Appendix 7B

Desktop Study and Survey Methodology, Malachy Walsh and Partners (MWP)

MWP

Appendix 7B - Desktop Study and Survey Methodology

Ballycar Wind Farm, Co. Clare.

Ballycar Green Energy Ltd.

January 2024

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1. Introduction

This report outlines the bird survey methodologies employed at the proposed Ballycar Wind Farm site over a 4-year period, which commenced in October 2019.

Bird surveys were undertaken by Malachy Walsh and Partners, Engineering and Environmental Consultants (MWP), between October 2019 and August 2022, inclusive. For the period September 2022 to September 2023, inclusive, bird surveys were carried out by the Irish Ornithological Survey Group (IOSG). A description of the bird surveys undertaken by IOSG and the accompanying bird survey results are presented in detail in Appendices 7I and 7J in Volume 3 of the Environmental Impact Assessment Report (EIAR).

For clarity, all of the bird survey methodologies employed at the proposed Ballycar Wind Farm over the entirety of the 4-year survey period from October 2019 to September 2023, inclusive, as outlined above, have been incorporated into this MWP 'Desktop Study and Bird Survey Methodology' report, and are outlined in the following sections.

2. Methodology

2.1 Scientific Nomenclature: Conventions

Species nomenclature in this report follows the standard form of the common name, followed by the binomial (italicized), on the first instance of usage in a text or the first instance of usage in a table. Thereafter, for any subsequent usage, common names only are used.

2.2 Desktop Study

An initial desktop study was carried out by MWP prior to the commencement of the field surveys.

The desktop study provided the opportunity to gain an understanding of the bird populations' occurring within the study area via an investigation of the habitats present and previous species records. The desktop study area included lands directly affected by the project, as well as areas that are geographically distant from the project but whose avian interests may be indirectly affected by the various phases of the project from construction to decommissioning.

Available ornithological information and data were reviewed, including:

- Ordnance Survey Ireland (OSI) aerial photography and 1:50000 mapping, and other sources of online aerial imagery;
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC);
- Review of the 2007 – 2011 Bird Atlas (Balmer *et al*., 2013);
- Review of Birds of Conservation Concern in Ireland (BoCCI) 2020-2026 (Gilbert *et al*., 2021);
- Review of BirdWatch Ireland I-WeBS (Irish Wetland Bird Surveys) site information;
- General ornithological information available from BirdWatch Ireland (www.birdwatchireland.ie);
- Irish Bird Reports and the journal Irish Birds, published by BirdWatch Ireland;
- Review of the 2015 National Survey of Breeding Hen Harrier in Ireland Report (Ruddock *et al*. 2016);

- Other information sources and reports footnoted throughout the report.

2.3 Criteria for Identifying Target Species

Target species are typically those species which are afforded a higher level of legislative protection, or which are considered to be more sensitive to potential impacts from wind farm developments by virtue of their behaviour (SNH, 2017). Target species should be restricted to those likely to be affected by wind farms (SNH, 2017).

A reconnaissance survey was undertaken by the Project Ornithologist prior to the commencement of bird surveys to review the habitats occurring and the general landscape character of the study area in the context of its potential ornithological importance.

The results of the comprehensive desk-top study, in conjunction with the site reconnaissance survey, were used to identify target bird species which were considered likely to occur. These target species formed the main focus of the bird surveys undertaken.

With regards to drawing up the target species list for Ballycar Wind Farm, the Scottish Natural Heritage (SNH) (2017) guidance was referred to. This guidance outlines important sources of potential target species.

In conjunction with the findings of the desk-top study, the target species list was drawn from:

- Annex I of the Birds Directive;
- Species protected under the Fourth Schedule of the Wildlife Acts 1976-2012 (buzzards, eagles, falcons, harriers, hawks, kites, osprey, owls);
- Red-listed birds of Conservation Concern (Gilbert *et al*., 2021).

As outlined above and as set out in SNH (2017), target species typically comprise those species which are afforded a higher level of legislative protection and should be restricted to those likely to be affected by wind farms. Therefore, only red-listed species have been included as target species, unless the species meets one of the other target species selection criteria as outlined above e.g., Annex I. However, to ensure other species which may potentially be sensitive to wind farms were not missed during surveys, all other species of gull, wader, duck, diver, goose, swan, cormorant, and heron were included as secondary species and flight activity data recorded where it did not infringe on the collection of target species data. It is generally considered that passerine species are not significantly impacted by wind farms (SNH, 2017).

2.4 Field Surveys

Initial recce walkovers of the site were carried out to assist in determining the scope and extent of the surveys. Field surveys were undertaken to gather detailed information on bird distribution and flight activity to assist in predicting the potential effects of the wind farm proposal on local bird populations.

The field surveys comprised two main elements: vantage point (VP) surveys to gather flight activity data for target species, and targeted distribution and abundance surveys undertaken to gain an understanding of the bird species occurring in the area which may be subject to impacts from the development.

The targeted distribution and abundance surveys comprised the following elements:

- Transect surveys;
- Winter waterbird counts;
- Breeding hen harrier surveys;

- Breeding woodcock/nightjar surveys;
- Winter hen harrier roost watches;
- Breeding raptor surveys;
- Breeding peregrine/kestrel surveys;
- Breeding wader surveys;
- Hinterland surveys.

A range of different study areas were used for bird surveys undertaken including:

- 500m development area buffer: Vantage point watch to assess avian collision risk; Transect surveys; Wader surveys; Woodcock/nightjar surveys;
- 2km development area buffer: Breeding hen harrier surveys and hen harrier winter roost surveys targeting suitable habitat; Breeding raptor and peregrine/kestrel surveys;
- 5km development area buffer: Targeting wintering waterbird surveys; Hinterland surveys.

Note: Initially the buffers were applied to the potential development area

Bird surveys have been ongoing at the Ballycar Wind Farm site since the winter of 2019, and comprise the following survey seasons:

Season 1	Winter 2019-2020	October 2019 to March 2020
Season 2	Summer 2020	April to September 2020
Season 3	Winter 2020-2021	October 2020 to March 2021
Season 4	Summer 2021	April to September 2021
Season 5	Winter 2021-2022	October 2021 to March 2022
Season 6	Summer 2022	April to September 2022
Season 7	Winter 2022-2023	October 2022 to March 2023
Season 8	Summer 2023	April to September 2023

2.4.1 Vantage Point (VP) Surveys

Vantage point (VP) surveys were carried out by suitably qualified personnel monthly between October 2019 and September 2023, inclusive. The overall aim of these surveys was to quantify the level of target species flight activity within the flight activity survey area. The flight activity survey area was taken to be that area encompassing the potential development area (study area), extending out to a distance of 500 m beyond the potential development boundary.

Vantage point locations with corresponding viewshed arcs, as well as the site boundary and 500m buffer extent are provided in **Figure 1,** below.

2.4.1.1 Selection of VP Locations

Vantage points are ideally located on elevated areas, or other areas, which provide clear views over the study area. Achieving maximum visibility over as much of the site as possible is important for these surveys. Three

Vantage Point (VPs) locations were selected to cover the site achieving as much visibility as possible and these three locations were visited monthly during the winter and summer periods.

To minimise observer effect on bird behaviour, VPs should ideally be located outside the survey area but should be located as close as possible. SNH (2017) stipulates that where VPs are located within the study area, they should not be used simultaneously with other VPs which overlook them to minimise potential observer effect.

Three VP locations (VP1-3) were selected for coverage of the proposed wind farm site (using the initial survey area red line boundary issued to MWP by the client) and were surveyed over all seasons. The location of each VP using latitude and longitude co-ordinates are provided in Error! Reference source not found., below.

Table 1: Vantage point locations at the proposed Ballycar Wind Farm site.

Vantage Point Number	Latitude, Longitude
1	52.713320, -8.640607
2	52.714537, -8.674022
3	52.726433, -8.691171

A summary of VP survey effort at each VP is provided in Table 2 below.

Table 2: Summary of Vantage Point survey effort

VP	Hours of observation								
	NB 2019/20	B 2020	NB 2020/21	B 2021	NB 2021/22	B 2022	NB 2022/23	B 2023	Total
VP1	36	36	36	36	36	36	36	36	282
VP2	36	36	36	36	36	48	36	36	294
VP3	36	36	36	36	36	24	36	36	270

A total site coverage of 864 hours over the survey period October 2019 – September 2023 was undertaken.

2.4.1.2 Viewshed Analysis of VPs

According to SNH (2017), VP viewsheds should extend out to a maximum of 2km to account for decreasing detectability of birds by humans with increasing distance. Viewshed analysis was undertaken for each VP location to determine visual coverage of the survey area. Viewsheds were set to an observer height of 2m giving a view of everything over 25m height. Viewsheds encompassed a 2km radius with 360^0 views, the full extent of which can be readily viewed using a telescope. Each viewshed was then cropped to an 180^0 arc showing the relevant direction of view.

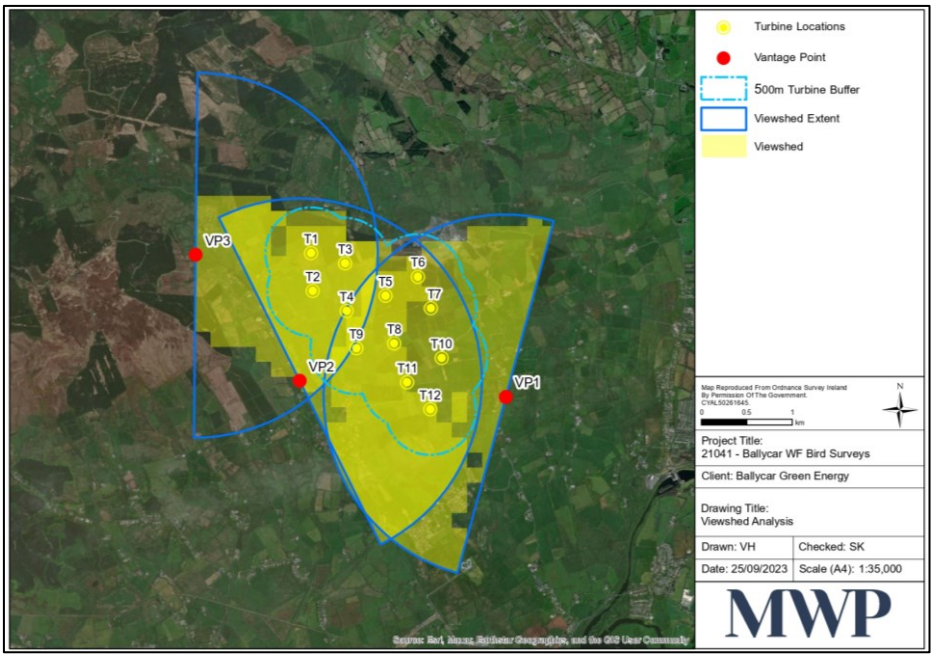

Figure 1: The 500-metre buffer zone around the proposed development site, the three Vantage Point (VP) locations and the viewshed coverage of each VP.

2.4.1.3 Recording of Flight Data

During VP surveys the flight behavior of target species was recorded. The flight behavior of secondary species was also recorded; however, recording of secondary species flight data was subsidiary to the recording of target species flight data (SNH, 2017).

At the time of each species observation, the following information was recorded for each species:

- The time that the bird was detected.
- The flight direction and duration (in seconds) within various flight height categories (0-20m, 20-50m, 50-100m, 100-180m and >180m).
- Sex and age of the bird(s) (adult/juvenile), where possible to determine.
- Type of activity/behavior such as hunting, flying, displaying etc.
- Estimation of actual flight height.
- Habitat(s) where the bird was observed.
- Weather conditions at the time of sighting, including wind speed, wind direction, and degree of visibility.

Once an initial sighting was made, each target or secondary species was observed until lost from view. Flight paths were recorded as observed, including where birds travelled or were observed outside of the flight activity survey area; such that all flight activity within the broader landscape was encompassed. A unique map identifier code was assigned to each target/secondary species which corresponds to a mapped flight path.

2.4.1.4 Recording of Other Species

During the VP surveys, counts of all other bird species (e.g. passerines) seen/heard were recorded to provide a complete picture of bird usage of the site.

2.4.2 Distribution and Abundance Surveys

2.4.2.1 Transect Surveys

A transect survey is a survey along a defined route within the study area. The overall aim of the transect surveys was to assess general bird distribution throughout the site and gather data on bird usage of the site. The methodology was broadly based on methods described in Bibby *et al*., (2000) and Gilbert *et al*., (1998).

Transect surveys were completed in the following months over the 2019 – 2023 survey period:

Table 3: Months in which transect surveys were completed.

Survey Period	Corresponding Transect Survey Months
Winter 2019/20	November 2019
Winter 2020/21	October 2020, February 2021
Winter 2021/22	December 2021, January, February and March 2022
Winter 2022/23	November 2022, January 2023
Breeding 2020	April, May and August 2020
Breeding 2021	April, June, August 2021
Breeding 2022	April, May, June, July, August 2022
Breeding 2023	May, June, July, August, September 2023

One transect route was utilized for the site, with the same route used for all seasons up to and including August 2022 (see **Figure 2**, below).

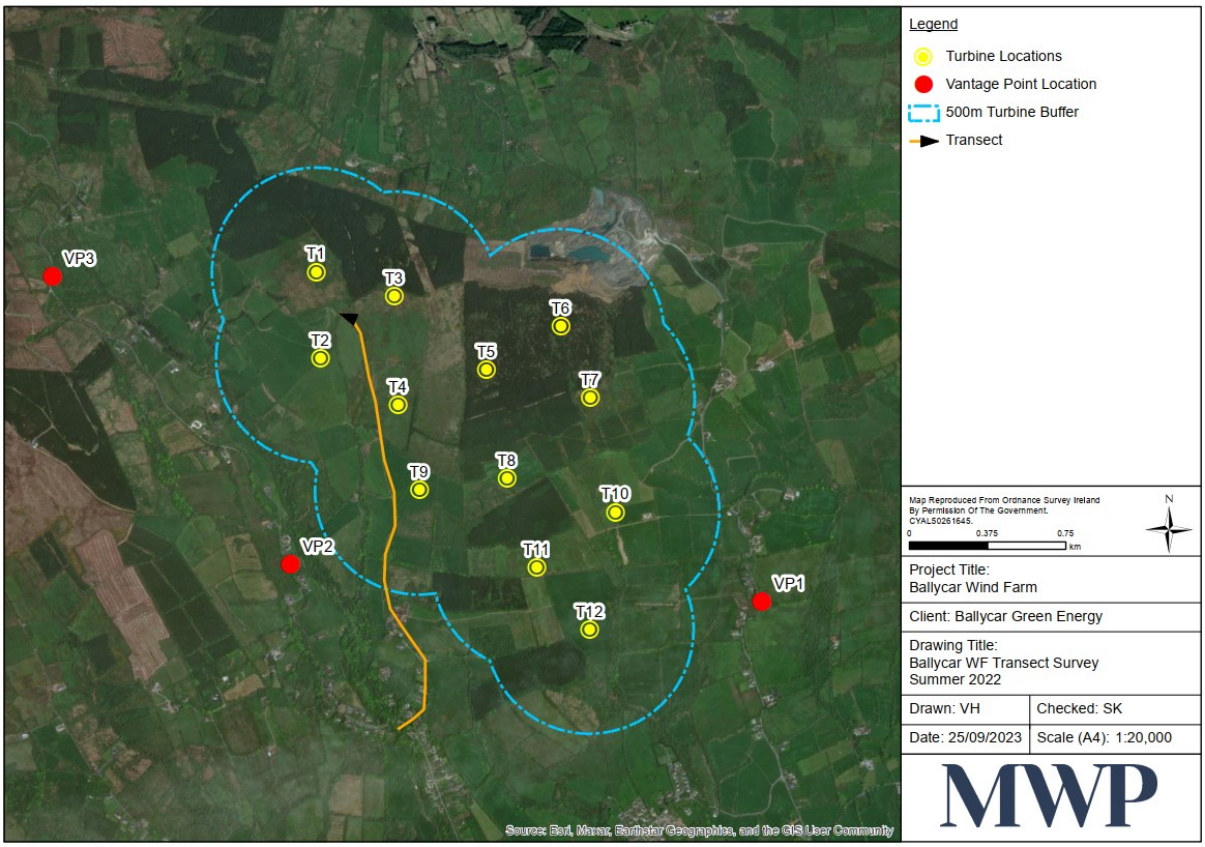

Figure 2: Transect survey route used between November 2019 and August 2022, inclusive.

An extension of the same transect route was used for the period October 2022 to March 2023 because of landowner consents becoming more favorable across the site (refer to the winter 2022/23 Summary Report by IOSG contained in **Appendix 7I** in Volume 3 of the EIAR). An additional route was added for the 2023 breeding season (refer to the summer 2023 Summary Report by IOSG contained in **Appendix 7J** in Volume 3 of the EIAR).

During each transect survey, all bird species seen or heard, typically within 100 m of the route were recorded, although the topography of the landscape often allowed for the detection of birds at greater distances.

2.4.2.2 Winter Waterbird Surveys

The River Shannon is the only significant body of water close to the site. Counts of wintering bird species (e.g. waders, swans and other waterbirds) were undertaken over the winter 2019/20 and in winter 2022/23 at the Shannon Banks / Saint Thomas Island areas, comprising areas prone to regular flooding and thus potentially suitable for waterbird species. The purpose of the counts was to gain a better understanding of the bird species using the habitats surrounding the site, and those which may traverse the proposed development site.

Survey methodology was based on BirdWatch Irelands I-WeBS methodology (Bibby *et al.*, 2000). The area surveyed was suitable estuarine habitat on the Shannon estuary from the Shannon Banks area of Limerick city westwards through Bunlicky. Four sections were created and each one surveyed where all target species were recorded and counted in each section. Habitats surveyed include all suitable foraging and roosting areas for wintering waterbird within the survey area. The results are presented in **Appendix 7F** for Winter 2019/2020 and in **Appendix 7I** for Winter 2022/2023 in Volume 3 of the EIAR.

2.4.2.3 Breeding Hen Harrier Surveys

Bird surveyor local knowledge of the general area indicated that the nearest known area of interest for hen harrier to the site is Woodcock Hill, located approximately 1.5 km west of the study area. Another hen harrier breeding site is believed to be located approximately 4 km to the north.

A Hen Harrier Breeding Territory Survey commenced at the site in 2022. The focus of the survey was to locate and monitor all potential hen harrier nests within and up to 2km of the site boundary. The survey methodology had regard to Hardey *et al* (2013), SNH (2017) and Ruddock *et al*. (2016). **Table 4,** below outlines the hen harrier survey schedule undertaken during the 2022 breeding season.

Table 4: Hen harrier 2022 breeding season visit schedule.

Date	Period	Survey Objective
19th April	March to Mid-April	To locate any nest sites and check for occupancy
19th May	Mid-April to late May	To locate incubating females
14th and 15th June	Late May to late June	To check for young or for evidence of breeding
12th July and 3rd August	Late June to late August	To check for fledged young

The survey comprised a combination of transects within the site and the surrounding 2 km hinterland area, to identify any potential breeding territories/nest-sites, followed by targeted VP watches overlooking these areas to monitor potential breeding activity (see **Figure 3,** below). During the targeted hen harrier breeding surveys, any other target species observed were recorded. Breeding hen harrier surveys were also carried out during the 2023 breeding season using a similar visit schedule to that outlined in **Table 4**, above.

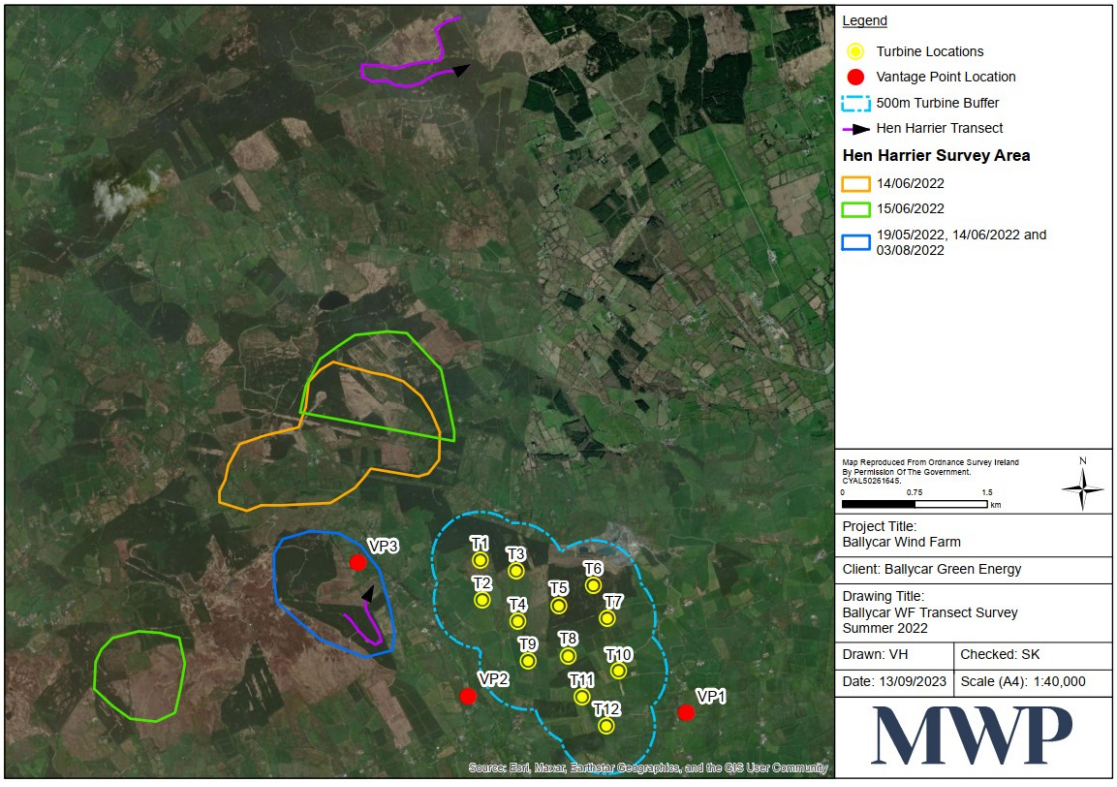

Figure 3: Locations of the 2022 breeding hen harrier surveys undertaken at the proposed development site.

2.4.2.4 Breeding Woodcock/nightjar Surveys

Breeding season walkover surveys were undertaken at dusk on three dates in June 2022 to determine the presence of breeding woodcock (*Scolopax rusticola*) and nightjar (*Caprimulgus europaeus*) and record any potential breeding activity. Surveys were undertaken on the 9th, 16th and 29th June 2022. . Surveys were carried out again on the 18th April, 8th May and 19th June 2023 with survey locations shown in the summer 2023 Summary Report by IOSG contained in **Appendix 7J** in Volume 3 of the EIAR).

The surveys focussed on areas of potentially suitable habitat within the study area. The methodologies were broadly based on methods described in Bibby *et al*., (2000) and Gilbert *et al*., (1998). Any displaying and/or calling male birds were recorded, along with any other target species observed or heard.

2.4.2.5 Winter Hen Harrier Roost Watches

Hen Harrier Roost Surveys were carried out in winter 2022/2023 by IOSG to monitor suitable roosting habitat within 2 km of the site boundary, as per guidance by SNH (2017). Survey methodologies were also adapted from published guidance by Hardey *et al* (2013), Gilbert *et al* (1998) and O'Donoghue (2019). The survey locations for the winter roost surveys are mapped in the winter 2022/23 Summary Report by IOSG contained in **Appendix 7I** in Volume 3 of the EIAR.

2.4.2.6 Hinterland Surveys

Driven hinterland surveys were undertaken twice during the winter 2022/2023 survey period. These surveys encompassed the area out to 5 km from the site boundary. The hinterland survey route utilised is shown inthe winter 2022/23 Summary Report by IOSG contained in **Appendix 7I** in Volume 3 of the EIAR..

2.4.2.7 Wader Surveys

In the summer of 2023, surveys for breeding waders were carried out at the most suitable locations within and around the proposed development site during April, May, and June. The survey methodology used was adapted from the O'Brien and Smith methodology for censusing lowland breeding wader populations as described in Gilbert *et al*. (1998).

2.4.2.8 Breeding Raptor Surveys

Surveys for breeding raptors were carried out in June and July 2023 in accordance with the methodology set out in Hardey *et al* (2013). The surveys involved visits to suitable breeding habitats within 2km of the proposed development site.

2.4.2.9 Breeding Peregrine/Kestrel Surveys

Species specific surveys for breeding peregrine and kestrel were carried out throughout April, May, June and July 2023 in accordance with the methodology set out in Hardey *et al* (2013). The surveys involved visits to four suitable breeding habitats within the surrounding landscape, namely Ballycar Quarry, Rossmanagher Castle, Cratloemoyle Castle, and St John's Cathedral. For mapped survey locations, refer to the Summer 2023 baseline report by IOSG contained in **Appendix 7J** in Volume 3 of the EIAR.

3. Existing Environment

3.1 Site Location

The proposed development is located in a rural area of southeast Clare on the east of Woodcock Hill and approximately 3km northwest of Ardnacrusha, 3km northwest of Limerick City and Suburbs and 6.7km east of Sixmilebridge. Lands within the study area comprise primarily intensively managed agricultural grassland meadows and fields interspersed with some less developed areas of rough grazing and several commercial conifer plantations (see **Figure 4** below).

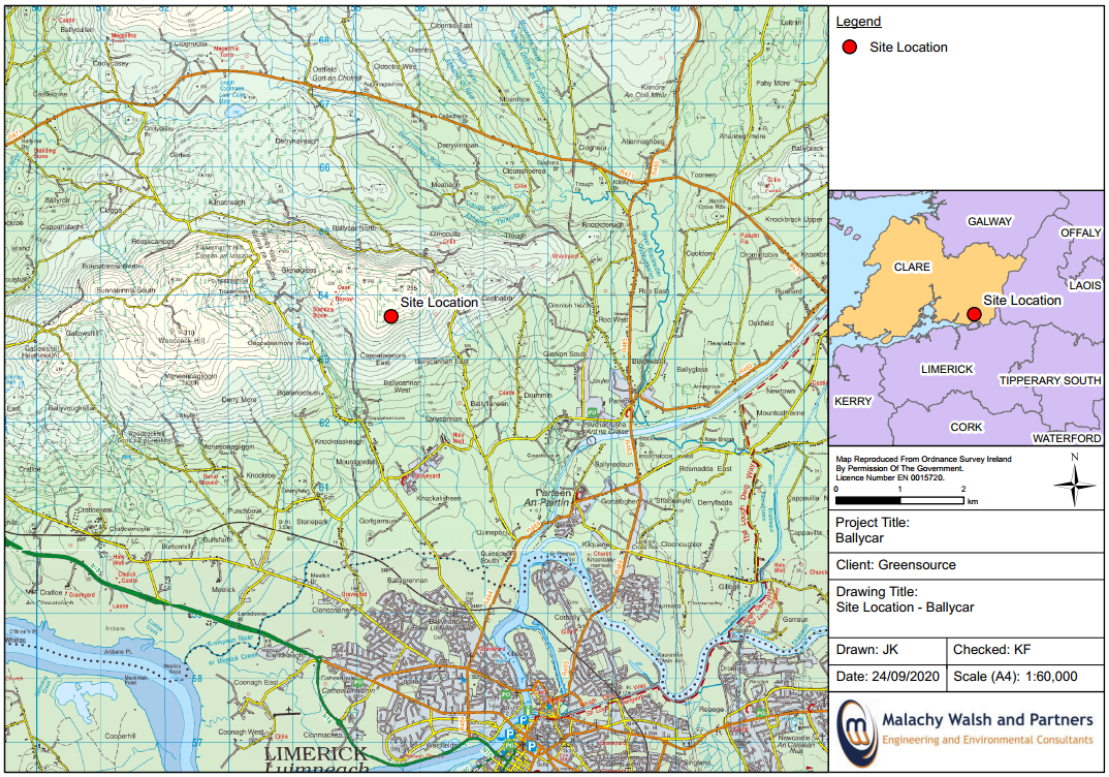

Figure 4: Ballycar Wind Farm site location overview

3.2 Natura 2000 Designated Sites

3.2.1 Special Protection Areas (SPAs)

The European Union Directive on the Conservation of Wild Birds, known as the Birds Directive (Directive 2009/147/EC) requires Member States to designate legally protected areas for the conservation of endangered or migratory species of bird, as listed on Annex I of the Directive. These areas are known as Special Protection Areas (SPAs) and, since 1994, all SPAs form part of the Natura 2000 network of protected sites. The EU Birds Directive is implemented in Irish law under the European Communities (Birds and Natural Habitats) Regulations 2011.

An on-line search for SPAs within the wider area surrounding the proposal site was carried out to identify any potential 'connectivity' between the site and SPAs, and to assess whether pathways exist through which the proposal could impact on qualifying interest species. This was undertaken with reference to the SNH guidance document '*Assessing Connectivity with Special Protection Areas (SPAs)*' (SNH, 2016). Within this guidance

document, core foraging ranges from nest-sites and roost-sites are published for both the breeding and winter seasons for the bird species frequently encountered when considering wind farm development proposals. SNH (2016) recommends that typically the core foraging range should be used when determining whether there is connectivity between the proposal and qualifying interest species. Core foraging ranges for wind farm sensitive species can range from <5 km to 20km, in the case of certain wide-ranging species of geese in the winter season (SNH, 2016).

The evaluation of potential for connectivity between qualifying interest species of SPAs and the proposed development site took account of the habitats that occur at the proposed development site, and their suitability with regard to individual species ecological requirements. An on-line search for SPAs within a 15 km radius of the proposal site was undertaken. This determined that there is one SPA within 15 km of the site – the River Shannon and River Fergus Estuaries SPA located approximately 4.4 km southwest of the proposed development site and summarised in Table 5 below.

Table 5: Qualifying features of conservation interest of the only Special Protection Area (SPAs) located within a 15km radius of the proposed development site at Ballycar.

Designated Site and Code	Qualifying features of conservation interest
River Shannon and River Fergus Estuaries SPA (004077)	▪ Cormorant (*Phalacrocorax carbo*) [A017] Wintering and breeding ▪ Whooper Swan (*Cygnus cygnus*) [A038] Wintering ▪ Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Wintering ▪ Shelduck (*Tadorna tadorna*) [A048] Wintering ▪ Wigeon (*Anas penelope*) [A050] Wintering ▪ Teal (*Anas crecca*) [A052] Wintering ▪ Pintail (*Anas acuta*) [A054] Wintering ▪ Shoveler (*Anas clypeata*) [A056] Wintering ▪ Scaup (*Aythya marila*) [A062] Wintering ▪ Ringed Plover (*Charadrius hiaticula*) [A137] Wintering ▪ Golden Plover (*Pluvialis apricaria*) [A140] Wintering ▪ Grey Plover (*Pluvialis squatarola*) [A141] Wintering ▪ Lapwing (*Vanellus vanellus*) [A142] Wintering ▪ Knot (*Calidris canutus*) [A143] Wintering ▪ Dunlin (*Calidris alpina*) [A149] Wintering ▪ Black-tailed Godwit (*Limosa limosa*) [A156] Wintering ▪ Bar-tailed Godwit (*Limosa lapponica*) [A157] Wintering ▪ Curlew (*Numenius arquata*) [A160] Wintering ▪ Redshank (*Tringa totanus*) [A162] Wintering ▪ Greenshank (*Tringa nebularia*) [A164] Wintering ▪ Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Wintering ▪ Wetland and Waterbirds [A999]

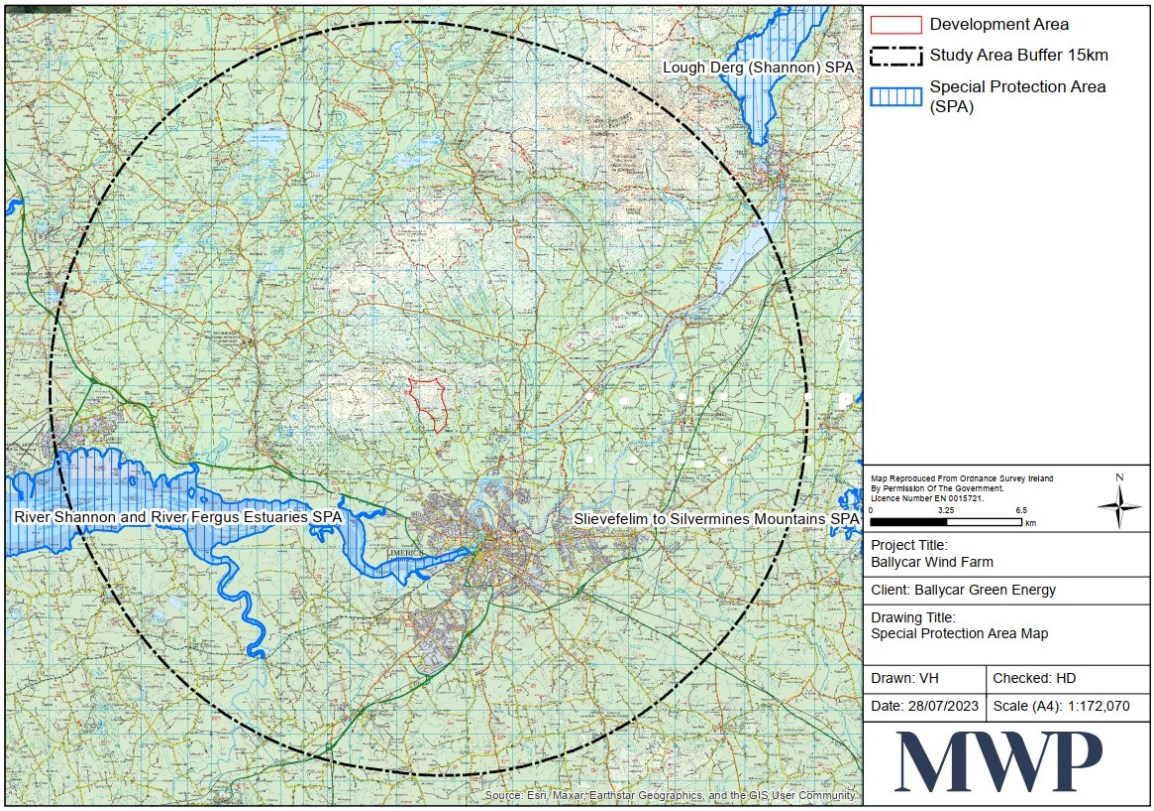

Figure 5: SPA sites within 15 km of the proposed wind farm site

3.3 Ramsar Sites/Important Bird and Biodiversity Areas (IBAs)

The Convention on Wetlands, also known as the Ramsar Convention, is an intergovernmental treaty which aims to conserve and protect wetlands and their resources around the world[1]. It was ratified by Ireland in 1984 and came into force on 15th March 1985. While this convention is not legislation, it is an international treaty. Ireland presently has 45 sites designated as Wetlands of International Importance, with a surface area of 66,994 hectares. The desk-top review concluded that there are no Ramsar sites within 15 km of the site boundary.

The Important Bird and Biodiversity Areas (IBAs) Programme, overseen by Birdlife International, aims to identify, conserve, and protect those areas throughout the world considered to be of the greatest significance to bird populations[2]. The desk-top review concluded that there is one IBA site within 15 km of the site boundary: 'Shannon and Fergus Estuaries'[3], approximately 5.5 km southwest of the site.

3.4 I-WeBS Sites

I-WeBS (Irish Wetland Bird Survey) is a joint project between BirdWatch Ireland and National Parks and Wildlife (NPWS) in which specific wetland sites are surveyed. In order to count the wetland birds, a 'look-see' method (Bibby *et al*, 2000) is used in which all birds present within a pre-defined area are counted. The aim of these surveys is to monitor non-breeding birds in Ireland and contribute to population counts. The information is also important to help assess the quality of these wetland areas. The bird groups to be counted for I-WeBS consist of

[1] http://www.ramsar.org/
[2] http://www.birdlife.org/worldwide/programmes/important-bird-and-biodiversity-areas-ibas
[3] http://datazone.birdlife.org/site/factsheet/588

swans and geese, ducks, divers, waders, and gulls. Counts are made once per month from September to March annually[4].

There are a total of two I-WeBS sites within 10 km of the wind farm site. See Table 6 below.

Table 6: I-WeBS sites within 10 km of the wind farm site

I-WeBS Site	Site code
River Shannon (Lower), located 5.3 km to east	0H301
Shannon and Fergus Estuary (Aerial), located 4 km to south	0H410

3.5 BirdWatch Ireland Sensitivity Tool

A Bird Sensitivity Mapping Tool for wind energy development was developed by BirdWatch Ireland and provides a measured spatial indication of where protected birds are likely to be sensitive to wind energy developments. The tool can be accessed via the National Biodiversity Data Centre Website (www.biodiversityireland.ie) and is accompanied by a guidance document (McGuiness *et al*. (2015)). The criteria for estimating a zone of sensitivity (i.e., 'low', 'medium', 'high' and 'highest') is based on a review of the behavioural, ecological, and distributional data available for each species.

A review of this mapping tool determined that the site lies within a zone of low bird sensitivity to wind energy development.

3.6 Bird Atlas Records and Distribution

'*Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland*' (Balmer *et al*., 2013) is the most recent comprehensive work on wintering and breeding birds in Ireland.

The proposed wind farm site lies entirely within hectad R56. Table 7, below, presents Breeding Bird Atlas (2007 – 2011) data for potential target species recorded within this hectad.

Table 7: Breeding Bird Atlas (2007 – 2011) data for R56 with breeding status and conservation statuses.

Species Name	Breeding Atlas (07-11)*	Conservation Status^
Barn Owl (*Tyto alba*)	Possible	RL, IV
Black-headed Gull (*Larus ridibundus*)	Present	AL, SCI
Common Gull (*Larus canus*)	Present	AL
Coot (*Fulica atra*)	Present	AL
Cormorant (*Phalacrocorax carbo*)	Present	AL, SCI
Corn Crake (*Crex crex*)	Not Recorded	BD, RL
Curlew (*Numenius arquata*)	Possible	RL, SCI
Goosander (*Mergus merganser*)	Present	AL
Grey Heron (*Ardea cinerea*)	Present	GL
Greylag Goose (*Anser anser*)	Probable	AL

[4] Irish Wetland Bird Survey Training Resources - BirdWatch Ireland Accessed: 30th August 2023

Species Name	Breeding Atlas (07-11)*	Conservation Status^
Hen Harrier (*Circus cyaneus*)	Confirmed	BD, AL, SCI, IV
Herring Gull (*Larus argentatus*)	Not Recorded	AL
Kestrel (*Falco tinnunculus*)	Present	RL, IV
Kingfisher (*Alcedo atthis*)	Probable	BD, AL
Lapwing (*Vanellus vanellus*)	Present	RL, SCI
Little Grebe (*Tachybaptus ruficollis*)	Present	GL
Long-eared Owl (*Asio otus*)	Not Recorded	IV
Mallard (*Anas platyrhynchos*)	Confirmed	AL
Merlin (*Falco columbarius*)	Not Recorded	BD, AL, IV, SCI
Moorhen (*Gallinula chloropus*)	Present	GL
Mute Swan (*Cygnus olor*)	Present	AL
Nightjar (*Caprimulgus europaeus*)	Not Recorded	BD, RL
Northern Shoveler (*Anas clypeata*)	Present	RL, SCI
Peregrine Falcon (*Falco peregrinus*)	Possible	BD, IV
Pochard (*Aythya ferina*)	Present	RL
Red Grouse (*Lagopus lagopus*)	Not Recorded	RL
Redshank (*Tringa totanus*)	Present	SCI
Snipe (*Gallinago gallinago*)	Present	RL
Sparrowhawk (*Accipiter nisus*)	Present	IV
Teal (*Anas crecca*)	Present	AL, SCI
Tufted Duck (*Aythya fuligula*)	Present	AL, SCI
Woodcock (*Scolopax rusticola*)	Present	RL

*Breeding status: Seen = recorded; Possible = possible breeding; Probable = probable breeding; Confirmed = confirmed breeding; Non-B = non-breeding; Breeding = breeding; Present = present
^Conservation Status: BD = Annex I of the Birds Directive; RL = BoCCI Red-listed; AL = BoCCI Amber-listed; GL = BoCCI Green-listed; SCI = Special Conservation Interest of nearby SPA; IV = protected under Schedule IV of the Wildlife Act.

Table 8, below, presents Wintering Bird Atlas (2007 – 2011) data for potential target species recorded within hectad R56.

Table 8: Wintering Bird Atlas data (2007 – 2011) for R56 with wintering status and conservation statuses.

Species Name	Wintering Atlas (07-11)	Conservation Status^
Black-headed Gull (*Larus ridibundus*)	Present	AL, SCI
Common Gull (*Larus canus*)	Present	AL
Coot (*Fulica atra*)	Present	AL
Cormorant (*Phalacrocorax carbo*)	Present	AL, SCI
Goosander (*Mergus merganser*)	Present	AL
Grey Heron (*Ardea cinerea*)	Present	GL

Species Name	Wintering Atlas (07-11)	Conservation Status^
Greylag Goose (*Anser anser*)	Present	AL
Hen Harrier (*Circus cyaneus*)	Present	BD, AL, SCI, IV
Herring Gull (*Larus argentatus*)	Not Recorded	AL
Kestrel (*Falco tinnunculus*)	Present	RL, IV
Kingfisher (*Alcedo atthis*)	Present	BD, AL
Lapwing (*Vanellus vanellus*)	Present	RL, SCI
Little Grebe (*Tachybaptus ruficollis*)	Present	GL
Mallard (*Anas platyrhynchos*)	Present	AL
Moorhen (*Gallinula chloropus*)	Present	GL
Mute Swan (*Cygnus olor*)	Present	AL
Northern Shoveler (*Anas clypeata*)	Present	RL, SCI
Peregrine Falcon (*Falco peregrinus*)	Not Recorded	BD, IV
Pochard (*Aythya ferina*)	Present	RL
Redshank (*Tringa totanus*)	Present	SCI
Snipe (*Gallinago gallinago*)	Present	RL
Sparrowhawk (*Accipiter nisus*)	Present	IV
Teal (*Anas crecca*)	Present	AL, SCI
Tufted Duck (*Aythya fuligula*)	Present	AL, SCI
Whooper Swan (*Cygnus cygnus*)	Not Recorded	SCI, BD, AL
Wigeon (*Anas penelope*)	Not Recorded	SCI, AL
Woodcock (*Scolopax rusticola*)	Present	RL

^Conservation Status: BD = Annex I of the Birds Directive; RL = BoCCI Red-listed; AL = BoCCI Amber-listed; GL = BoCCI Green-listed; SCI = Special Conservation Interest of nearby SPA; IV = protected under Schedule IV of the Wildlife Act.

3.7 NPWS Rare and Protected Species Dataset

A Sensitive Data Request regarding previous records of threatened or protected bird species within the hectad R56 was submitted to NPWS in November 2021. A follow-up data request was submitted to NPWS in October 2022. Information received from NPWS on both occasions was reviewed.

With regard to hen harrier, there are no known traditional hen harrier nest sites located inside the study area. The hen harrier information in **9,** below, was provided as part of the NPWS Sensitive Data Requests.

Table 9: NPWS recorded hen harrier sightings and breeding sites (within 0 – 10 km of the study area).

Year of Survey	No. of Sightings	No. of Breeding Sites
2005	12	0
2010	0	1
2015	0	3
2020	0	1

Further consultation with NPWS determined that one confirmed breeding site was located within a 0-3 km radius of the study area in both 2015 and 2010. NPWS also confirmed that a portion of the study area (approximately 20%) overlaps with one of nine non-designated but regionally important breeding areas for hen harrier in Ireland, as established in the 2015 National Hen Harrier Survey. This area, partially encompassing the study area, was subsequently identified as the 'South Clare' non-designated regional zone for hen harrier, as per NPWS (2022) (see Figure 6 below). No other records on threatened or protected bird species were received as part of the NPWS data requests.

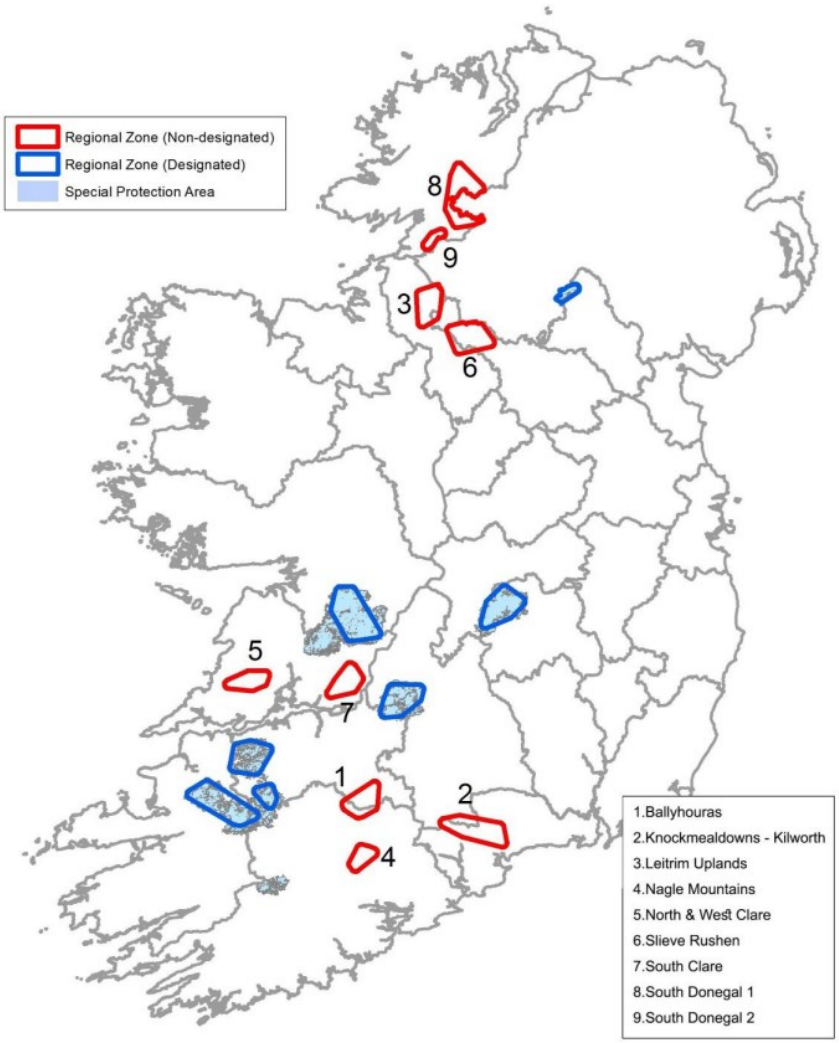

Figure 6. The distribution of relatively important breeding populations of Hen Harriers (i.e. designated and non-designated regional zones) (Source: NPWS, (2022)).

3.8 Identification of Target Species

The following table (Table 10) outlines those species for which past records exist, which meet one or more of the target species selection criteria, as outlined in Section 2.3 above, and which are considered to have the potential to occur within the vicinity of the proposed development site, in light of the habitats occurring. Wind farm sensitive species meeting the selection criteria that were not identified as having previously occurred within the relevant hectad during the desk-top study search, but for which habitats are suitable, such as buzzard, were also included as target species on a precautionary basis. The conservation status/level of protection afforded to each species is also included.

Table 10: Identification of Target Species for the bird surveys at the proposed development site.

Target species	Conservation status	Typical habitat (details from birdwatchireland.ie)
Barn Owl (*Tyto alba*)	BoCCI Red-listed/ Wildlife Acts	**Breeding** Breeds in ruined buildings, such as castles and to a lesser extent in outbuildings (barns/sheds). Will use special nest boxes. Breeding success heavily dependent on the availability of suitable prey. **Wintering** Largely resident, though young birds will wander in search of new territories.
Buzzard (*Buteo buteo*)	BoCCI Green-listed/ Wildlife Acts	**Breeding** Widespread breeding species. Nests in trees, sometimes cliffs, usually with access to open land including farmland, moorland and wetland. **Wintering** Largely resident.
Curlew (*Numenius arquata*)	BoCCI Red-listed/ Wildlife Acts/ SCI	**Breeding** Nests on the ground in rough pastures, meadows and heather. Not a common breeder but found in most parts of the country. **Wintering** Winters in a wide range of wetland habitats (coastal and inland) and other good feeding areas including damp fields.
Hen Harrier (*Circus cyaneus*)	Annex I EU Birds Directive/ BoCCI Amber-listed/ Wildlife Acts	**Breeding** Breeding birds are confined largely to heather moorland and young forestry plantations, where they nest on the ground. **Wintering** Spends winter in more coastal and lowland areas throughout Ireland hence most easily seen on the coast in the winter months
Kestrel (*Falco tinnunculus*)	BoCCI Red-listed/Wildlife Acts	**Breeding** A widespread breeder throughout the country. Nests in trees, buildings or in cracks in cliffs. Will use old Crow nests. Found in a wide variety of open habitats including coasts, moorland, farmland, wetlands, roadside verges and town parks. **Wintering** Largely resident within breeding territory. Some birds move within the country, especially down from the uplands.
Kingfisher (*Alcedo atthis*)	Annex I EU Birds Directive/ BoCCI Amber-listed/ Wildlife Acts	**Breeding** Kingfishers breed in tunnels dug in vertical banks along streams and rivers. **Wintering** A very sedentary species, Kingfishers rarely move from their territories. However, some may move to lakes and coasts during extended spells of poor weather.

Target species	Conservation status	Typical habitat (details from birdwatchireland.ie)
Lapwing (*Vanellus vanellus*)	BoCCI Red-listed/ Wildlife Acts/SCI	**Breeding** They breed on open farmland and appear to prefer nesting in fields that are relatively bare (particularly when cultivated in the spring) and adjacent to grass. **Wintering** Wintering distribution in Ireland is widespread. Large flocks are regularly recorded in a variety of habitats, including most of the major wetlands, pasture and rough land adjacent to bogs
Long-eared Owl (*Asio otus*)	BoCCI Green-listed/ Wildlife Acts	**Breeding** Breeds in lowlands throughout Ireland, usually in a stand of conifers **Wintering** Largely resident, though young birds will wander in search of new territories. During winter, may occasionally gather in communal roosts of between 5 and 30 birds.
Merlin (*Falco columbarius*)	Annex I EU Birds Directive/ BoCCI Amber-listed/ Wildlife Acts	**Breeding** Nests on the ground on moorland, mountain and blanket bog. Also nests in woodland and has taken to nesting in forestry plantations adjacent to moorland. **Wintering** Much more widely distributed in the winter, than in the breeding season. Merlins move away from high ground at this time of the year and can often be seen on the coast, where concentrations of other birds are attractive as prey species.
Nightjar (*Caprimulgus europaeus*)	Annex I EU Birds Directive/ BoCCI Red-listed/ Wildlife Acts	**Breeding** Only a handful of pairs breed in Ireland, usually on recently planted conifer plantations or clearfells in uplands. More widespread in Britain and Continental Europe. **Wintering** Winters in tropical Africa.
Peregrine Falcon (*Falco peregrinus*)	Annex I EU Birds Directive / BoCCI Green-listed/ Wildlife Acts	**Breeding** Breeds on coastal and inland cliffs. Most birds on the coast breed on the south, west and north coasts, coastal breeding on the east coast is limited by the availability of suitable nesting cliffs. Most inland birds breed on mountain cliffs but will also breed at lower levels. **Wintering** Resident in Ireland but shows some movement away from its breeding areas in the winter. Can be found on the coast, especially on estuaries where they hunt water birds. Some birds move into cities. Wintering birds may also comprise individuals which have arrived from Britain or even further afield.
Red Grouse (*Lagopus lagopus*)	BoCCI Red-listed/ Wildlife Acts	**Breeding** Nest on the ground on mountains, moorland and lowland blanket bogs and raised bogs, where it is associated with heather, which it requires for food, shelter and nesting. **Wintering** Resident and sedentary (non-migratory). Will move in the winter if snow is on the ground, to wind swept ridges and lower ground.
Redshank (*Tringa totanus*)	BoCCI Red-listed/ Wildlife Acts/SCI	**Breeding** Nests on the ground in grassy tussock, in wet, marshy areas and occasionally heather. Breeds mainly in midlands (especially Shannon Callows) and the northern half of the country. **Wintering** Winters all around the coasts of Ireland, Britain and many European countries. Favours mudflats, large estuaries and inlets. Smaller numbers at inland lakes and large rivers.

Target species	Conservation status	Typical habitat (details from birdwatchireland.ie)
Snipe (*Gallinago gallinago*)	BoCCI Red-listed/ Wildlife Acts/SCI	**Breeding** Nests on the ground, usually concealed in a grassy tussock, in or near wet or boggy terrain. **Wintering** Highly dispersed distribution in winter. They forage across a variety of wetland and damp habitats. Particularly high concentrations are found on the fringes of lowland lakes
Sparrowhawk (*Accipiter nisus*)	BoCCI Amber-listed / Wildlife Acts	**Breeding** Probably the most common bird of prey in Ireland. Widespread in woodland, farmland with woods, larger parks and gardens. **Wintering** Resident in Ireland. Can be seen throughout the country.
Teal (*Anas crecca*)	BoCCI Amber-listed/ Wildlife Acts/SCI	**Breeding** They usually nest near small freshwater lakes or pools and small upland streams away from the coast, and in thick cover. **Wintering** Widespread on wetlands with good cover, such as reedbeds. Wide variety of habitats, both coastal and inland, and usually below an altitude of 200 metres, including coastal lagoons and estuaries and inland marshes, lakes, ponds and turloughs.
Whooper Swan (*Cygnus cygnus*)	Annex I EU Birds Directive/ BoCCI Amber-listed/ Wildlife Acts/SCI	**Breeding** The Whooper Swans that are present in Ireland each winter nest in Iceland during the summer. Each year a small number of Whoopers stay in Ireland for the summer and there have been occasional breeding records on lakes in the midlands and northwest. **Wintering** Most on lowland open farmland around inland wetlands, regularly seen while feeding on grasslands and stubble.
Woodcock (*Scolopax rusticola)*	BoCCI Red-listed / Wildlife Acts	**Breeding** Nests on the ground in forests and woodland, usually well camouflaged amongst dead leaves and low vegetation. **Wintering** Wider distribution in winter, occurring in woodland, also scrub and some open areas (bracken and heather-covered hills).

4. References

Balmer, D., Gillings, S., Caffrey, B., Swann, B., Downie, I. and Fuller, R. (2013). *Bird Atlas 2007-11: The breeding and wintering birds of Britain & Ireland*. BTO Books, Thetford.

Bibby, C.J., Burgess, N.D., Hill, D.A., and Mustoe, S.H. (2000). *Bird Census Techniques*. 2nd Edition. Academic Press, London.

Colhoun, K. and Cummins, S., (2013). Birds of Conservation Concern in Ireland 2014-2019. *Irish Birds*, Volume 9, pp. 523-544.

Gilbert, G., Gibbons, D.W. and Evans J. (1998). *Bird Monitoring Methods – A manual for key UK species*. Royal Society for the Protection of Birds, Bedfordshire, U.K.

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

Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013). *Raptors: a field guide to survey and monitoring* (3rd Edition). The Stationery Office, Edinburgh.

McGuinness, S., Muldoon, C., Tierney, N., Cummins, S., Murray, A., Egan, S. and Crowe, O. (2015). *Bird sensitivity mapping for wind energy developments and associated infrastructure in the Republic of Ireland*. BirdWatch Ireland, Kilcoole, Wicklow.

National Parks and Wildlife Service (NPWS) (2022). *Hen Harrier Conservation and the Wind Energy Sector in Ireland*. Supporting document to the Hen Harrier Threat Response Plan. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

O'Donoghue, B.G. (2019). *Hen Harrier Roost Types and Guidelines to Roost Watching.* Irish Hen Harrier Winter Survey.

Percival, S.M. (2003). *Birds and Wind farms in Ireland: A Review of Potential Issues and Impact Assessment*. Sustainable Energy Ireland.

Ruddock, M., Mee, A., Lusby, J., Nagle, A., O'Neill, S. and O'Toole, L. (2016). *The 2015 National Survey of Breeding Hen Harrier in Ireland*. Irish Wildlife Manuals No. 93. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Scottish Natural Heritage (SNH) (2014). *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms*. Version 1. Scottish Natural Heritage.

Scottish Natural Heritage (SNH) (2016). *Assessing Connectivity with Special Protection Areas (SPAs*). Version 3. Scottish Natural Heritage.

Scottish Natural Heritage (SNH) (2017). *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms*. Version 2. Scottish Natural Heritage.