrant population. Given the observed wintering population, and the likelihood that this is made up of individuals from different breeding populations, this is considered minor and not significant.

There was relatively little activity for Red grouse within the Proposed Development with most records coming from moorland adjacent to it. This means that potential

displacement effects on Red grouse would be largely as a result of the development of Knocknamork wind farm which has already been consented and so these effects have been considered not to be significant. The addition of the Proposed Development is not considered to greatly increase displacement for this species given its apparent tolerance of wind farm developments (Pearce-Higgins J. S., 2009).

Collision risk was not assessed for this species on either development. There would therefore be no significant effect.

As a result, there are no additional effects on ornithological receptors which would rise to significant as a result of in combination or cumulative effects.

9.7 Summary of Residual Effects

Following impact assessment and taking into effect the mitigation identified in section 9.4, there is one significant residual effect, on disturbance to Woodcock during the operational phase of the development. However as noted above in section 9.6.2, this effect was assessed as a precautionary significant effect. It was also concluded that additional mortality on Woodcock as a result of collision risk was assessed as not significant.

The Proposed Development could proceed without any other adverse significant effect on sensitive ornithological receptors on and in the vicinity of the Proposed Development.

9.8 Summary and Statement of Significance

The ornithological baseline conditions have been described and evaluated in order to identify IOFs associated with the Proposed Development. Proposed mitigation measures have been identified and set out in section 9.4.

Potential effects upon IOFs as a result of the Proposed Development have been identified and the effect of these effects on IEFs has been assessed in line with current guidance (CIEEM, 2022). On the basis of adoption of measures outlined in section 9.4, one significant residual effect (precautionary) on IOFs was identified on Woodcock due to uncertainty about the effects of disturbance from the operational wind farm as a result of the proposed development.

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