Cush Wind Farm
Phase II

Environmental Impact Assessment Report

Annex 5.8: Baseline Bird Survey Reports

Cush Wind Limited

BIRD SURVEY REPORT
BREEDING 2022

Cush Wind Farm

Prepared for: Galetech Energy Developments



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1.0 Introduction

Bird surveys have been previously undertaken at the proposed wind farm development site at Cush, Co. Offaly (hereafter 'the Project Site') by SLR Consulting Ireland (SLR) for the breeding 2020, non-breeding 2020/21, breeding 2021, and non-breeding 2021/22 seasons. The Project Site also includes a linear area that was previously surveyed for a proposed overhead line[1]. Flight activity surveys were carried out at two vantage point locations along the proposed overhead line route corridor during the breeding season in 2018.

SLR was commissioned by Galetech Energy Developments to carry out a bird survey programme for the proposed wind farm at Cush, Co. Offaly (hereafter 'the Project') during the breeding season in 2022.

1.1 Background to the Commission

The Project Site includes a phase 1 (eight turbines) and an extension area (three turbines). Phase 1 was granted planning permission in November 2024. As the bird survey programme for the breeding season 2022 covered both phases, and the data are within date according to NatureScot (NS; formerly Scottish Natural Heritage, SNH) Guidance[2], the results are considered to be relevant to the proposed extension area (Phase 2). This report focuses on the methodology and results that are relevant to the extension area. The methodology and results of the entire bird survey programme can be found in the previously issued baseline breeding bird survey report[3].

1.2 Site Description

The Project Site located in the townland of Cush approximately 4 km north of Birr, Co. Offaly. The extension area predominantly consists of cutaway bog, with small areas of agricultural grassland and mixed and coniferous forest (refer to Appendix 01 Figure 1).

1.3 Scope of Work

The scope of survey work was based on existing knowledge of the area and took into account current NS Guidance[2], with details provided in Table 1-1. Further details are provided in Sections 2.2 to 2.5.

Table 1-1
Scope of Ornithological Survey Work May to August 2022

Survey Type	Summary Methodology (see Section 2 for further details)
Vantage Point (VP) surveys	12 hours of survey per month were carried out from a single VP between May and June 2022. Six hours of survey per month were carried out from the VP between July and August 2022.
Breeding wader surveys	Three breeding wader surveys were carried out from May to June 2022 to search for lowland waders breeding within the Project Site.

[1] SLR (2018) *Cloghan Wind Farm and Long Oak Wind Farm Breeding Bird Survey Report 2018*. Prepared for Galetech Energy Services Ltd

[2] Scottish Natural Heritage (2017). *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms V2*. Scottish Natural Heritage, Inverness.

[3] SLR (2022) Cush Wind Farm Breeding Bird Survey Report 2022.

Survey Type	Summary Methodology (see Section 2 for further details)
Breeding raptor surveys	Five breeding raptor surveys were carried out from May to July to search for any raptors breeding within 2 km of the Project Site. An additional survey was undertaken at Loughnane Quarry in August to search for breeding peregrine falcon *Falco peregrinus*.

1.4 Target Species

Target species for the surveys were defined by legal and/or conservation status and vulnerability to impacts caused by wind turbines, as defined in NS guidance.

1.4.1 Primary Target Species

Primary target species was limited to species upon which effects are most likely to be potentially significant in EIA and Appropriate Assessment (AA) terms e.g., species forming qualifying features for nearby Special Protection Areas (SPAs) or species listed on Annex 1 of the Birds Directive[4]. This enabled recording to focus on the species of greatest importance without the distraction of having to record detailed flight data for a larger number of more common species.

Primary target species included the following bird species:

- All Annex 1 raptor/owl species;
- Qualifying interest species for nearby SPAs[5]; and
- Other raptors, waders or wildfowl red-listed on the latest Birds of Conservation Concern in Ireland (BoCCI)[6] scheme.

1.4.2 Secondary Species

Local circumstances may indicate that survey information should also be acquired on other species, especially those of regional conservation concern. Such species are termed secondary species. Recording of secondary species is subsidiary to recording of primary target species.

Secondary target species included:

- Any other wildfowl and wader species;
- Common buzzard *Buteo buteo;*
- Eurasian sparrowhawk *Accipiter nisus*;
- Northern raven *Corvus corax*;
- Grey heron *Ardea cinerea;*
- Great cormorant *Phalacrocorax carbo;* and

[4] Annex 1 of the Birds Directive (Directive 2009/147/EC)
[5] The relevant SPAs are listed in Section 3.1.
[6] Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 2020–2026. Irish Birds 43: 1–22

- Gulls *Larus* sp.

NS guidance states that "it is generally considered the passerine species are not significantly impacted by wind farms". It goes on to state that "survey of woodland passerines, especially in commercial conifer forest is generally not required". The only exception is if the desk study identifies that the Project Site is in a key area for a Schedule 1 woodland passerine species. As Schedule 1 refers to UK legislation, it is prudent to assume that passerines red-listed under the latest Birds of Conservation Concern in Ireland (BoCCI) scheme[7] should be considered as equivalent. No such species were returned during the desk-based review or data request. NS guidance also states that "surveys of farmland passerines especially on more intensive arable habitat are generally not required". Based on the above, while not the targets, any red-listed passerines were recorded as incidental species during other surveys.

1.5 Terminology

For this report, "flight line" refers to the line drawn to record avian movement during a VP survey. A single flight line may be used to indicate the collective movement of a flock of birds. Each individual bird moving within the same flight line is referred to as "a flight". Note that the "cumulative number of flights" reflects the occupancy of the study area by a particular species. It is not equivalent to the total number of unique individuals and should not be used to infer abundance.

1.6 Purpose of this Report

This report outlines the surveys undertaken and methods used. It then summarises the survey data obtained and provides descriptions of the legal and conservation status of the species recorded.

The assessment of impacts resulting from the proposed development and the development of mitigation measures, if required, are beyond the scope of this report and will be covered in a separate Environmental Impact Assessment (EIA) Report in due course.

[7] Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 2020–2026. Irish Birds 43: 1–22

2.0 Methods

2.1 Desk-Based Review

The desk review collated any available information to date on the breeding and non-breeding bird populations and movements around the Project site.

The following reports resulting from previous breeding and non-breeding bird surveys were reviewed for any relevant information that could be used to inform the current bird surveys:

- SLR (2020) Cush Wind Farm Breeding Bird Survey Report 2020.
- SLR (2022) Cush Wind Farm Winter Bird Survey Report 2020-2021.
- SLR (2022) Cush Wind Farm Breeding and Winter Bird Survey Report 2021-2022.
- SLR (2018) Cloghan Wind Farm and Long Oak Wind Farm Breeding Bird Survey Report 2018

The websites of the National Parks and Wildlife Service (NPWS)[8], the UK and Ireland Bird Atlas 2007-2011[9] and the National Biodiversity Data Centre (NBDC)[10] were accessed for information on sites designated for nature conservation and notable bird species in the vicinity of the Project Site.

2.2 Field Survey Dates and Personnel

Surveys were undertaken by Jonathon Dunn (JD) PhD, Aisling Kinsella (AK) BSc (Hons) MSc, Darragh Nagle (DN) BSc (Hons), and Maeve Maher-McWilliams BSc (Hons) MSc.

Details of survey dates and times are provided in Appendix 02 and a record of weather conditions during surveys is provided in Appendix 03.

2.3 Flight Activity Surveys

Three VP locations were selected that covered both phases of the Project Site. The viewsheds from VP1 and VP2 cover phase 1 of the Project, and the viewshed from VP3 covers the extension area. As VP3 was deemed to adequately cover the extension area without adding additional VPs, this report will focus on surveys conducted from VP3.

VP locations, 2 km viewing arcs and viewsheds are shown in Appendix 01 Figure 1.

A total of 36 hours of flight activity surveys were conducted from VP3 during the 2022 breeding season, as summarised in Table 2-1.

In order to avoid possible complications during any subsequent collision risk modelling, VP watches were timed such that surveys were not undertaken simultaneously from both VPs. This avoids double-counting birds and ensures that no disturbance is made to birds within viewsheds from presence of the observer.

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined in Section 1.4) within the study area.

The main purpose of VP watches is to collect data on primary target species that will enable estimates to be made of:

[8] www.npws.ie Accessed 16/12/202421/08/26
[9] https://app.bto.org/mapstore/StoreServlet Accessed 16/12/202421/08/26
[10] http://maps.biodiversityireland.ie/#/Map Accessed 16/12/2024

- The time spent flying over the Project Site;
- The relative use by birds of different parts of the Project Site;
- The proportion of flying time spent within the provisional upper and lower risk height limits as determined by the potential rotor diameter and rotor hub height; and
- Ultimately, the analysis of the potential risk of collision of birds with rotating turbines.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Duration of flying bout;
- Species, age and sex (where determinable);
- Number of birds observed;
- Time spent within each height band; and
- Notes on observation.

In the absence of detailed information regarding turbine specifications at the time of commencing surveys, a precautionary approach was taken in relation to recording height bands. For the 2022 breeding season, height bands were determined allowing for the maximum rotor tip height of 200 m and a lowest rotor swept height of 28 m. The relation of the height bands to the latest turbine specification is shown below.

Flight heights were attributed to four distinct height bands for the breeding season as follows:

- 1 = <25 m (below the likely rotor swept area);
- 2 = 25 m to 160 m (potentially within the likely rotor swept area, at least in part);
- 3 = 160 m to 200 m (within the likely rotor swept area); and
- 4 = >200 m (potentially within the likely rotor swept area, at least in part).

In addition, a summary of observations of secondary target species was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within and around the Project Site, in accordance with current NS guidance.

Table 2-1
Summary of VP Surveys Undertaken during the Breeding Season 2022

Month	VP3 (hours)
May	12:00
June	12:00
July	6:00
August	6:00
Total hrs	36:00
VP locations ITM (Figure 1)	607798 E 711305 N

2.4 Breeding Wader Surveys

Breeding wader surveys followed the methodology described in O'Brien and Smith (1992)[11]. The survey involved a walked transect which covered all habitat potentially suitable for breeding waders within the Project Site.

There are large plantations of mature conifer forestry in the central, western, and southern areas of the Project Site. These habitats are not suitable for breeding waders[12] and so were excluded from the survey. There are some areas of recolonising cutover bog which were as considered suitable habitats for breeding waders. As such, transects were undertaken where habitats which are more suited to breeding waders. These transects are located in the western, eastern and northern sections of the Project Site where semi-natural and wet grassland fields are present and also, passing near to areas of recolonising cutover bog.

The transect route was repeated three times across the 2022 breeding season on 9th May, 17th May and 8th June.

The location, movement and behaviour of all wader species were recorded onto field maps using standard BTO species codes. The following criteria was recorded for each species:

- Northern lapwing *Vanellus vanellus* – the total numbers of birds seen from the transect;
- Common snipe *Gallinago gallinago* – the number of drumming plus chipping birds heard or seen from the transect; and
- Other species – the number of pairs (where 'pairs' = (paired individuals/2), displaying birds, nests or broods and other single birds not in flocks).

For birds to be considered as "confirmed breeding", one or more of the following criteria needed to be met:

- They were observed displaying or singing on more than one visit;
- Nests, eggs, or young were located;
- Adults repeatedly alarm called;
- Distraction displays were seen; and/ or
- Territorial disputes were observed.

Birds were considered to be probably or possibly (i.e. unconfirmed) breeding if:

- They were observed displaying or singing on one visit (i.e. possibly breeding) or more than one visit (i.e. probably breeding) (with the exception of obvious passage migrants in spring); or
- A pair of birds was observed in suitable habitat for nesting.

Other records were considered to be of non-breeding birds, failed breeders, birds loafing, feeding or on passage to other areas.

Please see Appendix 01 Figure 3 for an outline of the walked transect and Appendices 02 and 03 for metadata relating to these surveys.

[11] O'Brien, M. and Smith, K. W. (1992) Changes in the status of waders breeding on wet lowland grasslands in England and Wales between 1982 and 1989, Bird Study, 39:3, 165-176

[12] Apart from potentially for woodcock, which were not the target of surveys here.

2.5 Breeding Raptor Surveys

The survey methodology for breeding raptors used was a driven transect with regular stops, to carry out watches of suitable habitat from appropriate viewpoints to identify potential nesting territories in suitable breeding habitat[13]. The locations of these viewpoints are presented in Appendix 01 Figure 4 together with the outline of the driven survey route and the results of the surveys.

A driven survey was used due to limitations to access to third party land within the 2 km buffer zone and the availability of a good road network in the vicinity of the Project Site. Visibility from the survey route was sufficient to cover the vast majority of potentially suitable breeding habitat within the survey area.

Survey timings followed NS guidelines. This survey was repeated along the same routes on once on 9th May, 17th May and 7th June, and twice on 14th July (dawn and dusk). An additional survey was undertaken on 2nd August at Loughnane Quarry (located 1 km south of the Project Site) to search for evidence of breeding peregrine falcon. Details of survey dates, times and observers are provided in Appendix 02 and a record of weather conditions during surveys is provided in Appendix 03.

The location, movement and behaviour of all raptor species observed were recorded onto the field maps using standard BTO species codes.

2.6 Survey Limitations

No surveys were completed in April 2022. However, the survey effort was doubled up in May and June, which ensured that the required number of surveys was completed before the end of the breeding season.

Vantage point surveys at VP3 were undertaken in optimal weather conditions. Visibility was recorded as “good” (i.e. >3 km) during all 36 hours of surveys. There were no recorded hours of “moderate” (i.e. 1-3 km) or “poor” (i.e. <1 km) visibility. Further details regarding weather conditions during surveys are provided in Appendix 02.

No other limitations were encountered during surveys.

[13] Hardey, J., Crick, H.Q.P., Wernham, C., Riley, H., Etheridge, B., Thompson, D. (2013). Raptors: A field guide for surveys and monitoring (3rd Edition). The Stationery Office Edinburgh.

3.0 Results

3.1 Desk Based Results

3.1.1 Natura 2000 sites

The Project Site is not within or immediately adjacent to any SPA. However, there are a total of eight SPAs within a 20 km[14] radius with details shown in Table 3-1.

The closest SPAs to the Project Site are Dovegrove Callows SPA (Site Code: 004137), All Saints Bog SPA (Site Code: 004103) and River Little Brosna Callows SPA (Site Code: 004086) at distances of 3.6 km, 5.1 km and 5.8 km, respectively. Dovegrove Callows SPA and All Saints Bog SPA are designated for the protection of wintering Greenland white-fronted geese *Anser albifrons flavirostris,* whereas the River Little Brosna Callows SPA is designated for several wintering gull, wader and wildfowl species.

Table 3-1
SPAs within 20 km of the Project Site and their Qualifying Interests (Species Present During the Breeding Season)

Site Name	Site Code	Distance/Direction from Extension Area Boundary	Species of Special Conservation Interest Relevant to the Breeding Season
Dovegrove Callows SPA	004137	3.6 km southwest	• N/A
All Saints Bog SPA	004103	5.1 km west	• N/A
River Little Brosna Callows SPA	004086	5.8 km west	• N/A
Middle Shannon Callows SPA	004096	7.2 km northwest	• Corncrake *Crex crex* • Northern lapwing
Slieve Bloom Mountains SPA	004160	11.8 km southeast	• Hen harrier *Circus cyaneus*
River Suck Callows SPA	004097	17.3 km northwest	• N/A
Lough Derg (Shannon) SPA	004058	17.5 km southwest	• Great cormorant *Phalacrocorax carbo* • Tufted duck *Aythya fuligula* • Common tern *Sterna hirundo*
Mongan Bog SPA	004017	19.0 km northwest	• N/A

[14] A 20 km search radius was used as this represents the maximum core foraging distance used by Qualifying Interest species of SPAs in the UK and Ireland

3.1.2 Other Nature Conservation Sites

There are three NHAs located within 20 km of the Project Site with site synopses that mention birds. Two NHAs (River Little Brosna Callows NHA and Suck River Callows NHA) are also SPAs, and the bird species for which they are designated are detailed above in Table 3 1. Details of the remaining NHA are presented in Table 3-2.

There are three pNHAs within 20 km of the Project Site with site synopses that mention birds. Details of these pNHAs are presented in Table 3-2.

The Project Site is not within or immediately adjacent to any Ramsar site. The Slieve Bloom Mountains Ramsar site is located 11.8 km east of the Project Site and is contained within the boundaries of the Slieve Bloom Mountains SPA.

Table 3-2
NHAs and pNHAs within 20 km of the Project Site and their Qualifying Interests (Species Present During the Breeding Season)

Site Name	Site Code	Distance/Direction from Extension Area Boundary	Species of Special Conservation Interest Relevant to the Breeding Season
Woodville Woods pNHA	000927	2.0 km southwest	• Common snipe
Arragh More Bog NHA	004137	12.5 km southwest	• Hen harrier
Lough Nahinch (Tipperary) pNHA	000936	17.1 km southwest	• Common redshank *Tringa totanus* • Common snipe • Water rail *Rallus arquaticus*
Pallas Lough pNHA	000916	18.3 km northeast	• Mallard *Anas platyrhynchos* • Eurasian teal *Anas crecca* • Eurasian wigeon • Western marsh harrier *Circus aeruginosus*

3.1.3 Species Records

The NBDC database was searched for records of relevant bird species (those listed as primary/secondary target species and rare/protected species) from the 2 km grid squares N01Q and N01V within which phase 2 is located. The results are listed below in.

Table 3-3: Relevant Bird Species Recorded from the 2 km Grid Squares Within Which Phase 2 is Located

Grid Square	Species	Date of Last Record & Dataset	Designation
N01Q, N01V	Common buzzard *Buteo buteo*	2021, Birds of Ireland	BoCCI4 Green
N01V	Northern lapwing	2022, Birds of Ireland	BoCCI4 Red
N01V	Yellowhammer *Emberiza citrinella*	2021, Birds of Ireland	BoCCI4 Red

3.2 Breeding Season Flight Activity Surveys

Flight activity recorded from VP3 combined by primary target species is summarised in Table 3-4. Primary target species flights from VP3 are shown in Appendix 01 Figures 2.1 to 2.5. Flight activity data are provided in more detail in Appendix 04 with full data retained in GIS and excel format for subsequent collision risk modelling.

3.2.1 Primary Target Species

A total of 236 flight lines by five primary target species were recorded between May and August 2022.

Table 3-4
Number of Primary Target Species Flights from VP3, May to August 2022

Species	Number of flight lines by month				Total number of flight lines	Time at risk height* (s)	Cumulative number of flights
	May	June	July	August			
Black-headed gull	54	14	0	0	68	840	230
Common kestrel *Falco tinnunculus*	9	20	2	0	31	3,180	31
Northern lapwing	43	32	19	1	95	750	154
Peregrine falcon	1	2	1	0	4	240	4
Common snipe	1	19	7	0	27	1,110	29
* precautionary risk height assumed to be between 28 – 200 m							

A summary description of flight activity by each species is presented below.

Black-Headed Gull

Sixty-eight black-headed gull flight lines were recorded from May to June 2022, with a cumulative total of 230 flights. Most flight lines were within the extension area and a total of 24 flight lines (35%) were recorded within potential collision risk heights. Most flight lines consisted of a small number of birds, but there were a few

larger flocks recorded (up to 34 flights per flight line). Flight durations varied with a maximum duration of 480 seconds.

Common Kestrel

Thirty-one common kestrel flight lines were recorded during the flight activity surveys, with all observations consisting of a single bird. Most flight lines were within the extension area and total of 21 flight lines (68%) were recorded within potential collision risk heights. Flight durations varied with a maximum duration of 446 seconds.

Northern Lapwing

Ninety-five northern lapwing flight lines were recorded during the flight activity surveys, with a cumulative total of 154 flights. The highest number of flight lines was recorded in May, with numbers declining in later months. Most flight lines consisted of a single bird, but a few small flocks were recorded (up to 11 flights). Most flight lines were within the 500 m survey buffer and total of 14 flight lines (15%) were recorded within potential collision risk heights. Activity was located mostly immediately in front of VP3 outside the developable area.

Peregrine Falcon

Four peregrine falcon flight lines were recorded from May to July 2022, with all observations consisting of a single bird. Three flight lines were within the 500 m buffer and all flight lines were within potential collision risk heights.

Common Snipe

Twenty-seven common snipe flight lines were recorded from May to July 2022, with a cumulative total of 29 flights. The highest number of flight lines was recorded in June. All flight lines were within the 500 m survey buffer and total of 11 flight lines (42%) were recorded within potential collision risk heights. Flight durations varied with a maximum duration of 814 seconds.

3.2.2 Secondary Target Species

Secondary species activity at the Project Site is summarised in Table 3-5. There were ten secondary species recorded throughout the season. Common buzzard was the most frequently recorded secondary species (in 56 five-minute periods out of a possible 432). The highest number of birds recorded in one observation was 19 mallards.

Table 3-5
Secondary Species Activity Summary for VP3 – May to August 2022

Species	Number of 5 min periods recorded	Peak count of birds recorded in any 5 min period	Comments
Common buzzard	56	4	Activity in all months, within the Project Site, survey buffer and beyond.
Common gull *Larus canus*	1	1	Activity in May only, within the Project Site.
Common ringed plover *Charadrius hiaticula*	12	3	Activity in June and July only, within the Project Site.
Great black-backed gull *Larus marinus*	3	2	Activity in August only, within the Project Site and survey buffer.
Grey heron	5	2	Activity in all months except August, within the Project Site.
Herring gull *Larus argentatus*	4	8	Activity in May and June, within the Project Site and survey buffer.
Lesser black-backed gull *Larus fuscus*	10	4	Activity in all months, within the Project Site and survey buffer.
Mallard	6	19	Activity in all months except July, within the Project Site, survey buffer and beyond.
Northern raven	14	4	Activity in May and August, within the Project Site, survey buffer and beyond.
Eurasian sparrowhawk	6	1	Activity in all months, within the Project Site and survey buffer.

3.3 Breeding Wader Surveys

A total of three wader species were recorded during the breeding wader surveys. All wader observations were recorded during the two surveys in May.

Eurasian Curlew

Two observations of Eurasian curlew were made during the survey on 9th May. Two birds were recorded from the northern transect within 100 m of the extension area, and one bird was recorded from the western transect in an agricultural field adjacent to the extension area but separated by the N62 road. No evidence of breeding was recorded for this species.

Common Snipe

A single common snipe was recorded flying briefly over the survey area north-west of the extension area on 17th May. No evidence of breeding was recorded for this species. No drumming behaviour was recorded during flight activity surveys.

Northern Lapwing

A probable northern lapwing territory was identified within the extension area c. 300 m from the nearest turbine, as evidenced by frequent flight activity and aggressive behaviour. A single bird was also observed flying further south. This territory was within the south of the developable area.

Incidental Records of Other Species

No incidental records of non-target surveys were recorded during the breeding wader surveys.

3.4 Breeding Raptor Surveys

A total of four species of raptor were recorded during the targeted breeding raptor surveys.

Common Buzzard

There were 17 common buzzard observations made between May-July 2022, but no confirmed evidence of breeding was recorded during these months. Two possible territories were identified within 1 km of the extension area in May. Three birds were observed circling over suitable nest habitat in July, but no nests or young birds were recorded.

Common Kestrel

Common kestrel was observed hunting during May-July 2022 on six occasions, but there was no evidence of breeding by this species within 2 km of the Project Site.

Peregrine Falcon

A single peregrine falcon was observed flying towards Loughnane Quarry in July 2022, which is c.2 km from the nearest turbine. During the survey at the quarry in August, one bird was recorded perched on a ledge and flew off to the north. A possible nest site and several used roosts were also recorded.

Eurasian Sparrowhawk

A single Eurasian sparrowhawk was observed circling over woodland within 2 km of the Project Site, but there was no evidence of breeding by this species within 2 km of the Project Site.

Incidental Records of Other Species

Incidental records were made of sandwich tern *Sterna sandvicensis* (heard flying very high over the site, >200 m), northern lapwing and little egret during the surveys in May. A barn owl *Tyto alba* was recorded hunting on 18th May during a bat activity transect undertaken after a breeding raptor survey. The owl was located c. 1 km west of the Project Site, separated by the N62.

4.0 Summary and Conclusions

Flight activity surveys (VPs), breeding wader and breeding raptor surveys were carried out at the Project Site during the breeding season in 2022.

The following primary target species were recorded during the breeding season flight activity surveys:

- Black-headed gull;
- Common kestrel;
- Northern lapwing;
- Peregrine falcon; and
- Common snipe.

Northern lapwing was the most frequently recorded species (95 flight lines), followed by black-headed gull (68 flight lines), common kestrel (31 flight lines) and common snipe (27 flight lines).

Then secondary target species were recorded during the breeding season: common buzzard, common gull, common ringed plover, great black-backed gull, grey heron, herring gull, lesser black-backed gull, mallard, northern raven and Eurasian sparrowhawk.

Northern lapwing was probably breeding (as evidenced by a territory and aggressive behaviour) within the extension area in the same location where a nest and chicks were recorded previously, c.300 m from the nearest turbine. Common buzzards were suspected to breed (i.e. territories were present) within 2 km of the Project Site, and peregrine falcon were suspected to breed (one possible nest) in Loughnane Quarry located c.2 km south of the nearest turbine.

Incidental records made of species of conservation concern during taxon-specific surveys included sandwich tern, little egret, northern lapwing and barn owl.

4.1 Legal and Conservation Status of Target Species Recorded

Table 4-1 summarises the legal and conservation status of the primary and secondary target species recorded during the range of ornithological surveys mentioned above. Note that all bird species in Ireland are afforded general protection by the Wildlife Acts 2000 (as amended).

Table 4-1
Legal and Conservation Status of Target Species

Primary or Secondary Target	Species (BTO code)	Legal and Conservation status in Ireland
Primary	Black-headed gull (BH)	BoCCI4 Amber
	Common kestrel (K.)	BoCCI4 Red
	Northern lapwing (L.)	BoCCI4 Red
	Peregrine falcon (PE)	Annex 1, BoCCI4 Green
	Common ringed plover (RP)	BoCCI4 Amber
	Common snipe (SN)	BoCCI4 Red
Secondary	Common buzzard (BZ)	BoCCI4 Green
	Common gull (CM)	BoCCI4 Amber
	Great black-backed gull (GB)	BoCCI4 Green
	Grey heron (H.)	BoCCI4 Green
	Herring gull (HG)	BoCCI4 Amber
	Lesser black-backed gull (LB)	BoCCI4 Amber
	Mallard (MA)	BoCCI4 Amber
	Northern raven (RN)	BoCCI4 Green
	Eurasian sparrowhawk (SH)	BoCCI4 Green
Incidentals	Sandwich tern (TE)	Annex 1, BoCCI4 Amber
	Barn owl (BO)	BoCCI4 Red
Key		Annex 1 – the species is listed in Annex 1 of the EC Birds Directive; and BoCCI4 status (green, amber or red) – indicates the current Birds of Conservation Concern in Ireland[6] status category.

APPENDIX 01

Figures

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501.065723.00001.0004.0 Vantage Point Locations and Viewing Arcs

N

L300 L3006 L3003 L1092 N62 N52

Galros Cross Roads

Derryad ED Mounterin ED Eglish ED Birr Rural ED

Boolinarig River

Tullamore Road

Birr Golf Club

3

0 1 2

Kilometres

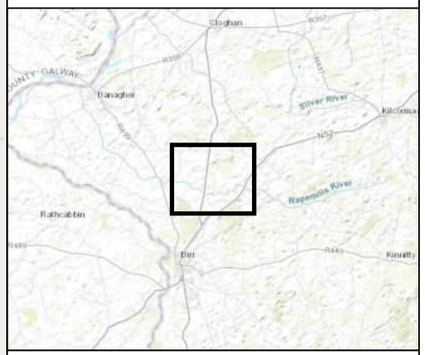
NOTES

The ZTV is calculated with a surface offset 28m & from a viewing height of 1.8m above ground level. The terrain model is derived from EU Copernicus 25 m data with a vertical accuracy of ± 7m. The ZTV was calculated using ArcMAP 10.5.1 software

The analysis does not take into account the screening effects
of vegetation, buildings or other screening features.

LEGEND

- Site Boundary
- Turbine Location
- Turbine Location 500 m Buffer
- Vantage Point (VP)
- VP 2 km Viewing Arc
- Theoretical Visibility from VP 3



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CUSH WIND FARM ORNITHOLOGY

BREEDING BIRD SURVEYS 2022

VANTAGE POINT LOCATIONS AND VIEWING ARCS

FIGURE 1

Scale 1:15,000 @ A3

Date AUGUST 2026

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501.065723.00001.0008.0 VP Flightlines

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Kilometres

LEGEND

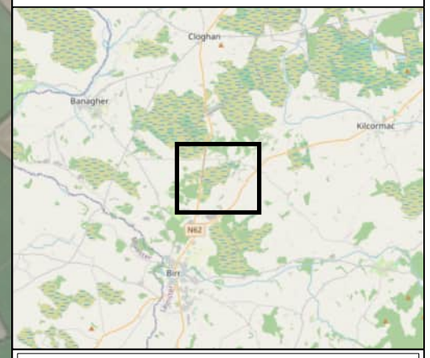
Site Boundary

Turbine Location 500 m Buffer

Turbine Location

Species Flightline

Black-headed Gull



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BREEDING BIRD SURVEYS 2022

BLACK-HEADED GULL FLIGHTLINES

FIGURE 2.1

Scale 1:15,000 @ A3

Date AUGUST 2026

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501.065723.00001.0008.0 VP Flightlines

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1
Kilometres

LEGEND

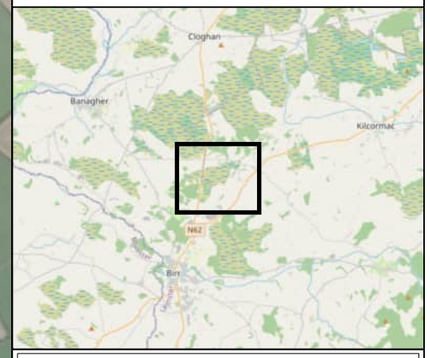
Site Boundary

Turbine Location 500 m Buffer

Turbine Location

Species Flightline

Kestrel



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BREEDING BIRD SURVEYS 2022

KESTREL FLIGHTLINES

FIGURE 2.2

Scale 1:15,000 @ A3

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Kilometres

LEGEND

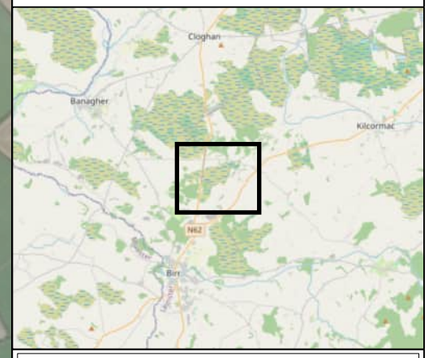
Site Boundary

Turbine Location 500 m Buffer

Turbine Location

Species Flightline

Lapwing



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BREEDING BIRD SURVEYS 2022

LAPWING FLIGHTLINES

FIGURE 2.3

Scale 1:15,000 @ A3

Date AUGUST 2026

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Kilometres

LEGEND

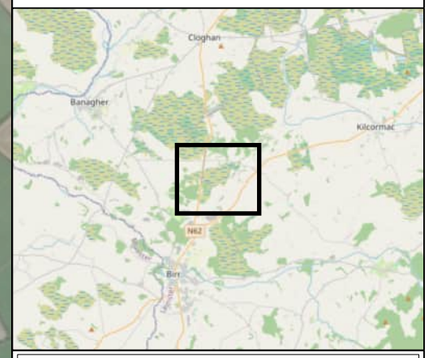
Site Boundary

Turbine Location 500 m Buffer

Turbine Location

Species Flightline

Peregrine



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BREEDING BIRD SURVEYS 2022

PEREGRINE FLIGHTLINES

FIGURE 2.4

Scale 1:15,000 @ A3

Date AUGUST 2026

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Kilometres

LEGEND

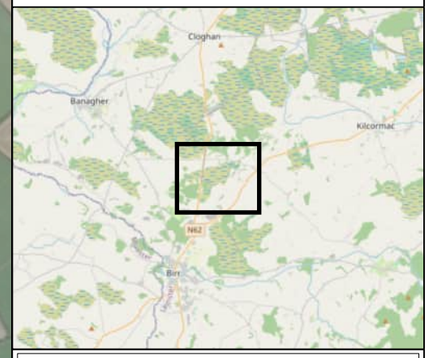
Site Boundary

Turbine Location 500 m Buffer

Turbine Location

Species Flightline

Snipe



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SNIPE FLIGHTLINES

FIGURE 2.5

Scale 1:15,000 @ A3

Date AUGUST 2026

501.065723.00001.0008.0 VP Flightlines

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501.065723.00001.0006.0 Breeding Wader Walked Transect Survey

L300 L3006 L1092 L3003 N62 N52 R439 L70044 L30033

Galros Cross Roads

Mounterin ED Eglish ED Derry ED Birr Rural ED

Boolinarig River

Tullamore Road

Birr Golf Club

CU

N

LEGEND

- Site Boundary
- Site Infrastructure At Time Of Survey 500 m Buffer
- Turbine Location
- Walked Transect Route
- Lapwing Territory

Wader Point

- CU Curlew

Wader Flight Line

- Lapwing
- Snipe

Cloghan Banagher Kilcormac Birr

0 1 2

Kilometres

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BREEDING BIRD SURVEYS

BREEDING WADER WALKED TRANSECT SURVEY

FIGURE 3

Scale 1:15,000 @ A3

Date AUGUST 2026

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604000 606000 608000 610000 612000

714000 712000 710000

N

R438 R439 L3010 L3003 N52 L1077 Banagher Road Tullamore Road Woodville Wood Little Brosna County Tipperary County Offaly Munster

A B C D E F G H

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Kilometres

LEGEND

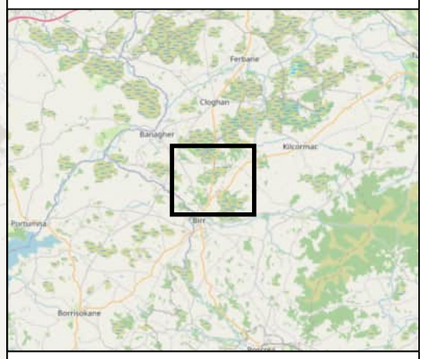
- Site Boundary
- Site Infrastructure At Time Of Survey 2 km Buffer
- Turbine Location
- Raptor Vantage Point (VP)
- Driven Transect Route

Species Code

- Buzzard
- Kestrel
- Peregrine
- Sparrowhawk

BTO Activity Code

- Male



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BREEDING BIRD SURVEYS

BREEDING RAPTOR DRIVEN TRANSECT SURVEY

FIGURE 4

Scale 1:30,000 @ A3

Date AUGUST 2026

501.065723.00001.0007.0 Breeding Raptor Driven Transect Survey

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APPENDIX 02

Survey dates times and observers[15]

[15] Surveyor initials are given in Section 2.2

Table A2-1
Details of VP Surveys Undertaken from VP3

Date	Surveyor	Start time	End time	No. Hours
18/05/2022	JD	09:00	12:00	03:00
20/05/2022	JD	16:00	19:00	03:00
24/05/2022	MMW	10:15	13:15	03:00
26/05/2022	MMW	12:50	15:50	03:00
13/06/2022	MMW	15:30	18:30	03:00
14/06/2022	MMW	19:00	22:00	03:00
28/06/2022	MMW	06:10	09:10	03:00
29/06/2022	MMW	09:45	12:45	03:00
11/07/2022	MMW	16:00	19:00	03:00
12/07/2022	MMW	09:20	12:20	03:00
01/08/2022	MMW	11:30	14:30	03:00
03/08/2022	MMW	06:40	09:40	03:00
Total hours				36

Table A2-2
Details of Breeding Wader Surveys

Date	Surveyor	Start time	End time	No. Hours
09/05/2022	DN	18:00	21:00	03:00
17/05/2022	JD	18:30	21:30	03:00
08/06/2022	MMW	05:30	07:35	02:05
08/06/2022	MMW	20:00	20:55	00:55
08/06/2022	MMW	21:15	22:05	00:50
Total hours				09:50

Table A2-3
Details of Breeding Raptor Surveys

Date	Surveyor	Start time	End time	No. Hours
09/05/2022	DN	12:20	16:00	03:40
17/05/2022	JD	14:30	18:30	04:00
07/06/2022	MMW	10:15	14:30	04:15
14/07/2022	MMW	07:00	10:00	03:00
14/07/2022	MMW	17:00	22:00	05:00
02/08/2022	MMW	10:00	12:30	02:30
Total hours				22:25

APPENDIX 03

Weather data

Table A3-1
Weather Data Collected During Flight Activity Surveys Undertaken from VP3

Date	Survey Start	Survey End	Hr	Wind Speed	Wind Direction	Rain[16]	Cloud Cover[17]	Cloud Height[18]	Visibility[19]	Snow[20]	Frost[21]	Temp (°c)
18/05/2022	09:00	12:00	1	4	S	0	4	2	2	0	0	12
18/05/2022	09:00	12:00	2	4	S	0	5	1	2	0	0	14
18/05/2022	09:00	12:00	3	4	S	0	7	1	2	0	0	15
20/05/2022	16:00	19:00	1	3	E	0	7	1	2	0	0	15
20/05/2022	16:00	19:00	2	3	NE	0	8	1	2	0	0	14
20/05/2022	16:00	19:00	3	3	NE	0	8	1	2	0	0	13
24/05/2022	10:15	13:15	1	2	NW	0	7	1	2	0	0	13
24/05/2022	10:15	13:15	2	3	NW	0	5	2	2	0	0	15
24/05/2022	10:15	13:15	3	3	NW	0	6	2	2	0	0	15
26/05/2022	12:50	15:50	1	4	SW	0	8	1	2	0	0	15
26/05/2022	12:50	15:50	2	4	SW	0	6	1	2	0	0	16
26/05/2022	12:50	15:50	3	4	SW	0	3	2	2	0	0	16
13/06/2022	15:30	18:30	1	2	SW	0	8	1	2	0	0	15

[16] Key: None = 0; Drizzle = 1; Light showers/snow = 2; Heavy showers/snow = 3; Heavy rain/snow = 4.
[17] Expressed in oktas (n/8)
[18] Key: Height of cloud above average height of viewshed. <150m = 0; 150-500m = 1; >500m = 2.
[19] Key: Poor (<1km) = 0; Moderate (1-3km) = 1; Good (>3km) = 2.
[20] Key: Lying snow. None = 0; On site = 1; On higher ground = 2.
[21] Key: None = 0; Ground = 1; All day = 2.

Date	Survey Start	Survey End	Hr	Wind Speed	Wind Direction	Rain[16]	Cloud Cover[17]	Cloud Height[18]	Visibility[19]	Snow[20]	Frost[21]	Temp (°c)
13/06/2022	15:30	18:30	2	2	SW	0	8	1	2	0	0	15
13/06/2022	15:30	18:30	3	3	SW	0	8	1	2	0	0	14
14/06/2022	19:00	22:00	1	1	SW	0	7	1	2	0	0	18
14/06/2022	19:00	22:00	2	1	SW	0	8	1	2	0	0	17
14/06/2022	19:00	22:00	3	1	SW	0	7	1	2	0	0	16
28/06/2022	06:10	09:10	1	4	S	2	8	1	2	0	0	13
28/06/2022	06:10	09:10	2	4	S	2	8	1	2	0	0	14
28/06/2022	06:10	09:10	3	4	S	3	7	1	2	0	0	14
29/06/2022	09:45	12:45	1	2	SW	0	8	1	2	0	0	14
29/06/2022	09:45	12:45	2	2	SW	3	8	1	2	0	0	17
29/06/2022	09:45	12:45	3	2	SW	0	8	1	2	0	0	18
11/07/2022	16:00	19:00	1	3	S	0	6	2	2	0	0	24
11/07/2022	16:00	19:00	2	4	S	0	7	2	2	0	0	23
11/07/2022	16:00	19:00	3	3	S	0	8	2	2	0	0	22
12/07/2022	09:20	12:20	1	2	S	0	6	2	2	0	0	18
12/07/2022	09:20	12:20	2	2	S	0	7	2	2	0	0	19
12/07/2022	09:20	12:20	3	3	SW	0	8	2	2	0	0	20
01/08/2022	11:30	14:30	1	3	SW	0	8	1	2	0	0	19
01/08/2022	11:30	14:30	2	4	SW	0	5	2	2	0	0	20
01/08/2022	11:30	14:30	3	4	SW	0	6	2	2	0	0	20
03/08/2022	06:40	09:40	1	4	SW	0	7	2	2	0	0	15
03/08/2022	06:40	09:40	2	4	SW	0	8	1	2	0	0	15
03/08/2022	06:40	09:40	3	3	SW	1	8	1	2	0	0	17

Table A3-2
Weather During Breeding Wader Surveys

Date	Start	End	Hr	Wind Speed	Wind Direction	Rain[16]	Cloud Cover[17]	Cloud Height[18]	Visibility[19]	Snow[20]	Frost	Temp (°c)
09/05/2022	18:00	21:00	All	4	S	1	8	1	2	0	0	13
17/05/2022	18:30	21:30	1	2	S	0	7	1	2	0	0	14
17/05/2022	18:30	21:30	2	2	S	0	6	1	2	0	0	13
17/05/2022	18:30	21:30	3	2	S	0	6	1	2	0	0	12

Table A3-3
Weather During Breeding Raptor Surveys

Date	Start	End	Hr	Wind Speed	Wind Direction	Rain[16]	Cloud Cover[17]	Cloud Height[18]	Visibility[19]	Snow[20]	Frost[21]	Temp (°c)
09/05/2022	12:20	16:00	1	5	S	0	8	1	1	0	0	13
09/05/2022	12:20	16:00	2	4	S	0	8	2	2	0	0	13
09/05/2022	12:20	16:00	3	4	S	1	8	1	2	0	0	13
17/05/2022	1	3	S	1	8	1	2	0	0	12	1	3
17/05/2022	2	3	S	1	8	1	2	0	0	12	2	3
17/05/2022	3	3	S	2	8	1	2	0	0	12	3	3
17/05/2022	4	3	S	0	8	1	2	0	0	12	4	3
14/07/2022	07:00	10:00	All	3	SW	2	8	1	2	0	0	16
14/07/2022	17:00	22:00	All	3	S	0	8	2	2	0	0	23
02/08/2022	10:00	12:30	1	2	SW	1	8	1	2	0	0	17

APPENDIX 04

Flight activity survey data[22]

[22] Surveyor initials are given in Section 2.2 and BTO code information is given in Section 4.1

Table A4-1
Primary Target Species Recorded During Flight Activity Surveys Undertaken at VP3

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
18/05/2022	JD	1	K.	1	U	U	09:00	90
18/05/2022	JD	2	K.	1	U	U	09:04	60
18/05/2022	JD	3	BH	2	AD	U	09:14	120
18/05/2022	JD	4	K.	1	AD	M	09:27	45
18/05/2022	JD	5	PE	1	AD	M	09:27	30
18/05/2022	JD	6	BH	2	AD	U	09:33	87
18/05/2022	JD	7	BH	1	AD	U	09:47	10
18/05/2022	JD	8	BH	1	AD	U	10:11	48
18/05/2022	JD	9	BH	3	AD	U	10:55	25
18/05/2022	JD	10	BH	2	AD	U	11:47	5
20/05/2022	JD	1	L.	2	AD	U	16:00	10
20/05/2022	JD	2	L.	1	AD	U	16:05	10
20/05/2022	JD	3	BH	1	AD	U	16:05	20
20/05/2022	JD	4	L.	3	AD	U	16:38	30
20/05/2022	JD	5	L.	2	AD	U	16:40	20
20/05/2022	JD	6	BH	7	AD	U	16:40	120
20/05/2022	JD	7	BH	2	AD	U	16:40	20

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
20/05/2022	JD	8	L.	2	AD	U	17:00	20
20/05/2022	JD	9	L.	2	AD	U	17:00	60
20/05/2022	JD	10	L.	2	AD	U	17:05	240
20/05/2022	JD	11	BH	2	AD	U	18:00	35
24/05/2022	MMW	1	L.	1	AD	U	10:18	12
24/05/2022	MMW	2	L.	1	AD	U	10:19	29
24/05/2022	MMW	3	L.	1	AD	U	10:20	3
24/05/2022	MMW	4	L.	1	AD	U	10:22	55
24/05/2022	MMW	5	L.	1	AD	U	10:24	34
24/05/2022	MMW	6	L.	1	AD	U	10:28	22
24/05/2022	MMW	7	L.	1	AD	U	10:31	17
24/05/2022	MMW	8	L.	1	AD	U	10:33	9
24/05/2022	MMW	9	L.	1	AD	U	10:36	6
24/05/2022	MMW	10	L.	1	AD	U	10:39	11
24/05/2022	MMW	11	L.	1	AD	U	10:43	27
24/05/2022	MMW	12	L.	1	AD	U	10:45	51
24/05/2022	MMW	13	L.	1	AD	U	10:48	3
24/05/2022	MMW	14	L.	1	AD	U	10:57	39
24/05/2022	MMW	15	BH	2	AD	U	10:57	480
24/05/2022	MMW	15	BH	2	AD	U	10:57	480
24/05/2022	MMW	16	L.	1	AD	U	10:56	42

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
24/05/2022	MMW	17	BH	2	AD	U	11:00	36
24/05/2022	MMW	18	L.	1	AD	U	11:00	49
24/05/2022	MMW	19	BH	1	AD	U	11:02	66
24/05/2022	MMW	20	L.	1	AD	U	11:03	5
24/05/2022	MMW	21	BH	3	AD	U	11:07	92
24/05/2022	MMW	22	BH	4	AD	U	11:10	59
24/05/2022	MMW	23	L.	1	AD	U	11:11	13
24/05/2022	MMW	24	BH	2	AD	U	11:12	4
24/05/2022	MMW	25	L.	1	AD	U	11:13	2
24/05/2022	MMW	26	BH	5	AD	U	11:16	57
24/05/2022	MMW	27	L.	1	AD	U	11:17	27
24/05/2022	MMW	28	BH	1	AD	U	11:18	78
24/05/2022	MMW	29	BH	4	AD	U	11:18	65
24/05/2022	MMW	30	BH	3	AD	U	11:22	44
24/05/2022	MMW	31	L.	2	AD	U	11:22	38
24/05/2022	MMW	32	L.	1	AD	U	11:23	24
24/05/2022	MMW	33	L.	1	AD	U	11:29	55
24/05/2022	MMW	34	L.	1	AD	U	11:32	27
24/05/2022	MMW	35	BH	1	AD	U	11:33	12
24/05/2022	MMW	36	BH	1	AD	U	11:34	33
24/05/2022	MMW	37	BH	2	AD	U	11:38	64

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
24/05/2022	MMW	38	BH	3	AD	U	11:43	22
24/05/2022	MMW	39	BH	4	AD	U	11:47	73
24/05/2022	MMW	40	L.	1	AD	U	11:56	26
24/05/2022	MMW	41	BH	4	AD	U	12:02	31
24/05/2022	MMW	42	BH	2	AD	U	12:03	7
24/05/2022	MMW	43	L.	1	AD	U	12:04	18
24/05/2022	MMW	44	L.	1	AD	U	12:08	13
24/05/2022	MMW	45	BH	1	AD	U	12:09	129
24/05/2022	MMW	46	BH	2	AD	U	12:17	55
24/05/2022	MMW	47	BH	3	AD	U	12:28	156
24/05/2022	MMW	48	BH	7	AD	U	12:33	242
24/05/2022	MMW	49	L.	1	AD	U	12:34	11
24/05/2022	MMW	50	BH	2	AD	U	12:37	63
24/05/2022	MMW	51	BH	2	AD	U	12:43	30
24/05/2022	MMW	52	BH	1	AD	U	12:52	44
24/05/2022	MMW	53	BH	1	AD	U	12:58	28
24/05/2022	MMW	54	BH	1	AD	U	13:02	71
24/05/2022	MMW	55	L.	1	AD	U	13:05	23
24/05/2022	MMW	56	BH	1	AD	U	13:06	49
26/05/2022	MMW	1	BH	3	AD	U	12:57	48
26/05/2022	MMW	2	SN	1	AD	U	12:57	3

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
26/05/2022	MMW	3	BH	22	U	U	13:06	91
26/05/2022	MMW	4	K.	1	AD	U	13:12	47
26/05/2022	MMW	5	BH	2	AD	U	13:16	19
26/05/2022	MMW	6	L.	2	AD	U	13:21	142
26/05/2022	MMW	7	L.	1	AD	U	13:30	54
26/05/2022	MMW	8	L.	1	AD	U	13:31	16
26/05/2022	MMW	9	BH	3	AD	U	13:34	33
26/05/2022	MMW	10	K.	1	AD	U	13:36	11
26/05/2022	MMW	11	BH	1	AD	U	13:41	18
26/05/2022	MMW	12	L.	1	AD	U	13:45	27
26/05/2022	MMW	13	K.	1	AD	U	13:46	45
26/05/2022	MMW	14	BH	34	AD	U	13:50	44
26/05/2022	MMW	15	BH	1	AD	U	13:53	10
26/05/2022	MMW	16	BH	1	AD	U	13:58	13
26/05/2022	MMW	17	BH	1	AD	U	14:00	35
26/05/2022	MMW	18	BH	1	AD	U	14:07	22
26/05/2022	MMW	19	K.	1	AD	F	14:15	81
26/05/2022	MMW	20	K.	1	AD	F	14:21	367
26/05/2022	MMW	20	K.	1	AD	F	14:21	367
26/05/2022	MMW	21	L.	1	AD	U	14:27	3
26/05/2022	MMW	22	K.	1	AD	F	14:28	42

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
26/05/2022	MMW	23	L.	1	AD	U	14:28	17
26/05/2022	MMW	24	BH	2	AD	U	14:36	48
26/05/2022	MMW	25	BH	9	AD	U	14:39	63
26/05/2022	MMW	26	BH	8	AD	U	14:53	65
26/05/2022	MMW	27	BH	31	AD	U	15:07	61
26/05/2022	MMW	28	L.	1	AD	U	15:16	19
26/05/2022	MMW	29	BH	1	AD	U	15:27	50
26/05/2022	MMW	30	BH	1	AD	U	15:38	34
26/05/2022	MMW	31	BH	2	AD	U	15:49	48
13/06/2022	MMW	1	K.	1	AD	F	15:55	143
13/06/2022	MMW	2	K.	1	AD	F	16:08	237
13/06/2022	MMW	2	K.	1	AD	F	16:08	237
13/06/2022	MMW	3	K.	1	AD	F	16:13	8
13/06/2022	MMW	4	SN	1	AD	U	16:26	3
13/06/2022	MMW	5	BH	1	AD	U	16:28	29
13/06/2022	MMW	7	PE	1	AD	U	16:43	55
13/06/2022	MMW	8	PE	1	AD	U	17:00	61
13/06/2022	MMW	9	BH	1	AD	U	17:10	42
13/06/2022	MMW	10	BH	1	AD	U	17:28	44
13/06/2022	MMW	11	BH	1	AD	U	17:32	10
13/06/2022	MMW	12	K.	1	AD	F	17:34	5

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
13/06/2022	MMW	13	K.	1	AD	M	17:35	9
13/06/2022	MMW	14	K.	1	AD	F	17:35	3
13/06/2022	MMW	15	BH	1	AD	U	17:37	16
13/06/2022	MMW	16	SN	1	AD	U	17:46	130
13/06/2022	MMW	17	SN	1	AD	U	17:55	73
13/06/2022	MMW	18	SN	2	AD	U	17:58	249
13/06/2022	MMW	19	L.	1	AD	U	18:15	16
13/06/2022	MMW	20	SN	1	AD	U	18:17	28
13/06/2022	MMW	21	K.	1	AD	F	18:25	293
14/06/2022	MMW	1	K.	1	AD	F	19:04	6
14/06/2022	MMW	2	SN	1	AD	U	19:10	10
14/06/2022	MMW	4	SN	1	AD	U	19:19	34
14/06/2022	MMW	5	SN	1	AD	U	19:21	4
14/06/2022	MMW	6	BH	2	AD	U	19:22	52
14/06/2022	MMW	7	SN	1	AD	U	19:29	4
14/06/2022	MMW	8	K.	1	AD	U	19:32	267
14/06/2022	MMW	9	K.	1	AD	F	19:38	159
14/06/2022	MMW	10	K.	1	AD	F	19:41	446
14/06/2022	MMW	10	K.	1	AD	F	19:41	446
14/06/2022	MMW	11	K.	1	AD	U	19:48	5
14/06/2022	MMW	12	BH	1	AD	U	19:52	18

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
14/06/2022	MMW	13	L.	1	AD	U	19:58	31
14/06/2022	MMW	14	K.	1	AD	M	19:59	289
14/06/2022	MMW	15	SN	1	AD	U	20:01	10
14/06/2022	MMW	16	L.	1	AD	U	20:10	36
14/06/2022	MMW	17	K.	1	AD	F	20:13	257
14/06/2022	MMW	18	BH	1	AD	U	20:17	5
14/06/2022	MMW	19	L.	1	AD	U	20:17	46
14/06/2022	MMW	20	K.	1	AD	U	20:31	207
14/06/2022	MMW	21	K.	1	AD	U (M?)	20:37	33
14/06/2022	MMW	22	BH	1	AD	U	20:45	74
14/06/2022	MMW	23	BH	2	AD	U	20:58	25
14/06/2022	MMW	24	BH	2	AD	U	21:02	22
28/06/2022	MMW	1	L.	2	AD	U	06:19	43
28/06/2022	MMW	3	L.	1	AD	U	06:22	11
28/06/2022	MMW	4	L.	1	AD	U	06:27	46
28/06/2022	MMW	5	L.	1	AD	U	06:30	15
28/06/2022	MMW	6	L.	2	AD	U	06:31	50
28/06/2022	MMW	8	L.	1	AD	U	06:33	17
28/06/2022	MMW	10	L.	3	AD	U	06:37	63
28/06/2022	MMW	11	L.	11	U	U	06:43	88
28/06/2022	MMW	12	L.	1	AD	U	06:48	12

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
28/06/2022	MMW	14	SN	1	AD	U	06:58	54
28/06/2022	MMW	15	L.	1	AD	U	07:16	28
28/06/2022	MMW	16	SN	1	AD	U	07:24	7
28/06/2022	MMW	17	L.	1	AD	U	07:35	5
28/06/2022	MMW	19	L.	1	AD	U	07:41	12
28/06/2022	MMW	20	BH	2	AD	U	07:42	31
28/06/2022	MMW	21	SN	1	AD	U	07:46	78
28/06/2022	MMW	22	SN	1	AD	U	07:50	33
28/06/2022	MMW	23	K.	1	AD	U	07:57	232
28/06/2022	MMW	24	SN	1	AD	U	07:57	27
28/06/2022	MMW	25	L.	1	U	U	08:10	6
28/06/2022	MMW	26	SN	1	AD	U	08:16	237
28/06/2022	MMW	27	SN	1	AD	U	08:26	74
28/06/2022	MMW	28	L.	1	U	U	08:27	43
28/06/2022	MMW	29	L.	1	AD	U	08:33	11
28/06/2022	MMW	30	L.	1	AD	U	08:37	34
28/06/2022	MMW	31	BH	1	AD	U	08:48	44
28/06/2022	MMW	33	SN	1	AD	U	09:05	17
29/06/2022	MMW	1	L.	1	AD	U	09:47	40
29/06/2022	MMW	2	L.	1	AD	U	09:59	11
29/06/2022	MMW	3	L.	1	AD	U	10:18	6

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
29/06/2022	MMW	4	L.	1	AD	U	10:37	5
29/06/2022	MMW	5	L.	1	AD	U	10:42	34
29/06/2022	MMW	6	L.	2	AD	U	10:48	26
29/06/2022	MMW	8	L.	1	AD	U	10:50	5
29/06/2022	MMW	9	L.	2	AD	U	10:58	21
29/06/2022	MMW	11	L.	1	AD	U	11:04	17
29/06/2022	MMW	12	L.	3	AD	U	11:06	4
29/06/2022	MMW	13	L.	1	AD	U	11:08	78
29/06/2022	MMW	14	K.	1	AD	U	11:21	163
29/06/2022	MMW	15	SN	2	AD	U	11:59	102
29/06/2022	MMW	16	BH	2	AD	U	12:19	63
29/06/2022	MMW	17	K.	1	AD	F	12:25	21
29/06/2022	MMW	18	K.	1	AD	F	12:26	244
29/06/2022	MMW	19	L.	1	AD	U	12:26	7
11/07/2022	MMW	1	L.	1	U	U	16:06	9
11/07/2022	MMW	2	L.	1	AD	U	16:18	12
11/07/2022	MMW	3	L.	1	AD	U	17:01	26
11/07/2022	MMW	4	L.	1	U	U	17:06	10
11/07/2022	MMW	5	L.	3	U	U	17:27	93
11/07/2022	MMW	6	L.	2	U	U	17:49	78
11/07/2022	MMW	7	SN	1	U	U	18:06	88

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
11/07/2022	MMW	8	PE	1	AD	U	18:21	130
11/07/2022	MMW	9	K.	1	U	U	18:43	101
11/07/2022	MMW	10	K.	1	U	U	18:57	35
12/07/2022	MMW	1	L.	1	AD	U	07:22	5
12/07/2022	MMW	2	L.	4	AD	U	09:34	52
12/07/2022	MMW	3	SN	1	AD	U	09:45	44
12/07/2022	MMW	4	SN	1	AD	U	09:48	6
12/07/2022	MMW	5	L.	5	AD	U	09:51	161
12/07/2022	MMW	6	L.	5	AD	U	09:51	148
12/07/2022	MMW	7	L.	1	AD	U	09:57	45
12/07/2022	MMW	8	L.	1	AD	U	10:02	50
12/07/2022	MMW	9	L.	2	AD	U	10:05	140
12/07/2022	MMW	10	L.	5	AD	U	10:23	11
12/07/2022	MMW	11	L.	3	AD	U	10:25	65
12/07/2022	MMW	12	SN	1	AD	M	10:30	814
12/07/2022	MMW	13	SN	1	AD	U	10:57	13
12/07/2022	MMW	14	SN	1	AD	M	10:59	554
12/07/2022	MMW	14	SN	1	AD	M	10:59	554
12/07/2022	MMW	16	L.	1	AD	U	11:22	14
12/07/2022	MMW	17	SN	1	AD	U	11:58	10
12/07/2022	MMW	18	L.	10	U	U	12:05	8

Date	Surveyor	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	StartTime (hr:min)	Flight duration (s)
12/07/2022	MMW	19	L.	1	U	U	12:10	16
12/07/2022	MMW	20	L.	3	U	U	12:10	123
03/08/2022	MMW	1	L.	1	U	U	08:21	34

Table A4-2
Secondary Target Species Recorded During Flight Activity Surveys Undertaken at VP3

Date	Survey start	Survey end	5 min period start time	5 min period end time	Species	Count Max	Height band	Location (on site, in buffer or beyond)
18/05/2022	09:00	12:00	09:00	09:05	RN	2	1	Buffer, beyond
18/05/2022	09:00	12:00	09:50	09:55	RN	1	2	Beyond
18/05/2022	09:00	12:00	10:40	10:45	BZ	2	2	Buffer
18/05/2022	09:00	12:00	10:25	10:30	RN	2	1	On site
20/05/2022	16:00	19:00	16:40	16:45	BZ	4	2	On site, buffer
24/05/2022	10:15	13:15	10:45	10:50	H.	2	1	On site
24/05/2022	10:15	13:15	11:05	11:10	BZ	1	3	Beyond
24/05/2022	10:15	13:15	11:10	11:15	BZ	1	2	Beyond
24/05/2022	10:15	13:15	11:20	11:25	RN	1	2	On site
24/05/2022	10:15	13:15	11:40	11:45	MA	1	1	On site
24/05/2022	10:15	13:15	12:00	12:05	H.	1	1	On site
24/05/2022	10:15	13:15	12:00	12:05	RN	1	2	On site
24/05/2022	10:15	13:15	12:20	12:25	RN	1	2	Beyond
24/05/2022	10:15	13:15	12:25	12:30	BZ	1	2	On site
24/05/2022	10:15	13:15	12:30	12:35	BZ	1	2	Buffer
24/05/2022	10:15	13:15	12:45	12:50	RN	3	2	On site
24/05/2022	10:15	13:15	13:00	13:05	BZ	1	2	On site
24/05/2022	10:15	13:15	13:10	13:15	BZ	1	2	Buffer
26/05/2022	12:50	15:50	13:05	13:10	BZ	1	2	Buffer, beyond
26/05/2022	12:50	15:50	13:05	13:10	HG	1	1	Onsite, buffer

Date	Survey start	Survey end	5 min period start time	5 min period end time	Species	Count Max	Height band	Location (on site, in buffer or beyond)
26/05/2022	12:50	15:50	13:25	13:30	BZ	2	2	Buffer
26/05/2022	12:50	15:50	13:25	13:30	BZ	2	2	On site
26/05/2022	12:50	15:50	13:30	13:35	RN	1	1	On site
26/05/2022	12:50	15:50	13:40	13:45	BZ	3	2	Buffer
26/05/2022	12:50	15:50	13:40	13:45	BZ	3	2	On site, buffer
26/05/2022	12:50	15:50	13:40	13:45	BZ	3	2	Beyond
26/05/2022	12:50	15:50	13:45	13:50	LB	4	2	On site
26/05/2022	12:50	15:50	13:50	13:55	HG	8	1	On site
26/05/2022	12:50	15:50	13:50	13:55	CM	1	1	On site
26/05/2022	12:50	15:50	14:40	14:45	BZ	1	2	Buffer
26/05/2022	12:50	15:50	14:45	14:50	BZ	1	2	Buffer
26/05/2022	12:50	15:50	15:00	15:05	BZ	2	2	On site, buffer
26/05/2022	12:50	15:50	15:00	15:05	RN	1	1	On site
26/05/2022	12:50	15:50	15:10	15:15	BZ	1	2	On site
26/05/2022	12:50	15:50	15:25	15:30	SH	1	1	On site, buffer
26/05/2022	12:50	15:50	15:40	15:45	BZ	1	3	On site, buffer
26/05/2022	12:50	15:50	15:45	15:50	BZ	1	2	Buffer
13/06/2022	15:30	18:30	15:30	15:35	BZ	1	2	Buffer
13/06/2022	15:30	18:30	15:35	15:40	BZ	2	2	On site, buffer
13/06/2022	15:30	18:30	15:35	15:40	H.	1	2	On site
13/06/2022	15:30	18:30	15:40	15:45	BZ	2	2	On site, buffer
13/06/2022	15:30	18:30	15:45	15:50	BZ	3	2	On site, buffer

Date	Survey start	Survey end	5 min period start time	5 min period end time	Species	Count Max	Height band	Location (on site, in buffer or beyond)
13/06/2022	15:30	18:30	16:30	16:35	RP	1	1	On site
13/06/2022	15:30	18:30	16:45	16:50	BZ	1	1	On site, buffer
13/06/2022	15:30	18:30	17:00	17:05	SH	1	1	Buffer
13/06/2022	15:30	18:30	17:15	17:20	BZ	1	2	Buffer
13/06/2022	15:30	18:30	17:40	17:45	H.	1	1	On site
13/06/2022	15:30	18:30	17:40	17:45	BZ	1	2	On site
13/06/2022	15:30	18:30	17:55	18:00	HG	2	2	On site, buffer
13/06/2022	15:30	18:30	18:00	18:05	BZ	2	2	On site, buffer
13/06/2022	15:30	18:30	18:10	18:15	BZ	1	2	Buffer
13/06/2022	15:30	18:30	18:15	18:20	BZ	1	2	On site
13/06/2022	15:30	18:30	18:20	18:25	BZ	1	2	Buffer
13/06/2022	15:30	18:30	18:25	18:30	BZ	1	2	Buffer
14/06/2022	19:00	22:00	19:10	19:15	RP	1	1	On site
14/06/2022	19:00	22:00	20:10	20:15	LB	1	2	On site
14/06/2022	19:00	22:00	20:20	20:25	BZ	1	1	On site
14/06/2022	19:00	22:00	20:20	20:25	BZ	1	2	On site
14/06/2022	19:00	22:00	21:15	21:20	HG	2	1	On site
28/06/2022	06:10	09:10	06:20	06:25	RP	2	1	On site
28/06/2022	06:10	09:10	06:30	06:35	RP	2	1	On site
28/06/2022	06:10	09:10	06:55	07:00	RP	3	1	On site
28/06/2022	06:10	09:10	07:35	07:40	BZ	1	2	On site, buffer
28/06/2022	06:10	09:10	07:35	07:40	RP	2	1	On site

Date	Survey start	Survey end	5 min period start time	5 min period end time	Species	Count Max	Height band	Location (on site, in buffer or beyond)
28/06/2022	06:10	09:10	07:40	07:45	BZ	1	2	On site, buffer
28/06/2022	06:10	09:10	07:40	07:45	MA	1	1	On site
28/06/2022	06:10	09:10	07:45	07:50	BZ	1	2	Buffer
28/06/2022	06:10	09:10	08:55	09:00	RP	1	1	On site
29/06/2022	09:45	12:45	10:35	10:40	MA	2	1	On site
29/06/2022	09:45	12:45	10:50	10:55	RP	1	1	On site
29/06/2022	09:45	12:45	11:00	11:05	RP	1	1	On site
29/06/2022	09:45	12:45	11:10	11:15	BZ	2	2	On site, buffer
29/06/2022	09:45	12:45	11:10	11:15	BZ	2	2	On site, buffer
29/06/2022	09:45	12:45	11:20	11:25	BZ	2	2	On site, buffer
29/06/2022	09:45	12:45	11:25	11:30	BZ	2	2	On site, buffer
29/06/2022	09:45	12:45	12:30	12:35	BZ	2	2	On site, buffer
11/07/2022	16:00	19:00	16:30	16:35	BZ	1	2	On site
11/07/2022	16:00	19:00	16:35	16:40	LB	4	2	On site
11/07/2022	16:00	19:00	16:35	16:40	BZ	1	2	On site
11/07/2022	16:00	19:00	16:40	16:45	BZ	1	1	On site
11/07/2022	16:00	19:00	17:00	17:05	BZ	1	2	On site
11/07/2022	16:00	19:00	17:05	17:10	BZ	1	2	On site
11/07/2022	16:00	19:00	17:50	17:55	BZ	1	2	On site
11/07/2022	16:00	19:00	17:55	18:00	SH	1	2	On site
11/07/2022	16:00	19:00	18:00	18:05	SH	1	2	On site
12/07/2022	09:20	12:20	09:20	09:25	LB	1	1	On site

Date	Survey start	Survey end	5 min period start time	5 min period end time	Species	Count Max	Height band	Location (on site, in buffer or beyond)
12/07/2022	09:20	12:20	09:30	09:35	SH	1	1	On site
12/07/2022	09:20	12:20	11:00	11:05	H	1	1	On site
12/07/2022	09:20	12:20	11:15	11:20	LB	2	2	On site
12/07/2022	09:20	12:20	11:15	11:20	RP	2	1	On site
12/07/2022	09:20	12:20	11:25	11:30	LB	1	2	On site
12/07/2022	09:20	12:20	11:40	11:45	BZ	1	2	On site, buffer
12/07/2022	09:20	12:20	11:45	11:50	BZ	1	2	On site, buffer
12/07/2022	09:20	12:20	12:10	12:25	RP	2	1,2	On site
12/07/2022	09:20	12:20	12:15	12:20	BZ	1	2	On site
01/08/2022	11:30	14:30	12:05	12:10	RN	1	2	On site
01/08/2022	11:30	14:30	12:30	12:35	BZ	1	2	Buffer
01/08/2022	11:30	14:30	12:45	12:50	BZ	1	2	On site
01/08/2022	11:30	14:30	13:05	13:10	SH	1	1	On site
01/08/2022	11:30	14:30	13:15	13:20	BZ	2	2	On site
01/08/2022	11:30	14:30	13:15	13:20	RN	1	2	On site
01/08/2022	11:30	14:30	13:15	13:20	BZ	2	2	Buffer
01/08/2022	11:30	14:30	13:20	13:25	LB	1	2	On site, buffer
01/08/2022	11:30	14:30	13:40	13:45	BZ	1	2	On site, buffer
01/08/2022	11:30	14:30	14:25	14:30	GB	2	2	Buffer
01/08/2022	11:30	14:30	14:25	14:30	GB	2	2	On site
03/08/2022	06:40	09:40	07:05	07:10	LB	1	2	Buffer
03/08/2022	06:40	09:40	07:25	07:30	MA	19	2	On site, buffer

Date	Survey start	Survey end	5 min period start time	5 min period end time	Species	Count Max	Height band	Location (on site, in buffer or beyond)
03/08/2022	06:40	09:40	07:40	07:45	LB	3	2	On site, buffer
03/08/2022	06:40	09:40	07:50	07:55	LB	2	2	On site, buffer
03/08/2022	06:40	09:40	08:00	08:05	MA	6	2	On site, buffer
03/08/2022	06:40	09:40	08:15	08:20	MA	2	2	Buffer, beyond
03/08/2022	06:40	09:40	08:50	08:55	RN	1	2	On site
03/08/2022	06:40	09:40	08:55	09:00	RN	1	2	On site
03/08/2022	06:40	09:40	09:10	09:15	GB	1	2	On site, buffer
03/08/2022	06:40	09:40	09:10	09:15	RN	4	2	On site

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Bird Survey Report Non-Breeding 2022/23

Cush Wind Farm

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Basis of Report

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1.0 Introduction

SLR Environmental Consulting (Ireland) Ltd. (SLR) was commissioned by Galetech Energy Developments Ltd to carry out a bird survey programme for the proposed wind farm at Cush, Co. Offaly (hereafter 'the Project') during the non-breeding season in 2022/23. The purpose of this report is to describe these surveys and the resulting ornithological baseline.

1.1 Background to the Commission

The Project Site includes a phase 1 (eight turbines) and an extension area (three turbines, alsko know as Phase 2). Phase 1 was granted planning permission in November 2024. As the bird survey programme for the breeding season 2022 covered both phases, and the data are within date according to NatureScot (NS; formerly Scottish Natural Heritage, SNH) Guidance[1], the results are considered to be relevant to the proposed extension area. This report focuses on the methodology and results that are relevant to extension area. The methodology and results of the entire bird survey programme can be found in the previously issued baseline non-breeding bird survey report[2].

Bird surveys have been previously undertaken at the proposed wind farm development site at Cush, Co. Offaly (hereafter 'the Project Site') by SLR for the breeding 2020, non-breeding 2020/21, breeding 2021, non-breeding 2021/22, and breeding 2022 seasons. The Project Site also includes a linear area that was previously surveyed for a proposed overhead line[3]. Flight activity surveys were carried out at two vantage point locations along the proposed overhead line route corridor during the breeding season in 2018.

1.2 Site Description

The Project Site is located in the townland of Cush approximately 4 km north of Birr, Co. Offaly at approximate ITM coordinates 608237, 709946. The habitats within the Project Site are dominated by conifer plantations of varying age classes (c.327 ha), cutaway bog (c.102 ha) and agricultural grasslands (ca. 327 ha; refer to Appendix A **Figure 1**). The Project Site is not designated for nature conservation.

1.3 Terminology

For this report, "flight line" refers to the line drawn to record avian movement during a vantage point (VP) survey. A single flight line may be used to indicate the collective movement of a flock of birds. Each individual bird moving within the same flight line is referred to as "a flight". Note that the "cumulative number of flights" reflects the occupancy of the study area by a particular species. It is not equivalent to the total number of unique individuals and should not be used to infer abundance.

1.4 Purpose of this Report

This report outlines the surveys undertaken and methods used. It then summarises the survey data obtained and provides descriptions of the legal and conservation status of the species recorded.

The assessment of impacts resulting from the Project and the development of mitigation measures, if required, are beyond the scope of this report and will be covered in a separate Environmental Impact Assessment (EIA) Report in due course.

---

[1] Scottish Natural Heritage (2017). *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms V2.* Scottish Natural Heritage, Inverness.

[2] SLR (2023) Cush Wind Farm Non-Breeding Bird Survey Report 2022/23..

[3] SLR (2018) *Cloghan Wind Farm and Long Oak Wind Farm Breeding Bird Survey Report 2018*. Prepared for Galetech Energy Services Ltd

2.0 Methods

2.1 Scope of Work

The scope of survey work was based on existing knowledge of the area and took into account current NS guidance[4], with details provided in **Table 2-1**. Further details are provided in Section 2.0.

Surveys were undertaken by Senior Ecologist Aisling Kinsella (AK) BSc (Hons) MSc, Senior Field Ecologist Faolán Linnane BSc (Hons) MSc, Project Ecologist Darragh Nagle (DN) BSc (Hons), and Graduate Ecologist Hugo Brooks (HB) BSc (Hons).

Details of survey dates and times are provided in Appendix B and a record of weather conditions during surveys is provided in Appendix C.

Table 2-1: Scope of Ornithological Survey Work October 2022 to March 2023

Survey Type	Summary Methodology (see Section 2 for further details)
Vantage Point (VP) surveys	Six hours of survey per month were carried out from VP3 between October 2022 and March 2023.
Feeding distribution surveys	Feeding distribution surveys were carried out on a twice-monthly basis during the period October 2022 to March 2023 to search for swans and/or geese using the fields for foraging within 500 m of the Project Site.
Nocturnal golden plover surveys	Two nocturnal golden plover surveys (one in January and one in March) were carried out during the 2022/23 non-breeding season.

2.2 Desk-Based Review

The desk review collated any available information to date on the breeding and non-breeding bird populations and movements around the Project Site.

The following reports resulting from previous breeding and non-breeding bird surveys were reviewed for any relevant information that could be used to inform the current bird surveys:

- SLR (2018) Cloghan Wind Farm and Long Oak Wind Farm Breeding Bird Survey Report 2018.
- SLR (2020) Cush Wind Farm Breeding Bird Survey Report 2020.
- SLR (2022) Cush Wind Farm Winter Bird Survey Report 2020-2021.
- SLR (2022) Cush Wind Farm Breeding and Winter Bird Survey Report 2021-2022.
- SLR (2022) Cush Wind Farm Breeding Bird Survey Report 2022.

The websites of the National Parks and Wildlife Service (NPWS)[5], the UK and Ireland Bird Atlas 2007-2011[6] and the National Biodiversity Data Centre (NBDC)[7] were accessed for information on sites designated for nature conservation and notable bird species in the vicinity of the Project Site.

[4] Scottish Natural Heritage (2017). *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms V2.* Scottish Natural Heritage, Inverness.

[5] www.npws.ie (Last accessed August 2023)

[6] https://app.bto.org/mapstore/StoreServlet Accessed 29/08/2023

[7] http://maps.biodiversityireland.ie/#/Map Accessed 29/08/2023

2.3 Flight Activity Surveys

VP locations, 2 km viewing arcs and viewsheds are shown in Appendix A **Figure 1**.

Three VP locations were selected that covered both phases of the Project Site. The viewsheds from VP1 and VP2 cover phase 1 of the Project, and the viewshed from VP3 covers the extension area. As VP3 was deemed to adequately cover the extension area without adding additional VPs, this report will focus on surveys conducted from VP3.

A total of 36 hours of flight activity surveys were conducted from VP3 during the 2022/23 non-breeding season, as summarised in **Table 2-2**.

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined below) within the study area.

The main purpose of VP watches is to collect data on primary target species that will enable estimates to be made of:

- The time spent flying over the Project Site;
- The relative use by birds of different parts of the Project Site;
- The proportion of flying time spent within the provisional upper and lower risk height limits as determined by the potential rotor diameter and rotor hub height; and
- Ultimately, the analysis of the potential risk of collision of birds with rotating turbines.

Target species for the surveys were defined by legal and/or conservation status and vulnerability to impacts caused by wind turbines, as defined in NS guidance.

Primary target species were limited to species upon which effects are most likely to be potentially significant in EIA and Appropriate Assessment (AA) terms e.g., species forming qualifying features for nearby Special Protection Areas (SPAs) or species listed on Annex 1 of the Birds Directive[8]. This enabled recording to focus on the species of greatest importance without the distraction of having to record detailed flight data for a larger number of more common species.

Primary target species included the following bird species:

- All Annex 1 raptor/owl species;
- Qualifying interest species for nearby SPAs[9]; and
- Other raptors, waders or wildfowl red-listed on the latest Birds of Conservation Concern in Ireland (BoCCI)[10] scheme.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Duration of flying bout;
- Species, age and sex (where determinable);
- Number of flights observed;
- Time spent within each height band; and
- Notes on observation.

[8] Annex 1 of the Birds Directive (Directive 2009/147/EC)

[9] The relevant SPAs are listed in Section 3.1.

[10] Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 2020–2026. Irish Birds 43: 1–22

Local circumstances may indicate that survey information should also be acquired on other species, especially those of regional conservation concern. Such species are termed secondary species. Recording of secondary species is subsidiary to recording of primary target species. A summary of observations of secondary target species was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within and around the Project Site, in accordance with current NS guidance.

Secondary target species included:

- Any other wildfowl and wader species;
- Common buzzard *Buteo buteo;*
- Eurasian sparrowhawk *Accipiter nisus*;
- Northern raven *Corvus corax*;
- Grey heron *Ardea cinerea; and*
- Gulls *Larus* sp.

NS guidance states that "it is generally considered the passerine species are not significantly impacted by wind farms". It goes on to state that "survey of woodland passerines, especially in commercial conifer forest is generally not required". The only exception is if the desk study identifies that the Project Site is in a key area for a Schedule 1 woodland passerine species. As Schedule 1 refers to UK legislation, it is prudent to assume that passerines red-listed under the latest BoCCI scheme[10] should be considered as equivalent. No such species were returned during the desk-based review or data request. NS guidance also states that "surveys of farmland passerines especially on more intensive arable habitat are generally not required". Based on the above, while not the targets, any red-listed passerines were recorded as incidental species during other surveys.

In the absence of detailed information regarding turbine specifications at the time of commencing surveys, a precautionary approach was taken in relation to recording height bands. For the 2022/23 non-breeding season, height bands were determined allowing for the maximum rotor tip height of 200 m and a lowest rotor swept height of 28 m. The relation of the height bands to the latest turbine specification is shown below.

Flight heights were attributed to four distinct height bands for the non-breeding season as follows:

- 1 = <25 m (below the likely rotor swept area);
- 2 = 25 m to 160 m (potentially within the likely rotor swept area, at least in part);
- 3 = 160 m to 200 m (within the likely rotor swept area); and
- 4 = >200 m (above the likely rotor swept area).

Table 2-2: Summary of VP Surveys Undertaken From VP3 during the Non-Breeding Season 2022/23

Month	VP3 (hours)
October	06:00
November	06:00
December	06:00
January	09:00
February	03:00
March	06:00
Total hrs	**36:00**

Month	VP3 (hours)
VP locations ITM (**Figure 1**)	607798 E 711305 N

2.4 Feeding Distribution Surveys

NS guidance recommends that for whooper swan *Cygnus cygnus*, Greenland white-fronted goose *Anser albifrons flavirostris* and other geese species, feeding distribution surveys should be undertaken in areas of suitable habitat when the survey area lies within the core foraging distance of SPAs or other major roosts for these species, unless it can be established from existing data that the area is not utilised for feeding. As there are SPAs for swans and geese located close to the Project Site, feeding distribution surveys were undertaken.

A buffer of 500 m around the Project Site was used for these surveys, which were undertaken by driven transects twice per month, stopping on a regular basis to check all fields for goose and swan feeding activity. The transect route is shown in Appendix A **Figure 3**, survey dates in Appendix B, weather conditions in Appendix C.

2.5 Nocturnal Golden Plover Surveys

Survey transects were identified that were representative of potentially suitable winter habitats (see Gillings et al., 2007)[11] for European golden plover *Pluvialis apricaria* and northern lapwing *Vanellus vanellus* (see **Figure 4**). Transects were focused on pastures and bog habitats.

Surveys were undertaken using a Helion 2 XP50 Pro Thermal Monocular. This enables birds to be readily detected by their body heat at up to c. 350 m range. Where birds were detected, images were recorded as videos.

Each transect was walked twice, once in January 2023 and once in March 2023, after dark using the thermal monocular to detect and identify the presence of target species. Birds were also detected and identified by sound, as appropriate. Nocturnal surveys were conducted by a pair of surveyors on the basis of health and safety.

Two golden plover surveys were completed. Full details of survey dates, times and observers are provided in Appendix B and details of the weather conditions during surveys are provided in Appendix C.

2.6 Survey Limitations

Most VP surveys were undertaken in optimal weather conditions. However, during such an extensive series of surveys carried out it was inevitable that some surveys were completed in suboptimal conditions. There were three hours out of the total of 36 during which the visibility was recorded as “moderate”, i.e. 1-3 km. This comprises 8% of the total survey effort but in almost all cases all the relevant 2 km viewing arc was visible. There was one hour during which visibility was recorded as “poor”, i.e. less than 1 km, which comprises 3% of the total survey effort. However, these conditions were not persistent through the affected survey and target species were still recorded. Therefore, these conditions are not considered to be significant limitations to the survey data obtained. Details regarding weather conditions during surveys are provided in Appendix C.

[11] Gillings, S., Fuller, R.J. and Sutherland, W.J. (2007). Winter field use and habitat selection by Eurasian Golden Plovers *Pluvialis apricaria* and Northern Lapwings *Vanellus vanellus* on arable farmland. Ibis. 149: 509 – 520.

3.0 Results

3.1 Desk Based Results

3.1.1 Natura 2000 Sites

The Project Site is not within or immediately adjacent to any SPA. However, there are a total of eight SPAs within a 20 km[12] radius with details shown in **Table 3-1**.

The closest SPAs to the Project Site are Dovegrove Callows SPA (Site Code: 004137), All Saints Bog SPA (Site Code: 004103) and River Little Brosna Callows SPA (Site Code: 004086) distances of 3.6 km, 5.1 km and 5.8 km, respectively. Dovegrove Callows SPA and All Saints Bog SPA are designated for the protection of wintering Greenland white-fronted geese, whereas the River Little Brosna Callows SPA is designated for several wintering gull, wader and wildfowl species.

Table 3-1: SPAs within 20 km of the Project Site and their Qualifying Interests (Species Present During the Non-Breeding Season)

Site Name	Site Code	Distance/Direction from Site Boundary	Species of Special Conservation Interest Relevant to the Non-Breeding Season
Dovegrove Callows SPA	004137	3.6 km southwest	• Greenland white-fronted goose
All Saints Bog SPA	004103	5.1 km west	• Greenland white-fronted goose
River Little Brosna Callows SPA	004086	5.8 km west	• Whooper swan • Eurasian wigeon *Mareca penelope* • Eurasian teal *Anas crecca* • Northern pintail *Anas acuta* • Northern shoveler *Anas clypeata* • European golden plover • Northern lapwing • Black-tailed godwit *Limosa limosa* • Black-headed gull *Chroicocephalus ridibundus* • Greenland white-fronted goose
Middle Shannon Callows SPA	004096	7.2 km northwest	• Whooper swan • Eurasian wigeon • European golden plover • Northern lapwing • Black-tailed godwit • Black-headed gull
Slieve Bloom Mountains SPA	004160	11.8 km southeast	• Hen harrier *Circus cyaneus*
River Suck Callows SPA	004097	17.3 km northwest	• Whooper swan • Eurasian wigeon • European golden plover • Northern lapwing • Greenland white-fronted goose

[12] A 20 km search radius was used as this represents the maximum core foraging distance used by Qualifying Interest species of SPAs in the UK and Ireland

Site Name	Site Code	Distance/Direction from Site Boundary	Species of Special Conservation Interest Relevant to the Non-Breeding Season
Lough Derg (Shannon) SPA	004058	17.5 km southwest	• Great cormorant *Phalacrocorax carbo* • Tufted duck *Aythya fuligula* • Common goldeneye *Bucephala clangula*
Mongan Bog SPA		19.0 km northwest	• Greenland white-fronted goose

3.1.2 Other Nature Conservation Sites

The Project Site is not within or immediately adjacent to any Natural Heritage Area (NHA) or proposed NHA (pNHA). However, there are a total of eight NHAs and 52 pNHAs within a 20 km radius, with details shown in **Table 3-2**.

River Little Brosna Callows NHA is located 9.4 km west of the Project Site and is the only NHA within a 20 km radius which is designated for its bird populations. The site has internationally important populations of Greenland white-fronted goose and black-tailed godwit, and a further seven species have populations of national importance: whooper swan, Eurasian wigeon, Eurasian teal, northern pintail, northern shoveler, European golden plover and lapwing[13]. All remaining NHAs within a 20 km radius are designated for peatlands.

The Project Site is not within or immediately adjacent to any Ramsar site. The Slieve Bloom Mountains Ramsar site is located 11.7 km east of the Project Site and is contained within the boundaries of the Slieve Bloom Mountains SPA. There are no other Ramsar sites within a 20 km radius of the Project Site.

Table 3-2: NHAs and pNHAs within 20 km of the Project Site and their Qualifying Interests (Sites Designated for Ornithological Qualifying Interests Only)[14]

Site Name	Site Code	Distance/Direction from Site Boundary	Qualifying Interests
Woodville Woods pNHA	000927	2.0 km southwest	Common snipe *Gallinago gallinago*
Arragh More Bog NHA	004137	12.5 km southwest	Hen harrier
Lough Nahinch (Tipperary) pNHA	000936	17.1 km southwest	Common redshank *Tringa totanus* Common snipe Water rail *Rallus arquaticus*
Pallas Lough pNHA	000916	18.3 km northeast	Mallard *Anas platyrhynchos* Eurasian teal Eurasian wigeon Western marsh harrier *Circus aeruginosus*

3.1.3 Species Records

The NBDC database was searched for records of bird species within the 2 km grid squares which overlap with the extension area (N01Q and N01V). All bird species are protected under the Wildlife Acts 1976 – 2018 but for the purposes of this report, only records of species that are Red or Amber-

[13] NPWS (2014) Site Synopsis: River Little Brosna Callows SPA [000564] National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

[14] Only NHAs and pNHAs that do not overlap with SPAs are shown.

listed in BoCCI4 or listed on Annex 1 of the Birds Directive are included in the results. Details of the results are shown in **Table 3-3.**

Table 3-3: Species recorded within the 10 km grid squares N00 and N01 (Species Present During the Non-Breeding Season)

Grid Square	Species	Date of Last Record & Dataset	Designation
N01Q, N01V	Common buzzard *Buteo buteo*	2021, Birds of Ireland	BoCCI4 Green
N01V	Northern lapwing	2022, Birds of Ireland	BoCCI4 Red
N01V	Yellowhammer *Emberiza citrinella*	2021, Birds of Ireland	BoCCI4 Red

3.2 Flight Activity Surveys

Flight activity by primary target species is summarised in **Table 3-4**. Primary target species flight lines are shown in Appendix A Figures **2.1** to **2.10**. Flight activity data are provided in more detail in Appendix D with full data retained in GIS and excel format for subsequent collision risk modelling.

3.2.1 Primary Target Species

A total of 54 flight lines by 11 primary target species were recorded between October 2022 and March 2023. No flight lines were recorded from VP3 in February. Common kestrel was the most frequently recorded species (12 flight lines), followed by northern lapwing (11 flight lines).

Table 3-4: Number of Primary Target Species Flights from VP3, October 2022 to March 2023

Species	Number of flight lines by month						Total number of flight lines	Time at risk height* (s)	Cumulative number of flights
	Oct	Nov	Dec	Jan	Feb	Mar			
Common kestrel	6	3	1	2	0	0	**12**	**1,035**	**12**
Common snipe	3	0	1	2	0	1	**7**	**225**	**8**
European golden plover	9	0	0	0	0	0	**9**	**1,290**	**178**
Great cormorant	0	0	2	0	0	0	**2**	**30**	**2**
Great white egret *Ardea alba*	1	0	0	0	0	0	**1**	**0**	**1**
Hen harrier	0	0	0	5	0	0	**5**	**180**	**5**
Mallard	0	1	0	0	0	0	**1**	**105**	**5**
Merlin	1	1	2	0	0	0	**4**	**45**	**4**
Northern lapwing	0	1	5	0	0	5	**11**	**135**	**48**
Peregrine falcon	0	1	0	0	0	0	**1**	**0**	**1**
Whooper swan	0	0	0	1	0	0	**1**	**0**	**2**
* precautionary risk height assumed to be between 28 – 200 m									

A summary description of flight activity by each species is presented below.

3.2.1.1 Common Kestrel

Twelve common kestrel flight lines were recorded during the flight activity surveys, all of which consisted of a single flight. The highest number of flight lines occurred in October. Nine flight lines (75%) were recorded within potential collision risk heights. Flight durations varied with a maximum duration of 330 seconds.

3.2.1.2 Common Snipe

Seven common snipe flight lines were recorded during the flight activity surveys, with a cumulative total of eight flights. Six flight lines (86%) were recorded within potential collision risk heights.

3.2.1.3 European Golden Plover

Nine European golden plover flight lines were recorded during the flight activity surveys, with a cumulative total of 178. All flight lines were recorded in October, suggesting they were of birds moving as part of autumn migration. Flock sizes ranged from four to 56 birds. Eight flight lines (89%) were recorded within potential collision risk heights. Flight durations varied with a maximum duration of 510 seconds. Activity was focused over the east of the 500 m survey buffer.

3.2.1.4 Great Cormorant

Two great cormorant flight lines were recorded during one survey in December, with both flight lines consisting of a single flight to the west of the 500 m survey buffer. One flight line was within collision risk heights and lasted for 74 seconds. The other flight line was below collision risk heights.

3.2.1.5 Great White Egret

A single great white egret was recorded in October flying south over an area of cutover bog outside of the Project Site in October. The flight line was below potential collision risk heights and lasted for 15 seconds. No other observations of this species were recorded during the 2022/23 non-breeding season.

3.2.1.6 Hen Harrier

Five hen harrier flight lines were recorded during one survey in January. All observations consisting of a single adult male flight hunting over an area of cutover bog within the Project Site. It is likely that these flights represented the same individual. Two flight lines (40%) were recorded within potential collision risk heights.

3.2.1.7 Mallard

One mallard flightline consisting of five flights was recorded in November. The flights were circling over cutover bog south of the Project Site within collision risk heights.

3.2.1.8 Merlin

Four merlin flight lines were recorded during the flight activity surveys from October to December 2022, with all flight lines consisting of a single flight. One flight line (25%) was recorded within potential collision risk heights; all were outside the Project Site on the edge of the 500 m survey buffer.

3.2.1.9 Northern Lapwing

Eleven northern lapwing flight lines were recorded during the flight activity surveys in November 2022, December 2022 and March 2023, with a cumulative total of 48 flights. Most flight lines consisted of a small number of flights (up to 12 flights in one flight line). Four flight lines (36%) were recorded within potential collision risk heights. Activity was focused to the west of the 500 m survey buffer.

3.2.1.10 Peregrine Falcon

A single peregrine falcon flight line was recorded flying east over the 500 m survey buffer in November. The flight line was below collision risk heights and lasted for 63 seconds. No other observations of this species were recorded from VP3 during the 2022/23 non-breeding season.

3.2.1.11 Whooper Swan

One whooper swan flight line consisting of two flights was recorded in January. The flights travelled west below collision risk heights before landing on cutover bog within the Project Site.

3.2.2 Secondary Target Species

Secondary species activity at the Project Site is summarised in **Table 3-5**. There were three secondary species recorded throughout the season. Common buzzard was the most frequently recorded secondary species (in 17 five-minute periods out of a possible 432).

Table 3-5: Secondary Species Activity Summary for VP3 – October 2022 to March 2023

Species	Number of 5 min periods recorded	Peak count of birds recorded in any 5 min period	Comments
Common buzzard	17	3	Activity in all months except February, within the Project Site and survey buffer.
Grey heron	15	2	Activity in October, November, January and March, within the Project Site, survey buffer and beyond.
Northern raven	4	3	Activity between October and January inclusive, within the Project Site, survey buffer and beyond.

3.3 Feeding Distribution Surveys

The feeding distribution surveys did not record any aggregations of swans or geese.

3.3.1 Incidental Records of Other Species

During the survey visits, the following incidental records were made of other species of conservation concern:

- Raptors: buzzard, kestrel, merlin, peregrine falcon and sparrowhawk;
- Waders: common snipe and northern lapwing; and
- Wildfowl: grey heron

3.4 Nocturnal Golden Plover Surveys

No European golden plover activity was recorded during surveys.

3.4.1 Incidental Records of Other Species

Incidental observations of common snipe, Eurasian curlew, northern lapwing and hen harrier were recorded during one survey in March 2023 near the western transect, c.470 m from the Project Site; there was no evidence of hen harrier roosting but passing through the area.

4.0 Summary and Conclusions

Flight activity surveys (VPs), feeding distribution surveys and nocturnal golden plover surveys were carried out at the Project Site during the non-breeding season in 2022/23.

The following primary target species were recorded during the non-breeding season flight activity surveys:

- Common snipe
- Common kestrel;
- Great cormorant;
- European golden plover;
- Great white egret;
- Hen harrier;
- Mallard;
- Merlin;
- Northern lapwing;
- Peregrine falcon; and
- Whooper swan.

Common kestrel was the most frequently recorded species (12 flight lines), followed by northern lapwing (11 flight lines).

Three secondary target species were recorded during the non-breeding season: common buzzard, grey heron and northern raven.

No aggregations of swans or geese were recorded during the feeding distribution surveys. No golden plover activity was recorded during the nocturnal golden plover surveys.

Incidental records made of species of conservation concern during taxon-specific surveys included the following:

- Raptors: buzzard, hen harrier, kestrel, merlin, peregrine falcon, and sparrowhawk;
- Waders: common snipe, Eurasian curlew and northern lapwing; and
- Wildfowl: grey heron

5.0 Legal and Conservation Status of Target Species Recorded

Table 5-1 summarises the legal and conservation status of the primary and secondary target species recorded during the range of ornithological surveys mentioned above. Note that all bird species in Ireland are afforded general protection by the Wildlife Acts 2000 (as amended).

Table 5-1: Legal and Conservation Status of Target Species

Primary or Secondary Target	Species (BTO code)	Legal and Conservation Status in Ireland
Primary	Black-headed gull (BH)	BoCCI4 Amber
	Common kestrel (K.)	BoCCI4 Red
	Common snipe (SN)	BoCCI4 Red
	European golden plover (GP)	Annex 1, BoCCI4 Red
	Great cormorant (CA)	BoCCI4 Amber
	Great white egret (HW)	Annex 1, not assessed under BoCCI4
	Hen harrier (HH)	Annex 1, BoCCI4 Amber
	Mallard (MA)	BoCCI4 Amber
	Merlin (ML)	Annex 1, BoCCI4 Amber
	Northern lapwing (L.)	BoCCI4 Red
	Peregrine falcon (PE)	Annex 1, BoCCI4 Green
	Whooper swan (WS)	Annex 1, BoCCI4 Amber
Secondary	Common buzzard (BZ)	BoCCI4 Green
	Grey heron (H.)	BoCCI4 Green
	Northern raven (RN)	BoCCI4 Green
	Eurasian sparrowhawk (SH)	BoCCI4 Green
Incidentals	Eurasian curlew (CU)	BoCCI4 Red
Key		Annex 1 – the species is listed in Annex 1 of the EC Birds Directive; and BoCCI4 status (green, amber or red) – indicates the current Birds of Conservation Concern in Ireland[10] status category.

Appendix A Figures

Bird Survey Report Non-Breeding 2022/23

Cush Wind Farm

Galetech Energy Developments Ltd

SLR Project No.: 501.V64760.00001

21 August 2026

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712500

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L3006 Galros Cross Roads L3003 L1092 N62 N52 Derryad ED Eglish ED Mountern ED Boolnarig River Tullamore Road

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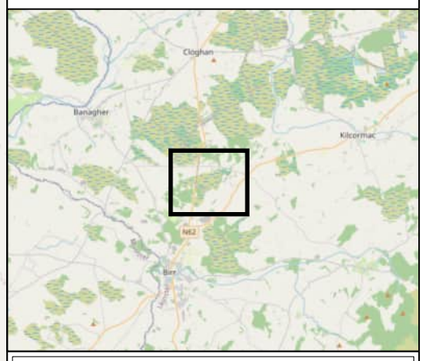
Kilometres

NOTES

1.The ZTV is calculated with a surface offset of 28m & from a viewing height of 1.8m above ground level. The terrain model is derived from EU-DEM data with a vertical accuracy of ± 7m. The ZTV was calculated using ArcMAP 10.5.1 software.

LEGEND

- Site Boundary
- Turbine Location 500 m Buffer
- Proposed Turbine Location
- Vantage Point (VP) Location
- Theoretical Visibility from VP3



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CUSH WIND FARM

WINTER BIRD SURVEYS

VANTAGEPOINTS

FIGURE 1

Scale 1:15,000 @ A3

Date AUGUST 2026

501.065723.00001.0011.0 Vantage Point Locations and Viewing Arcs

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604500 606000 607500 609000 610500 612000

713500 712000 710500 709000

501.065723.00001.0016.0 Flight Lines

N62 L3003 N52 L3010 L3006 L1092 L3003 N52 N62 N52 R439 N62 N52 Tullamore Road Banagher Road Woodville Wood

3

N

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Turbine Location 500 m Buffer
- Proposed Met Mast
- Vantage Point (VP) Location

Flight Line

- Whooper Swan



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WINTER BIRD SURVEYS

FLIGHT LINES: WHOOPER SWAN

FIGURE 2.1

Scale 1:30,000 @ A3

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Banagher Road Tullamore Road Woodville Wood

3

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0 1 2

Kilometres

LEGEND

Site Boundary

Proposed Turbine Location

Turbine Location 500 m Buffer

Proposed Met Mast

Vantage Point (VP) Location

Flight Line

Merlin

Banagher N62 Birr

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WINTER BIRD SURVEYS

FLIGHT LINES: MERLIN

FIGURE 2.2

Scale 1:30,000 @ A3

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501.065723.00001.0016.0 Flight Lines

N62 L3003 L3010 L3006 L1092 N52 R439 Banagher Road Tullamore Road Woodville Wood

3

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LEGEND

- Site Boundary
- Proposed Turbine Location
- Turbine Location 500 m Buffer
- Proposed Met Mast
- Vantage Point (VP) Location

Flight Line

- Cormorant



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Kilometres

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WINTER BIRD SURVEYS

FLIGHT LINES: CORMORANT

FIGURE 2.3

Scale 1:30,000 @ A3

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Banagher Road Tullamore Road

Woodville Wood

3

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LEGEND

- Site Boundary
- Proposed Turbine Location
- Turbine Location 500 m Buffer
- Proposed Met Mast
- Vantage Point (VP) Location

Flight Line

- Golden Plover

Banagher N62 Birr

0 1 2

Kilometres

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WINTER BIRD SURVEYS

FLIGHT LINES: GOLDEN PLOVER

FIGURE 2.4

Scale 1:30,000 @ A3

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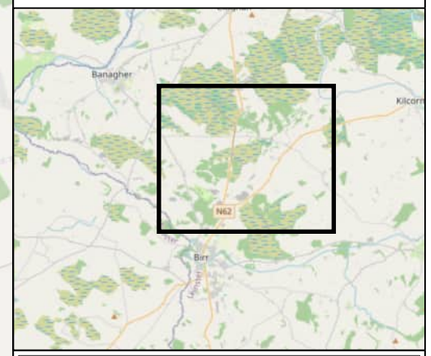
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LEGEND

- Site Boundary
- Proposed Turbine Location
- Turbine Location 500 m Buffer
- Proposed Met Mast
- Vantage Point (VP) Location

Flight Line

- Hen Harrier



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FLIGHT LINES: HEN HARRIER

FIGURE 2.5

Scale 1:30,000 @ A3

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Kilometres

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N62 L3003 N52 L3010 L3006 L1092 L3003 N52 N62 N52 R439 N62 N52

Woodville Wood

Banagher Road Tullamore Road

3

N

LEGEND

Site Boundary

Proposed Turbine Location

Turbine Location 500 m Buffer

Proposed Met Mast

Vantage Point (VP) Location

Flight Line

Kestrel

Banagher Kilcorn N62 Birr

0 1 2

Kilometres

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FLIGHT LINES: KESTREL

FIGURE 2.6

Scale 1:30,000 @ A3

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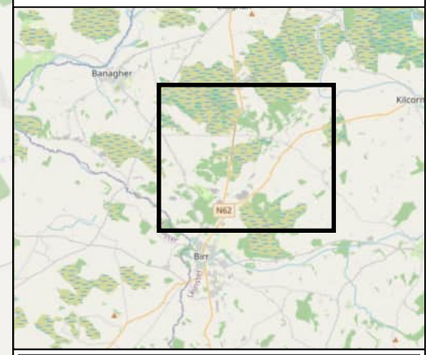
N

LEGEND

- Site Boundary
- Proposed Turbine Location
- Turbine Location 500 m Buffer
- Proposed Met Mast
- Vantage Point (VP) Location

Flight Line

- Lapwing



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WINTER BIRD SURVEYS

FLIGHT LINES: LAPWING

FIGURE 2.7

Scale 1:30,000 @ A3

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Kilometres

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501.065723.00001.0016.0 Flight Lines

N62 L3003 L3010 L3006 L1092 N52 R439 Woodville Wood Banagher Road Tullamore Road

3

N

LEGEND

Site Boundary

Proposed Turbine Location

Turbine Location 500 m Buffer

Proposed Met Mast

Vantage Point (VP) Location

Flight Line

Mallard

0 1 2

Kilometres

Banagher Kilcorm N62 Birr

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FLIGHT LINES: MALLARD

FIGURE 2.8

Scale 1:30,000 @ A3

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713500 712000 710500 709000 501.065723.00001.0016.0 Flight Lines

N62 L3003 L3010 L3006 L1092 N52 L3003 N62 N52 Banagher Road Banagher Road Banagher Road Tullamore Road N52 R439 N62 N52 Woodville Wood

3

N

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Turbine Location 500 m Buffer
- Proposed Met Mast
- Vantage Point (VP) Location

Flight Line

- Peregrine



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WINTER BIRD SURVEYS

FLIGHT LINES: PEREGRINE

FIGURE 2.9

Scale 1:30,000 @ A3

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501.065723.00001.0016.0 Flight Lines

N62 L3003 N52 L3010 L3006 L1092 L3003 N52 N62 N52 R439 N62 N52 Tullamore Road Woodville Wood Banagher Road

N

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Turbine Location 500 m Buffer
- Proposed Met Mast
- Vantage Point (VP) Location

Flight Line

- Snipe

Banagher Kilcorn N62 Birr

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WINTER BIRD SURVEYS

FLIGHT LINES: SNIPE

FIGURE 2.10

Scale 1:30,000 @ A3

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604500 606000 607500 609000 610500 612000

713500 712000 710500 709000 501.065723.00001.0016.0 Flight Lines

N62 L3003 L3010 L3006 L1092 N52 L3003 N62 N52 Banagher Road Banagher Road Banagher Road Banagher Road R439 Tullamore Road N52 N62 N52 Woodville Wood

3

N

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Turbine Location 500 m Buffer
- Proposed Met Mast
- Vantage Point (VP) Location

Flight Line

- Great White Egret

Banagher N62

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CUSH WIND FARM

WINTER BIRD SURVEYS

FLIGHT LINES: GREAT WHITE-EGRET

FIGURE 2.11

Scale 1:30,000 @ A3

Date AUGUST 2026

OpenStreetMap: © OpenStreetMap (and) contributors, CC-BY-SA
Image: (18/09/2020)

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605000 606000 607000 608000 609000 610000

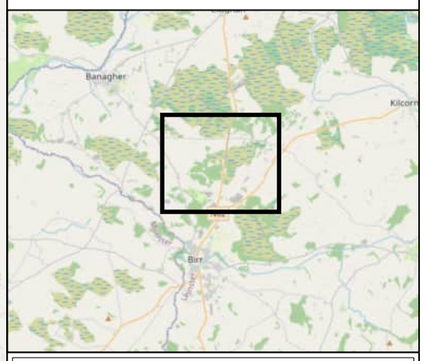
713000 712000 711000 710000

N

LEGEND

- Site Boundary
- Turbine Location
- Site Infrastructure At Time Of Survey 500 m Buffer
- Proposed Met Mast
- Driven Transect Route

No Swans or Geese were recorded.



0 1 2

Kilometres

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CUSH WIND FARM

WINTER BIRD SURVEYS

SWAN & GEESE FEEDING AND DISTRIBUTION SURVEY RESULTS

FIGURE 3

Scale 1:20,000 @ A3

Date AUGUST 2026

501.065723.00001.0018.0 Feeding and Distribution

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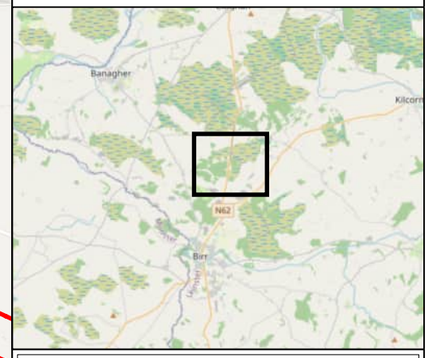
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606000
607000
608000
609000
712000
711000
710000

N

LEGEND

- Site Boundary
- Site Infrastructure At The Time Of Survey 500 m Buffer
- Turbine Location
- Proposed Met Mast
- Golden Plover Transect West
- Golden Plover Transect East



0 0.5 1
Kilometres

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CUSH WIND FARM

WINTER BIRD SURVEYS

NOCTURNAL GOLDER PLOVER SURVEY

FIGURE 4

Scale 1:12,500 @ A3

Date AUGUST 2026

501.065723.00001.0017.0 Golden Plover Transects

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Appendix B Survey dates, times and observers[15]

Bird Survey Report Non-Breeding 2022/23

Cush Wind Farm

Galetech Energy Developments Ltd

SLR Project No.: 501.V64760.00001

21 August 2026

[15] Surveyor initials are given in Section 2.1

Table B-1: Details of VP Surveys Undertaken from VP3

Date	Surveyor	Start time	End time	No. Hours
18/10/2022	AK	15:25	18:25	03:00
19/10/2022	AK	07:45	10:45	03:00
01/11/2022	AK	14:00	17:00	03:00
15/11/2022	AK	13:45	16:45	03:00
01/12/2022	AK	13:30	16:30	03:00
15/12/2022	AK	13:45	16:45	03:00
04/01/2023	AK	13:20	16:20	03:00
26/01/2023	AK	11:05	14:05	03:00
31/01/2023	AK	14:15	17:15	03:00
15/02/2023	AK	15:00	18:00	03:00
15/03/2023	AK	13:40	16:40	03:00
16/03/2023	AK	09:55	12:55	03:00
Total hours				**36**

Table B-2: Details of Feeding Distribution Surveys

Date	Surveyor	Start time	End time	No. Hours
05/10/2022	AK	10:40	13:00	02:20
21/10/2022	AK	13:25	15:30	02:05
03/11/2022	AK	08:50	11:20	02:30
16/11/2022	AK	14:30	16:00	01:30
02/12/2022	AK	12:10	13:45	01:35
16/12/2022	AK	13:55	15:30	01:35
04/01/2023	AK	11:50	13:15	01:25
20/01/2023	DN	10:00	11:50	01:50
02/02/2023	AK	14:20	15:30	01:10
16/02/2023	AK	12:45	13:50	01:05
03/03/2023	AK	11:30	12:45	01:15
14/03/2023	AK	13:40	15:15	01:35
Total hours				**19:55**

Table B-3: Details of Nocturnal Golden Plover Surveys

Date	Surveyor	Start time	End time	No. Hours
03/01/2023	AK/FL	16:45	18:30	01:45
13/03/2023	AK/HB	19:20	21:00	01:40
Total hours				**03:25**

Appendix C Weather data

Bird Survey Report Non-Breeding 2022/23

Cush Wind Farm

Galetech Energy Developments Ltd

SLR Project No.: 501.V64760.00001

21 August 2026

Table C-1: Weather Data Collected During Flight Activity Surveys Undertaken from VP3

Date	Survey Start	Survey End	Hr	Wind Speed	Wind Direction	Rain[16]	Cloud Cover[17]	Cloud Height[18]	Visibility[19]	Snow[20]	Frost[21]	Temp (°c)
18/10/2022	15:25	18:25	1	3	E	0	6	2	2	0	0	15
18/10/2022	15:25	18:25	2	3	E	0	4	2	2	0	0	15
18/10/2022	15:25	18:25	3	3	E	0	3	2	2	0	0	15
19/10/2022	07:45	10:45	1	4	SE	3	8	1	1	0	0	13
19/10/2022	07:45	10:45	2	4	E	3	8	1	2	0	0	12
19/10/2022	07:45	10:45	3	4	E	2	8	1	2	0	0	12
01/11/2022	14:00	17:00	1	2	SW	0	8	2	2	0	0	10
01/11/2022	14:00	17:00	2	2	W	0	6	2	2	0	0	10
01/11/2022	14:00	17:00	3	2	W	1	8	2	2	0	0	9
15/11/2022	13:45	16:45	1	2	S	0	3	2	2	0	0	9
15/11/2022	13:45	16:45	2	2	S	2	6	2	2	0	0	9
15/11/2022	13:45	16:45	3	2	S	0	3	2	2	0	0	8

[16] Key**:** None = 0; Drizzle = 1; Light showers/snow = 2; Heavy showers/snow = 3; Heavy rain/snow = 4.
[17] Expressed in oktas (n/8)
[18] Key: Height of cloud above average height of viewshed. <150m = 0; 150-500m = 1; >500m = 2.
[19] Key: Poor (<1km) = 0; Moderate (1-3km) = 1; Good (>3km) = 2.
[20] Key: Lying snow. None = 0; On site = 1; On higher ground = 2.
[21] Key: None = 0; Ground = 1; All day = 2.

Date	Survey Start	Survey End	Hr	Wind Speed	Wind Direction	Rain[16]	Cloud Cover[17]	Cloud Height[18]	Visibility[19]	Snow[20]	Frost[21]	Temp (°c)
01/12/2022	13:30	16:30	1	2	S	0	6	2	2	0	0	10
01/12/2022	13:30	16:30	2	2	S	0	5	2	2	0	0	10
01/12/2022	13:30	16:30	3	2	S	0	5	2	2	0	0	10
15/12/2022	13:45	16:45	1	2	NW	0	5	1	2	2	2	1
15/12/2022	13:45	16:45	2	2	NW	0	4	1	2	2	2	0
15/12/2022	13:45	16:45	3	2	NW	0	7	1	2	2	2	-1
04/01/2023	13:20	16:20	1	4	SW	0	7	1	2	0	0	10
04/01/2023	13:20	16:20	2	4	SW	1	6	1	2	0	0	10
04/01/2023	13:20	16:20	3	4	SW	0	4	2	2	0	0	9
26/01/2023	11:05	14:05	1	1	N	0	7	1	2	0	0	5
26/01/2023	11:05	14:05	2	1	N	0	8	1	2	0	0	7
26/01/2023	11:05	14:05	3	1	N	0	8	1	2	0	0	7
31/01/2023	14:15	17:15	1	4	W	0	5	2	2	0	0	8
31/01/2023	14:15	17:15	2	4	W	1	6	1	2	0	0	7
31/01/2023	14:15	17:15	3	4	W	1	6	1	2	0	0	7
15/02/2023	15:00	18:00	1	3	SW	0	8	2	2	0	0	9
15/02/2023	15:00	18:00	2	3	SW	2	8	2	2	0	0	9
15/02/2023	15:00	18:00	3	3	SW	2	8	1	2	0	0	8
15/03/2023	13:40	16:40	1	4	SE	3	8	1	1	0	0	8
15/03/2023	13:40	16:40	2	4	SE	3	8	0	0	0	0	8

Date	Survey Start	Survey End	Hr	Wind Speed	Wind Direction	Rain[16]	Cloud Cover[17]	Cloud Height[18]	Visibility[19]	Snow[20]	Frost[21]	Temp (°c)
15/03/2023	13:40	16:40	3	4	SE	3	8	1	1	0	0	8
16/03/2023	09:55	12:55	1	3	S	0	6	1	2	0	0	12
16/03/2023	09:55	12:55	2	3	S	1	8	1	2	0	0	12
16/03/2023	09:55	12:55	3	3	S	2	8	2	2	0	0	12

Table C-2: Weather During Feeding Distribution Surveys

Date	Start	End	Hr	Wind Speed	Wind Direction	Rain[16]	Cloud Cover[17]	Cloud Height[18]	Visibility[19]	Snow[20]	Frost[21]	Temp (°c)
05/10/2022	10:40	13:00	1	3	SW	0	4	2	2	0	0	11
05/10/2022	10:40	13:00	2	3	SW	2	5	1	2	0	0	12
05/10/2022	10:40	13:00	3	3	SW	2	7	2	2	0	0	12
21/10/2022	13:25	15:30	1	3	SE	2	6	2	2	0	0	14
21/10/2022	13:25	15:30	2	3	SE	1	6	2	2	0	0	14
03/11/2022	08:50	11:20	1	2	SE	0	3	2	2	0	0	6
03/11/2022	08:50	11:20	2	2	SE	0	3	2	2	0	0	7
03/11/2022	08:50	11:20	3	2	SE	0	5	2	2	0	0	8
16/11/2022	14:30	16:00	1	1	SE	0	2	2	2	0	0	9
16/11/2022	14:30	16:00	2	1	SE	0	2	2	2	0	0	8
02/12/2022	12:10	13:45	1	1	SE	0	6	2	2	0	0	9
02/12/2022	12:10	13:45	2	1	SE	0	8	2	2	0	0	10

Date	Start	End	Hr	Wind Speed	Wind Direction	Rain[16]	Cloud Cover[17]	Cloud Height[18]	Visibility[19]	Snow[20]	Frost[21]	Temp (°c)
16/12/2022	13:55	15:30	1	0	NA	0	2	2	2	0	2	2
16/12/2022	13:55	15:30	2	0	NA	0	2	2	2	0	2	2
04/01/2023	11:50	13:15	1	4	SW	1	7	1	2	0	0	11
04/01/2023	11:50	13:15	2	4	SW	0	8	1	2	0	0	11
20/01/2023	10:00	11:50	1	2	W	0	8	2	2	0	0	7
20/01/2023	10:00	11:50	2	3	W	1	8	2	2	0	0	8
02/02/2023	14:20	15:30	1	3	SW	0	8	2	2	0	0	10
16/02/2023	12:45	13:50	1	2	W	0	6	2	2	0	0	9
03/03/2023	11:30	12:45	1	1	NE	0	8	2	2	0	0	6
03/03/2023	11:30	12:45	2	1	NE	0	8	2	2	0	0	6
14/03/2023	13:40	15:15	1	4	NW	0	4	2	2	0	0	6
14/03/2023	13:40	15:15	2	4	NW	0	4	2	2	0	0	6

Table C-3: Weather During Nocturnal Golden Plover Surveys

Date	Start	End	Hr	Wind Speed	Wind Direction	Rain[16]	Cloud Cover[17]	Cloud Height[18]	Visibility[19]	Snow[20]	Frost[21]	Temp (°c)
03/01/2023	16:45	18:30	1	3	S	2	8	1	0	0	0	11
03/01/2023	16:45	18:30	2	3	S	2	8	1	0	0	0	10
13/03/2023	19:20	21:00	1	2	W	0	4	2	0	0	0	3
13/03/2023	19:20	21:00	2	2	W	0	4	2	0	0	0	3

Appendix D Flight activity survey data[22]

Bird Survey Report Non-Breeding 2022/23

Cush Wind Farm

Galetech Energy Developments Ltd

SLR Project No.: 501.V64760.00001

21 August 2026

[22] Surveyor initials are given in Section 2.1 and BTO code information is given in Section 5.0

Table D-1: Primary Target Species Recorded During Flight Activity Surveys Undertaken at VP3

Date	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	Start Time (hr:min)	Flight duration (s)
18-Oct-22	3.CU051.1.1	K.	1	AD	U	16:21	75
18-Oct-22	3.CU051.2.1	SN	1	AD	U	16:23	60
18-Oct-22	3.CU051.3.1	K.	1	AD	F	16:36	210
18-Oct-22	3.CU051.4.1	GP	56	U	U	16:37	510
18-Oct-22	3.CU051.5.1	GP	5	U	U	16:48	105
18-Oct-22	3.CU051.6.1	GP	11	U	U	16:53	60
18-Oct-22	3.CU051.7.1	K.	1	AD	F	16:53	120
18-Oct-22	3.CU051.8.1	GP	16	U	U	16:59	90
18-Oct-22	3.CU051.9.1	GP	24	U	U	17:05	120
18-Oct-22	3.CU051.10.1	GP	4	U	U	17:31	210
18-Oct-22	3.CU051.11.1	K.	1	AD	F	18:03	75
18-Oct-22	3.CU051.12.1	K.	1	AD	F	18:07	150
18-Oct-22	3.CU051.13.1	K.	1	AD	F	18:17	150
19-Oct-22	3.CU052.1.1	ML	1	U	U	07:40	15
19-Oct-22	3.CU052.2.1	SN	1	U	U	08:33	45

Date	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	Start Time (hr:min)	Flight duration (s)
19-Oct-22	3.CU052.3.1	GP	10	U	U	09:06	165
19-Oct-22	3.CU052.4.1	GP	36	U	U	09:20	90
19-Oct-22	3.CU052.5.1	SN	1	U	U	09:49	60
19-Oct-22	3.CU052.6.1	GP	16	U	U	10:19	210
19-Oct-22	3.CU052.7.1	HW	1	U	U	10:36	15
01-Nov-22	3.CU057.1.1	PE	1	AD	F	14:03	75
01-Nov-22	3.CU057.2.1	K.	1	AD	M	14:09	45
01-Nov-22	3.CU057.3.1	K.	1	AD	M	14:24	345
01-Nov-22	3.CU057.4.1	K.	1	AD	M	14:34	105
15-Nov-22	3.CU060.1.1	ML	1	U	U	14:08	45
15-Nov-22	3.CU060.2.1	MA	5	U	U	14:36	135
15-Nov-22	3.CU060.3.1	L.	12	U	U	16:24	105
01-Dec-22	3.CU065.1.1	CA	1	AD	U	14:04	75
01-Dec-22	3.CU065.2.1	CA	1	AD	U	14:32	45
01-Dec-22	3.CU065.3.1	ML	1	AD	U	15:28	75
15-Dec-22	3.CU069.1.1	L.	1	U	U	14:12	30
15-Dec-22	3.CU069.2.1	L.	3	U	U	14:46	45
15-Dec-22	3.CU069.3.1	L.	6	U	U	15:22	45
15-Dec-22	3.CU069.4.1	L.	8	U	U	15:45	60



Date	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	Start Time (hr:min)	Flight duration (s)
15-Dec-22	3.CU069.5.1	K.	1	A	F	15:47	30
15-Dec-22	3.CU069.6.1	ML	1	U	U	16:12	15
15-Dec-22	3.CU069.7.1	L.	5	U	U	16:27	45
15-Dec-22	3.CU069.8.1	SN	1	U	U	16:28	30
26-Jan-23	3.CU079.1.1	WS	2	A	U	13:02	30
31-Jan-23	3.CU080.1.1	HH	1	A	M	14:56	120
31-Jan-23	3.CU080.2.1	HH	1	A	M	15:02	195
31-Jan-23	3.CU080.3.1	HH	1	A	M	15:06	150
31-Jan-23	3.CU080.4.1	SN	2	U	U	15:06	60
31-Jan-23	3.CU080.5.1	HH	1	A	M	15:17	195
31-Jan-23	3.CU080.6.1	SN	1	U	U	15:18	45
31-Jan-23	3.CU080.7.1	K.	1	U	U	15:18	45
31-Jan-23	3.CU080.8.1	HH	1	A	M	15:26	105
31-Jan-23	3.CU080.9.1	K.	1	U	U	15:38	15
16-Mar-23	3.CU097.1.1	L.	1	U	U	09:56	30
16-Mar-23	3.CU097.2.1	L.	6	U	U	10:10	75
16-Mar-23	3.CU097.3.1	SN	1	U	U	10:10	15
16-Mar-23	3.CU097.4.1	L.	2	U	U	10:18	60
16-Mar-23	3.CU097.5.1	L.	1	U	U	10:41	45

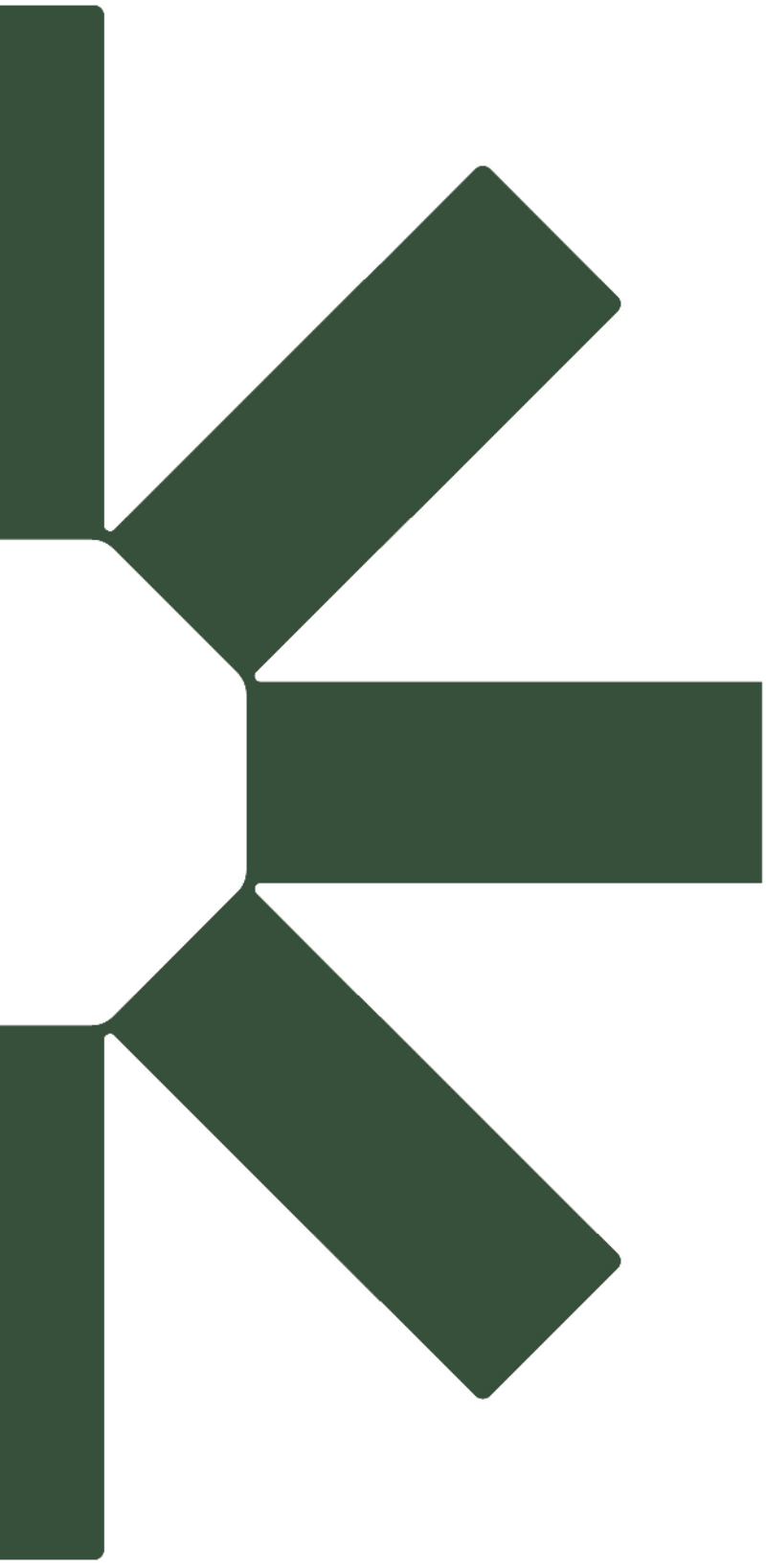
Date	Flight ID	BTO Code	No. Birds	Age (Ad = adult; Imm = immature)	Sex (M = male; F = female; U = unknown)	Start Time (hr:min)	Flight duration (s)
16-Mar-23	3.CU097.6.1	L.	3	U	U	10:42	45

Table D-2: Secondary Target Species Recorded During Flight Activity Surveys Undertaken at VP3

Date	Survey start	Survey end	5 min period start time	5 min period end time	Species	Count Max	Height band	Location (on site, in buffer or beyond)
18/10/2022	15:25	18:25	16:55	17:00	H.	1	1	1
18/10/2022	15:25	18:25	17:05	17:10	BZ	1	1	2
18/10/2022	15:25	18:25	17:40	17:45	H.	1	1	1, 2
19/10/2022	07:45	10:45	09:10	09:15	RN	1	1	1
19/10/2022	07:45	10:45	09:30	09:35	BZ	1	1	1
19/10/2022	07:45	10:45	10:20	10:25	BZ	2	2	1, 2
19/10/2022	07:45	10:45	10:25	10:30	BZ	2	2	1, 2
15/11/2022	13:45	16:45	13:05	13:10	H.	1	1	1
15/11/2022	13:45	16:45	15:00	15:05	BZ	1	1	2
15/11/2022	13:45	16:45	16:10	16:15	RN	1	1	1
01/12/2022	13:30	16:30	13:50	13:55	BZ	1	1	2
01/12/2022	13:30	16:30	14:20	14:25	BZ	1	1	2
01/12/2022	13:30	16:30	14:40	14:45	RN	3	3	2
01/12/2022	13:30	16:30	15:00	15:05	BZ	1	1	1,2
15/12/2022	13:45	16:45	14:15	14:20	BZ	1	1	1

Date	Survey start	Survey end	5 min period start time	5 min period end time	Species	Count Max	Height band	Location (on site, in buffer or beyond)
04/01/2023	13:20	16:20	14:35	14:40	BZ	1	1	2
04/01/2023	13:20	16:20	14:50	14:55	H.	1	1	1
04/01/2023	13:20	16:20	16:00	16:05	RN	2	2	1
26/01/2023	11:05	14:05	11:05	11:10	H.	1	1	1
26/01/2023	11:05	14:05	11:20	11:25	H.	1	1	1
26/01/2023	11:05	14:05	11:55	12:00	H.	1	1	1
26/01/2023	11:05	14:05	12:00	12:05	H.	1	1	1
26/01/2023	11:05	14:05	12:10	12:15	H.	1	1	1
26/01/2023	11:05	14:05	13:20	13:25	H.	1	1	1
26/01/2023	11:05	14:05	13:30	13:35	H.	1	1	1
26/01/2023	11:05	14:05	13:30	13:35	BZ	1	1	2
26/01/2023	11:05	14:05	13:35	13:40	BZ	3	3	1, 2
26/01/2023	11:05	14:05	13:45	13:50	BZ	2	2	2
26/01/2023	11:05	14:05	13:50	13:55	BZ	1	1	1
26/01/2023	11:05	14:05	13:50	13:55	H.	1	1	1
26/01/2023	11:05	14:05	13:50	13:55	H.	1	1	1
31/01/2023	14:15	17:15	14:15	17:15	H.	2	2	1
31/01/2023	14:15	17:15	15:45	15:50	BZ	1	1	2
15/03/2023	13:40	16:40	13:40	13:45	H.	1	1	1
16/03/2023	09:55	12:55	10:00	10:05	BZ	1	1	1

Date	Survey start	Survey end	5 min period start time	5 min period end time	Species	Count Max	Height band	Location (on site, in buffer or beyond)
16/03/2023	09:55	12:55	10:45	10:50	BZ	1	1	2



Making Sustainability Happen

Bird Survey Report Breeding Season 2023

Cush Wind Farm

Galetech Energy Developments Ltd

Clondargan, Stradone, Co. Cavan

Prepared by:

SLR Environmental Consulting (Ireland) Ltd

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SLR Project No.: 501.065092.00001

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21 August 2026

Revision: 0

Revision Record

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0	21 August 2026	Alice Magee	Dr Jonathon Dunn	Dr Jonathon Dunn
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	Click to enter a date.			
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	Click to enter a date.			

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Acronyms and Abbreviations

The Project	Cush Wind Farm
The Project Site	The application site
VP	Vantage Point

1.0 Introduction

SLR Environmental Consulting (Ireland) Ltd (SLR) was commissioned by Galetech Energy Developments Ltd (Galetech) to carry out a bird survey programme for the proposed wind farm at Cush, Co. Offaly (hereafter 'the Project') during the breeding season in 2023. The purpose of this report is to describe these surveys and the resulting ornithological baseline.

1.1 Background to the Commission

The Project Site includes phase 1 (eight turbines) and an extension area (three turbines; also known as phase 2). Phase 1 was granted planning permission in November 2024. As the bird survey programme for the breeding season 2022 covered both phases, and the data are within date according to NatureScot (NS; formerly Scottish Natural Heritage, SNH) Guidance[1], the results are considered to be relevant to the proposed extension area. This report focuses on the methodology and results that are relevant to extension area. The methodology and results of the entire bird survey programme can be found in the previously issued baseline breeding bird survey report[2].

Bird surveys have been previously undertaken at the proposed wind farm development site at Cush, Co. Offaly (hereafter 'the Project Site') by SLR for the breeding 2020, non-breeding 2020/21, breeding 2021, non-breeding 2021/22, breeding 2022 and non-breeding 2022/23 seasons. The Project Site also includes a linear area that was previously surveyed for a proposed overhead line[3]. Flight activity surveys were carried out at two vantage point locations along the proposed overhead line route corridor during the breeding season in 2018.

1.2 Site Description

The Project Site is located in the townland of Cush approximately 4 km north of Birr, Co. Offaly at approximate ITM coordinates 608237, 709946 (refer to Appendix D **Figure 1)**. The habitats within the Project Site are dominated by conifer plantations of varying age classes (c.327 ha), cutaway bog (c.102 ha) and agricultural grasslands (ca. 327 ha). The Project Site is not designated for nature conservation.

1.3 Terminology

For this report, "flight line" refers to the line drawn to record avian movement during a Vantage Point (VP) survey. A single flight line may be used to indicate the collective movement of a flock of birds. Each individual bird moving within the same flight line is referred to as "a flight". Note that the "cumulative number of flights" reflects the occupancy of the study area by a particular species. It is not equivalent to the total number of unique individuals and should not be used to infer abundance.

1.4 Purpose of the Report

This report outlines the surveys undertaken and methods used. It then summarises the survey data obtained and provides descriptions of the legal and conservation status of the species recorded.

---

[1] Scottish Natural Heritage (2017). *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms V2.* Scottish Natural Heritage, Inverness.

[2] SLR (2024) Cush Wind Farm Breeding Bird Survey Report 2023.

[3] SLR (2018) *Cloghan Wind Farm and Long Oak Wind Farm Breeding Bird Survey Report 2018*. Prepared for Galetech Energy Services Ltd

The assessment of impacts resulting from the proposed development and the development of mitigation measures, if required, are beyond the scope of this report and will be covered in a separate Environmental Impact Assessment (EIA) Report.

1.5 Relevant Legislation

Legislation relevant to this report includes the EC Birds Directives and the Wildlife Act (1976, as amended). Birds listed under Annex I of the Birds Directive are described in Section 5 and are afforded strict protection at the European and national level. All Irish birds are protected by the Wildlife Act.

2.0 Methodology

2.1 Scope of Work

The scope of survey work during the breeding season was based on knowledge of the Project Site acquired during the previous bird surveys, a desk-based review and access to lands within and surrounding the red line boundary. It also considered current NatureScot (NS; formerly Scottish Natural Heritage, SNH) Guidance [4]. The details of the scope of work are provided in Table 2-1. Further details are provided in Sections 2.2.1 to 2.2.4, including study areas and target species.

Table 2-1: Scope of Ornithological Work April-August 2023

Survey Type	Summary Methodology
Vantage Point (VP) Surveys	Thirty-six hours of surveys (spread out as evenly as possible across the survey period) were carried out from each of three VPs between April and August 2023 inclusive.
Breeding Raptor Surveys	Four breeding raptor surveys were carried out within the period 26th April to 14th July to search for potential nesting territories within a 2 km radius of the Project Site.
Breeding Wader Surveys	Three lowland wader surveys were carried out within the period 25th April to 14th June to search for waders breeding in suitable habitat within the Project Site.
Points Counts for Passerines	Point counts for passerines were carried out at the same time as breeding raptor and wader surveys.
Kingfisher *Alcedo atthis* Habitat Assessment	A kingfisher habitat survey was conducted on the 25th April to assess watercourses within the Project Site for their suitability to support breeding kingfisher.
Barn owl *Tyto alba* Breeding Surveys	Searches for breeding evidence at all structures that could be suitable for barn owl nesting or roosting was made within a 1 km radius of the Project Site on the 25th April.

NS guidance states that "*it is generally considered the passerine species are not significantly impacted by wind farms*". It goes on to state that "*survey of woodland passerines, especially in commercial conifer forest is generally not required*". The only exception is if the desk study identifies that the Project Site is in a key area for a Schedule 1 woodland passerine species. As Schedule 1 refers to UK legislation, it is prudent to assume that passerines red-listed under the latest Birds of Conservation Concern in Ireland (BoCCI) scheme[5] should be

[4] Scottish Natural Heritage (2017). *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms V2.* Scottish Natural Heritage, Inverness.

[5] Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 2020–2026. Irish Birds 43: 1–22

considered as equivalent. No such species were returned during the desk-based review or data request. NS guidance also states that "*surveys of farmland passerines especially on more intensive arable habitat are generally not required*". Based on the above, while not the targets, any red-listed passerines were recorded as incidental species during other surveys.

2.2 Desk-based Review

The desk review collated any available information to date on the breeding and non-breeding bird populations and movements around the Project Site.

The following reports resulting from previous breeding and non-breeding bird surveys were reviewed for any relevant information that could be used to inform the current bird surveys:

- SLR (2018) Cloghan Wind Farm and Long Oak Wind Farm Breeding Bird Survey Report 2018;
- SLR (2020) Cush Wind Farm Breeding Bird Survey Report 2020;
- SLR (2022) Cush Wind Farm Winter Bird Survey Report 2020-2021;
- SLR (2022) Cush Wind Farm Breeding and Winter Bird Survey Report 2021-2022;
- SLR (2022) Cush Wind Farm Breeding Bird Survey Report 2022; and
- SLR (2023a) Cush Wind Farm Non-Breeding Bird Survey Report 2022-2023.

The websites of the National Parks and Wildlife Service (NPWS)[6], the UK and Ireland Bird Atlas 2007-2011[7] and the National Biodiversity Data Centre (NBDC)[8] were also accessed for information on sites designated for nature conservation in the vicinity of the Project Site.

2.2.1 Flight Activity Surveys

Existing VP locations chosen for the previous breeding bird surveys were used. The adequacy of these VPs was checked by carrying out a desk-based viewshed analysis using a bespoke GIS tool for calculating the visible area from each VP. The Zones of Theoretical Visibility (ZTV) from each VP were calculated using ArcMAP 10.5.1 Spatial Analyst using a terrain model derived from EU-DEM data with a vertical accuracy of ± 7 m. The ZTVs were calculated with a surface offset of 28 m and are based on a viewing height of 1.8 m above ground level. The VPs, viewsheds and viewing arcs are shown in Appendix D **Figure 1**.

The viewsheds from VP1 and VP2 cover phase 1 of the Project, and the viewshed from VP3 covers the extension area (phase 2). As VP3 was deemed to adequately cover the extension area without adding additional VPs, this report will focus on surveys conducted from VP3.

There were 36 hours of watches undertaken at VP3 during the survey period. Survey start times ranged from 04:53 to 19:17 (with the latest survey finishing at 22:17).

The VP survey effort undertaken during the breeding season of 2023 is summarised in Table 2-2, with full details of survey dates, times and observers provided in Appendix A and details of weather conditions during the surveys provided in Appendix B.

[6] www.npws.ie (last accessed September 2023)

[7] https://app.bto.org/mapstore/StoreServlet (last accessed September 2023)

[8] http://maps.biodiversityireland.ie/#/Map (last accessed September 2023)

Table 2-2: VP Survey Effort Undertaken at VP3 During the Breeding Bird Season 2023

Month	VP3
April	06:00
May	06:00
June	06:00
July	12:00
August	06:00
Total hrs	**36:00**

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined below) within the study area.

The main purpose of VP watches is to collect data on primary target species that will enable estimates to be made of:

- The time spent flying over the Project Site;
- The relative use by birds of different parts of the Project Site;
- The proportion of flying time spent within the provisional upper and lower risk height limits as determined by the potential rotor diameter and rotor hub height; and
- Ultimately, the analysis of the potential risk of collision of birds with rotating turbines.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Duration of flying bout;
- Species, age and sex (where determinable);
- Number of birds observed;
- Time spent within each height band and;
- Notes on observation.

Recording height bands were determined based on the likely turbine specifications under consideration at the time of survey (upper tip height 200 m and lower tip height 28 m). Flight heights were attributed to four distinct height bands as follows:

- 1 = < 20 m (below the likely rotor swept area);
- 2 = 20 m to 150 m (potentially within the likely rotor swept area, at least in part);
- 3 = 150 m to 200 m (potentially within the likely rotor swept area);
- 4 = >200 m (above the likely rotor swept area).

In addition, a summary of observations of secondary target species was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within the Project Site, in accordance with current NS guidance. Data collected on secondary species included:

- The five-minute period start and end time;
- Species;
- Number of birds observed;
- If flying, the height band in which birds were observed flying;

- Whether birds were observed onsite, in the 500 m buffer or beyond;
- Flight behaviour; and
- Notes on observation.

2.2.1.1 Target Species

Target species for the surveys were defined by legal and/or conservation status and vulnerability to impacts caused by wind turbines, as defined in NS guidance.

Primary Target Species

The list of primary target species was limited to species upon which effects are most likely to be potentially significant in EIA and Appropriate Assessment (AA) terms e.g., species forming qualifying features for nearby Special Protection Areas (SPAs) or species listed on Annex I of the Birds Directive[9]. This enabled recording to focus on the species of greatest importance without the distraction of having to record detailed flight data for a larger number of more common species.

Primary target species included the following bird species:

- All Annex I raptor/owl species;
- Qualifying interest species for nearby SPAs[10]; and
- Other raptors, waders or wildfowl red-listed on the latest Birds of Conservation Concern in Ireland (BoCCI)[5] scheme.

Secondary Species

Local circumstances may indicate that survey information should also be acquired on other species, especially those of regional conservation concern. Such species are termed secondary species. Recording of secondary species is subsidiary to recording of primary target species.

Secondary species included:

- Any other wildfowl and wader species that are not primary species;
- All gull species that are not primary species;
- Common buzzard *Buteo buteo;*
- Eurasian sparrowhawk *Accipiter nisus*;
- Northern raven *Corvus corax*;
- Grey heron *Ardea cinerea*; and
- Great cormorant *Phalacrocorax carbo.*

2.2.2 Breeding Raptor Surveys

The survey methodology for breeding raptors used a driven transect, with regular stops, to carry out watches of suitable habitat from appropriate viewpoints to identify potential nesting territories. A total of eight unique stops were made along the transect around the Project Site overlooking potentially suitable breeding habitat. The locations of these viewpoints are

[9] Annex I of the Birds Directive (Directive 2009/147/EC)

[10] The relevant SPAs are listed in Section 3.1.

presented in Appendix D **Figure 3** together with the outline of the survey route and the results of the surveys.

Suitable breeding habitat differs for each raptor species[11]. Table 2-3 provides a summary of the potentially suitable raptor habitats within the 2 km buffer zone of the Site and the approximate locations of these in relation to the viewpoints used during the survey.

Table 2-3: Potentially Suitable Habitats for Breeding Raptors within the Study Area

Raptor Viewpoint	Month Surveyed	Habitat Type Visible	Target Raptor Species Potentially Present
rVPA	All months but July	Quarry cliff faces	Peregrine falcon *Falco peregrinus*, common kestrel *Falco tinnunculus*
rVPB	April, May, June, July	Edge of quarry, broadleaf woodland	Peregrine falcon, common kestrel, red kite *Milvus milvus*, common buzzard, Eurasian sparrowhawk
rVPC	April	Broadleaf woodland & treelines	Common kestrel, red kite, common buzzard, Eurasian sparrowhawk
rVPD	April	Broadleaf woodland	Common kestrel, red kite, common buzzard, Eurasian sparrowhawk
rVPE	May, July	Broadleaf woodland	Common kestrel, red kite, common buzzard, Eurasian sparrowhawk
rVPF	May, July	Lowland cutover bog, conifer plantation, treelines & broadleaf woodland	Common kestrel, red kite, common buzzard, Eurasian sparrowhawk, hen harrier *Circus cyaneus*, merlin *Falco columbarius*
rVPG	June, July	Lowland cutover bog, conifer plantation, treelines & broadleaf woodland	Common kestrel, red kite, common buzzard, Eurasian sparrowhawk, hen harrier, merlin
rVPH	June, July	Lowland cutover bog, conifer plantation, treelines & broadleaf woodland	Common kestrel, red kite, common buzzard, Eurasian sparrowhawk, hen harrier, merlin

2.2.3 Breeding Wader Surveys

Lowland breeding wader surveys followed an adapted version of the methodology described in O'Brien & Smith[12], as recommended by NS guidance. Lowland breeding wader surveys were conducted in the grasslands in the western section of the Project Site and the bog in the eastern section of the Project Site. The surveys involved a walked transect which covered all habitat potentially suitable for breeding waders within the Project Site.

Surveys were carried out three hours before dusk and until too dark to see to search for crepuscular Eurasian woodcock *Scolopax rusticola*.

[11] Hardey, J., Crick, H.Q.P., Wernham, C., Riley, H., Etheridge, B., Thompson, D. (2013). Raptors: A field guide for surveys and monitoring (3rd Edition). The Stationery Office Edinburgh.

12 O'Brien & K. W. Smith (1992) Changes in the status of waders breeding on wet lowland grasslands in England and Wales between 1982 and 1989, Bird Study, 39:3, 165-176

The location, movement and behaviour of all wader species were recorded onto field maps using standard BTO species codes. The following criteria was recorded for each species:

- Northern lapwing *Vanellus vanellus* – the total numbers of birds seen from the transect;
- Common snipe *Gallinago gallinago* – the number of drumming plus chipping birds heard or seen from the transect; and
- Other species – the number of pairs (where 'pairs' = (paired individuals/2), displaying birds, nests or broods and other single birds not in flocks).

Birds were considered to be confirmed breeding if one or more of the following criteria were met:

- They were observed displaying or singing on more than one visit;
- Nests, eggs, or young were located;
- Adults repeatedly alarm called;
- Distraction displays were seen; and/ or
- Territorial disputes were observed.

Birds were considered to be probably or possibly (i.e. unconfirmed) breeding if:

- They were observed displaying or singing on one visit (i.e. possibly breeding) or more than one visit (i.e. probably breeding) (with the exception of obvious passage migrants in spring); or
- A pair of birds was observed in suitable habitat for nesting.

Other records were considered to be of non-breeding birds, failed breeders, birds loafing, feeding or on passage to other areas.

Please see Appendix D **Figure 4** for an outline of the walked transect and Appendices A and B for metadata relating to these surveys.

2.2.4 Kingfisher Habitat Assessment

NS guidance does not specifically mention surveys for kingfisher; however, a precautionary survey for this species was undertaken due to sightings made during habitat surveys along the Rapemills River.

The survey methodology used was an adapted version of that used by Crowe *et al.* (2008)[13]. The kingfisher habitat assessment consisted of two surveyors walking the length of all watercourses within the Project Site and assessing them for their suitability to support breeding kingfisher. The watercourses were evaluated by section. Different sections were areas which differed significantly from each other in relation to the following characteristics[14]:

- Water quality;
- River flow;
- Angle of bank; and
- Bank substrate or features.

[13] Crowe, O., G. Webb, E. Collins and P. Smiddy 2008. Assessment of the distribution and abundance of Kingfisher Alcedo atthis and other riparian birds on two SAC river systems in Ireland. Unpublished BirdWatch Ireland report to the National Parks and Wildlife Service. Newtownmountkennedy, Co. Wicklow.

[14] Details for distinguishing the characteristics can be found in Section 3.5.

Each section was then evaluated for its suitability to support breeding kingfisher through the following characteristics:

- Bank substrate or features;
- Availability of perches;
- Disturbance; and
- Foraging suitability.

Any live sightings of kingfisher or kingfisher nests observed were also recorded on maps using a GPS.

Details of survey dates, times and observers are provided in Appendix A and details of weather conditions in Appendix B. Please see Appendix D **Figure 5** for an outline of the areas surveyed.

2.2.5 Barn Owl Breeding Survey

A sighting of an adult barn owl was made during bat activity transect surveys in the summer of 2022 near the meteorological mast. NS guidance mentions that breeding surveys for owls should be undertaken according to the methods supplied by Hardey et al. (2009) up to 1 km from the Project Site.

According to Hardey et al. (2009), the number of visits required are dependent on whether suitable nesting sites are occupied. All suitable roost / nest sites for barn owl were surveyed as part of summer roost surveys for bats in 2022, with no signs (such as feathers, pellets and droppings) detected. Bat surveys (including survey area) are described in SLR (2023b)[15] and included searches within optioned lands (access to areas outside these was not possible).

As a precaution, additional surveys of structures were made on the same date as for the kingfisher habitat assessment. The aim of these surveys was to locate active barn owl nests (corresponding to visit 2 in Hardey et al. (2009)). None of the trees searched as part of bat surveys had large cavities suitable for nesting barn owl, so focus was given to structures.

Locations surveyed for barn owl are shown below in Table 2-4.

Table 2-4: Locations Surveyed for Barn Owl

Potential Nest Type	Description	X (ITM)	Y(ITM)	Distance/Direction from Extension Area
Structure	Agricultural shed	608696.95	710083.15	400 m south
	Concrete shed	608481.14	710291.66	<100 m south
	Stone buildings	607538.66	710053.68	450 m south
	Small farm canopy	607308.78	710481.14	200 m west
	Concrete shed	607324.83	710501.79	200 m west
	Slatted units and hay shed	606433.05	708963.74	1.9 km southwest
	Concrete shed	606474.72	708955.77	1.9 km southwest
	Ruins	607620.09	710098.05	400 m south

[15] SLR (2023b). Baseline Bat Report. Cush Wind Farm. SLR Environmental Consulting (Ireland) Ltd

Project Team

Details of the project team are described below with those involved in field surveys only described in Section 2.4.1.

2.2.6 Dr Jonathon Dunn (JD) MA (Cantab.) MSc PhD MCIEEM –Technical Reviewer & Approver

Jonathon is an Associate Ecologist with SLR and holds an MA (Cantab.) in Zoology from Homerton College, Cambridge, an MSc in Ecology, Evolution and Conservation from Imperial College London, and a PhD in avian ecology from Newcastle University. He is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has worked in the environmental sector since 2014. He has experience as a project manager on many wind farm developments throughout Ireland. Jonathon conducted the technical review and approvals of this report.

2.2.7 Aisling Kinsella (AK) BSc (Hons) MSc – Project Manager and Report Author

Aisling is a Senior Ecologist with SLR and holds a BSc in Zoology from University College Cork and an MSc in Wildlife Management and Conservation from University College Dublin. Aisling has three years' experience with breeding and non-breeding bird surveys (vantage point surveys, breeding wader and raptor surveys, winter feeding and distribution surveys, goose roost and winter hen harrier surveys). She is also involved with project management, report writing and technical reviews, survey scheduling and training new staff in bird survey work. Aisling is the project manager for Cush Wind Farm. She also carried out surveys at the Project Site during the 2023 breeding season and is the author of this report.

2.3 Field Survey Team

2.3.1 Kieran Moynihan (KM) – Project Ecologist

Kieran Moynihan is a Project Ecologist with SLR and has worked in ecological consultancy since July 2022. Kieran holds a BSc in Ecology from University College Cork. Since joining SLR Kieran has gained experience in a range of ornithological surveys, plant identification and habitat surveys. He has helped prepare AA screenings for a range of projects. Kieran is a qualifying member of CIEEM.

2.3.2 Michael James (MJ) – Graduate Ecologist

Michael is a Graduate Ecologist with SLR. Michael holds a BA (Hons) in Zoology from Trinity College Dublin. Since starting at SLR, Michael has been involved in various surveys. These include bird surveys (vantage point and breeding raptor) and bat transects for wind farms. He has also conducted bat emergence surveys and habitat surveys for other projects.

2.3.3 Nick Veale (NV) – Subcontractor

Nick is the Principal Ecologist for Veale Ecology and has a lifetime experience as an ornithologist and 22 years professional experience as a consulting ornithologist. Nick has worked on a large number of renewable energy projects.

2.4 Survey Limitations

Most VP surveys were undertaken in optimal weather conditions. There were five hours out of the total 36 during which the visibility was recorded as "moderate" i.e. 1-3 km (comprising 14% of total survey effort). In most cases where the visibility was recorded as "moderate",

the relevant 2 km viewing arcs were still visible. Further details regarding weather conditions during surveys are provided in Appendix B.

A section of grassland at approximate ITM coordinates 606819, 710474 could not be accessed for the breeding wader survey in May due to the road being blocked. However, it was accessible for all other breeding wader surveys. It should also be noted that during the breeding 2023 survey period this habitat was no longer considered suitable for breeding waders, as it had been during previous years, due to the presence of grazing donkeys and the resultant short sward.

One flight line of black headed gull *Chroicocephalus ridibundus* was accidentally recorded as secondary target species in July and as such, does not have the primary target species attribute data. However, this is not considered to have the potential to significantly affect the output of any subsequent collision risk modelling.

Access to structures / trees within third-party lands in the 1 km survey buffer was not possible for barn owl breeding surveys, so only those within optioned lands could be searched.

3.0 Results

3.1 Desk-based Review

3.1.1 Species Records

Species records collated via desk-based review are shown in Appendix E.

3.1.2 Natura 2000 Sites

The Project Site is not within or immediately adjacent to any SPA. However, there are a total of eight SPAs within a 20 km[16] radius with details shown in Table 3-1.

Table 3-1: SPAs within 20 km of the Project Site and their Qualifying Interests

Site Name	Site Code	Distance/Direction from Extension Area Boundary	Qualifying Interest Species Relevant to the Breeding Season
Dovegrove Callows SPA	004137	3.6 km southwest	• N/A
All Saints Bog SPA	004103	5.1 km west	• N/A
River Little Brosna Callows SPA	004086	5.8 km west	• N/A
Middle Shannon Callows SPA	004096	7.2 km northwest	• Corncrake *Crex crex* • Northern lapwing
Slieve Bloom Mountains SPA	004160	11.8 km southeast	• Hen harrier
River Suck Callows SPA	004097	17.3 km northwest	• N/A
Lough Derg (Shannon) SPA	004058	17.5 km southwest	• Great cormorant • Tufted duck Aythya *fuligula* • Common tern *Sterna hirundo*
Mongan Bog SPA	004017	19.0 km northwest	• N/A

3.1.3 Other Nature Conservation Sites

The Project Site is not within or immediately adjacent to any Natural Heritage Area (NHA) or proposed NHA (pNHA). However, there are a total of 14 NHAs and 50 pNHAs within a 20 km radius, with details shown in Table 3-2.

River Little Brosna Callows NHA is located 1.65 km west of the Project Site and is the only NHA within a 20 km radius which is designated for its bird populations. The site is of importance for breeding common redshank *Tringa totanus* and common snipe[17].

The Project Site is not within or immediately adjacent to any Ramsar site. The Slieve Bloom Mountains Ramsar site is located 11.7 km east of the Project Site and is contained within the boundaries of the Slieve Bloom Mountains SPA.

[16] A 20 km search radius was used as this represents the maximum core foraging distance used by Qualifying Interest species of SPAs in the UK and Ireland

[17] NPWS (2014) Site Synopsis: River Little Brosna Callows SPA [000564] National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

Table 3-2: NHAs and pNHAs within 20 km of the Project Site and their Qualifying Interests (Sites Designated for Ornithological Qualifying Interests Only)[18]

Site Name	Site Code	Distance/Direction from Extension Area Boundary	Qualifying Interests Relevant to the Breeding Season
Woodville Woods pNHA	000927	2.0 km southwest	Common snipe
Lough Nahinch (Tipperary) pNHA	000936	12.5 km southwest	Common redshank Common snipe Water rail *Rallus arquaticus*
Roscrea Bog pNHA	000583	17.1 km southwest	Common snipe Eurasian curlew *Numenius arquata*
Pallas Lough pNHA	000916	18.3 km northeast	Mallard *Anas platyrhynchos* Eurasian teal Eurasian wigeon Western marsh harrier *Circus aeruginosus*

3.2 Flight Activity Surveys

Flight lines of primary target species recorded at the proposed wind farm site throughout the 2023 breeding season are presented in Appendix D **Figures 2.1 to 2.7** and a summary of the survey findings are provided in Sections 3.2.1 and 3.2.2 for primary and secondary target species, respectively. Flight data for both primary and secondary target species are provided in Appendix C with full data retained in GIS and excel format for subsequent collision risk modelling, if required.

3.2.1 Primary Target Species

In total, flight lines by seven primary target species were recorded from VP3 during the five-month survey period. Flight activity recorded is summarised in Table 3-3. Northern lapwing was the most frequently recorded species (17 flight lines), followed by common snipe (13 flight lines).

Table 3-3: Number of Primary Target Species Flights

Species	Number of flight lines by month					Total no. of flight lines	Time at risk height* (s)	Cumulative no. of flights
	April	May	June	July	August			
Black-headed gull	5	0	3	0	0	**8**	**450**	**23**
Common kestrel	2	3	0	4	0	**9**	**1,260**	**9**
Common snipe	0	2	10	1	0	**13**	**975**	**17**
Little egret *Egretta garzetta*	0	0	2	0	0	**2**	**120**	**2**

[18] Only NHAs and pNHAs that do not overlap with SPAs are shown.

Species	Number of flight lines by month					Total no. of flight lines	Time at risk height* (s)	Cumulative no. of flights
	April	May	June	July	August			
Mallard	1	1	1	0	0	**3**	**105**	**6**
Northern lapwing	2	3	7	3	2	**17**	**375**	**25**
Teal	4	0	0	0	0	4	**135**	**8**
* precautionary risk height assumed to be between 28 – 200 m								

A summary of flight activity by species is presented below.

3.2.1.1 Black-Headed Gull

Eight flight lines of black-headed gull were recorded during the flight activity surveys (Appendix D **Figure 2.1**). The peak number of flights per any one flight line was eight. Flight lines were recorded from VP3 in April and June. Seven flight lines were within collision risk heights. Activity was mostly located in the west of the 500 m survey buffer.

3.2.1.2 Common Kestrel

Nine flight lines of common kestrel were recorded during the flight activity surveys (Appendix D **Figure 2.3**). All flight lines consisted of a single flight. Eight flight lines were within collision risk heights. Activity was mostly outside the 500 m survey buffer.

3.2.1.3 Common Snipe

Thirteen flight lines of common snipe recorded across May, June and July (Appendix D **Figure 2.6**). Nearly half of these (n=6) included breeding behaviour (courtship display or movement to / from breeding sites). Activity was mostly located within the northwest part of the 500 m survey buffer.

3.2.1.4 Little Egret

Two flight lines of little egret were recorded in June (Appendix D **Figure 2.2**). Both flight lines consisted of a single flight and occurred at collision risk heights.

3.2.1.5 Mallard

Three flight lines of mallard were recorded across April, May and June (Appendix D **Figure 2.5**). Two flight lines occurred at collision risk heights.

3.2.1.6 Northern Lapwing

Seventeen flight lines of northern lapwing were recorded during the flight activity surveys (Appendix D **Figure 2.4**). Six flight lines included breeding behaviour (territorial / nest defending, courtship display, or to/from breeding sites). Activity was mostly to the west of the 500 m survey buffer and Project Site.

3.2.1.7 Teal

There were four flight lines of teal comprising a total of eight flights recorded in April (Appendix D **Figure 2.7**). All flight lines occurred at collision risk heights and were to the west of the Project Site.

3.2.2 Secondary Species

Secondary species activity at the Project Site is summarised in Table 3-4. Common buzzard was the most frequently recorded secondary species (recorded in 21 out of a possible 432 five-minute periods).

Table 3-4: Secondary Species Activity Summary

Species	Number of 5 min periods recorded	Peak count of birds recorded in any 5 min period	Comments
Common buzzard	21	2	Activity in all months except June within the Project Site, buffer & beyond
Common gull	5	8	Activity in July only within the Project Site and buffer.
Grey heron	15	2	Activity in all months within the Project Site, buffer & beyond
Herring gull	3	5	Activity in July only within the Project Site and buffer.
Lesser black-backed gull	2	4	Activity in April only within the Project Site and buffer.
Northern raven	4	2	Activity in July & August within the Project Site, buffer & beyond
Ringed plover	5	3	Activity in May and June within the Project Site

3.2.3 Incidental records of other species

Fallow deer *Dama dama* (Wildlife Act 1976, as amended) was frequently observed foraging within the Project Site.

3.3 Breeding Raptor Surveys

Three species of raptor were recorded during the breeding raptor surveys. The following species accounts provide summary details of the primary raptor species encountered during the 2023 surveys. The results of the breeding raptor survey, with the rVPs and species locations, can be found in Appendix D **Figure 3**.

3.3.1 Common kestrel

Common kestrel was observed in the lands surrounding Loughnane Quarry (c. 2 km of the extension area) on multiple occasions. No nest sites were identified within the quarry itself, but it is likely that a breeding territory exists within the lands surrounding it which are under third-party ownership. During flight activity surveys from VP2 (located 2 km southwest of the extension area and 2 km northwest of Loughnane Quarry), a flight line comprising of a

female and two juveniles was observed in July, confirming the presence of a breeding territory within the general area of the Project Site.

3.3.2 Peregrine falcon

A single bird was observed on the northeast quarry face within Loughnane Quarry c. 2 km south of the Project Site, during the first breeding raptor survey in April. During the VP surveys from VP2, an adult male and female were observed displaying courtship behaviour, which is indicative of probable breeding according to the criteria outlined by BTO. During the second breeding raptor survey, a possible nest site was observed within the quarry, but no birds were present. During subsequent visits, this possible nest site was no longer identifiable, and peregrine was not observed again.

3.3.3 Secondary target species

Common buzzard was frequently observed within the 2 km survey buffer. Two likely breeding territories was identified during the breeding raptor surveys at approx. ITM coordinates 608452, 709186 and 608266, 710201.

3.4 Breeding Wader Surveys

No wader nest sites were confirmed during the breeding wader surveys. However, two species of wader were confirmed as breeding and one as probably breeding within the Project Site during flight activity surveys, based on the criteria set out in Section 2.2.3.

Lapwing, ringed plover and common snipe were frequently observed displaying courtship behaviour on the bog in the northern section of the Project Site during the VP surveys.

On 23rd May, ringed plover was observed mating during a survey at VP3, at approximate ITM coordinates 607939, 711107, which is indicative of confirmed breeding.

Additionally, common snipe was observed foraging and displaying courtship behaviour in the grassland surrounding the met mast (wader transect to the west of the N62 road) during the April and June breeding wader surveys. On the 19th July, during the flight activity surveys, an adult and juvenile were observed on the bog by VP3 at approximate ITM coordinates 607895 711211 within suitable breeding habitat, confirming successful breeding of this species within the Project Site.

There were three observations of northern lapwing in the same area where breeding was recorded during previous breeding surveys. All were of birds present in suitable breeding habitats, which is indicative of probable breeding. A juvenile lapwing with two adults was recorded within the Project Site during a survey at VP3 in July. This area was c.350 m from the nearest turbine location.

3.5 Kingfisher Habitat Assessment

Four watercourses, split into six separate sections based on their distinguishing characteristics, within the Project Site were surveyed to determine their potential to support breeding kingfisher The watercourses and their sections are presented in Appendix D **Figure 5**. Sections 1, 2, 5 and 6 overlap with the extension area.

No section was deemed suitable to support breeding kingfisher. No potential kingfisher nests were identified and there were no live sightings of kingfisher during the survey. Three sections (sections 1, 2 and 4) were deemed suitable for foraging, given the availability of perches. The findings of the survey are detailed in Table 3-5 below.

Table 3-5: Details of the Kingfisher Habitat Assessment

Section of Watercourse	Water Quality[19]	River Flow[20]	Angle of Bank[21]	Bank Substrate or Features[22]	Agriculture[23]	Availability of Perches[24]	Disturbance[25]	Section Suitable for foraging? (Y/N)	Section Suitable for nesting? (Y/N)	Nest notes	Kingfisher sighting notes
1	Clear	Slow	Steep	Wet earth	Improved	Lots	Regular disturbance	Y	N	-	-
2	Clear	Slow	Steep	Vegetated	Improved	Some	Regular disturbance	Y	N	-	-
3	Clear	Slow	Steep	Dry earth	Improved	No	Regular disturbance	N	N	-	-
4	Clear	Medium	Steep	Vegetated	Highly improved	Some	No	Y	N	-	-
5	Slightly silty	Slow	Vertical	Vegetated	Highly improved	Some	Slight	N	N	-	-
6	Silty	Slow	Vertical	Wet earth	Slightly improved	No	Slight	N	N	-	-

[19] Clear, slightly silty, silty (but still can see the bottom), polluted.

[20] Slow, medium, rapid

[21] Vertical (90° to water surface), steep (40-80° to water surface), gentle 20-40° to water surface), very slight (0-20° to water surface)

[22] Loose earth, dry earth, wet earth, vegetated, gravel, stony, rock

[23] Not improved, slightly improved, improved, highly improved

[24] Lots of overhanging branches, some overhanging branches, no branches

[25] No disturbance, slight disturbance, anglers, regular disturbance

3.6 Barn Owl Breeding Surveys

There was no evidence of barn owls using any of the structures within the optioned lands for breeding. It is possible that they breed elsewhere outside the optioned lands, as they are known to forage up to 5 km from a nest site (Hardey et al., 2009). Similarly, the bird observed in 2022 may have simply been passing through the area, as evidence for territorial behaviour is weak (Hardey et al, 2009). This is reinforced further by the fact that no crepuscular activity of barn owl was observed during dusk wader surveys, where it might be expected that barn owl would be recorded as an incidental sighting, if present.

4.0 Summary and Conclusions

A range of ornithology surveys were carried out at the site of the proposed Cush Wind Farm during the 2023 breeding season. These were:

- Flight activity (VP) surveys;
- Breeding wader surveys;
- Breeding raptor surveys; and
- Kingfisher habitat assessment.

The following primary target species were recorded during flight activity surveys at VP3:

- Black-headed gull;
- Common kestrel;
- Common snipe;
- Little egret;
- Mallard;
- Northern lapwing; and
- Teal.

The most frequent flight activity was by northern lapwing (n=17), followed by common snipe (n=13), common kestrel (n=9) and black-headed gull (n=8). These species are likely to have the highest levels of collision risk during the breeding season.

Three species of waders were confirmed breeding within the Project Site: ringed plover, common snipe and northern lapwing.

Breeding raptor surveys recorded two primary target species and one secondary species:

- Common kestrel (suspected breeding territory within the 2 km buffer);
- Peregrine falcon (possible failed breeding attempt at Loughnane Quarry); and
- Common buzzard (two suspected breeding territories within 2 km buffer).

No suitable habitat for breeding kingfisher was identified within the Project Site although there is some suitability for foraging kingfisher present.

No evidence of breeding barn owl was identified during surveys, although it is acknowledged that it was not possible to survey every potential nest site within a 1 km buffer due to lack of access to third-party land.

5.0 Legal and Conservation Status of Target Species Recorded

Table 5-1 summarises the legal and conservation status of the target species recorded during the range of ornithology surveys mentioned above. All birds are protected by the Wildlife Acts 1976 (as amended) in Ireland.

Table 5-1: Legal and Conservation Status of Target Species

Primary or Secondary Target	Species (BTO Code)	Legal & Conservation Status in Ireland
Primary	Black-headed gull	BoCCI4 Amber
	Common kestrel (K.)	BoCCI4 Red
	Common snipe (SN)	BoCCI4 Red
	Little egret (ET)	Annex I; BoCCI4 Green
	Mallard (MA)	BoCCI4 Amber
	Northern lapwing (L.)	BoCCI4 Red
	Peregrine falcon (PE)	Annex I; BoCCI4 Green
	Teal (T.)	BoCCI4 Amber
Secondary	Common buzzard (BZ)	BoCCI4 Green
	Common gull (CM)	BoCCI4 Amber
	Eurasian sparrowhawk (SH)	BoCCI4 Green
	Grey heron	BoCCI4 Green
	Herring gull (HG)	BoCCI4 Amber
	Lesser black-backed gull (LB)	BoCCI4 Amber
	Northern raven (RN)	BoCCI4 Green
	Ringed plover (RP)	BoCCI4 Amber

Appendix A Survey Dates, Times and Surveyors[26]

Bird Survey Report Breeding Season 2023

Cush Wind Farm

Galetech Energy Developments Ltd

SLR Project No.: 501.065092.00001

21 August 2026

[26] Surveyors initials can be found in Section 0

Table A-3: Details of VP Surveys Undertaken from VP3

Date	Surveyor	Start	End	Survey Duration
27/04/2023	AK	12:45	15:45	03:00
28/04/2023	AK	06:00	09:00	03:00
18/05/2023	AK	15:15	18:15	03:00
23/05/2023	AK	13:30	16:30	03:00
13/06/2023	AK	19:00	22:00	03:00
20/06/2023	AK	18:00	21:00	03:00
29/08/2023	MJ	17:45	20:45	03:00
30/08/2023	MJ	06:15	09:15	03:00
13/07/2023	NV	13:40	16:40	03:00
18/07/2023	NV	04:55	07:55	03:00
19/07/2023	NV	10:20	13:20	03:00
20/07/2023	NV	19:15	22:15	03:00
Total Hours				**36:00**

Table A-2: Details of Breeding Raptor Surveys

Date	Surveyor	Start	End	Survey Duration
26/04/2023	AK	10:00	14:30	04:30
25/05/2023	AK	12:00	17:00	05:00
14/06/2023	AK	09:45	14:30	04:45
14/07/2023	KM	07:40	13:15	05:35
Total Hours				**19:50**

Table A-3: Details of Breeding Wader Surveys

Date	Type	Surveyor	Start	End	Survey Duration
25/04/2023	Wader east	AK	19:15	20:30	01:15
26/04/2023	Wader west	AK	19:00	20:00	01:00
23/05/2023	Wader	AK	19:50	20:30	00:40
14/06/2023	Wader	AK	20:05	21:40	01:35
Total Hours					**04:30**

Appendix B Weather Data

Bird Survey Report Breeding Season 2023

Cush Wind Farm

Galetech Energy Developments Ltd

SLR Project No.: 501.065092.00001

21 August 2026

Table B-1: Weather Data Collected During Flight Activity Surveys Undertaken at VP3

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain[27]	Cloud Cover[28]	Cloud Height[29]	Visibility[30]	Snow[31]	Frost[32]	Temp (°C)
27/04/2023	AK	12:45	15:45	1	2	SE	0	8	2	2	0	0	12
27/04/2023	AK	12:45	15:45	2	2	SE	0	8	2	2	0	0	12
27/04/2023	AK	12:45	15:45	3	2	SE	0	8	2	2	0	0	12
28/04/2023	AK	06:00	09:00	1	1	SW	1	8	0	1	0	0	11
28/04/2023	AK	06:00	09:00	2	1	SW	1	8	0	1	0	0	11
28/04/2023	AK	06:00	09:00	3	1	SW	0	8	1	2	0	0	11
18/05/2023	AK	15:15	18:15	1	2	SW	0	8	2	2	0	0	15
18/05/2023	AK	15:15	18:15	2	2	SW	2	8	2	2	0	0	15
18/05/2023	AK	15:15	18:15	3	2	SW	2	8	2	2	0	0	15
23/05/2023	AK	13:30	16:30	1	1	NW	0	3	2	2	0	0	15
23/05/2023	AK	13:30	16:30	2	1	NW	0	3	2	2	0	0	15

[27] Key: None = 0; Drizzle = 1; Light showers/snow = 2; Heavy showers/snow = 3; Heavy rain/snow = 4.

[28] Expressed in oktas (n/8)

[29] Key: Height of cloud above average height of viewshed. <150m = 0; 150-500m = 1; >500m = 2.

[30] Key: Poor (<1km) = 0; Moderate (1-3km) = 1; Good (>3km) = 2.

[31] Key: Lying snow. None = 0; On site = 1; On higher ground = 2.

[32] Key: None = 0; Ground = 1; All day = 2.

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain[27]	Cloud Cover[28]	Cloud Height[29]	Visibility[30]	Snow[31]	Frost[32]	Temp (°C)
23/05/2023	AK	13:30	16:30	3	1	NW	0	3	2	2	0	0	15
13/06/2023	AK	19:00	22:00	1	1	E	0	2	2	2	0	0	22
13/06/2023	AK	19:00	22:00	2	1	E	0	2	2	2	0	0	22
13/06/2023	AK	19:00	22:00	3	1	E	0	2	2	2	0	0	20
20/06/2023	AK	18:00	21:00	1	2	SW	2	7	2	2	0	0	18
20/06/2023	AK	18:00	21:00	2	2	SW	0	6	2	2	0	0	18
20/06/2023	AK	18:00	21:00	3	2	SW	0	6	2	2	0	0	18
29/08/2023	MJ	17:45	20:45	1	3	NW	1	8	2	2	0	0	16
29/08/2023	MJ	17:45	20:45	2	4	NW	0	8	2	2	0	0	15
29/08/2023	MJ	17:45	20:45	3	4	NW	0	7	2	2	0	0	15
30/08/2023	MJ	06:15	09:15	1	1	W	0	5	2	2	0	0	10
30/08/2023	MJ	06:15	09:15	2	1	W	0	6	2	2	0	0	10
30/08/2023	MJ	06:15	09:15	3	2	W	0	6	2	2	0	0	10
13/07/2023	NV	13:40	16:40	1	1	SW	0	6	1	2	0	0	18
13/07/2023	NV	13:40	16:40	2	2	SW	1	7	1	2	0	0	19
13/07/2023	NV	13:40	16:40	3	2	SW	0	7	1	2	0	0	18
18/07/2023	NV	04:55	07:55	1	2	SE	1	8	1	1	0	0	14
18/07/2023	NV	04:55	07:55	2	2	SE	1	8	1	1	0	0	14
18/07/2023	NV	04:55	07:55	3	1	SE	1	8	1	1	0	0	15
19/07/2023	NV	10:20	13:20	1	2	NW	0	3	2	2	0	0	17

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain[27]	Cloud Cover[28]	Cloud Height[29]	Visibility[30]	Snow[31]	Frost[32]	Temp (°C)
19/07/2023	NV	10:20	13:20	2	2	NW	0	2	2	2	0	0	18
19/07/2023	NV	10:20	13:20	3	2	NW	0	1	2	2	0	0	18
20/07/2023	NV	19:15	22:15	1	3	NW	0	3	2	2	0	0	17
20/07/2023	NV	19:15	22:15	2	2	NW	0	3	2	2	0	0	16
20/07/2023	NV	19:15	22:15	3	1	W	0	2	2	2	0	0	16

Table B-2: Weather Data Collected During Breeding Raptor Surveys

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain[27]	Cloud Cover[28]	Cloud Height[29]	Visibility[30]	Snow[31]	Frost[32]	Temp (°C)
26/04/2023	AK	10:00	14:30	1	2	SE	0	4	2	2	0	0	11
26/04/2023	AK	10:00	14:30	2	2	SE	0	7	2	2	0	0	11
26/04/2023	AK	10:00	14:30	3	2	SE	0	7	2	2	0	0	11
26/04/2023	AK	10:00	14:30	4	2	SE	0	5	2	2	0	0	12
26/04/2023	AK	10:00	14:30	5	2	SE	0	5	2	2	0	0	12
25/05/2023	AK	12:00	17:00	1	2	N	0	6	2	2	0	0	19
25/05/2023	AK	12:00	17:00	2	2	N	0	6	2	2	0	0	19
25/05/2023	AK	12:00	17:00	3	2	N	0	4	2	2	0	0	20
25/05/2023	AK	12:00	17:00	4	2	N	0	3	2	2	0	0	20
25/05/2023	AK	12:00	17:00	5	2	N	0	3	2	2	0	0	20
14/06/2023	AK	09:45	14:30	1	1	E	0	4	2	2	0	0	24
14/06/2023	AK	09:45	14:30	2	1	E	0	4	2	2	0	0	24

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain[27]	Cloud Cover[28]	Cloud Height[29]	Visibility[30]	Snow[31]	Frost[32]	Temp (°C)
14/06/2023	AK	09:45	14:30	3	1	E	0	3	2	2	0	0	25
14/06/2023	AK	09:45	14:30	4	1	E	0	5	2	2	0	0	25
14/06/2023	AK	09:45	14:30	5	1	E	0	4	2	2	0	0	26
14/07/2023	KM	07:40	13:15	1	2	E	2	8	2	2	0	0	12
14/07/2023	KM	07:40	13:15	2	2	E	2	8	2	2	0	0	14
14/07/2023	KM	07:40	13:15	3	2	E	2	8	2	2	0	0	14
14/07/2023	KM	07:40	13:15	4	2	E	2	8	2	2	0	0	14
14/07/2023	KM	07:40	13:15	5	2	E	2	8	2	2	0	0	14

Table B-3: Weather Data Collected During Breeding Wader Surveys

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain[27]	Cloud Cover[28]	Cloud Height[29]	Visibility[30]	Snow[31]	Frost[32]	Temp (°C)
25/04/2023	AK	19:15	20:30	1	2	SE	0	8	2	2	0	9	9
25/04/2023	AK	19:15	20:30	2	2	SE	0	8	2	2	0	9	9
26/04/2023	AK	19:00	20:00	1	2	SE	0	8	2	2	0	0	13
23/05/2023	AK	19:50	20:30	1	2	NW	0	2	2	2	0	0	17
14/06/2023	AK	20:05	21:40	1	2	SW	0	4	2	2	0	0	21
14/06/2023	AK	20:05	21:40	2	2	SW	0	4	2	2	0	0	21



Appendix C Flight Activity Survey Data[33]

Bird Survey Report Breeding Season 2023

Cush Wind Farm

Galetech Energy Developments Ltd

SLR Project No.: 501.065092.00001

21 August 2026

[33] The key to BTO Codes can be found in Section 5.0.

Primary Target Species

Table C-1: Primary Target Species Recorded During Flight Activity Surveys Undertaken at VP3

Date	Flight ID	Species	Num. Birds	Age	Sex	Obs. Time	Flight time (s)
27-Apr-23	3.CU007.1.1	BH	1	AD	U	12:56	60
27-Apr-23	3.CU007.2.1	K.	1	U	U	12:57	15
27-Apr-23	3.CU007.3.1	BH	8	AD	U	13:08	75
27-Apr-23	3.CU007.4.1	BH	5	AD	U	13:11	45
27-Apr-23	3.CU007.5.1	BH	4	AD	U	13:14	60
27-Apr-23	3.CU007.6.1	T.	2	AD	M&F	13:26	45
27-Apr-23	3.CU007.7.1	K.	1	U	U	13:39	180
27-Apr-23	3.CU007.8.1	BH	2	AD	U	13:41	60
28-Apr-23	3.CU008.1.1	T.	2	AD	M	06:46	60
28-Apr-23	3.CU008.2.1	T.	3	AD	2M & 1F	07:28	60
28-Apr-23	3.CU008.3.1	L.	1	AD	U	07:35	45
28-Apr-23	3.CU008.4.1	MA	1	AD	M	07:37	45
28-Apr-23	3.CU008.5.1	L.	1	AD	U	07:43	30
28-Apr-23	3.CU008.6.1	T.	1	AD	M	08:03	45
18-May-23	3.CU012.1.1	K.	1	AD	F	15:47	225
18-May-23	3.CU012.2.1	K.	1	AD	F	16:21	240
18-May-23	3.CU012.3.1	L.	1	U	U	16:23	75
18-May-23	3.CU012.4.1	SN	2	U	U	16:23	45
18-May-23	3.CU012.5.1	SN	1	AD	U	16:27	525
18-May-23	3.CU012.6.1	K.	1	AD	M	17:08	150
18-May-23	3.CU012.7.1	MA	3	AD	2M 1F	17:18	60
23-May-23	3.CU015.1.1	L.	1	AD	U	14:44	75
23-May-23	3.CU015.3.1	L.	2	AD	U	16:13	45
13-Jun-23	3.CU019.1.1	L.	1	AD	U	19:04	60
13-Jun-23	3.CU019.2.1	L.	1	AD	U	19:11	15
13-Jun-23	3.CU019.3.1	SN	1	AD	U	19:13	45
13-Jun-23	3.CU019.4.1	SN	1	AD	U	19:23	15
13-Jun-23	3.CU019.5.1	SN	2	AD	U	19:27	15
13-Jun-23	3.CU019.6.1	ET	1	AD	U	19:32	60
13-Jun-23	3.CU019.7.1	L.	2	AD	U	19:35	105



Date	Flight ID	Species	Num. Birds	Age	Sex	Obs. Time	Flight time (s)
13-Jun-23	3.CU019.8.1	L.	1	AD	U	19:50	30
13-Jun-23	3.CU019.9.1	L.	1	AD	U	19:55	45
13-Jun-23	3.CU019.11.1	L.	1	AD	U	20:28	30
13-Jun-23	3.CU019.12.1	ET	1	AD	U	20:56	60
20-Jun-23	3.CU024.2.1	SN	1	AD	U	18:34	75
20-Jun-23	3.CU024.3.1	SN	1	AD	U	18:37	105
20-Jun-23	3.CU024.4.1	SN	1	U	U	18:41	90
20-Jun-23	3.CU024.5.1	SN	2	U	U	18:45	15
20-Jun-23	3.CU024.7.1	SN	1	AD	U	18:54	15
20-Jun-23	3.CU024.8.1	SN	1	AD	U	18:56	15
20-Jun-23	3.CU024.9.1	SN	1	AD	U	19:47	60
20-Jun-23	3.CU024.10.1	MA	2	AD	F	19:54	45
20-Jun-23	3.CU024.11.1	BH	1	AD	U	20:13	75
20-Jun-23	3.CU024.12.1	BH	1	AD	U	20:33	75
20-Jun-23	3.CU024.13.1	BH	1	AD	U	20:39	75
20-Jun-23	3.CU024.14.1	L.	1	AD	U	20:49	15
30-Aug-23	3.CU033.1.1	L.	4	AD	U	07:27	30
30-Aug-23	3.CU033.2.1	L.	4	AD	U	07:33	45
18-Jul-23	3.CU043.1.1	L.	1	AD	U	06:41	105
18-Jul-23	3.CU043.2.1	L.	1	AD	U	07:26	60
18-Jul-23	3.CU043.3.1	K.	1	AD	U	07:43	90
19-Jul-23	3.CU044.1.1	K.	1	AD	M	10:38	210
19-Jul-23	3.CU044.2.1	L.	1	AD	U	11:14	60
20-Jul-23	3.CU045.1.1	K.	1	AD	F	20:31	120
20-Jul-23	3.CU045.2.1	SN	2	AD	F	20:56	60
20-Jul-23	3.CU045.3.1	K.	1	AD	F	21:11	150



Secondary Target Species

Table C-6: Secondary Target Species Recorded During Flight Activity Surveys Undertaken at VP3

Date	Survey Start	Survey End	5 min period	BTO Code	Count
27/04/2023	12:45	15:45	13:25	BZ	1
27/04/2023	12:45	15:45	13:50	LB	4
27/04/2023	12:45	15:45	14:10	BZ	1
27/04/2023	12:45	15:45	14:50	H.	1
27/04/2023	12:45	15:45	14:55	BZ	2
27/04/2023	12:45	15:45	15:05	BZ	1
28/04/2023	06:00	09:00	06:55	H.	1
28/04/2023	06:00	09:00	07:45	LB	1
28/04/2023	06:00	09:00	07:50	H.	1
28/04/2023	06:00	09:00	08:25	H.	1
18/05/2023	15:15	18:15	15:15	H.	1
18/05/2023	15:15	18:15	15:35	H.	2
18/05/2023	15:15	18:15	15:55	H.	1
18/05/2023	15:15	18:15	16:40	BZ	1
18/05/2023	15:15	18:15	17:25	H.	1
23/05/2023	13:30	16:30	14:35	BZ	2
23/05/2023	13:30	16:30	14:50	BZ	2
23/05/2023	13:30	16:30	14:55	RP	3
23/05/2023	13:30	16:30	15:20	BZ	1
23/05/2023	13:30	16:30	15:30	BZ	1
23/05/2023	13:30	16:30	15:40	BZ	1
23/05/2023	13:30	16:30	15:50	BZ	1
23/05/2023	13:30	16:30	15:55	BZ	1
23/05/2023	13:30	16:30	16:00	BZ	2
23/05/2023	13:30	16:30	16:05	BZ	1
23/05/2023	13:30	16:30	16:10	RP	1
13/06/2023	19:00	22:00	19:15	H.	1
13/06/2023	19:00	22:00	20:18	RP	2
20/06/2023	18:00	21:00	18:18	RP	3
20/06/2023	18:00	21:00	18:50	RP	1
29/08/2023	17:45	20:45	17:50	RN	2
29/08/2023	17:45	20:45	18:10	H.	1
29/08/2023	17:45	20:45	19:35	H.	1

Date	Survey Start	Survey End	5 min period	BTO Code	Count
30/08/2023	06:15	09:15	06:15	BZ	1
30/08/2023	06:15	09:15	07:20	RN	2
30/08/2023	06:15	09:15	08:35	H.	1
13/07/2023	13:40	16:40	13:40	BZ	1
13/07/2023	13:40	16:40	14:20	RN	2
18/07/2023	04:55	07:55	05:20	CM	6
18/07/2023	04:55	07:55	05:20	HG	3
18/07/2023	04:55	07:55	06:05	CM	2
18/07/2023	04:55	07:55	06:05	BH	4
18/07/2023	04:55	07:55	06:25	H.	1
18/07/2023	04:55	07:55	06:55	BZ	1
18/07/2023	04:55	07:55	07:15	HG	3
18/07/2023	04:55	07:55	07:15	CM	4
19/07/2023	10:20	13:20	10:55	H.	1
19/07/2023	10:20	13:20	12:05	BZ	2
19/07/2023	10:20	13:20	12:10	BZ	2
19/07/2023	10:20	13:20	12:30	RN	1
19/07/2023	10:20	13:20	12:45	H.	1
20/07/2023	19:15	22:15	20:20	BZ	1
20/07/2023	19:15	22:15	20:25	BZ	1
20/07/2023	19:15	22:15	21:30	CM	6
20/07/2023	19:15	22:15	21:35	CM	8
20/07/2023	19:15	22:15	21:35	HG	5

Appendix D Figures

Bird Survey Report Breeding Season 2023

Cush Wind Farm

Galetech Energy Developments Ltd

SLR Project No.: 501.065092.00001

21 August 2026

608000

610000

712000

N

Site Boundary

Turbine Location 500 m Buffer

Turbine Location

Vantage Point (VP) Location

Vantage Point 2 km Viewing Arc

Theoretical Visibility from VP3

Note: The ZTV is calculated with a surface offset of 28m and from a viewing height of 1.8m above ground level. The terrain model is derived from EU-DEM data with a vertical accuracy of ± 7m. The ZTV was calculated using ArcMAP 10.5.1 software.



3

L3006

Gairos Cross Roads

L3003

L1092

N62

N52

Derryad ED

Eglish ED

Mountlerin ED

Boonmarig River

Tullamore Road

0 1 2

Kilometres

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CUSH WIND FARM

WINTER BIRD SURVEYS

VANTAGE POINTS AND VIEWSHEDS

FIGURE 1

Scale 1:15,000 @ A3

Date AUGUST 2026

501.065723.00001.0022.0 VP Locations and Viewsheds

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607000 608000 609000 610000

712000 711000 710000

N

LEGEND

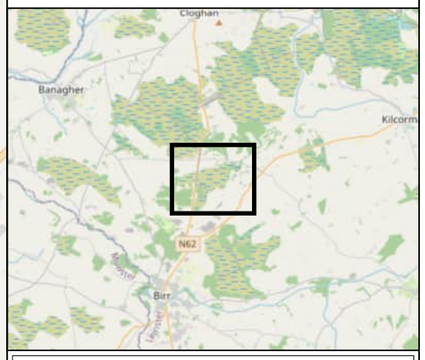
Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Black-Headed Gull



0 0.5 1

Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES
BLACK-HEADED GULL

FIGURE 2.1

Scale 1:12,500 @ A3

Date AUGUST 2026

501.065723.00001.0019.0 VP Flightlines

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712000 711000 710000

N

LEGEND

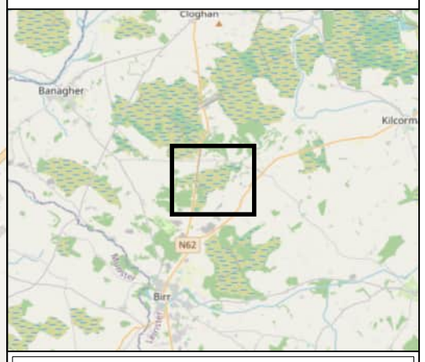
Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Little Egret



0 0.5 1

Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES
LITTLE EGRET

FIGURE 2.2

Scale 1:12,500 @ A3

Date AUGUST 2026

501.065723.00001.0019.0 VP Flightlines

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607000 608000 609000 610000

712000

711000

710000

N

LEGEND

Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Kestrel

0 0.5 1

Kilometres

501.065723.00001.0019.0 VP Flightlines

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BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES KESTREL

FIGURE 2.3

Scale 1:12,500 @ A3

Date AUGUST 2026

607000 608000 609000 610000

712000

711000

710000

N

LEGEND

Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Lapwing

0 0.5 1

Kilometres

501.065723.00001.0019.0 VP Flightlines

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BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES LAPWIND

FIGURE 2.4

Scale 1:12,500 @ A3

Date AUGUST 2026

607000 608000 609000 610000

712000

711000

710000

501.065723.00001.0019.0 VP Flightlines

N

LEGEND

Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Mallard



0 0.5 1

Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES MALLARD

FIGURE 2.5

Scale 1:12,500 @ A3

Date AUGUST 2026

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712000 711000 710000

N

LEGEND

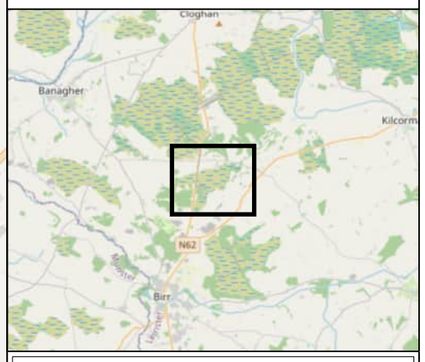
Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Snipe



0 0.5 1

Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES
SNIPE

FIGURE 2.6

Scale 1:12,500 @ A3

Date AUGUST 2026

501.065723.00001.0019.0 VP Flightlines

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712000

711000

710000

501.065723.00001.0019.0 VP Flightlines

N

LEGEND

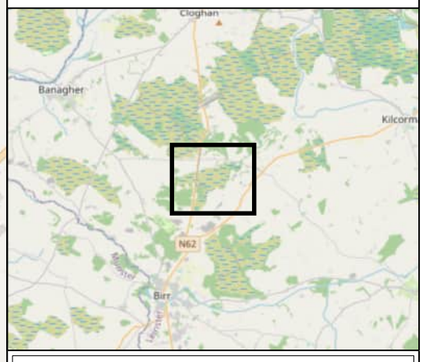
Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Teal



0 0.5 1

Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES TEAL

FIGURE 2.7

Scale 1:12,500 @ A3

Date AUGUST 2026

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605000
607500
610000
712500
710000

N

LEGEND

- Site Boundary
- Site Infrastructure At Time Of Survey 2 km Buffer
- Turbine Location
- Raptor Vantage Point (rVP)
- Driven Transect Route

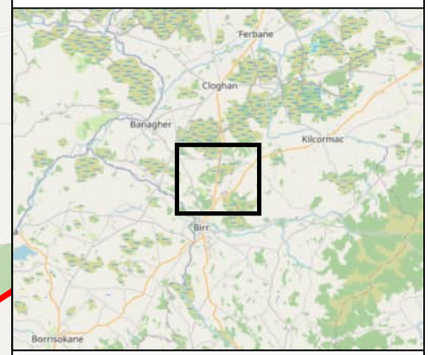
Raptor Record (Labelled with Behaviour Code)

- Buzzard
- Buzzard Breeding Territory
- Peregrine

Raptor Flightline

- Buzzard
- Kestrel

Breeding Raptor Behaviour Codes:
B16 - Present in Suitable Habitat



B16
B16
B16
B16
B16
B16

A
B
C
D
E
F
G
H

0
1
2
Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

BREEDING RAPTORS

FIGURE 3

Scale 1:25,000 @ A3

Date AUGUST 2026

501.065723.00001.0020.0 Breeding Raptors

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606250
607500
608750
711250
710000

B16
B2
B16
B16
B2
B16
B16

N

LEGEND

Site Boundary

Site Infrastructure At Time Of Survey 500 m Buffer

Turbine Location

Walked Transect Route

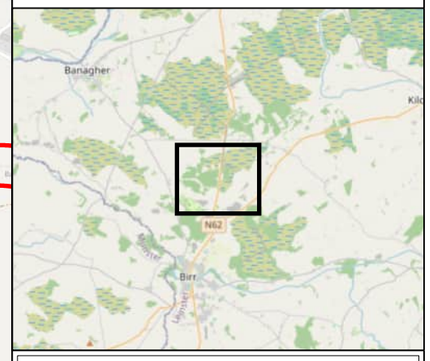
Wader Species Record (Labelled with Behaviour Code)

Lapwing

Ringed Plover

Snipe

Breeding Wader Behaviour Codes:
B2 - Courtship or Display Behaviour Seen, Including Copulation
B16 - Present in Suitable Habitat



0
0.5
1
Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

BREEDING WADERS

FIGURE 4

Scale 1:12,500 @ A3

Date JULY 2026

501.065723.00001.0021.0 Breeding Waders

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606250
607500
608750
711250
710000

N

LEGEND

- Site Boundary
- Site Infrastructure At Time Of Survey 500 m Buffer
- Turbine Location
- Kingfisher River Surveyed (Labelled with Section)

1&2
3
4
5
5



0
0.5
1
Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

KINGFISHER SURVEY RESULTS

FIGURE 5

Scale 1:12,500 @ A3

Date AUGUST 2026

501.065723.00001.0023.0 Kingfisher Survey Results

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Appendix E Species Records

Bird Survey Report Breeding Season 2023

Cush Wind Farm

Galetech Energy Developments Ltd

SLR Project No.: 501.065092.00001

21 August 2026

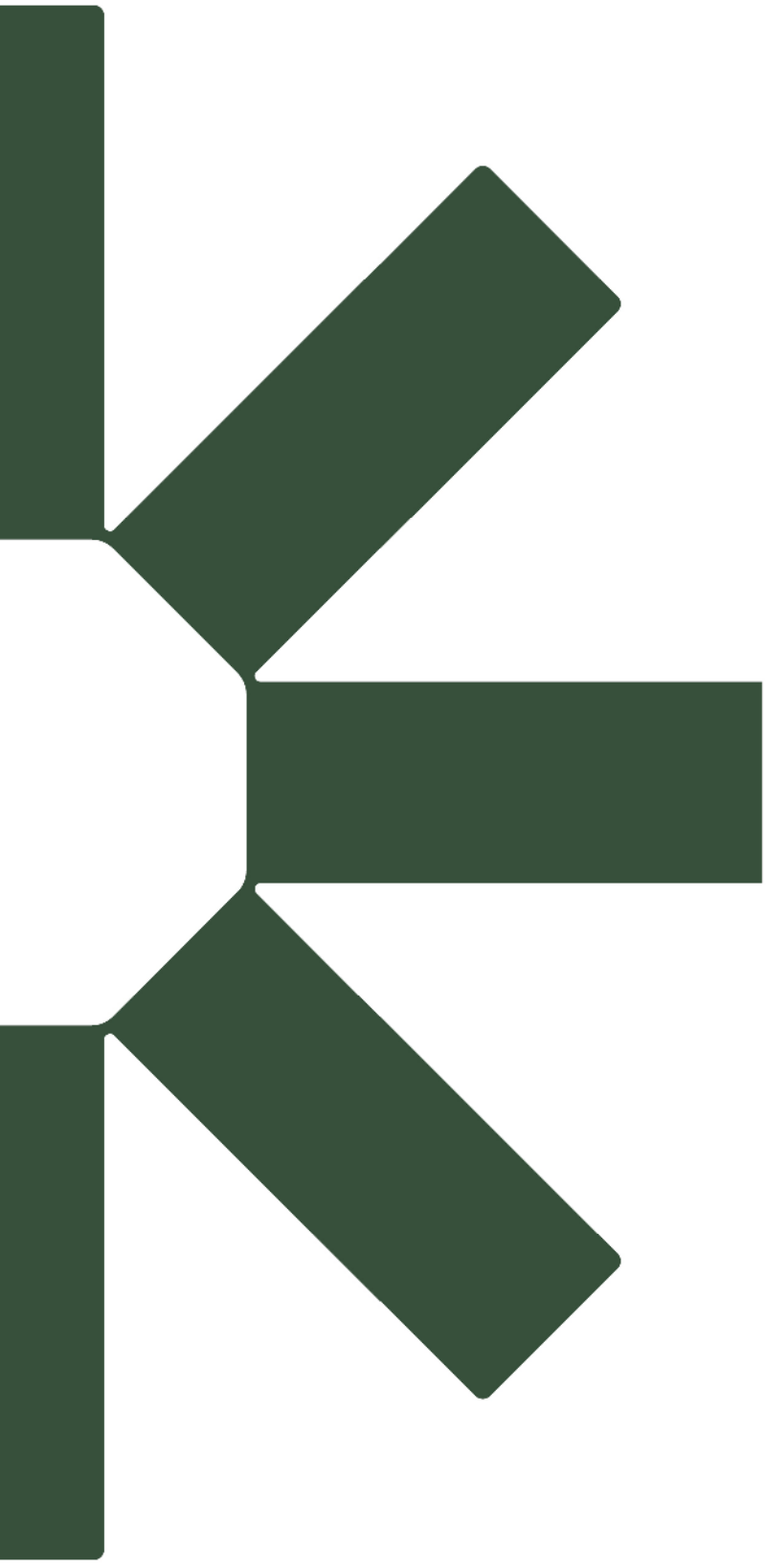
The NBDC database was searched for records of bird species within the 10 km grid squares which overlap the Project Site (N00 and N01). All bird species are protected under the Wildlife Acts (1976, as amended) but for the purposes of this report, only records of species that are Red or Amber-listed in Birds of Conservation Concern in Ireland or listed under Annex I of the Birds Directive are included in the results. Only records within the last 10 years are considered within this report as older records are unlikely to be relevant. Details of the results are shown in Table E-1 **.**

Table E-1: Species recorded within the 10 km grid squares N00 and N01 (Species Present During the Breeding Season)

Species name	Season	Grid square	Last Record Year	Designation
Barn owl	Breeding	N01	2019	BoCCI4 Red
Black-headed gull	Breeding and wintering	N01	2022	BoCCI4 Amber
Common gull *Larus canus*	Breeding and wintering	N00	2019	BoCCI4 Amber
Common kestrel	Breeding	N00, N01	2023	BoCCI4 Red
Common kingfisher	Breeding	N00, N01	2022	Annex 1, BoCCI4 Amber
Common linnet *Linaria cannabina*	Breeding	N00, N01	2019	BoCCI4 Amber
Common pochard *Aythya ferrina*	Breeding and wintering	N00, N01	2019	BoCCI4 Red
Common redshank	Breeding and wintering	N00	2019	BoCCI4 Red
Common snipe	Breeding and wintering	N01	2022	BoCCI4 Red
Common starling *Sturnus vulgaris*	Breeding	N00, N01	2019	BoCCI4 Amber
Dunlin *Calidris alpina*	Breeding and wintering	N00, N01	2019	BoCCI4 Red
Eurasian curlew	Breeding and wintering	N01	2019	BoCCI4 Red
Eurasian skylark *Alauda arvensis*	Breeding	N01	2019	BoCCI4 Amber
Eurasian teal	Breeding and wintering	N00, N01	2019	BoCCI4 Amber
Eurasian wigeon	Breeding and wintering	N00, N01	2019	BoCCI4 Amber
European golden plover	Breeding and wintering	N01	2019	Annex 1, BoCCI4 Red
Gadwall *Mareca strepera*	Breeding and wintering	N00, N01	2019	BoCCI4 Amber
Hen harrier	Breeding	N01	2014	BoCCI4 Amber
House sparrow *Passer domesticus*	Breeding	N00, N01	2022	BoCCI4 Amber

Species name	Season	Grid square	Last Record Year	Designation
Little egret	Breeding and wintering	N00	2020	Annex 1, BoCCI4 Green
Mallard	Breeding and wintering	N00, N01	2023	BoCCI4 Amber
Meadow pipit *Anthus pratensis*	Breeding	N00, N01	2019	BoCCI4 Red
Merlin	Breeding	N01	2017	Annex 1, BoCCI4 Amber
Mute swan *Cygnus olor*	Breeding and wintering	N00, N01	2022	BoCCI4 Amber
Northern lapwing	Breeding and wintering	N00, N01	2022	BoCCI4 Red
Northern shoveler	Breeding and wintering	N00, N01	2019	BoCCI4 Red
Peregrine falcon	Breeding	N00, N01	2023	Annex 1, BoCCI4 Green
Tufted duck	Breeding and wintering	N01	2018	BoCCI4 Amber
Willow warbler *Phylloscopus trochilus*	Breeding	N00, N01	2019	BoCCI4 Amber
Yellowhammer	Breeding	N00, N01	2021	BoCCI4 Red
Key	Season – indicates which season was assessed for each species under the Birds of Conservation Concern in Ireland[34]; Annex 1 – the species is listed in Annex 1 of the EC Birds Directive; and BoCCI4 status (green, amber or red) – indicates the current Birds of Conservation Concern in Ireland status category.			

[34] Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 2020–2026. Irish Birds 43: 1–22



Making Sustainability Happen

Bird Survey Report Non-Breeding Season 2023/24

Cush Wind Farm

Cush Wind Farm Ltd

Clondargan, Stradone, Co. Cavan

Prepared by:

SLR Environmental Consulting (Ireland) Ltd

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21 August 2026

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Revision	Date	Prepared By	Checked By	Authorised By
0	21 August 2026	Aisling Kinsella	Dr Jonathon Dunn	Dr Jonathon Dunn

Basis of Report

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Acronyms and Abbreviations

AA	Appropriate Assessment
BoCCI	Birds of Conservation Concern Ireland
CIEEM	Chartered Institute of Ecology and Environmental Management
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
GIS	Geospatial Information Systems
NBDC	National Biodiversity Data Centre
NHA	Natural Heritage Area
NS	NatureScot
NPWS	National Parks and Wildlife Service
pNHA	proposed Natural Heritage Area
The Project	Cush Wind Farm
The Project Site	The application site
SNH	Scottish Natural Heritage
SPA	Special Protection Area
VP	Vantage Point
ZTV	Zones of Theoretical Visibility

1.0 Introduction

SLR Environmental Consulting (Ireland) Ltd (SLR) was commissioned by Cush Wind Farm Ltd to carry out a bird survey programme for an extension area (hereafter 'the Project') at a proposed wind farm at Cush, Co. Offaly during the non-breeding season 2023/24. The purpose of this report is to describe these surveys and the resulting ornithological baseline.

1.1 Background to the Commission

No previous planning permission has been sought on the application site for the development of wind farms by Cush Wind Farm Ltd or any other party.

Bird surveys have been previously undertaken at the proposed wind farm development site at Cush, Co. Offaly (hereafter 'the Project Site') by SLR for the breeding 2020, non-breeding 2020/21, breeding 2021, non-breeding 2021/22, breeding 2022, non-breeding 2022/23 and breeding 2023 seasons. These surveys targeted a larger survey area than for the current season.

This larger area also included a linear area that was previously surveyed for a proposed overhead line[1]. Flight activity surveys were carried out at two vantage point locations along the proposed overhead line route corridor during the breeding season in 2018.

1.2 Site Description

The Project Site is in the townland of Cush approximately 4 km north of Birr, Co. Offaly at approximate ITM coordinates 608237, 709946 (refer to **Appendix D Figure 1)**. The habitats within the Project Site are dominated by conifer plantations of varying age classes (c.327 ha), cutaway bog (c.102 ha) and agricultural grasslands (ca. 327 ha). The Project Site is not designated for nature conservation.

1.3 Terminology

For this report, "flight line" refers to the line drawn to record avian movement during a Vantage Point (VP) survey. A single flight line may be used to indicate the collective movement of a flock of birds. Each individual bird moving within the same flight line is referred to as "a flight". Note that the "cumulative number of flights" reflects the occupancy of the study area by a particular species. It is not equivalent to the total number of unique individuals and should not be used to infer abundance.

1.4 Purpose of the Report

This report outlines the surveys undertaken and methods used. It then summarises the survey data obtained and provides descriptions of the legal and conservation status of the species recorded.

The assessment of impacts resulting from the proposed development and the development of mitigation measures, if required, are beyond the scope of this report and are covered in a separate Environmental Impact Assessment (EIA) report and Natura Impact Statement (NIS).

1.5 Relevant Legislation

Legislation relevant to this report includes the EC Birds Directives and the Wildlife Act (1976, as amended). Birds listed under Annex I of the Birds Directive are described in Section 5.0

[1] SLR (2018) *Cloghan Wind Farm and Long Oak Wind Farm Breeding Bird Survey Report 2018*. Prepared for Galetech Energy Services Ltd

and are afforded strict protection at the European and national level. All Irish birds are protected by the Wildlife Act.

2.0 Methodology

2.1 Scope of Work

The scope of survey work during the non-breeding season was based on knowledge of the Project Site acquired during the previous bird surveys, a desk-based review and access to lands within and surrounding the red line boundary. It also considered current NatureScot (NS; formerly Scottish Natural Heritage, SNH) Guidance[2]. The details of the scope of work are provided in Table 2-1. Further details are provided in sections 2.3 to 2.5, including study areas and target species.

Table 2-1: Scope of Ornithological Work October 2023-March 2024

Survey Type	Summary Methodology
Vantage Point (VP) Surveys	Thirty-six hours of surveys (spread out as evenly as possible across the survey period) were carried out from a single VP between October 2023 and March 2024 inclusive.
Feeding Distribution Surveys	Feeding distribution surveys were carried out on a twice-monthly basis to search for swans and/or geese using the fields for foraging within 500 m of the Project Site.

NS guidance states that "*it is generally considered the passerine species are not significantly impacted by wind farms*". It goes on to state that "*survey of woodland passerines, especially in commercial conifer forest is generally not required*". The only exception is if the desk study identifies that the Project Site is in a key area for a Schedule 1 woodland passerine species. As Schedule 1 refers to UK legislation, it is prudent to assume that passerines red-listed under the latest Birds of Conservation Concern in Ireland (BoCCI) scheme[3] should be considered as equivalent. No such species were returned during the desk-based review or data request. NS guidance also states that "*surveys of farmland passerines especially on more intensive arable habitat are generally not required*". Based on the above, while not the targets, any red-listed passerines were recorded as incidental species during other surveys.

2.2 Desk-based Review

The desk review collated any available information to date on the breeding and non-breeding bird populations and movements around the Project Site.

The following reports resulting from previous breeding and non-breeding bird surveys were reviewed for any relevant information that could be used to inform the current bird surveys:

- SLR (2018) Cloghan Wind Farm and Long Oak Wind Farm Breeding Bird Survey Report 2018;
- SLR (2020) Cush Wind Farm Breeding Bird Survey Report 2020;
- SLR (2022) Cush Wind Farm Winter Bird Survey Report 2020-2021;
- SLR (2022) Cush Wind Farm Breeding and Winter Bird Survey Report 2021-2022;
- SLR (2022) Cush Wind Farm Breeding Bird Survey Report 2022; and
- SLR (2023a) Cush Wind Farm Non-Breeding Bird Survey Report 2022-2023; and

[2] Scottish Natural Heritage (2017). *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms V2.* Scottish Natural Heritage, Inverness.

[3] Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 2020–2026. Irish Birds 43: 1–22

- SLR (2023b) Cush Wind Farm Breeding Bird Survey Report 2023.

The websites of the National Parks and Wildlife Service (NPWS)[4], the UK and Ireland Bird Atlas 2007-2011[5] and the National Biodiversity Data Centre (NBDC)[6] were also accessed for information on sites designated for nature conservation in the vicinity of the Project Site.

2.3 Flight Activity Surveys

A single VP location ("VP 3") was used for the current suite of surveys. The name reflects the fact that three VP locations were used from the start of the 2022 breeding season to survey a bigger area than currently considered here.

The adequacy of this VP was checked by carrying out a desk-based viewshed analysis using a bespoke GIS tool for calculating the visible area from the VP. The Zone of Theoretical Visibility (ZTV) from the VP was calculated using ArcMAP 10.5.1 Spatial Analyst using a terrain model derived from EU-DEM data with a vertical accuracy of ± 7 m. The ZTV was calculated with a surface offset of 28 m and is based on a viewing height of 1.8 m above ground level. The VP, viewshed and viewing arc is shown in **Appendix D Figure 1**.

Six hours of watches were undertaken at VP3 per month (October-March), culminating in a total of 36 hours of watches during the survey period. Survey start times ranged from 07:50 to 15:10 (with the latest survey finishing at 18:10).

Full details of survey dates, times and observers are provided in **Appendix A** and details of weather conditions during the surveys are provided in **Appendix B**.

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined below) within the study area.

The main purpose of VP watches is to collect data on primary target species that will enable estimates to be made of:

- The time spent flying over the Project Site;
- The relative use by birds of different parts of the Project Site;
- The proportion of flying time spent within the provisional upper and lower risk height limits as determined by the potential rotor diameter and rotor hub height; and
- Ultimately, the analysis of the potential risk of collision of birds with rotating turbines.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Duration of flying bout;
- Species, age and sex (where determinable);
- Number of birds observed;
- Time spent within each height band and;
- Notes on observation.

Recording height bands were determined based on the likely turbine specifications under consideration at the time of survey (upper tip height 200 m and lower tip height 28 m). Flight heights were attributed to four distinct height bands as follows:

[4] www.npws.ie (last accessed April 2024)

[5] https://app.bto.org/mapstore/StoreServlet (last accessed April 2024)

[6] http://maps.biodiversityireland.ie/#/Map (last accessed April 2024)

- 1 = < 20 m (below the likely rotor swept area);
- 2 = 20 m to 150 m (potentially within the likely rotor swept area, at least in part);
- 3 = 150 m to 200 m (potentially within the likely rotor swept area);
- 4 = >200 m (above the likely rotor swept area).

In addition, a summary of observations of secondary target species was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within the Project Site, in accordance with current NS guidance. Data collected on secondary species included:

- The five-minute period start and end time;
- Species;
- Number of birds observed;
- If flying, the height band in which birds were observed flying;
- Whether birds were observed onsite, in the 500 m buffer or beyond;
- Flight behaviour; and
- Notes on observation.

Target Species

Target species for the surveys were defined by legal and/or conservation status and vulnerability to impacts caused by wind turbines, as defined in NS guidance.

2.3.1 Primary Target Species

The list of primary target species was limited to species upon which effects are most likely to be potentially significant in EIA and Appropriate Assessment (AA) terms e.g., species forming qualifying features for nearby Special Protection Areas (SPAs) or species listed on Annex I of the Birds Directive[7]. This enabled recording to focus on the species of greatest importance without the distraction of having to record detailed flight data for a larger number of more common species.

Primary target species included the following bird species:

- All Annex I raptor/owl species;
- Qualifying interest species for nearby SPAs[8]; and
- Other raptors, waders or wildfowl red-listed on the latest Birds of Conservation Concern in Ireland (BoCCI)[3] scheme.

2.3.2 Secondary Species

Local circumstances may indicate that survey information should also be acquired on other species, especially those of regional conservation concern. Such species are termed secondary species. Recording of secondary species is subsidiary to recording of primary target species.

Secondary species included:

[7] Annex I of the Birds Directive (Directive 2009/147/EC)

[8] The relevant SPAs are listed in Section 3.1.

- Any other wildfowl and wader species that are not primary species;
- All gull species that are not primary species;
- Common buzzard *Buteo buteo;*
- Eurasian sparrowhawk *Accipiter nisus*;
- Northern raven *Corvus corax*;
- Grey heron *Ardea cinerea*; and
- Great cormorant *Phalacrocorax carbo.*

2.4 Feeding Distribution Surveys

NS guidance recommends that for whooper swan *Cygnus cygnus*, Greenland white-fronted goose *Anser albifrons flavirostris* and other geese species, feeding distribution surveys should be undertaken in areas of suitable habitat when the survey area lies within the core foraging distance of SPAs or other major roosts for these species, unless it can be established from existing data that the area is not utilised for feeding. As there are SPAs for swans and geese located close to the Project Site, feeding distribution surveys were undertaken.

A buffer of at least 500 m around the Project Site was used for these surveys, which were undertaken by driven transects twice per month, stopping on a regular basis to check all fields for goose and swan feeding activity. The driven transect also covered areas beyond 500 m from the Project Site to inform the locations of other potential Project infrastructure. All areas within the Project Site were visible from the driven transect.

Full details of survey dates, times and observers are provided in **Appendix A,** details of weather conditions during the surveys are provided in **Appendix B** and the transect route is shown in **Appendix D Figure 3.1**.

2.5 Survey Limitations

Most flight activity surveys were undertaken in optimal weather conditions. However, during the winter period it is inevitable that some surveys were completed in suboptimal conditions. There were 9 hours out of the total of 36 during which the visibility was recorded as “moderate”, i.e. 1-3 km. This comprises 25% of the total survey effort but in almost all cases all the relevant 2 km viewing arc was visible.

2.6 Project Team

Details of the project team are described below with those involved in field surveys only described in Section 2.6.1.

Dr Jonathon Dunn (JD) MA (Cantab.) MSc PhD MCIEEM – Project Manager, Technical Reviewer & Approver

Jonathon is an Associate Ecologist with SLR and holds an MA (Cantab.) in Zoology from Homerton College, Cambridge, an MSc in Ecology, Evolution and Conservation from Imperial College London, and a PhD in avian ecology from Newcastle University. He is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has worked in the environmental sector since 2014. He has experience as a project manager on many wind farm developments throughout Ireland. Jonathon conducted the technical review and approvals of this report.

Aisling Kinsella (AK) BSc (Hons) MSc – Project Manager and Report Author

Aisling is a Senior Ecologist with SLR and holds a BSc in Zoology from University College Cork and an MSc in Wildlife Management and Conservation from University College Dublin. Aisling has three years' experience with breeding and non-breeding bird surveys (vantage point surveys, breeding wader and raptor surveys, winter feeding and distribution surveys, goose roost and winter hen harrier *Circus cyaneus* surveys). She is also involved with project management, report writing and technical reviews, survey scheduling and training new staff in bird survey work. Aisling assisted Jonathon as project manager for Cush Wind Farm and she is the author of this report.

2.6.1 Field Survey Team

Darragh Nagle – Project Ecologist

Darragh graduated from University College Cork in 2020 with a BSc degree in Ecology and Environmental Ecology. Since joining SLR Darragh's field experience includes multiple bird surveys on windfarm sites across Ireland with experience in VP, breeding wader, breeding raptor, feeding distribution, hen harrier roost and intertidal bird surveys. Darragh is a qualifying member of CIEEM.

Hugo Brooks (HB) – Graduate Ecologist

Hugo is a Graduate Ecologist with SLR. Hugo has a BSc (Hons) in Zoology from University College Dublin. Hugo's first professional role in ecology was as a temporary consultant ecologist with Scott Cawley Ltd. (March – October 2022), where he gained experience in bat surveys, bat call analysis and breeding bird surveys. Since joining SLR, Hugo has worked on multiple renewable energy projects. He has carried out various bird surveys including vantage point, breeding wader, breeding raptor, hen harrier, swan and goose feeding/distribution and intertidal surveys. Hugo has also gained experience in bat transect surveys, bat roost potential surveys and general walkover habitat surveys.

Michael James (MJ) – Graduate Ecologist

Michael is a Graduate Ecologist with SLR. Michael holds a BA (Hons) in Zoology from Trinity College Dublin. Since starting at SLR, Michael has been involved in various surveys. These include bird surveys (vantage point and breeding raptor) and bat transects for wind farms. He has also conducted bat emergence surveys and habitat surveys for other projects.

(Ray Browne) – Subcontractor

Ray is an experienced bird surveyor who has worked on multiple wind farm projects in Ireland.

3.0 Results

3.1 Desk-based Review

3.1.1 Species Records

Species records collated via desk-based review are shown in **Appendix E.**

3.1.2 Natura 2000 Sites

The Project Site is not within or immediately adjacent to any SPA. However, there are a total of seven SPAs within a 20 km[9] radius with details shown in **Table 3-1**.

Table 3-1: SPAs within 20 km of the Project Site and their Qualifying Interests

Site Name	Site Code	Distance/Direction from Site Boundary	Qualifying Interest Species Relevant to the Non-Breeding Season
Dovegrove Callows SPA	004137	1.5 km southwest	• Greenland white-fronted goose
All Saints Bog SPA	004103	3.1 km west	• Greenland white-fronted goose
River Little Brosna Callows SPA	004086	3.1 km west	• Whooper swan • Wigeon *Anas penelope* • Teal *Anas crecca* • Pintail *Anas acuta* • Shoveler *Anas clypeata* • Golden plover *Pluvialis apricaria* • Lapwing *Vanellus vanellus* • Black-tailed godwit *Limosa limosa* • Black-headed gull *Chroicocephalus ridibundus* • Greenland white-fronted goose
Middle Shannon Callows SPA	004096	6.6 km northwest	• Whooper swan • Wigeon • Golden plover • Lapwing • Black-tailed godwit • Black-headed gull
Slieve Bloom Mountains SPA	004160	11.7 km east	• Hen harrier
River Suck Callows SPA	004097	17.3 km northwest	• Whooper swan • Wigeon • Golden plover • Lapwing • Greenland white-fronted goose
Lough Derg (Shannon) SPA	004058	17.5 km southwest	• Great cormorant • Tufted duck *Aythya fuligula* • Goldeneye *Bucephala clangula*

[9] A 20 km search radius was used as this represents the maximum core foraging distance used by Qualifying Interest species of SPAs in the UK and Ireland

3.1.3 Other Nature Conservation Sites

The Project Site is not within or immediately adjacent to any Natural Heritage Area (NHA) or proposed NHA (pNHA). However, there are a total of 14 NHAs and 50 pNHAs within a 20 km radius, with details shown in **Table 3-2**.

River Little Brosna Callows NHA is located 1.65 km west of the Project Site and is the only NHA within a 20 km radius which is designated for its bird populations. The site is of importance for wintering swans, geese and other wetland birds.

The Project Site is not within or immediately adjacent to any Ramsar site. The Slieve Bloom Mountains Ramsar site is located 11.7 km east of the Project Site and is contained within the boundaries of the Slieve Bloom Mountains SPA.

Table 3-2: NHAs and pNHAs within 20 km of the Project Site and their Qualifying Interests (Sites Designated for Ornithological Qualifying Interests Only)[10]

Site Name	Site Code	Distance/Direction from Project Site Boundary	Qualifying Interests Relevant to the Non-Breeding Season
Woodville Woods pNHA	000927	0.02 km south	• Common snipe *Gallinago gallinago*
River Little Brosna Callows NHA	000564	1.65 km west	• Winter birds (as listed in Table 3-1 for SPA of same name)
Lough Nahinch (Tipperary) pNHA	000936	13.95 km southwest	• Winter migratory birds
Roscrea Bog pNHA	000583	18.82 km southeast	• Common snipe • Eurasian curlew *Numenius arquata*
Pallas Lough pNHA		19.37 km northeast	• Mallard *Anas platyrhynchos* • Eurasian teal • Eurasian wigeon • Western marsh harrier *Circus aeruginosus*

[10] Only pNHAs that do not overlap with SPAs are shown.

3.2 Flight Activity Surveys

Flight lines of primary target species recorded at the proposed wind farm site throughout the 2023/24 non-breeding season are presented in **Appendix D Figures 2.1** to **2.5** and a summary of the survey findings are provided in Sections 3.2.1 and 3.2.2 for primary and secondary target species, respectively. Flight data for both primary and secondary target species are provided in **Appendix C** with full data retained in GIS and excel format for subsequent collision risk modelling, if required.

3.2.1 Primary Target Species

Flight activity recorded is summarised in **Table 3-3**.

Table 3-3: Number of Primary Target Species Flights

Species	Number of flight lines by month						Total no. of flight lines	Time at risk height* (s)	Cumulative no. of flights
	October	November	December	January	February	March			
Common kestrel *Falco tinnunculus*	0	0	2	0	2	4	8	240	9
Hen harrier	0	0	1	0	1	0	2	0	2
Northern lapwing	0	0	0	0	2	4	6	120	28
Peregrine falcon *Falco peregrinus*	0	0	0	0	1	0	1	0	1
* precautionary risk height assumed to be between 25 – 200 m									

A summary of flight activity by species is presented below.

3.2.1.1 Common kestrel

Eight flight lines of common kestrel were recorded during the flight activity surveys (**Appendix D Figure 2.3**). All flight lines were of a single flight except for one flight line in March which consisted of a pair of flights. Most flight lines occurred outside the 500 m buffer.

3.2.1.2 Hen harrier

Two flight lines of hen harrier were recorded during the flight activity surveys, each consisting of a single flight (**Appendix D Figure 2.2**). Both flight lines occurred within the 500 m survey buffer but below potential collision risk height.

3.2.1.3 Northern lapwing

There were six flight lines of northern lapwing recorded (**Appendix D Figure 2.4**). The peak number of flights per flightline was 17 with activity focused around turbine T10.

3.2.1.4 Peregrine falcon

One flight line of peregrine falcon was recorded during the flight activity surveys (**Appendix D Figure 2.5**). This consisted of a single flight, occurred within the 500 m buffer but below potential collision risk height.

3.2.2 Secondary Species

Secondary species activity at the Project Site is summarised in **Table 3-4**.

Table 3-4: Secondary Species Activity Summary

Species	Number of 5 min periods recorded	Peak count of birds recorded in any 5 min period	Comments
Common buzzard	1	1	Activity in March within the buffer & beyond
Great cormorant	1	1	Activity in March within the Project Site, buffer & beyond
Grey heron	1	1	Activity in December within the Project Site, buffer & beyond
Greylag goose	1	9	Activity in March within the buffer
Mallard	1	4	Activity in February within the Project Site, buffer & beyond
Northern raven	9	3	Activity in October & November within the Project Site, buffer & beyond

3.2.3 Incidental records of other species

During the VP surveys, incidental records were made of other species with a legal or conservation status of concern. The only incidental record was of a single Irish hare *Lepus timidus subsp. hiberncus* on the site in February. Irish hare is protected by the Wildlife Act 1976, as amended.

3.3 Feeding Distribution Surveys

There were no records of geese during the feeding distribution surveys including at Dovegrove Callows SPA.

There were no swan observations recorded within 500 m of the Project Site. All swan observations were restricted to Dovegrove Callows SPA, located c.4 km southwest of the Project Site. Swan observations are detailed in **Table 3-5** below.

Records of other important species (i.e. QI wildfowl/wader species of any designated site, Annex I wildfowl/waders or any red- or amber-listed wildfowl/waders) are detailed in **Table 3-6** below. The transect route and observation locations are shown in **Appendix D Figure 3.1** to **3.8**.

Table 3-5: Records of swans during the feeding distribution surveys

Date	Species	No. of birds	Closest Location
27/11/2023	Whooper swan	4	Dovegrove Callows (c. 4 km SW)
26/02/2024	Mute swan *Cygnus olor*	2	Dovegrove Callows (c. 4 km SW)
01/03/2024	Mute swan	1	Dovegrove Callows (c. 4 km SW)
11/03/2024	Whooper swan	5	Dovegrove Callows (c. 4 km SW)

Table 3-6: Records of other target wildfowl/wader species during the feeding distribution surveys

Date	Species	No. of birds	Location
01/03/2024 11/03/2024	Black-tailed godwit	375 270	Dovegrove Callows (c. 4 km SW)
11/03/2024	Great cormorant	2	Dovegrove Callows (c. 4 km SW)
12/02/2024	Little egret *Egretta garzetta*	2	Dovegrove Callows (c. 4 km SW)
29/01/2024 12/02/2024	Mallard	10 4	Dovegrove Callows and peatland near N62 road (>1.5 km N)
27/11/2023	Northern lapwing	400	Dovegrove Callows (c. 4 km SW)
01/03/2024 11/03/2024	Wigeon	26 18	Dovegrove Callows (c. 4 km SW)

3.3.1 Incidental records of other species

During the feeding distribution surveys, incidental records were made of non-wildfowl/wader secondary target bird species. The following species were observed:

- Common buzzard;
- Common gull *Larus canus*;
- Common kestrel;
- Eurasian sparrowhawk;
- Grey heron;
- Hen harrier;
- Herring gull *Larus argentatus*;
- Northern raven; and
- Peregrine falcon.

The observation locations of common gull, hen harrier, kestrel and peregrine falcon are shown in **Appendix D Figure 3.2.**

4.0 Summary and Conclusions

Flight activity (or VP) surveys and feeding distribution surveys were carried out at the Project Site during the non-breeding bird season 2023/24.

The following primary target species were recorded during flight activity surveys:

- Common kestrel;
- Greylag goose;
- Hen harrier;
- Northern lapwing; and
- Peregrine falcon.

The most frequent flight activity was by common kestrel (n=8), followed by northern lapwing (n=6) and hen harrier (n=2).

While these results indicate low collision risk for primary target species at the Project Site, these results should be interpreted cumulatively with previous data collected at the Project Site.

The following primary target species were recorded during feeding distribution surveys:

- Whooper swan; and
- Mute swan.

No swans or geese were recorded in proximity to the Project Site, which accords with all previous survey results carried out to date. Wildfowl and waders were found mainly near Dovegrove Callows SPA, which is c. 4 km from the Project Site.

The following incidental spp. were recorded during feeding distribution surveys:

- Black-tailed godwit;
- Great cormorant;
- Little egret;
- Mallard;
- Northern lapwing; and
- Wigeon.

5.0 Legal and Conservation Status of Target Species Recorded

Table 5-1 summarises the legal and conservation status of the target species recorded during the range of ornithology surveys mentioned above. All birds are protected by the Wildlife Acts 1976 (as amended) in Ireland.

Table 5-1: Legal and Conservation Status of Target Species

Primary or Secondary Target	Species (BTO Code)	Legal & Conservation Status in Ireland
Primary	Common kestrel (K.)	BoCCI4 Red
	Greylag goose (GJ)	BoCCI4 Amber (non-domestic)
	Hen harrier (HH)	Annex I; BoCCI4 Amber
	Mute swan (MS)	BoCCI4 Amber
	Northern lapwing (L.)	BoCCI4 Red
	Peregrine falcon (PE)	Annex I; BoCCI4 Green
	Whooper swan (WS)	Annex I; BoCCI4 Amber
Secondary/ Incidental	Black-tailed godwit (BW)	BoCCI4 Red
	Common buzzard (BZ)	BoCCI4 Green
	Common gull (CM)	BoCCI4 Amber
	Eurasian sparrowhawk (SH)	BoCCI4 Green
	Great cormorant (CA)	BoCCI4 Amber
	Grey heron (H.)	BoCCI4 Green
	Herring gull (HG)	BoCCI4 Amber
	Little egret (ET)	Annex I; BoCCI4 Green
	Mallard (MA)	BoCCI4 Amber
	Northern raven (RN)	BoCCI4 Green
	Wigeon (WN)	BoCCI4 Amber

Appendix A Survey Dates, Times and Surveyors[11]

Bird Survey Report Non-Breeding Season 2023/24

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065092.00001

21 August 2026

[11] Surveyors initials can be found in Section 2.6

Table A-1: Details of VP surveys undertaken from Vantage Point 3

Date	Surveyor	Start (hh:mm)	End (hh:mm)	Survey Duration (hh:mm)
03/10/2023	MJ	15:10	18:10	03:00
18/10/2023	MJ	10:20	13:20	03:00
21/11/2023	MJ	12:40	15:40	03:00
23/11/2023	MJ	07:50	10:50	03:00
18/01/2024	DN	09:31	12:31	03:00
29/01/2024	DN	12:52	15:52	03:00
12/02/2024	MJ	12:00	15:00	03:00
26/02/2024	MJ	14:20	17:20	03:00
01/03/2024	MJ	11:20	14:20	03:00
11/03/2024	MJ	08:50	11:50	03:00
05/12/2023	RB	13:00	16:00	03:00
30/12/2023	RB	13:10	16:10	03:00
Total Hours				**36:00**

Table A-2: Details of feeding distribution surveys

Date	Surveyor	Start (hh:mm)	End (hh:mm)	Survey Duration (hh:mm)
03/10/2023	MJ	11:35	13:55	02:20
18/10/2023	MJ	14:05	16:20	02:15
15/11/2023	HB	10:00	12:38	02:38
27/11/2023	HB	08:45	11:15	02:30
18/01/2024	DN	12:33	15:00	02:27
29/01/2024	DN	10:23	12:50	02:27
12/02/2024	MJ	09:20	11:55	02:35
26/02/2024	MJ	11:30	13:50	02:20
01/03/2024	MJ	09:05	11:10	02:05
11/03/2024	MJ	11:55	14:00	02:05
05/12/2023	RB	08:50	12:14	03:24
30/12/2023	RB	09:14	12:48	03:34
Total Hours				**30:40**

Appendix B Weather Data

Bird Survey Report Non-Breeding Season 2023/24

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065092.00001

21 August 2026

Table B-1: Weather data collected during flight activity surveys undertaken at VP3

Date	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
03/10/2023	15:10	18:10	1	4	W	0	5	2	2	0	0	15
03/10/2023	15:10	18:10	2	4	W	2	5	1	2	0	0	15
03/10/2023	15:10	18:10	3	4	W	2	7	2	2	0	0	13
18/10/2023	10:20	13:20	1	4	E	3	8	1	2	0	0	12
18/10/2023	10:20	13:20	2	4	E	3	8	1	2	0	0	12
18/10/2023	10:20	13:20	3	4	E	3	8	1	2	0	0	13
21/11/2023	12:40	15:40	1	2	NW	0	6	2	2	0	0	9
21/11/2023	12:40	15:40	2	2	W	0	7	2	2	0	0	9
21/11/2023	12:40	15:40	3	2	W	0	7	2	2	0	0	9
23/11/2023	07:50	10:50	1	3	W	0	8	1	2	0	0	11
23/11/2023	07:50	10:50	2	4	W	0	8	1	2	0	0	11
23/11/2023	07:50	10:50	3	4	W	0	8	2	2	0	0	11
18/01/2024	09:31	12:31	1	1	NW	0	1	2	2	0	2	-6
18/01/2024	09:31	12:31	2	1	NW	0	1	2	2	0	2	-3
18/01/2024	09:31	12:31	3	1	NW	0	1	2	2	0	2	-1
29/01/2024	12:52	15:52	1	2	N	0	8	2	2	0	0	5
29/01/2024	12:52	15:52	2	2	N	0	8	2	2	0	0	5
29/01/2024	12:52	15:52	3	2	N	0	7	2	2	0	0	5
12/02/2024	12:00	15:00	1	4	SW	2	5	1	2	0	0	7



Date	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
12/02/2024	12:00	15:00	2	4	SW	0	4	2	2	0	0	7
12/02/2024	12:00	15:00	3	4	SW	0	4	1	2	0	0	7
26/02/2024	14:20	17:20	1	3	N	0	5	2	2	0	0	8
26/02/2024	14:20	17:20	2	3	N	0	3	2	2	0	0	8
26/02/2024	14:20	17:20	3	3	N	0	1	2	2	0	0	7
01/03/2024	11:20	14:20	1	3	N	3	8	1	1	1	0	2
01/03/2024	11:20	14:20	2	2	N	2	8	1	1	1	0	2
01/03/2024	11:20	14:20	3	3	N	0	8	1	2	0	0	3
11/03/2024	08:50	11:50	1	2	SW	0	8	1	1	0	0	7
11/03/2024	08:50	11:50	2	2	W	0	8	1	1	0	0	8
11/03/2024	08:50	11:50	3	2	SW	0	8	1	1	0	0	8
05/12/2023	13:00	16:00	1	1	NW	0	4	2	2	0	0	6
05/12/2023	13:00	16:00	2	1	NW	0	4	2	2	0	0	6
05/12/2023	13:00	16:00	3	1	NW	0	4	2	2	0	0	5
30/12/2023	13:10	16:10	1	3	S	0	4	2	2	0	0	5
30/12/2023	13:10	16:10	2	3	S	0	4	2	2	0	0	6
30/12/2023	13:10	16:10	3	3	S	0	4	2	2	0	0	6

Cloud Cover	**Visibility**	**Lying Snow**	**Frost**
Expressed in oktas (n/8)	Poor (<1km) 0	None 0	None 0
Cloud Height	Moderate (1-3km) 1	On site 1	Ground 1

Date	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
Height of cloud above average height of viewshed <150m 0 150-500m 1 >500m 2			Good (>3km) 2				On higher ground 2			All day 2		

Table B-2: Weather data collected during feeding distribution surveys

Date	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
03/10/2023	11:35	13:55	1	5	W	0	3	2	2	0	0	15
03/10/2023	11:35	13:55	2	4	W	0	4	2	2	0	0	15
03/10/2023	11:35	13:55	3	4	W	2	6	1	1	0	0	15
18/10/2023	14:05	16:20	1	4	E	2	8	2	2	0	0	13
18/10/2023	14:05	16:20	2	4	E	3	8	1	2	0	0	13
18/10/2023	14:05	16:20	3	4	E	3	8	1	2	0	0	13
15/11/2023	10:00	12:38	1	3	W	0	1	2	2	0	0	8
15/11/2023	10:00	12:38	2	3	W	0	4	2	2	0	0	10
15/11/2023	10:00	12:38	3	3	W	0	7	2	2	0	0	10

Date	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
27/11/2023	08:45	11:15	1	2	NW	1	8	1	1	0	0	8
27/11/2023	08:45	11:15	2	2	NW	0	5	2	2	0	0	8
27/11/2023	08:45	11:15	3	3	N	0	3	2	2	0	0	8
18/01/2024	12:33	15:00	1	1	NW	0	1	2	2	0	2	-1
18/01/2024	12:33	15:00	2	1	NW	0	1	2	2	0	2	-1
18/01/2024	12:33	15:00	3	1	NW	0	1	2	2	0	2	-1
29/01/2024	10:23	12:50	1	2	N	0	8	2	2	0	0	4
29/01/2024	10:23	12:50	2	2	N	1	8	2	2	0	0	4
29/01/2024	10:23	12:50	3	2	N	1	8	2	2	0	0	4
12/02/2024	09:20	11:55	1	4	SW	0	3	2	2	0	0	4
12/02/2024	09:20	11:55	2	4	SW	1	6	1	2	0	0	5
12/02/2024	09:20	11:55	3	4	SW	0	6	1	2	0	0	6
26/02/2024	11:30	13:50	1	3	N	0	2	2	2	0	0	7
26/02/2024	11:30	13:50	2	4	N	0	4	2	2	0	0	8
26/02/2024	11:30	13:50	3	3	N	0	5	2	2	0	0	8
01/03/2024	09:05	11:10	1	4	W	2	8	1	2	0	1	2
01/03/2024	09:05	11:10	2	3	W	2	8	1	1	0	1	2
01/03/2024	09:05	11:10	3	3	N	3	8	1	1	1	0	2
11/03/2024	11:55	14:00	1	2	W	0	8	1	2	0	0	9
11/03/2024	11:55	14:00	2	2	W	0	8	1	2	0	0	9



Date	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
11/03/2024	11:55	14:00	3	2	W	0	8	1	2	0	0	9
05/12/2023	08:50	12:14	1	1	NW	0	3	2	2	0	0	4
05/12/2023	08:50	12:14	2	1	NW	0	3	2	2	0	0	5
05/12/2023	08:50	12:14	3	1	N	0	3	2	2	0	0	5
30/12/2023	09:14	12:48	1	3	S	0	4	2	2	0	0	5
30/12/2023	09:14	12:48	2	3	S	0	4	2	2	0	0	6
30/12/2023	09:14	12:48	3	3	S	0	4	2	2	0	0	6

Appendix C Flight Activity Survey Data[12]

Bird Survey Report Non-Breeding Season 2023/24

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065092.00001

21 August 2026

[12] The key to BTO Codes can be found in Section 5.0.

Primary Target Species

Table C-1: Primary target species recorded during flight activity surveys undertaken at VP3

Date	Flight ID	BTO Code	Num. Birds	Age [13]	Sex[14]	Obs. Time	Avg. flight height (m)	Flight time (s)
12/02/2024	1	PE	1	AD	U	12:03	13	61
12/02/2024	2	L.	17	U	U	12:16	9	24
12/02/2024	3	HH	1	AD	M	13:21	5	127
12/02/2024	4	K.	1	U	U	13:36	15	17
12/02/2024	5	K.	1	U	U	14:25	17	29
26/02/2024	1	L.	3	AD	U	16:21	22	85
01/03/2024	1	K.	1	AD	M	13:25	14	26
01/03/2024	2	K.	2	U	U	13:32	30	79
01/03/2024	3	K.	1	AD	M	13:47	16	64
01/03/2024	4	K.	1	AD	M	14:13	23	97
11/03/2024	1	L.	2	AD	U	08:57	4	19
11/03/2024	2	L.	1	AD	U	09:01	5	65
11/03/2024	3	L.	4	AD	U	09:11	21	42
11/03/2024	4	L.	1	AD	U	09:58	16	58
05/12/2023	1	K.	1	Juv	U	13:35	40	40
05/12/2023	2	HH	1	Juv	F	14:08	10	77
05/12/2023	3	K.	1	AD	M	15:20	35	112

Secondary Target Species

Table C-4: Secondary target species recorded during flight activity surveys undertaken at VP3

Date	Survey Start	Survey End	5 min period	BTO Code	Count
03/10/2023	15:10	18:10	15:15	H.	1
03/10/2023	15:10	18:10	16:10	RN	1
03/10/2023	15:10	18:10	17:35	RN	1
18/10/2023	10:20	13:20	12:50	H.	1
18/10/2023	10:20	13:20	13:05	H.	1
21/11/2023	12:40	15:40	13:00	RN	1
21/11/2023	12:40	15:40	14:10	RN	2

[13] Age letters refer to; A=Adult, U=Unrecorded

[14] Sex letters refer to; M=Male, F=Female, U=Unrecorded

Date	Survey Start	Survey End	5 min period	BTO Code	Count
21/11/2023	12:40	15:40	14:25	RN	2
21/11/2023	12:40	15:40	14:45	RN	3
21/11/2023	12:40	15:40	14:50	RN	3
23/11/2023	07:50	10:50	08:40	RN	2
23/11/2023	07:50	10:50	09:30	H.	1
23/11/2023	07:50	10:50	09:35	H.	1
23/11/2023	07:50	10:50	10:15	RN	1
18/01/2024	09:31	12:31	11:50	H.	1
29/01/2024	12:52	15:52	13:40	H.	2
12/02/2024	12:00	15:00	11:55	H.	1
12/02/2024	12:00	15:00	14:00	H.	1
12/02/2024	12:00	15:00	14:15	H.	1
26/02/2024	14:20	17:20	15:20	H.	1
26/02/2024	14:20	17:20	17:00	MA	4
01/03/2024	11:20	14:20	12:45	H.	1
01/03/2024	11:20	14:20	13:15	H.	1
01/03/2024	11:20	14:20	13:30	BZ	1
11/03/2024	08:50	11:50	11:25	GJ	9
11/03/2024	08:50	11:50	08:45	H.	1
11/03/2024	08:50	11:50	11:45	CA	1
05/12/2023	13:00	16:00	14:21	H.	1

Table C-5: Secondary target species recorded during feeding distribution surveys

Date	BTO Code	Count	Observation time	Notes
03/10/2023	RN	2	11:55	Flying over bog
03/10/2023	RN	7	12:28	Circling over field
03/10/2023	K.	1	13:25	Disappeared into field
15/11/2023	BZ	1	10:10	Perched in tree
27/11/2023	H.	2	09:35	
27/11/2023	L.	400	10:52	Dovegrove Callows
27/11/2023	BZ	1	11:10	
18/01/2024	H.	1	12:45	
18/01/2024	K.	1	13:20	Chasing corvid
18/01/2024	BZ	1	13:50	Perched on pole, flew N
29/01/2024	MA	10	11:15	8M/ 2F. Flew into site

Date	BTO Code	Count	Observation time	Notes
12/02/2024	ET	2	10:38	
12/02/2024	HG	21	10:40	
12/02/2024	MA	4	10:41	
26/02/2024	H.	1	11:35	
26/02/2024	BZ	1	11:38	Calling from trees
26/02/2024	BZ	1	11:57	
26/02/2024	BZ	1	13:17	
01/03/2024	WN	26	10:31	
01/03/2024	BW	375	10:32	
01/03/2024	H.	1	11:09	
11/03/2024	BW	270	12:56	
11/03/2024	H.	1	12:58	
11/03/2024	SH	2	13:00	
11/03/2024	WN	18	13:00	
11/03/2024	CA	2	13:10	
11/03/2024	BZ	1	13:50	
05/12/2023	K.	1	NA	Juvenile
05/12/2023	H.	1	NA	Juvenile
05/12/2023	K.	1	NA	
05/12/2023	CM	3	NA	
05/12/2023	SH	1	NA	
05/12/2023	BZ	1	NA	
05/12/2023	HH	1	NA	Ringtail
30/12/2023	BZ	1	NA	
30/12/2023	BZ	1	NA	
30/12/2023	K.	1	NA	Juvenile
30/12/2023	BZ	1	NA	
30/12/2023	H.	1	NA	
30/12/2023	PE	1	NA	

Appendix D Figures

Bird Survey Report Non-Breeding Season 2023/24

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065092.00001

21 August 2026

608000

610000

712000

N

Site Boundary

Turbine Location 500 m Buffer

Turbine Location

Vantage Point (VP) Location

Vantage Point 2 km Viewing Arc

Theoretical Visibility from VP3

Note: The ZTV is calculated with a surface offset of 28m and from a viewing height of 1.8m above ground level. The terrain model is derived from EU-DEM data with a vertical accuracy of ± 7m. The ZTV was calculated using ArcMAP 10.5.1 software.



3

L3006

Gairos Cross Roads

L3003

L1092

N62

N52

Derryad ED

Eglish ED

Mountlerin ED

Boonmarig River

Tullamore Road

0 1 2

Kilometres

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CUSH WIND FARM

WINTER BIRD SURVEYS

VANTAGE POINTS AND VIEWSHEDS

FIGURE 1

Scale 1:15,000 @ A3

Date AUGUST 2026

501.065723.00001.0022.0 VP Locations and Viewsheds

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607000 608000 609000 610000

712000 711000 710000

N

LEGEND

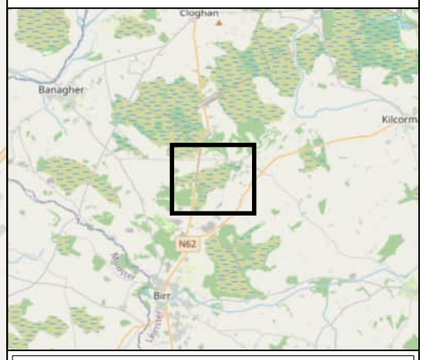
Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Black-Headed Gull



0 0.5 1

Kilometres

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CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES
BLACK-HEADED GULL

FIGURE 2.1

Scale 1:12,500 @ A3

Date AUGUST 2026

501.065723.00001.0019.0 VP Flightlines

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607000 608000 609000 610000

712000 711000 710000

N

LEGEND

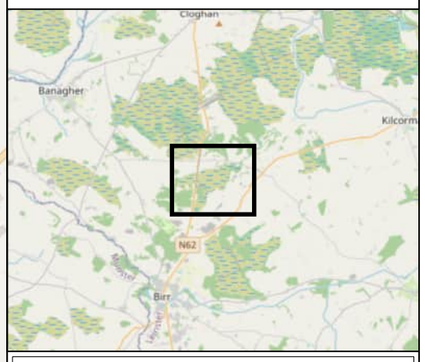
Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Little Egret



0 0.5 1

Kilometres

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CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES
LITTLE EGRET

FIGURE 2.2

Scale 1:12,500 @ A3

Date AUGUST 2026

501.065723.00001.0019.0 VP Flightlines

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607000 608000 609000 610000

712000

711000

710000

N

LEGEND

Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Kestrel

0 0.5 1

Kilometres

501.065723.00001.0019.0 VP Flightlines

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CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES KESTREL

FIGURE 2.3

Scale 1:12,500 @ A3

Date AUGUST 2026

607000 608000 609000 610000

712000

711000

710000

N

LEGEND

Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Lapwing

0 0.5 1

Kilometres

501.065723.00001.0019.0 VP Flightlines

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BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES LAPWIND

FIGURE 2.4

Scale 1:12,500 @ A3

Date AUGUST 2026

607000 608000 609000 610000

712000

711000

710000

501.065723.00001.0019.0 VP Flightlines

N

LEGEND

Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Mallard



0 0.5 1

Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES MALLARD

FIGURE 2.5

Scale 1:12,500 @ A3

Date AUGUST 2026

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607000 608000 609000 610000

712000 711000 710000

N

LEGEND

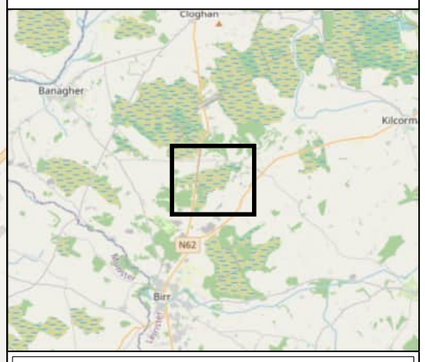
Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Snipe



0 0.5 1

Kilometres

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CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES
SNIPE

FIGURE 2.6

Scale 1:12,500 @ A3

Date AUGUST 2026

501.065723.00001.0019.0 VP Flightlines

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607000 608000 609000 610000

712000

711000

710000

501.065723.00001.0019.0 VP Flightlines

N

LEGEND

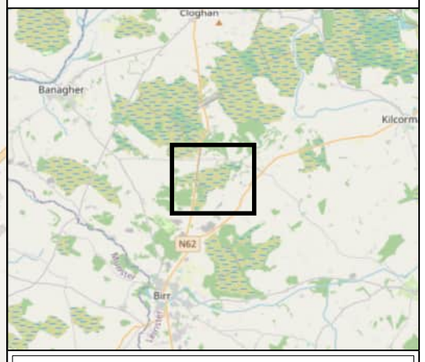
Site Boundary

Site Infrastructure 500 m Buffer

Turbine Location

Species Flightline

Teal



0 0.5 1

Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

VANTAGE POINT FLIGHTLINES TEAL

FIGURE 2.7

Scale 1:12,500 @ A3

Date AUGUST 2026

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605000
607500
610000
712500
710000

N

B16
B16
B16
B16
B16
B16
B16
BZ
BZ
BZ
PE
A
B
C
D
E
F
G
H

0
1
2
Kilometres

LEGEND

Site Boundary
Site Infrastructure At Time Of Survey 2 km Buffer
Turbine Location
Raptor Vantage Point (rVP)
Driven Transect Route

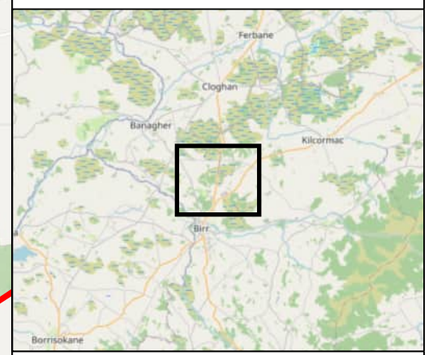
Raptor Record (Labelled with Behaviour Code)

Buzzard
Buzzard Breeding Territory
Peregrine

Raptor Flightline

Buzzard
Kestrel

Breeding Raptor Behaviour Codes: B16
- Present in Suitable Habitat



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BIRD SURVEY REPORT
BREEDING SEASON 2023

BREEDING RAPTORS

FIGURE 3

Scale 1:25,000 @ A3

Date AUGUST 2026

501.065723.00001.0020.0 Breeding Raptors

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606250
607500
608750
711250
710000

B16
B2
B16
B16
B2
B16
B16

N

LEGEND

Site Boundary

Site Infrastructure At Time Of Survey 500 m Buffer

Turbine Location

Walked Transect Route

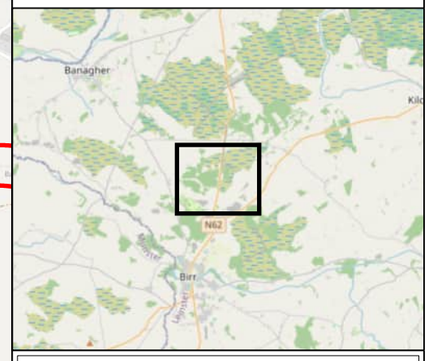
Wader Species Record (Labelled with Behaviour Code)

Lapwing

Ringed Plover

Snipe

Breeding Wader Behaviour Codes:
B2 - Courtship or Display Behaviour Seen, Including Copulation
B16 - Present in Suitable Habitat



0
0.5
1
Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

BREEDING WADERS

FIGURE 4

Scale 1:12,500 @ A3

Date JULY 2026

501.065723.00001.0021.0 Breeding Waders

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606250
607500
608750
711250
710000

N

LEGEND

- Site Boundary
- Site Infrastructure At Time Of Survey 500 m Buffer
- Turbine Location
- Kingfisher River Surveyed (Labelled with Section)

1&2
3
4
5
5



0
0.5
1
Kilometres

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BIRD SURVEY REPORT
BREEDING SEASON 2023

KINGFISHER SURVEY RESULTS

FIGURE 5

Scale 1:12,500 @ A3

Date AUGUST 2026

501.065723.00001.0023.0 Kingfisher Survey Results

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Appendix E Species Records

Bird Survey Report Non-Breeding Season 2023/24

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065092.00001

21 August 2026

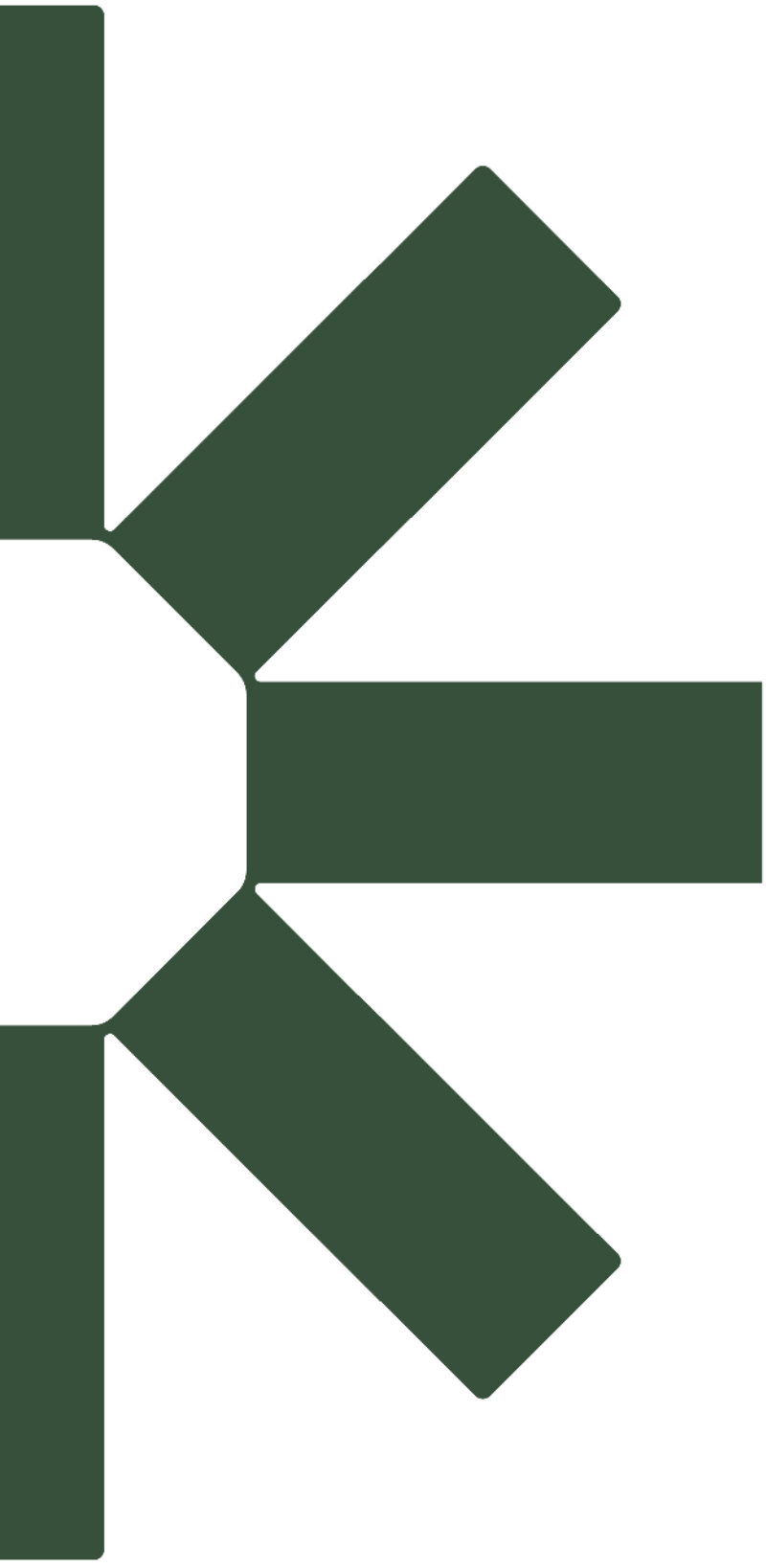
The NBDC database was searched for records of bird species within the 10 km grid squares which overlap the Project Site (N00 and N01). All bird species are protected under the Wildlife Acts (1976, as amended) but for the purposes of this report, only records of species that are Red or Amber-listed in Birds of Conservation Concern in Ireland or listed under Annex I of the Birds Directive are included in the results. Only records within the last 10 years are considered within this report as older records are unlikely to be relevant. Details of the results are shown in Table E-1**.**

Table E-1: Species recorded within the 10 km grid squares N00 and N01 (Species Present During the Non-Breeding Season)

Species name	Season	Grid square	Last Record Year	Designation
Barn owl *Tyto alba*	Breeding	N01	2019	BoCCI4 Red
Black-headed gull	Breeding and wintering	N01	2022	BoCCI4 Amber
Common gull	Breeding and wintering	N00	2019	BoCCI4 Amber
Common kestrel	Breeding	N00, N01	2023	BoCCI4 Red
Common kingfisher *Alcedo atthis*	Breeding	N00, N01	2022	Annex I, BoCCI4 Amber
Common linnet *Linaria cannabina*	Breeding	N00, N01	2019	BoCCI4 Amber
Common pochard *Aythya ferrina*	Breeding and wintering	N00, N01	2019	BoCCI4 Red
Common redshank *Tringa totanus*	Breeding and wintering	N00	2019	BoCCI4 Red
Common snipe	Breeding and wintering	N01	2022	BoCCI4 Red
Common starling *Sturnus vulgaris*	Breeding	N00, N01	2019	BoCCI4 Amber
Dunlin *Calidris alpina*	Breeding and wintering	N00, N01	2019	BoCCI4 Red
Eurasian curlew	Breeding and wintering	N01	2019	BoCCI4 Red
Eurasian skylark *Alauda arvensis*	Breeding	N01	2019	BoCCI4 Amber
Eurasian teal	Breeding and wintering	N00, N01	2019	BoCCI4 Amber
Eurasian wigeon	Breeding and wintering	N00, N01	2019	BoCCI4 Amber
European golden plover	Breeding and wintering	N01	2019	Annex I, BoCCI4 Red
Gadwall *Mareca strepera*	Breeding and wintering	N00, N01	2019	BoCCI4 Amber
Hen harrier	Breeding	N01	2014	BoCCI4 Amber

Species name	Season	Grid square	Last Record Year	Designation
House sparrow *Passer domesticus*	Breeding	N00, N01	2022	BoCCI4 Amber
Little egret	Breeding and wintering	N00	2020	Annex I, BoCCI4 Green
Mallard	Breeding and wintering	N00, N01	2023	BoCCI4 Amber
Meadow pipit *Anthus pratensis*	Breeding	N00, N01	2019	BoCCI4 Red
Merlin *Falco columbarius*	Breeding	N01	2017	Annex I, BoCCI4 Amber
Mute swan	Breeding and wintering	N00, N01	2022	BoCCI4 Amber
Northern lapwing	Breeding and wintering	N00, N01	2022	BoCCI4 Red
Northern shoveler	Breeding and wintering	N00, N01	2019	BoCCI4 Red
Peregrine falcon	Breeding	N00, N01	2023	Annex I, BoCCI4 Green
Tufted duck	Breeding and wintering	N01	2018	BoCCI4 Amber
Yellowhammer *Emberiza citrinella*	Breeding	N00, N01	2021	BoCCI4 Red
Key	Season – indicates which season was assessed for each species under the Birds of Conservation Concern in Ireland[15]; Annex I – the species is listed in Annex I of the EC Birds Directive; and BoCCI4 status (green, amber or red) – indicates the current Birds of Conservation Concern in Ireland status category.			

[15] Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 2020–2026. Irish Birds 43: 1–22



Making Sustainability Happen

Bird Survey Report Breeding Season 2024

Cush Wind Farm

Cush Wind Farm Ltd

Clondargan, Stradone, Co. Cavan
Prepared by:

SLR Environmental Consulting (Ireland) Ltd

7 Dundrum Business Park, Windy Arbour, Dublin, D14 N2Y7

SLR Project No.: 501.065415.00001

Client Reference No: NA

23 September 2024

Revision: 0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
00	23 September 2024	Hugo Brooks	Dr Jonathon Dunn	Dr Jonathon Dunn
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			

Basis of Report

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Appendix A Survey Dates, Times and Observers
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1.0 Introduction

SLR Environmental Consulting (Ireland) Ltd (SLR) was commissioned by Cush Wind Farm Ltd to carry out a bird survey programme for an extension area, amenity trail and grid route (hereafter 'the Project') at a proposed wind farm at Cush, Co. Offaly during the breeding season of 2024. The purpose of this report is to describe these surveys and the resulting ornithological baseline.

1.1 Background to the Commission

No previous planning permission has been sought on the Project Site for the development of wind farms by Cush Wind Farm Ltd or any other party.

Bird surveys have been previously undertaken at the proposed wind farm development site at Cush, Co. Offaly (hereafter 'the Project Site') by SLR for the breeding 2020, non-breeding 2020/21, breeding 2021, non-breeding 2021/22, breeding 2022, non-breeding 2022/23, breeding 2023 and non-breeding 2023/24 seasons.

Previous surveys have focused on a larger study area. Any reference to proposed turbines other than T9 to T11 refer to those part of a separate scheme.

1.2 Site Description

The Project Site is located in the townland of Cush approximately 4 km north of Birr, Co. Offaly at approximate ITM coordinates 608237, 709946 (Appendix D Figure 1). The survey area of this suite of surveys targets an extension area of three turbines, linear grid route and amenity route. The habitats within the Project Site and are dominated by conifer plantations of varying age classes, cutaway bog and agricultural grasslands. A small section of the amenity route is within Lough Coura pNHA; however, this site is not designated for any bird species.

1.3 Terminology

For this report, "flight line" refers to the line drawn to record avian movement during a woodcock survey. A single flight line may be used to indicate the collective movement of a flock of birds. Each individual bird moving within the same flight line is referred to as "a flight".

1.4 Purpose of Report

This report outlines the surveys undertaken and methods used. It then summarises the survey data obtained and provides descriptions of the legal and conservation status of the species recorded.

The assessment of impacts resulting from the proposed development and the development of mitigation measures, if required, are beyond the scope of this report and are covered in a separate Environmental Impact Assessment (EIA) report and Natura Impact Statement (NIS).

1.5 Relevant Legislation

Legislation relevant to this report includes the EC Birds Directives and the Wildlife Act (1976, as amended). Birds listed under Annex I of the Birds Directive are described in Section 5.0 and are afforded strict protection at the European and national level. All Irish birds are protected by the Wildlife Act.

2.0 Methodology

2.1 Scope of Work

The scope of survey work during the breeding season was based on knowledge of the Project Site acquired during the previous bird surveys, a desk-based review and access to lands within and surrounding the Project Site. It also considered current NatureScot (NS; formerly Scottish Natural Heritage, SNH) Guidance[1]. The details of the scope of work are provided in **Table 2-1**. Further details are provided in Section 2.3 including study areas and target species.

Table 2-1: Scope of Ornithological Survey Work April to July 2024

Survey Type	Summary Methodology
Breeding Raptor Surveys	Four breeding raptor surveys were carried out within the period of 29th April to 17th July to search for potential raptor nesting territories within a 2 km radius of the Project Site.
Breeding Wader Surveys	Three lowland wader surveys were carried out within the period of 30th April to 5th June to search for waders breeding in suitable habitat within a 500 m buffer of the Project Site.
Breeding Woodcock Surveys	Three breeding woodcock surveys per survey target area were carried out within the period of the 9th of May to 18th of June to search for breeding woodcock territories within suitable woodland areas within and nearby the Project Site.

NS guidance states that "*it is generally considered the passerine species are not significantly impacted by wind farms*". It goes on to state that "*survey of woodland passerines, especially in commercial conifer forest is generally not required*". The only exception is if the desk study identifies that the Project Site is in a key area for a Schedule 1 woodland passerine species. As Schedule 1 refers to UK legislation, it is prudent to assume that passerines red-listed under the latest Birds of Conservation Concern in Ireland (BoCCI) scheme[2] should be considered as equivalent. No such species were returned during the desk-based review or data request. NS guidance also states that "*surveys of farmland passerines especially on more intensive arable habitat are generally not required*". Based on the above, while not the targets, any red-listed passerines were recorded as incidental species during other surveys.

2.2 Desk-based Review

The desk review collated any available information to date on the breeding and non-breeding bird populations and movements around the Project Site.

The following reports resulting from previous breeding and non-breeding bird surveys were reviewed for any relevant information that could be used to inform the current bird surveys:

- SLR (2018) Cloghan Wind Farm and Long Oak Wind Farm Breeding Bird Survey Report 2018;
- SLR (2020) Cush Wind Farm Breeding Bird Survey Report 2020;
- SLR (2022) Cush Wind Farm Winter Bird Survey Report 2020-2021;

[1] Scottish Natural Heritage (2017). *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms V2.* Scottish Natural Heritage, Inverness.

[2] Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 2020–2026. Irish Birds 43: 1–22

- SLR (2022) Cush Wind Farm Breeding and Winter Bird Survey Report 2021-2022;
- SLR (2022) Cush Wind Farm Breeding Bird Survey Report 2022;
- SLR (2023) Cush Wind Farm Non-Breeding Bird Survey Report 2022-2023;
- SLR (2023) Cush Wind Farm Breeding Bird Survey Report 2023; and
- SLR (2024) Cush Wind Farm Migration Survey Report 2024.

The websites of the National Parks and Wildlife Service (NPWS)[3], the UK and Ireland Bird Atlas 2007-2011[4] and the National Biodiversity Data Centre (NBDC)[5] were also accessed for information on sites designated for nature conservation in the vicinity of the Project Site.

2.3 Field Surveys

2.3.1 Project Team: Evidence of Technical Competence and Experience

2.3.1.1 Jonathon Dunn (JD) – Project Manager and Lead Ornithologist

Jonathon is an Associate Ornithologist with SLR and holds a BA (Hons) in Natural Sciences from the University of Cambridge, an MSc in Ecology Evolution and Conservation from Imperial College London and a PhD in Avian Ecology from Newcastle University. He is a Full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Jonathon is a highly skilled and experienced bird surveyor with eight years' post graduate experience as a professional consultant ecologist. Jonathon managed this project through liaison with the client, coordination of the survey team, supervision of the health and safety of the team, collating, quality controlling and assessing the survey data. He also undertook the technical and approval review for this report.

2.3.1.2 Darragh Nagle (DN) – Project Ecologist

Darragh is a Project Ecologist and graduated from University College Cork in 2020 with a BSc degree (Hons) in Ecology and Environmental Ecology. He is a qualifying member with CIEEM. Since joining SLR Darragh's field experience includes multiple diverse bird surveys on windfarm sites across Ireland with experience in vantage point, breeding wader, breeding raptor, feeding distribution, hen harrier roost *Circus cyaneus* and intertidal bird surveys. Darragh carried out breeding raptor and breeding wader surveys at the Project.

2.3.1.3 Adrian Allen

Adrian Allen is a sub-contractor with experience of carrying out a wide array of bird surveys for onshore wind farm projects including among others, vantage point, breeding wader, breeding raptor, and feeding distribution surveys. Adrian has a lifetime experience of birdwatching.

2.3.2 Breeding Raptor Surveys

The survey methodology for breeding raptors used a driven transect, with regular stops, to carry out watches of suitable habitat from appropriate viewpoints to identify potential nesting territories. A total of four unique stops were made along the transect around the targeted survey area, overlooking potentially suitable breeding habitat. The amenity route (within cutover bog) was walked to survey for evidence of merlin. The locations of these viewpoints

[3] www.npws.ie (last accessed August 2024)
[4] https://app.bto.org/mapstore/StoreServlet (last accessed August 2024)
[5] http://maps.biodiversityireland.ie/#/Map (last accessed August 2024)

are presented in Appendix D Figure 2.1 together with the outline of the survey route and the results of the surveys. Suitable breeding habitat differs for each raptor species[6].

Table 2-2 provides a summary of the potentially suitable raptor habitats within the 2 km buffer zone of the Site and the approximate locations of these in relation to the viewpoints used during the survey.

Breeding peregrine falcons have been previously observed at Loughnane Quarry. A raptor viewpoint was located at this location (rVP3) to survey for evidence of breeding of this species.

Potentially suitable barn owl breeding structures were surveyed during the 2023 breeding season, with no evidence of breeding found. Therefore, no structures were targeted this year.

Table 2-2: Potentially Suitable Habitats for Breeding Raptors within the Study Area

Raptor Viewpoint	Habitat Type Visible	Target Raptor Species Potentially Present
rVP1	Lowland cutover bog, conifer plantation (non-pre-thicket), treelines & broadleaf woodland	Common kestrel *Falco tinnunculus*, red kite *Milvus milvus*, common buzzard, *Buteo buteo* Eurasian sparrowhawk *Accipiter nisus*, hen harrier, merlin *Falco columbarius*
rVP2	Lowland cutover bog & conifer plantation (pre-thicket and non-pre-thicket)	Common kestrel, common buzzard, Eurasian sparrowhawk, hen harrier & merlin
rVP3	Edge of quarry, broadleaf woodland, conifer plantation (pre-thicket and non-pre-thicket) & treelines	Peregrine falcon *Falco peregrinus,* common kestrel, common buzzard, hen harrier, red kite, Eurasian sparrowhawk & merlin
rVP4	Edge of quarry, lowland cutover bog, conifer plantation (non-pre-thicket), broadleaf woodland & treelines	Peregrine falcon Common kestrel, common buzzard, Eurasian sparrowhawk, hen harrier, red kite, Eurasian sparrowhawk, merlin

Evidence of breeding was assessed using BTO criteria replicated in **Table 2-3** below and amended as required for any species-specific criteria (e.g. for hen harrier) as outlined in Hardey et al. (2013)[6].

Table 2-3: Breeding Evidence criteria according to BTO

Non-breeding	
F	Flying over
M	Species observed but suspected to be still on migration
U	Species observed but suspected to be summering non-breeder
Possible breeder	
H	Species observed in breeding season in suitable nesting habitat
S	Singing male present (or breeding calls heard) in breeding season in suitable breeding habitat
Probable breeding	
P	Pair observed in suitable nesting habitat in breeding season

[6] Hardey, J., Crick, H.Q.P., Wernham, C., Riley, H., Etheridge, B., Thompson, D. (2013). Raptors: A field guide for surveys and monitoring (3rd Edition). The Stationery Office Edinburgh.

Non-breeding	
T	Permanent territory presumed through registration of territorial behaviour (song etc) on at least two different days a week or more part at the same place or many individuals on one day
D	Courtship and display (judged to be in or near potential breeding habitat; be cautious with wildfowl)
N	Visiting probable nest site
A	Agitated behaviour or anxiety calls from adults, suggesting probable presence of nest or young nearby
I	Brood patch on adult examined in the hand, suggesting Incubation
B	Nest building or excavating nest-hole
Confirmed breeding	
DD	Distraction-display or injury feigning
UN	Used nest or eggshells found (occupied or laid within period of survey)
FL	Recently fledged young (nidicolous species) or downy young (nidifugous species). Careful consideration should be given to the likely provenance of any fledged juvenile capable of significant geographical movement. Evidence of dependency on adults (e.g. feeding) is helpful. Be cautious, even if the record comes from suitable habitat.
ON	Adults entering or leaving nest-site in circumstances indicating occupied nest (including high nests or nest holes, the contents of which cannot be seen) or adults seen incubating
FF	Adult carrying faecal sac or food for young
NE	Nest containing eggs
NY	Nest with young seen or heard

2.3.3 Breeding Wader Surveys

Lowland breeding wader surveys followed an adapted version of the methodology described in O'Brien & Smith[7], as recommended by NS guidance. Lowland breeding wader surveys were conducted in the grasslands in the western section of the Project Site and the bog in the eastern section of the Project Site. The surveys involved a walked transect which covered all habitat potentially suitable for breeding waders within the Project Site and 500 m buffer, where accessible.

The location, movement and behaviour of all wader species were recorded onto field maps using standard BTO species codes. The following criteria was recorded for each species:

- Northern lapwing *Vanellus vanellus* – the total numbers of birds seen from the transect;
- Common snipe *Gallinago gallinago* – the number of drumming plus chipping birds heard or seen from the transect; and
- Other species – the number of pairs (where 'pairs' = (paired individuals/2), displaying birds, nests or broods and other single birds not in flocks).

7 O'Brien & K. W. Smith (1992) Changes in the status of waders breeding on wet lowland grasslands in England and Wales between 1982 and 1989, Bird Study, 39:3, 165-176

The breeding status of waders recorded during surveys was evaluated against the criteria set out in Gilbert et al. (2021)[8] and BTO[9] for wader surveys.

Birds were confirmed breeding if:

- Nests, eggs, or young were located;
- Adults repeatedly alarm called;
- Distraction displays were seen; and
- Territorial disputes were observed.

Birds were probably breeding if:

- They were observed displaying or singing on more than one visit;
- A pair was seen in suitable nesting habitat in the breeding season;
- Courtship was seen in or near suitable breeding habitat;
- They were observed visiting a probable nest site;
- Agitated behaviour or anxiety calls were observed; and
- A pair of birds was observed in suitable habitat for nesting.

Birds were possibly breeding if:

- They were observed displaying or singing on one visit in suitable breeding habitat; and
- A single bird was observed in the breeding season in suitable nesting habitat.

Other records were considered to be of non-breeding birds, failed breeders, birds loafing, feeding or on passage to other areas.

Please see Appendix D Figure 2 for an outline of the walked transect and Appendices A and B for metadata relating to these surveys.

2.3.4 Breeding Woodcock Surveys

Breeding woodcock *Scolopax rusticola* surveys followed an adapted version of the methodology described by the University College Cork (UCC) Woodcock Research Group[10]

Three survey visits were undertaken at least one week apart between 1st May and 30th June on dry and calm evenings following UCC methodology. Surveys commenced 15 mins before sunset and finished 60 mins after sunset, and a thermal imaging camera was used to aid detection of woodcock.

Transects were surveyed in areas with suitable breeding Eurasian woodcock habitat. These transects were along the amenity route, and in areas nearby the extension area and grid route.

Target notes were recorded on the number of woodcock heard or seen and habitat type. In addition, flight lines were recorded where possible and flight heights were assigned to 5 m flight height bands.

- 1 = < 5 m (below the likely rotor swept area);

[8] Gilbert et al. (1998). Bird Monitoring Methods. RSPB, UK.

[9] https://www.bto.org/our-science/projects/birdatlas/methods/breeding-evidence [Last Accessed 18/09/2024]

[10] https://www.ucc.ie/en/ornithology/projects/woodcock-phd/step2/ [last accessed 09/09/2024]

- 2 = 5 m to 10 m (below the likely rotor swept area);
- 3 = 10 m to 15 m (below the likely rotor swept area);
- 4 = 15 m to 20 m below the likely rotor swept area);
- 5 = 20 m to 25 m (below the likely rotor swept area);
- 6 = 25m to 30 m (potentially within the likely rotor swept area).

Other incidental species of note were also recorded.

Please see Appendix D Figure 4 for an outline of the walked transects and Appendix A and Appendix B for metadata relating to these surveys.

2.4 Survey Limitations

No significant limitations were present during surveys. Not all areas of potentially suitable raptor habitat within the 2 km search area could be viewed from public roads due to lack of access; however, the areas closest to the Project Site could be and so the areas potentially most likely to be affected by the Project could be surveyed.

3.0 Results

3.1 Desk-based review

3.1.1 Natura 2000 Sites

The amenity route, grid route and extension area are not within or immediately adjacent to any Special Protection Areas (SPAs). All SPAs within 20 km (area and their qualifying interest species) of the amenity route, grid route and extension area are presented in T**able 3-1** below.

Table 3-1: SPAs within 20 km of the Amenity Route, Grid Route and Extension Area and their Qualifying Interests

Site Name	Site Code	Distance / Direction from Amenity Route	Distance / Direction from Grid Route	Distance / Direction from Extension Area	Qualifying Interest Species Relevant to the Breeding Season
Dovegrove Callows SPA	004137	3.9 km southwest	1.0 km southwest	3.6 km southwest	N/A
All Saints Bog SPA	004103	5.1 km southwest	3.1 km northwest	5.1 km west	N/A
Middle Shannon Callows SPA	004096	5.3 km northwest	7.0 km northwest	7.2 km northwest	Corncrake *Crex crex* Northern lapwing
River Little Brosna Callows SPA	004086	6.1 km west	3.2 km west	5.9 km west	N/A
Slieve Bloom Mountains SPA	004160	12.4 km southeast	13.4 km southeast	13.4 km southeast	Hen harrier
River Suck Callows SPA	004097	15.3 km northwest	17.7 km northwest	17.2 km northwest	N/A
Mongan Bog SPA	004017	17.1 km northwest	>20 km	19.0 km northwest	Common snipe
Lough Derg (Shannon) SPA	004058	19.7 km southwest	16.7 km southwest	19.5 km southwest	Great cormorant *Phalacrocorax carbo* Tufted duck *Aythya fuligula* Common tern *Sterna hirundo*

3.1.1.1 Other Nature Conservation Sites

A small section of the amenity route is within Lough Coura pNHA, this site is not designated for any bird species.

All other NHAs and pNHAs (and their qualifying interest species) within 20 km of the amenity route, grid route and extension area are presented in **Table 3-2**.

Table 3-2: NHAs and pNHAs within 20 km of the Amenity Route and their Qualifying Interests (Sites Designated for Ornithological Qualifying Interests Only)[11]

Site Name	Site Code	Distance/Direction from Amenity Route	Distance/Direction from Grid Route	Distance/Direction from Extension Area	Qualifying Interests Relevant to the Breeding Season
Woodville Woods pNHA	000927	2.2 km south	0.1 km southeast	0.9 km south	Common snipe
River Little Brosna Callows NHA	000564	6.1 km west	3.2 km west	6.1 km west	Peatlands [4] Birds [12] There are no QIs for the breeding season for the SPA of the same name, which is likely true for the NHA also.
Lough Nahinch (Tipperary) pNHA	000936	17.3 km southwest	15.1 km southwest	15.1 km southwest	Common redshank Common snipe Water rail *Rallus arquaticus*
Roscrea Bog pNHA	000583	18.82 km southeast	>20 km	>20 km	Common snipe Eurasian curlew
Pallas Lough pNHA	000916	19.1 km northeast	> 20 km	18.3 km northeast	Mallard *Anas platyrhynchos* Eurasian teal *Anas crecca* Eurasian wigeon *Mareca penelope* Western marsh harrier *Circus aeruginosus*

[11] Only pNHAs and NHAs that do not overlap with SPAs are shown.

Site Name	Site Code	Distance/Direction from Amenity Route	Distance/Direction from Grid Route	Distance/Direction from Extension Area	Qualifying Interests Relevant to the Breeding Season
Lough Nanag Esker pNHA	000910	> 20 km	19.98 km northwest	>20 km	Wildfowl (site synopsis does not include season of relevance)

3.2 Breeding Raptor Surveys

Two species of raptor were recorded during the four breeding raptor surveys. The following species accounts provide summary details of the target raptor species encountered during the 2024 surveys. The results of the breeding raptor survey, with the rVPs and species locations, can be found in Appendix D Figure 2.

3.2.1 Common buzzard

A total of six common buzzard observations were made across the four breeding raptor surveys with a peak count of one bird. Three of these observations were of a common buzzard within suitable breeding habitats. As per BTO breeding criteria (presented in **Table 2-3**), this suggests possibly breeding buzzards were present. Of these three observations, one was made within the extension area, another approximately 600 m southwest of the extension area, and another 500 m north of the amenity route.

3.2.2 Common kestrel

A single observation of common kestrel was made in each of the four breeding raptor surveys. All observations were made of a single bird displaying hunting behaviours. Three of these observations were of kestrels in suitable breeding habitat, which is evidence of possible breeding according to the BTO (see **Table 2-3**). These observations of possible breeding kestrel were made approximately 750 m north of the grid route and approximately 1 km southwest of the extension area

3.2.3 Incidental recordings

3.2.3.1 Gulls

During the breeding raptor survey in June, aggressive behaviour of black-headed gulls *Larus ridibundus* (attacking surveyor) was recorded on the lake approximately 300 m north of the amenity route. Flocks of black-headed gulls were repeatedly recorded on this lake during breeding raptor surveys, with a peak count of 26 birds. According to BTO criteria (see **Table 2-3**), these behaviours suggest the probable breeding of black-headed gulls on this lake.

A flock of forty-six lesser black-backed gulls *Larus fuscus* were recorded resting on the lake north of amenity route during the breeding raptor survey in July. No evidence of breeding lesser black-backed gulls was observed.

3.2.3.2 Waders / Wildfowl

A single northern lapwing was recorded flying over the Project Site in April. No evidence of breeding was recorded for this species during the breeding raptor surveys.

Common snipe were observed on two occasions. In April, two birds were observed flying directly over the amenity route in a north-easterly direction. In June, a single common snipe

was recorded drumming immediately adjacent and flying over the amenity route. According to the criteria set out in section 2.3.3, this behaviour is evidence of possible breeding nearby to the amenity route.

A single Eurasian curlew was recorded flying south of the amenity route during the April breeding raptor survey. No evidence of breeding was observed.

A pair of great crested grebes *Podiceps cristatus* were recorded on the lake approximately 400 m north of the amenity route phase during the breeding raptor survey in May. According to BTO criteria (see **Table 2-3**), this pair in suitable breeding habitat is evidence of probable breeding. As this was the only observation of this species, confirmed breeding of this species is considered unlikely.

Mallards were recorded on two occasions. During the April survey, a pair of mallards (one male, one female) were observed flying over the amenity route. During the survey in May, breeding behaviours were observed. Seven mallards were recorded on the lake north of the amenity route, five of which were juveniles (with an adult male and adult female). This observation of downy young is evidence of confirmed breeding for this species according to BTO criteria (see **Table 2-3**).

There were no red listed passerines recorded during the breeding raptor surveys.

3.3 Breeding Wader

The following species accounts provide summary details of the target wader species encountered during the 2024 surveys. The results of the breeding wader survey, with the transect routes and species locations, can be found in Appendix D Figure 3.

3.3.1 Common snipe

Common snipe were recorded during the breeding wader surveys of April and May. During the survey in April, two separate observations were made of a common snipe in suitable breeding habitat, immediately adjacent to the amenity route. A further observation was made of a pair of common snipe in April in suitable breeding habitat in close proximity to the amenity route, within the survey buffer. This is evidence of probable breeding occurring according to the criteria set out in section 2.3.3. A single bird was observed flying directly over the amenity route during the survey in May.

3.3.2 Little egret *Egretta garzetta*

Little egrets were observed in May and June. Of these observations one individual was recorded foraging approximately 300 m northeast of the amenity route. This observation meets the criteria of a possible breeder according to the criteria set out in section 2.3.3.

3.3.3 Northern lapwing

Three northern lapwings were recorded during the breeding wader survey of April. Three birds were observed foraging in suitable breeding habitat within the extension area, east of the amenity route. Northern lapwing have been observed to be probably breeding in this area during the breeding season of 2022 and 2023. This is evidence of probable breeding occurring within the extension area according to the criteria set out in section 2.3.3.

3.3.4 Incidental Recordings

A common buzzard was recorded flying over in April.

Black-headed gulls were recorded during each of the breeding wader surveys. A peak count of thirty black-headed gulls were observed in May in the lake north-east of the amenity route. This is assumed to be the probable breeding colony reported in section 3.2.3.1.

Evidence of breeding mallards was recorded during the breeding wader survey in May. A flock of eleven mallards, consisting of five adults (three males, two females) and six juveniles were recorded approximately 250 m the grid route. According to BTO criteria (outlined in **Table 2-3**), this observation of downy young is evidence of confirmed breeding. Other observations of mallard were made which did not indicate any breeding behaviours.

A single great white egret *Ardea alba* was recorded foraging on the lake north-east of the amenity route. There was no evidence of breeding observed.

3.3.4.1 Amber / Red-listed[2] Passerines

There were no red-listed passerines recorded during the breeding wader surveys.

The following amber-listed species were recorded: barn swallow *Hirundo rustica*, house martin *Delichon urbicum*, linnet *Linaria cannabina*, and willow warbler *Phylloscopus trochilus*.

Barn swallows were recorded one occasion, during the breeding wader survey in April. A flock of over twenty birds were observed within the 500 m extension area buffer. No evidence of breeding was found for this species.

Flocks of house martins ranging from over twenty to over thirty were observed flying near the prospective location of turbine T10 during two breeding wader surveys. Suitable house martin nesting habitat is present in buildings approximately 900 m north of turbine T10.

Willow warblers were recorded during each of the breeding wader surveys. This species was recorded in the same area (along amenity route), in suitable nesting habitat during the breeding wader survey of April and May. These observations were of three to four birds. According to the BTO criteria outlined in **Table 2-3**; this suggests possible breeding.

Three linnets were recorded nearby suitable breeding habitat during the breeding wader survey of April within the extension area, nearby to T10. According to BTO criteria (see **Table 2-3**) this is evidence of probable breeding.

3.4 Breeding Woodcock Surveys

3.4.1 Eurasian Woodcock

A total of 58 Eurasian woodcock observations were recorded across all the breeding woodcock surveys. Of these observations, 43 were roding flight lines (all consisting of a single male). Other observations included ten recordings of calling Eurasian woodcocks, two flight lines consisting of two males interacting in the air, and three non-roding flight lines.

Details of recorded Eurasian woodcock flightlines are presented in Appendix C and Appendix D and a summary of Eurasian woodcock flight activity is displayed below in **Table 3-3**.

Displaying or ‘roding’ Eurasian woodcocks were observed at each of the targeted transect areas. Roding flightlines were most frequently recorded at transect B, with 25 of the 43 (58.14%) recorded roding flight lines recorded over the bog woodland in this area (approximately 450 m north of the grid route and over 2 km from the extension area). The highest number of roding flight lines recorded during a single survey was also made the transect B, with a total of 10 roding flight lines. The abundance and frequency of breeding behaviours observed in this area, suggests a breeding territory is present.

The frequency of and abundance of roding flightlines recorded over the conifer plantation during the A transect suggests a probable breeding territory to be present here. Most of these flight lines were within 500 m of the extension area buffer.

A possible breeding territory could also be present in the conifer plantation which was surveyed during transect C. Roding flightlines were recorded during consecutive surveys, all within the amenity route buffer.

The total flight time of all the Eurasian woodcock flight lines was 960 seconds, and 31.25% of this flight time was at potential collision risk heights. This data can be used for collision risk modelling if required.

See Appendix D Figure 4 for the locations of all Eurasian woodcock flight lines.

Table 3-3: Summary of the Breeding Woodcock Surveys

Transect Route	Number of Roding Flight Lines*			Total No. of Roding Flight Lines	Total No. of all Flight Lines	Time at risk height**(s)
	Survey 1	Survey 2	Survey 3			
A	4	3	1	8	9	30
B	10	8	7	25	28	105
C	6	2	0	8	9	165
Total				**41**	**46**	**300**

* all roding flight lines were of an single male bird

** precautionary risk height assumed to be between 28 – 200 m

3.4.2 Incidental Species

Further evidence of breeding black-headed gulls on the lake north of amenity route was recorded during a breeding woodcock survey in May. Approximately 80 black-headed gulls were observed on the lake, within the 500 m amenity route buffer. This is assumed to be the same colony reported in sections 3.2.3.1 and 3.3.4.

Common snipe were recorded in multiple breeding woodcock surveys, across all transect routes. In May, an individual snipe was heard drumming within the extension area, approximately 500 m southwest of T10. According to the criteria set out in section 2.3.3 this is evidence of possible breeding occurring within the extension area. Another individual was heard drumming in June, outside of the 500 m extension area buffer.

Two recordings of snipe were made at the lake north of amenity route. One of a drumming individual and another individual chirping. Both observations were within the 500 m amenity route buffer. This is further evidence of probable evidence within the same area reported in section 3.3.1 .

A single observation of a Eurasian whimbrel *Numenius phaeopus* on migration was made in May, flying north of the amenity route; no evidence of breeding was observed.

A great white egret was recorded flying south over the amenity route in June, no breeding behaviours were recorded

4.0 Summary and Conclusions

The following ornithological surveys were carried out on the Project Site during the 2024 breeding season:

- Breeding raptor surveys;
- Breeding wader surveys; and
- Breeding woodcock surveys.

Breeding raptor surveys recorded two target species:

- Common buzzard; and
- Common kestrel.

Evidence of possible breeding for both common buzzard and common kestrel was observed. However, these species are unlikely to present a constraint to the Project as no confirmed evidence of breeding was found within the Project Site or buffer areas. All recordings of breeding behaviours for common buzzard and common kestrel were outside of the recommended disturbance free buffer of 200 m for these species[12].

Breeding wader surveys recorded three target species:

- Common snipe;
- Little egret; and
- Northern lapwing.

Observations of common snipe were made in suitable breeding habitat were made across the survey period and different survey types, providing evidence of probable breeding within the amenity route buffer and possible breeding within the extension area. Considering this, common snipe could present a constraint to the Project if any nests are nearby the amenity route or within the extension area at the time of construction. Although there is no published disturbance-free buffer for snipe during the breeding season, a 500 m separation distance is recommended, as the maximum buffer required for other wader species is 500 m[12].

A possible breeding little egret was observed in suitable breeding habitat within 500 m of the amenity, which could present a constraint to the Project if any nests are found in this area at the time of construction.

Three northern lapwings were observed in suitable breeding habitat east of the amenity route, within the extension area. This is evidence of probable breeding within the Project Site and if any nests are present, could represent a constraint to the Project at the time of construction.

A Eurasian curlew was recorded during a breeding raptor survey in April, but no confirmed breeding was observed.

Evidence of confirmed breeding Eurasian woodcock territories were observed within 500 m of all survey transects. Although there is no published disturbance-free buffer for woodcock during the breeding season, a 500 m separation distance is recommended, as the maximum buffer required for other wader species is 500 m[12]. As most roding flight lines were recorded within this 500 m buffer, these breeding woodcock territories could present a constraint to the Project if any nests are present at the time of construction. The buffer would only need to be implemented until the chicks have fledged.

[12] Goodship, N.M. and Furness, R.W. 2022. Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. A report from MacArthur Green to NatureScot.

Collision risk for Eurasian woodcock must also be considered as 31.25% of their flight activity was recorded within potential collision risk heights.

Incidental recordings of note are discussed below.

Probable breeding black-headed gulls were recorded on the lake north of the amenity route (within the 500 m buffer), across all types of surveys. A peak flock count of approximately 80 birds was recorded during a breeding woodcock survey. Considering the proximity of this probable breeding colony to the amenity trail, this species could present a constraint to the Project if present at the time of construction.

Evidence of breeding mallard ducks was observed during both breeding wader and breeding raptor surveys. During a breeding wader survey, a flock consisting of five adults and six juveniles were recorded approximately 250 m of the proposed grid route. During a breeding raptor survey, a flock of seven mallards were observed on the lake north of the amenity route, five of which were juveniles. These observations indicate that confirmed breeding is occurring nearby to the amenity route and grid route and could present a constraint to the Project if any nests are present at the time of construction.

Evidence of probable breeding willow warbler was observed along the amenity route. Similarly, linnets also displayed evidence of probable breeding within the extension area, nearby to T10. These species could present a constraint to the Project. While NS guidance generally accepts that passerines do not present major constraints to wind farm developments, it would be prudent to undertake nest checks for these species prior to construction to avoid destruction of nests until breeding has finished.

5.0 Legal and Conservation Status of Target Species Recorded

Table 5-1 summarises the legal and conservation status of the target species recorded during the range of ornithology surveys mentioned above.

Table 5-1: Legal and Conservation Status of Recorded Species

Species (BTO Code)	Legal & Conservation Status in Ireland
Barn swallow (SL)	BoCCI4 Amber
Black-headed gull (BH)	BoCCI4 Amber
Common buzzard (BZ)	BoCCI4 Green
Common kestrel (K.)	BoCCI4 Red
Common snipe (SN)	BoCCI4 Red
Eurasian curlew (CU)	BoCCI4 Red
Eurasian whimbrel (WM)	BoCCI4 Green
Great crested grebe (GG)	BoCCI4 Amber
Great white egret (HW)	Annex I; Not categorised in BoCCI4
House martin (HM)	BoCCI4 Amber
Lesser black-backed gull (LB)	BoCCI4 Amber
Little egret (ET)	Annex I; BoCCI4 Green
Mallard (MA)	BoCCI4 Amber
Northern lapwing (L.)	BoCCI4 Red
Willow warbler (WW)	BoCCI4 Amber
Key: Annex I – the species is listed in Annex I of the EC Birds Directive[13]; and BoCCI4[2] status (green, amber or red) – indicates the current Birds of Conservation Concern in Ireland status category	

[13] Annex I of the Birds Directive (Directive 2009/147/EC)

Appendix A Survey Dates, Times and Observers[14]

Bird Survey Report Breeding Season 2024

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065415.00001

23 September 2024

[14] A list of surveyor initials is provided in section 2.3.1

Table A-1: Details of Breeding Raptor Surveys

Date	Surveyor	Start (hh:mm)	End (hh:mm)	Survey Duration (hh:mm)
29/04/2024	DN	12:45	17:00	04:15
23/05/2024	DN	10:45	15:00	04:15
07/06/2024	DN	08:40	13:20	04:40
17/07/2024	DN	11:00	16:00	05:00
Total Hours				**18:10**

Table A-2: Details of Breeding Wader Surveys

Date	Surveyor	Start (hh:mm)	End (hh:mm)	Survey Duration (hh:mm)
30/04/2024 (dawn)	DN	05:20	08:12	02:52
30/04/2024 (dusk)	DN	18:35	21:30	02:55
22/05/2024 (dawn)	DN	04:35	07:35	03:00
22/05/2024 (dusk)	DN	19:22	22:03	02:41
05/06/2024 (dusk)	DN	19:45	22:45	03:00
06/06/2024 (dawn)	DN	04:20	07:20	03:00
Total Hours				**17:28**

Table A-3: Details of Breeding Woodcock Surveys Transect A

Date	Surveyor	Start (hh:mm)	End (hh:mm)	Survey Duration (hh:mm)
13/05/2024	AA	21:06	22:21	01:15
12/06/2024	AA	21:43	22:58	01:15
21/06/2024	AA	21:47	23:02	01:15
Total Hours				**03:45**

Table A-4: Details of Breeding Woodcock Surveys Transect B

Date	Surveyor	Start (hh:mm)	End (hh:mm)	Survey Duration (hh:mm)
09/05/2024	AA	21:00	22:15	01:15
05/06/2024	AA	21:37	22:52	01:15
18/06/2024	AA	21:46	23:01	01:15
Total Hours				**03:45**

Table A-5: Details of Breeding Woodcock Surveys Transect C

Date	Surveyor	Start (hh:mm)	End (hh:mm)	Survey Duration (hh:mm)
08/05/2024	AA	20:45	22:10	01:15
04/06/2024	AA	21:36	22:51	01:15
19/06/2024	AA	21:46	23:01	01:15
Total Hours				**03:45**

Appendix B Weather Data[15]

Bird Survey Report Breeding Season 2024

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065415.00001

23 September 2024

[15] Key: Rain: None = 0, light showers/snow = 2, heavy showers = 3, heavy rain/snow = 4; cloud cover: expressed in oktas (n/8); height of cloud above average height of viewshed: <150 m = 0, 150-500 m = 1, >500 m = 2; visibility: poor (<1 km) = 0, moderate (1-3 km) = 1 and good (>3 km) = 2; snow: none = 0, on site = 1, on higher ground = 2; frost: none = 0, ground = 1 and all day = 2.

Table B-1: Weather Data Collected During Breeding Raptor Surveys

Date	Survey Start	Survey End	Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
29/04/2024	12:45	17:00	1	5	W	0	6	2	2	0	0	9
29/04/2024	12:45	17:00	2	5	W	0	5	2	2	0	0	13
29/04/2024	12:45	17:00	3	4	W	0	6	2	2	0	0	13
29/04/2024	12:45	17:00	4	4	W	0	6	2	2	0	0	13
23/05/2024	10:45	15:00	1	4	NW	0	7	2	2	0	0	11
23/05/2024	10:45	15:00	2	3	NW	0	8	2	2	0	0	12
23/05/2024	10:45	15:00	3	3	NW	0	8	2	2	0	0	12
23/05/2024	10:45	15:00	4	3	NW	0	8	2	2	0	0	12
07/06/2024	08:40	13:20	1	3	W	0	7	2	2	0	0	13
07/06/2024	08:40	13:20	2	3	W	0	8	2	2	0	0	13
07/06/2024	08:40	13:20	3	3	W	1	8	2	2	0	0	13
07/06/2024	08:40	13:20	4	3	W	0	8	2	2	0	0	14
07/06/2024	08:40	13:20	5	3	W	0	8	2	2	0	0	14
17/07/2024	11:00	16:00	1	3	SW	1	8	2	2	0	0	16
17/07/2024	11:00	16:00	2	3	SW	1	7	2	2	0	0	17
17/07/2024	11:00	16:00	3	3	SW	0	7	2	2	0	0	17
17/07/2024	11:00	16:00	4	3	SW	1	8	2	2	0	0	17
17/07/2024	11:00	16:00	5	3	SW	1	8	2	2	0	0	17

Table B-2: Weather Data Collected During Breeding Wader Surveys

Date	Survey Start	Survey End	Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
30/04/2024	05:20	08:12	1	2	W	0	6	2	2	0	0	8
30/04/2024	05:20	08:12	2	2	W	0	7	2	2	0	0	9
30/04/2024	05:20	08:12	3	3	W	0	6	2	2	0	0	9
30/04/2024	18:35	21:30	1	2	W	0	3	2	2	0	0	10
30/04/2024	18:35	21:30	2	3	W	0	4	2	2	0	0	11
30/04/2024	18:35	21:30	3	2	W	0	3	2	2	0	0	11
22/05/2024	04:35	07:35	1	3	NW	1	8	2	2	0	0	8
22/05/2024	04:35	07:35	2	3	NW	0	8	2	2	0	0	8
22/05/2024	04:35	07:35	3	3	NW	0	8	2	2	0	0	9
22/05/2024	19:22	22:03	1	3	NW	0	7	2	2	0	0	11
22/05/2024	19:22	22:03	2	3	NW	2	8	2	2	0	0	12
22/05/2024	19:22	22:03	3	3	NW	1	8	2	2	0	0	12
05/06/2024	19:45	22:45	1	2	W	0	7	2	2	0	0	12
05/06/2024	19:45	22:45	2	2	W	0	6	2	2	0	0	11
05/06/2024	19:45	22:45	3	2	W	0	6	2	2	0	0	11
06/06/2024	04:20	07:20	4	2	W	0	4	2	2	0	0	8
06/06/2024	04:20	07:20	5	2	W	0	5	2	2	0	0	9
06/06/2024	04:20	07:20	6	2	W	0	5	2	2	0	0	9

Table B-3: Weather Data Collected During Breeding Woodcock Surveys Transect A

Date	Survey Start	Survey End	Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
13/05/2024	21:06	22:21	1	2	SE	0	3	2	2	0	0	13
13/05/2024	21:06	22:21	2	2	SE	0	4	2	2	0	0	11
12/06/2024	21:43	22:58	1	2	S	0	7	2	2	0	0	15
12/06/2024	21:43	22:58	2	2	S	0	7	2	2	0	0	13
21/06/2024	21:47	23:02	1	3	W	0	1	2	2	0	0	12
21/06/2024	21:47	23:02	2	2	W	0	3	2	2	0	0	10

Table B-4: Weather Data Collected During Breeding Woodcock Surveys Transect B

Date	Survey Start	Survey End	Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
09/05/2024	21:00	22:15	1	2	S	0	8	2	2	0	0	16
09/05/2024	21:00	22:15	2	2	S	0	8	2	2	0	0	15
05/06/2024	21:37	22:52	1	2	W	0	7	2	2	0	0	11
05/06/2024	21:37	22:52	2	1	W	0	8	2	2	0	0	10
18/06/2024	21:46	23:01	1	3	N	0	7	2	2	0	0	13
18/06/2024	21:46	23:01	2	3	N	0	7	2	2	0	0	13

Table B-5: Weather Data Collected During Breeding Woodcock Surveys Transect C

Date	Survey Start	Survey End	Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
08/05/2024	20:45	22:10	1	2	S	0	5	2	2	0	0	16
08/05/2024	20:45	22:10	2	2	S	0	5	2	2	0	0	15
04/06/2024	21:36	22:51	1	3	NW	0	3	2	2	0	0	10
04/06/2024	21:36	22:51	2	0	NW	0	2	2	2	0	0	7
19/06/2024	21:46	23:01	1	2	W	0	2	2	2	0	0	14
19/06/2024	21:46	23:01	2	2	W	0	2	2	2	0	0	12

Appendix C Breeding Woodcock Survey Results[16]

Bird Survey Report Breeding Season 2024

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065415.00001

23 September 2024

[16] Species BTO codes are given in Section 5.0; age: U = unidentified, Ad = adult and Juv = juvenile; sex: U = unidentified, M = male, F = female, F / I = female or immature; observation type: 1 = roding flight line, 2 = non roding flight line, 3 = heard only, 4 = two males interacting

Table C-1: Results of Breeding Woodcock surveys undertaken at Transect A

Date	Flight ID	BTO Code	No. Birds	Age	Sex	Obs. Time	Obs. Type	Flight Time (s)
13/05/2024	1	WK	1	U	M	21:30	3	-
13/05/2024	2	WK	1	U	M	21:44	3	-
13/05/2024	3	WK	1	U	M	21:48	1	15
13/05/2024	4	WK	1	U	M	21:53	1	30
13/05/2024	5	WK	1	U	M	21:55	1	30
13/05/2024	6	WK	1	U	M	21:55	1	30
13/05/2024	7	SN	1	U	M	22:14	3	-
12/06/2024	1	WK	2	U	M	22:02	4	45
12/06/2024	2	WK	1	U	M	22:40	1	15
12/06/2024	3	WK	1	U	M	22:53	1	15
12/06/2024	4	SN	1	U	M	22:55	3	-
12/06/2024	5	WK	1	U	M	22:55	1	30
21/06/2024	1	WK	1	U	M	22:37	1	45
21/06/2024	2	WK	1	U	M	22:50	3	-

Table C-2: Results of Breeding Woodcock surveys undertaken at Transect B

Date	Flight ID	BTO Code	No. Birds	Age	Sex	Obs. Time	Obs. Type	Flight Time (s)
09/05/2024	1	WK	1	U	M	21:08	3	-
09/05/2024	2	WK	1	U	M	21:13	1	15
09/05/2024	3	WK	1	U	M	21:13	1	15
09/05/2024	4	WK	1	U	M	21:14	1	15
09/05/2024	5	WK	1	U	M	21:17	1	15
09/05/2024	6	WK	1	U	M	21:23	1	15
09/05/2024	7	WK	1	U	M	21:16	1	15
09/05/2024	8	WK	2	U	M	21:32	4	30
09/05/2024	9	WK	1	U	M	21:39	1	15
09/05/2024	10	WK	1	U	M	21:42	1	15
09/05/2024	11	WK	1	U	M	21:48	1	15
09/05/2024	12	WK	1	U	M	21:52	1	15
09/05/2024	13	WK	1	U	M	22:00	3	-
09/05/2024	14	SN	1	U	U	22:14	3	-
05/06/2024	1	WK	1	U	M	21:52	1	15
05/06/2024	2	WK	1	U	M	21:52	1	15
05/06/2024	3	WK	2	U	M	22:00	2	15

Date	Flight ID	BTO Code	No. Birds	Age	Sex	Obs. Time	Obs. Type	Flight Time (s)
05/06/2024	4	WK	1	U	M	22:06	3	-
05/06/2024	5	WK	1	U	M	22:09	1	15
05/06/2024	6	WK	1	U	M	22:10	1	15
05/06/2024	7	WK	1	U	M	22:12	1	15
05/06/2024	8	WK	1	U	M	22:13	3	-
05/06/2024	9	WK	1	U	M	22:22	1	30
05/06/2024	10	WK	1	U	M	22:31	1	15
05/06/2024	11	WK	1	U	M	22:39	3	-
05/06/2024	12	WK	1	U	M	22:45	1	15
18/06/2024	1	WK	1	U	M	22:02	3	-
18/06/2024	2	WK	1	U	M	22:04	1	15
18/06/2024	3	WK	1	U	U	22:07	2	15
18/06/2024	4	WK	1	U	M	22:19	1	15
18/06/2024	5	WK	1	U	M	22:23	1	15
18/06/2024	6	WK	1	U	M	22:26	1	15
18/06/2024	7	WK	1	U	M	22:31	1	15
18/06/2024	8	WK	1	U	M	22:38	1	15
18/06/2024	9	WK	1	U	M	22:47	3	-
18/06/2024	10	WK	1	U	M	22:54	1	15

Table C-3: Results of Breeding Woodcock surveys undertaken at Transect C

Date	Flight ID	BTO Code	No. Birds	Age	Sex	Obs. Time	Obs. Type	Flight Time (s)
08/05/2024	1	WM	1	U	U	21:04	2	50
08/05/2024	2	WK	1	U	M	21:24	1	45
08/05/2024	3	WK	1	U	M	21:26	1	30
08/05/2024	4	WK	1	U	M	21:29	1	30
08/05/2024	5	WK	1	U	M	21:32	1	45
08/05/2024	6	WK	1	U	M	21:34	1	30
08/05/2024	7	WK	1	U	M	21:44	3	-
08/05/2024	8	WK	1	U	M	21:46	1	30
08/05/2024	9	WK	1	U	M	21:55	3	-
08/05/2024	10	WK	1	U	M	21:58	2	15
04/06/2024	1	SN	1	U	U	21:52	2	60
04/06/2024	2	HW	1	U	U	21:55	2	75
04/06/2024	3	WK	1	U	M	22:15	1	45

Date	Flight ID	BTO Code	No. Birds	Age	Sex	Obs. Time	Obs. Type	Flight Time (s)
04/06/2024	4	WK	1	U	M	22:17	1	45
19/06/2024	1	SN	1	U	M	22:54	3	-
19/06/2024	2	SN	1	U	M	23:01	3	-

Appendix D Figures

Bird Survey Report Breeding Season 2024

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065415.00001

23 September 2024

605000 606000 607000 608000 609000 610000

713000 712000 711000 710000

N

N62 N62 N52 R439

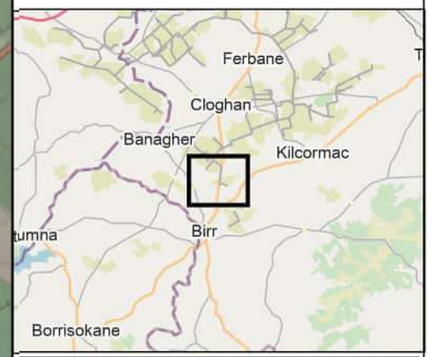
T9 T10 T11

Birr Golf Club

0 0.5 1
Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Grid Route
- Amenity Route Phase A
- Amenity Route Phase B



GALETECH ENERGY SERVICES

SLR

CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2024

SITE LAYOUT

FIGURE 1

Scale 1:20,000 @ A3

Date SEPTEMBER 2024

501.V64760.00001.0019.0 Site Layout

Aerial Imagery (2024) Source: World Imagery: Maxar, Microsoft
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri
Hybrid Reference Layer: Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

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602500 605000 607500 610000 612500

715000 712500 710000

Behaviour Code:
B16 - Present in suitable habitat
N - Non-breeding behaviour

Feeghs
Middle Road
R438 R439 N62 N52
B16 N-Flying N-Hunting
T9 T10 T11
1 2 3 4
Birr Golf Club

N

LEGEND

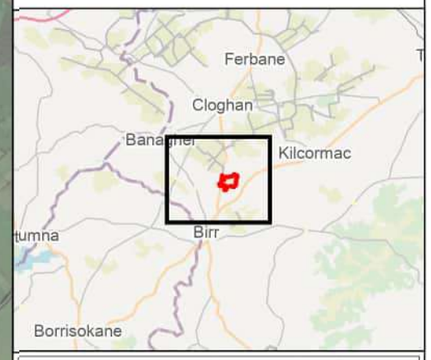
- Extension Area Site Boundary
- Proposed Turbine Location
- Grid Route
- Amenity Route Phase A
- Amenity Route Phase B
- Extension Area Infrastructure 2 km Buffer
- Raptor Viewpoint
- Raptor Transect

Raptor Flight Line

- Buzzard
- Kestrel

Raptor Species Record

- Buzzard
- Kestrel



0 1 2
Kilometres

GALETECH ENERGY SERVICES

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CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2024

BREEDING RAPTOR SURVEY - RAPTOR RESULTS

FIGURE 2.1

Scale 1:35,000 @ A3

Date SEPTEMBER 2024

501.V64760.00001.0016.0 Breeding Raptor Survey

Aerial Imagery (2024) Source: World Imagery: Earthstar Geographics
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri
Hybrid Reference Layer: Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

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602500 605000 607500 610000 612500

715000 712500 710000

Behaviour Code:
B16 - Present in suitable habitat
N - Non-breeding behaviour

Feeghs
Middle Road
R438 R439 N62 N52
T9 T10 T11
1 2 3 4
Birr Golf Club
0 1 2 Kilometres

LEGEND

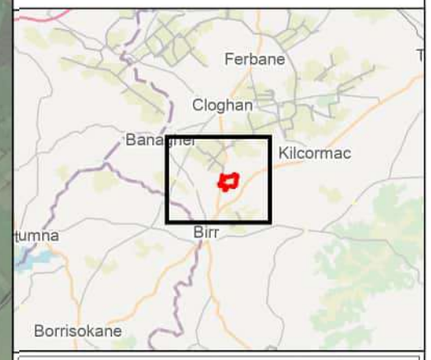
- Extension Area Site Boundary
- Proposed Turbine Location
- Grid Route
- Amenity Route Phase A
- Amenity Route Phase B
- Extension Area Infrastructure 2 km Buffer
- Raptor Viewpoint
- Raptor Transect

Incidental Species Flight Line

- Black-headed Gull
- Curlew
- Grey Heron
- Lapwing
- Mallard
- Snipe

Incidental Species Record

- Black-headed Gull (BH)
- Curlew (CU)
- Great Crested Grebe (GG)
- Grey Heron (H.)
- Lapwing (L.)
- Lesser Black-backed Gull (LB)
- Mallard (MA)
- Snipe (SN)



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CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2024

BREEDING RAPTOR SURVEY - INCIDENTAL RESULTS

FIGURE 2.2

Scale 1:35,000 @ A3

Date SEPTEMBER 2024

501.V64760.00001.0016.0 Breeding Raptor Survey

Aerial Imagery (2024) Source: World Imagery: Earthstar Geographics
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606000 607500 609000

714000

712500

Behaviour Code:
H - Observed in Breeding Season in Suitable Nest Habitat
P - Pair observed in suitable nesting habitat in breeding season

N

N62

N52

T9 T10 T11

H H H H P P

HW ET ET SN SN SN

0 0.5 1
Kilometres

LEGEND

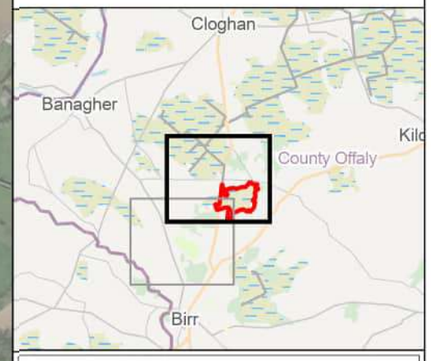
- Extension Area Site Boundary
- Proposed Turbine Location
- Amenity Route Phase A
- Amenity Route Phase B
- Extension Area Infrastructure 500 m Buffer
- Lowland Wader Transect

Lowland Wader Species Record

- Lapwing
- Snipe
- Great White Egret
- Little Egret

Lowland Wader Flight Line

- Snipe
- Little Egret



GALETECH ENERGY SERVICES

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CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2024

LOWLAND WADER SURVEY - WADER RESULTS

FIGURE 3.1

Scale 1:15,000 @ A3

Date SEPTEMBER 2024

501.V64760.00001.0017.0 Lowland Wader Survey

Aerial Imagery (2024) Source: World Imagery: Maxar, Microsoft
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606000 607500 609000

714000 712500

Behaviour Code:
H - Observed in Breeding Season in Suitable Nest Habitat
P - Pair observed in suitable nesting habitat in breeding season

N

N62 N52

T9 T10 T11

0 0.5 1
Kilometres

LEGEND

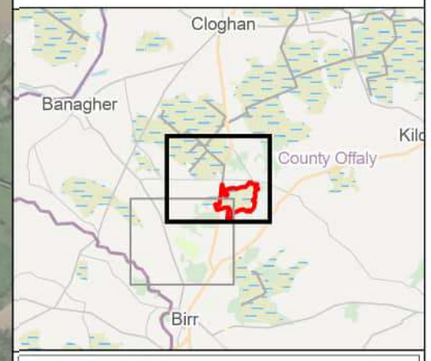
- Extension Area Site Boundary
- Proposed Turbine Location
- Amenity Route Phase A
- Amenity Route Phase B
- Extension Area Infrastructure 500 m Buffer
- Lowland Wader Transect

Incidental Species Record

- BH Black-headed Gull
- BZ Buzzard
- GG Great Crested Grebe
- LG Little Grebe
- MA Mallard
- PH Pheasant

Incidental Species Flight Line

- Black-headed Gull
- Buzzard
- Mallard
- Pheasant



GALETECH ENERGY SERVICES

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CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2024

LOWLAND WADER SURVEY - INCIDENTAL RESULTS

FIGURE 3.2

Scale 1:15,000 @ A3

Date SEPTEMBER 2024

501.V64760.00001.0017.0 Lowland Wader Survey

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604500 606000 607500

711000

709500

Behaviour Code:
H - Observed in Breeding Season in Suitable Nest Habitat
P - Pair observed in suitable nesting habitat in breeding season

R439 R439 R439 R439

N62 N62 N62 N62

N52 N52 N52

Birr Golf Club

BZ BZ MA

N

0 0.5 1
Kilometres

LEGEND

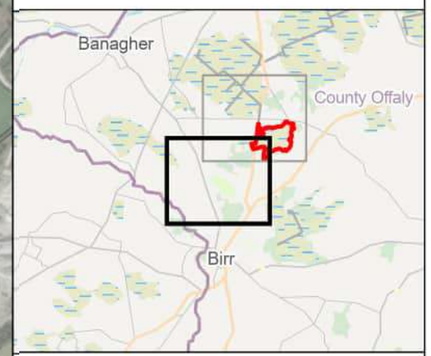
- Extension Area Site Boundary
- Grid Route
- Amenity Route Phase A
- Extension Area Infrastructure 500 m Buffer
- Lowland Wader Transect

Incidental Species Record

- Buzzard
- Mallard

Incidental Species Flight Line

- Buzzard
- Pheasant



GALETECH ENERGY SERVICES

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CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2024

LOWLAND WADER SURVEY - INCIDENTAL RESULTS

FIGURE 3.3

Scale 1:15,000 @ A3

Date SEPTEMBER 2024

501.V64760.00001.0017.0 Lowland Wader Survey

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606000 607000 608000 609000 610000

714000 713000 712000

Observation Type:
1 - Roding Flight
2 - Non-Roding Flight
3 - Heard Only
4 - Two Males Interacting

N

N62

T9 T10 T11

0 500 1,000
Metres

LEGEND

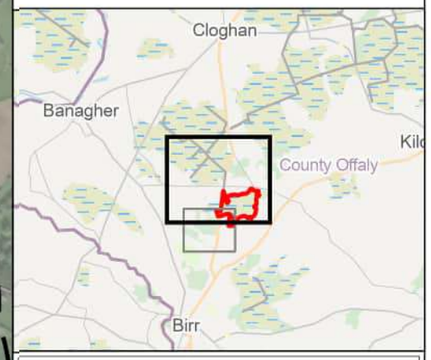
- Site Boundary
- Proposed Turbine Location
- Site Infrastructure
- Amenity Route Phase A
- Amenity Route Phase B
- Extension Area Infrastructure 500 m Buffer
- WoodcockTransect

Woodcock Species Record

- Woodcock

Woodcock Flight Line

- Woodcock



GALETECH ENERGY SERVICES

SLR

CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2024

WOODCOCK SURVEY
WOODCOCK RESULTS

FIGURE 4.1

Scale 1:15,000 @ A3

Date SEPTEMBER 2024

501.V64760.00001.0018.0 Woodcock Survey

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606000 607000 608000

710000

Observation Type:
1 - Roding Flight
2 - Non-Roding Flight
3 - Heard Only
4 - Two Males Interacting

A

B

N62

N

LEGEND

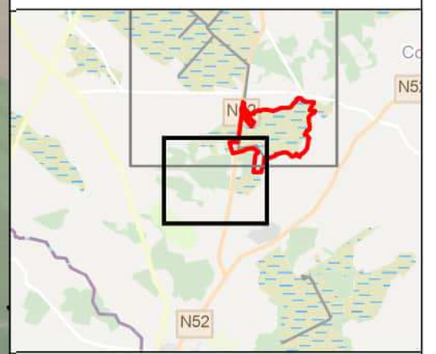
- Site Boundary
- Site Infrastructure
- Amenity Route Phase A
- Extension Area Infrastructure 500 m Buffer
- Grid Route
- WoodcockTransect

Woodcock Species Record

- Woodcock

Woodcock Flight Line

- Woodcock



0 250 500
Metres

GALETECH ENERGY SERVICES

SLR

CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2024

WOODCOCK SURVEY
WOODCOCK RESULTS

FIGURE 4.2

Scale 1:7,500 @ A3

Date SEPTEMBER 2024

501.V64760.00001.0018.0 Woodcock Survey

Aerial Imagery (2024) Source: World Imagery: Maxar, Microsoft
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri
Hybrid Reference Layer: Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

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606000 607000 608000 609000 610000

714000 713000 712000

Observation Type:
1 - Roding Flight
2 - Non-Roding Flight
3 - Heard Only
4 - Two Males Interacting

N

N62

T9 T10 T11

A

0 500 1,000
Metres

LEGEND

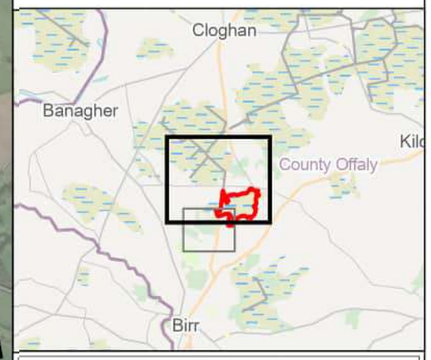
- Site Boundary
- Proposed Turbine Location
- Site Infrastructure
- Amenity Route Phase A
- Amenity Route Phase B
- Extension Area Infrastructure 500 m Buffer
- WoodcockTransect

Incidental Species Record

- Great White Egret
- Snipe
- Whimbrel

Incidental Species Flight Line

- Great White Egret
- Snipe
- Whimbrel



GALETECH ENERGY SERVICES

SLR

CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2024

WOODCOCK SURVEY INCIDENTAL RESULTS

FIGURE 4.3

Scale 1:15,000 @ A3

Date SEPTEMBER 2024

501.V64760.00001.0018.0 Woodcock Survey

Aerial Imagery (2024) Source: World Imagery: Maxar, Microsoft
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Hybrid Reference Layer: Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

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606000 607000 608000

710000

Observation Type:
1 - Roding Flight
2 - Non-Roding Flight
3 - Heard Only
4 - Two Males Interacting

N

LEGEND

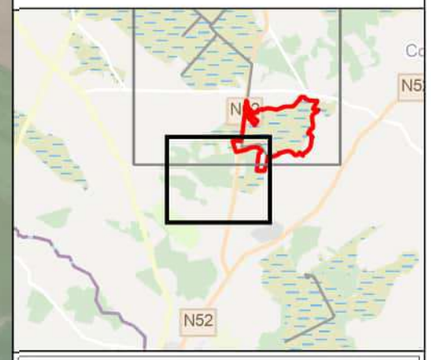
- Site Boundary
- Site Infrastructure
- Amenity Route Phase A
- Extension Area Infrastructure 500 m Buffer
- Grid Route
- WoodcockTransect

Incidental Species Record

- Snipe

Incidental Species Flight Line

- Snipe



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CUSH WIND FARM

BIRD SURVEY REPORT
BREEDING SEASON 2024

WOODCOCK SURVEY INCIDENTAL RESULTS

FIGURE 4.4

Scale 1:7,500 @ A3

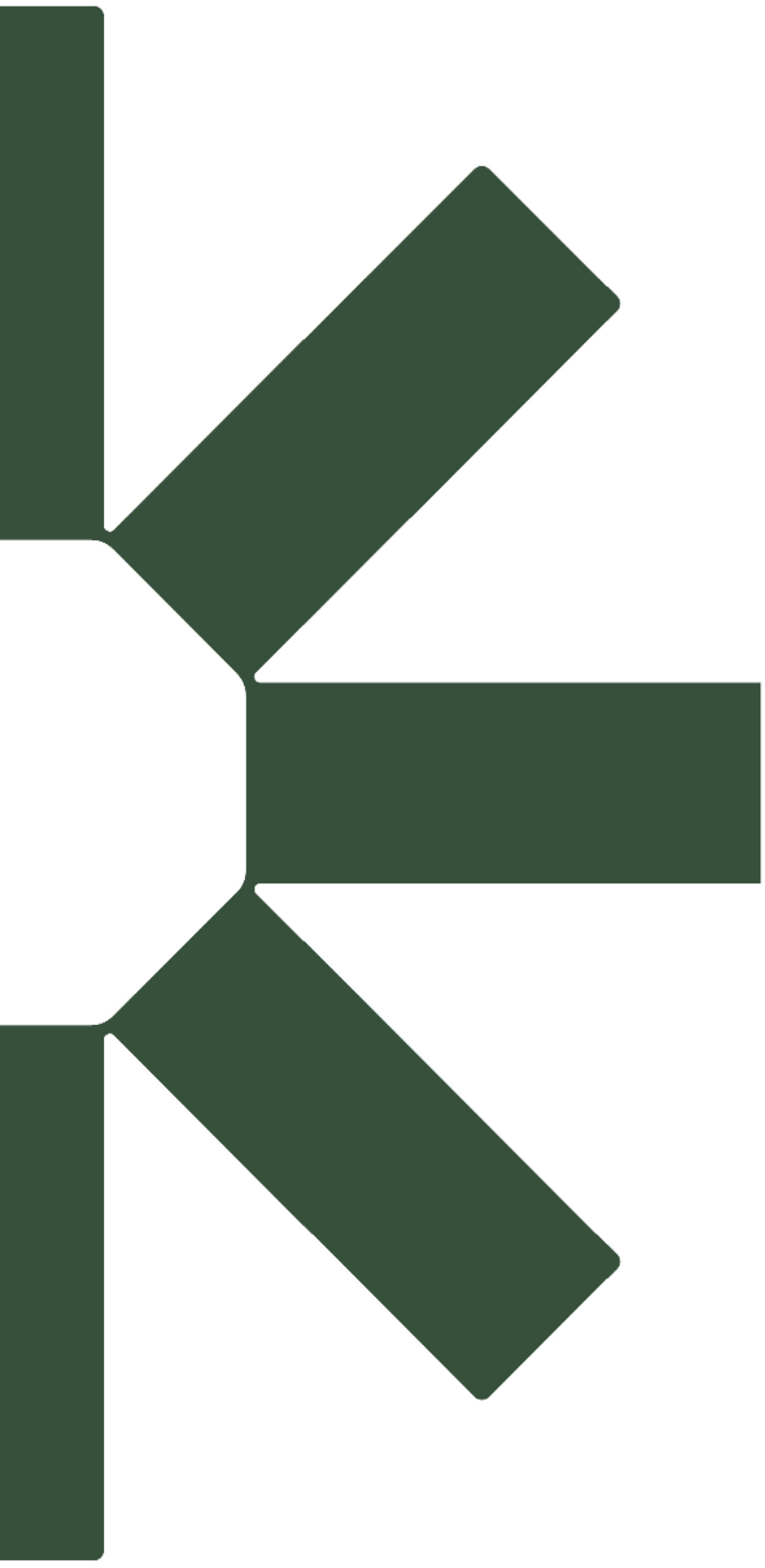
Date SEPTEMBER 2024

0 250 500
Metres

501.V64760.00001.0018.0 Woodcock Survey

Aerial Imagery (2024) Source: World Imagery: Maxar, Microsoft
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Making Sustainability Happen

Baseline Ornithology Report – Non Breeding Bird Surveys 2024/25

Cush Wind Farm Phase 2

Cush Wind Farm Ltd

Clondargan, Stradone, Co. Cavan

Prepared by:

SLR Environmental Consulting (Ireland) Ltd

Suite 212, Acorn Business Centre, Blackrock, Cork,
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SLR Project No.: 501.065415.00001

Client Reference No: N/A

13 August 2025

Revision: 0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
0	13 August 2025	Derbhla Moore	Dr Jonathon Dunn	Dr Jonathon Dunn
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			

Basis of Report

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Executive Summary

The proposed development comprises an extension to Cush Wind Farm, located in the townland of Cush, approximately 4 km north of Birr, Co. Offaly. The project includes three turbines, a grid connection route, and an amenity trail, with part of the trail overlapping Lough Coura pNHA. The site is primarily made up of conifer plantations, cutaway bog, and agricultural grassland.

The purpose of this report is to describe the baseline ornithological conditions recorded during the non-breeding season of 2024/25. The suite of surveys undertaken followed best-practice guidance as set out by NatureScot (2025), and included swan and goose feeding distribution surveys, nocturnal wader surveys, and nocturnal migration watch surveys during autumn and spring. The focus was on species of conservation concern and qualifying interests of nearby Special Protection Areas (SPAs).

Survey results showed generally low levels of target species activity across all methods. Feeding distribution surveys recorded low numbers of whooper swan (peak count of three birds) within the site on a single occasion and mute swan (peak count of two birds) at lands approximately 1.2 km from the site on two occasions. Northern lapwing and black-headed gull were occasionally recorded at the lake at Clooneen north of the amenity trail in small numbers, and northern lapwing were recorded once in small numbers to the southeast of the project site. Small numbers of northern lapwing and common snipe were occasionally recorded during nocturnal wader surveys in the same location. Only low numbers of mallard and snipe were recorded during migration watch surveys but there was no evidence of any bird species undergoing migration.

Overall, the results do not indicate any major constraints to the project. No further surveys or analysis are recommended currently.

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Acronyms and Abbreviations

AA	Appropriate Assessment
BoCCI	Birds of Conservation Concern Ireland
CIEEM	Chartered Institute of Ecology and Environmental Management
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
GIS	Geospatial Information Systems
IOC	International Ornithology Committee
NBDC	National Biodiversity Data Centre
NHA	Natural Heritage Area
NS	NatureScot
NPWS	National Parks and Wildlife Service
pNHA	proposed Natural Heritage Area
The Project	Cush Wind Farm Phase 2
The Project Site	The application site
RVP	Raptor Vantage Point
SNH	Scottish Natural Heritage
SPA	Special Protection Area
VP	Vantage Point
ZTV	Zones of Theoretical Visibility

1.0 Introduction

1.1 Purpose of this report

SLR Environmental Consulting (Ireland) Ltd (SLR) was commissioned by Cush Wind Farm Ltd to carry out baseline bird surveys during the 2024/25 bird non-breeding season at a proposed wind farm (hereafter 'the Project') at Cush Phase 2, Co. Offaly. This report documents the methods and results of those surveys. The assessment of impacts resulting from the Project and the identification of mitigation measures are beyond the scope of this report and will be covered in a separate Environmental Impact Assessment (EIA) report in due course.

1.2 Project and Site description

The Project is located in the townland of Cush approximately 4 km north of Birr, Co. Offaly at approximate ITM coordinates 608237, 709946, and the developable area (hereafter 'the Site') is illustrated in Figure 1, Appendix A. The Project comprises three wind turbines with a tip height of 200m, rotor diameter of 172 m and hub height of 114 m, an underground electricity cable and an amenity trail.

The habitats within the Project Site and are dominated by conifer plantations, cutaway bog and agricultural grasslands.

1.3 Evidence of technical competence and experience

Surveys were undertaken by Darragh Nagle (DN) Qualifying member of CIEEM, a Project Ecologist at SLR with over three years of ecological consulting experience, Faolán Linnane (FL) Qualifying member of CIEEM, a Senior Ecologist at SLR with five years of ecological consulting experience and Jake Matthews (JM) Associate member of CIEEM, a Senior Ecologist at SLR with over five years of ecological consulting experience. The report was authored by Derbhla Moore (DM) Qualifying member of CIEEM, a Graduate Ecologist at SLR with six months of ecological consulting experience. Technical review was conducted by Jonathon Dunn (JD) MCIEEM, an Associate Ornithologist at SLR with over ten years of ecological consulting experience.

1.4 Nomenclature

The nomenclature throughout this report follows The IOC (International Ornithological Committee; now renamed as International Ornithologist's Union) World Bird List (version 15.1[1]. A full list of the species is referred to in this report, including scientific names, is provided in Appendix C.

1.5 Terminology

For this report "flight line" refers to the line drawn to record avian movement. A single flight line may be used to indicate the collective movement of a flock of birds. Each bird moving within the same flight line is referred to as a "flight". The cumulative number of flights reflects occupancy of the study area by a particular species and not abundance.

[1] Gill, F, D Donsker, and P Rasmussen (Eds). 2024. IOC World Bird List (v 15.1). Doi 10.14344/IOC.ML.14.2. http://www.worldbirdnames.org/

1.6 Relevant legislation

Legislation relevant to this report includes the European Council (EC) directive 2009/147/EC ('the Birds Directive') and the Wildlife Act (1976, as amended). Birds listed under Annex I of the Birds Directive are afforded strict protection at the European and national level. All Irish birds are protected by the Wildlife Act.

2.0 Methodology

2.1 Scope of Work

The scope of survey work during the non-breeding season was based on knowledge of the Project Site acquired during the scoping survey, a desk-based review and access to lands within and surrounding the Project Site. It also considered current NatureScot (NS; formerly Scottish Natural Heritage, SNH) Guidance[2].

NS guidance states that "*it is generally considered the passerine species are not significantly impacted by wind farms*". It goes on to state that "*survey of woodland passerines, especially in commercial conifer forest is generally not required*". The only exception is if the desk study identifies that the Project Site is in a key area for a Schedule 1 woodland passerine species. As Schedule 1 refers to UK legislation, it is prudent to assume that woodland passerines red-listed under the latest Birds of Conservation Concern in Ireland (BoCCI)[3] scheme should be considered as equivalent. No such species were returned during the desk-based review or data request

NS guidance also states that "*surveys of farmland passerines especially on more intensive arable habitat are generally not required*". Based on the above, while not the targets, any red-listed passerines were recorded as incidental species during other surveys.

2.2 Desk study

2.2.1 Designated sites

A search was undertaken using the NPWS[4] website for Special Protection Areas (SPA), Natural Heritage Areas (NHA), proposed NHAs (pNHA) and Ramsar sites, with cited ornithological features within 20 km[5] of the Site.

2.2.2 Bird records

Data searches were undertaken for records of protected and conservation priority species, which are those listed on:

- Annex I of the Birds directive; and
- BoCCI red and amber list

Searches were undertaken with the following organisations:

- National Biodiversity Data Centre (NPWS)[6], for records from within 2 km of the Site;
- British Trust for Ornithology (BTO) Bird Track[7], for details on migration of birds within the same country as the Project;

[2] NatureScot. 2025. Recommended bird survey methods to inform impact assessment of onshore wind farms: version 2. NatureScot, Inverness.

[3] Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 2020–2026. Irish Birds 43: 1–22

[4] Maps and Data | National Parks & Wildlife Service Accessed on 07/04/2025.

[5] A 20 km search radius was used as this represents the maximum core foraging distance used by qualifying interest species of SPAs in the UK and Ireland.

[6] http://maps.biodiversityireland.ie/#/Map Accessed on 07/04/2025.

[7] https://app.bto.org/birdtrack/login/login.jsp Accessed on 07/04/2025.

- UK and Ireland Bird Atlas 2007-2011[8];
- BirdWatch Ireland[9], for Irish Wetland Bird Survey (I-WeBS) data from count sectors within 2 km of the Site

2.3 Field survey

2.3.1 Swan and goose feeding distribution surveys

NS[2] recommends that for whooper swan, Greenland white-fronted goose and other geese species, feeding distribution surveys should be undertaken in areas of suitable habitat when the survey area lies within the core foraging distance of SPAs or other major roosts for these species, unless it can be established from existing data that the area is not utilised for feeding. As there are SPAs within 20 km of the Project Site designated for whooper swan and Greenland white-fronted goose (Table 3-1) and there are habitats nearby the Project that could potentially support foraging swans and geese, feeding distribution surveys were undertaken.

A buffer of at least 500 m around the Project Site was used for these surveys, which were undertaken by driven transects twice per month, stopping on a regular basis to check all fields within the Project Site and 500 m buffer for goose and swan feeding activity. Dovegrove Callows SPA, which is located 1 km southwest of the grid route, was visited during the surveys.

The survey area is shown in Appendix A, Figure 2.1, survey dates, times and observers are provided in Appendix B.1 and details of the weather conditions during surveys are provided in Appendix B.2.

2.3.2 Nocturnal wader surveys

NS guidance[2] states that *"night vision/infra-red equipment and survey on moonlit nights can establish presence of nocturnal species or presence and direction of feeding/migration movements both by calls any by sight (although we accept following birds beyond short distances is almost impossible, and that for most species nocturnal activity is likely to be underestimated in any attempted survey)."*

On this basis and due to the proximity of the Middle Shannon Callow SPA and River Little Brosna Callows SPA which both include northern lapwing and European golden plover as qualifying interests, nocturnal wader surveys were conducted. The habitats present at and nearby the Project Site were also noted as suitable for European golden plover (and potentially other wader species; see Gillings *et al*., 2007[10] for further details of winter habitat use), which often forages at night.

The primary targets of surveys were European golden plover, although northern lapwing *Vanellus vanellus*, which utilises similar habitats to European golden plover, was also targeted and all other nocturnal species detected were also recorded.

Two transect routes within the Project Site that were representative of potentially suitable winter habitats for European golden plover and northern lapwing were identified.

[8] https://app.bto.org/mapstore/StoreServlet Accessed on 14/04/2025.

[9] I-WeBS Coverage Accessed on 29/04/2025.

[10] Gillings, S., Fuller, R.J. and Sutherland, W.J. (2007). Winter field use and habitat selection by Eurasian Golden Plovers *Pluvialis apricaria* and Northern Lapwings *Vanellus vanellus* on arable farmland. Ibis. 149: 509 – 520.

Surveys were undertaken using a Zeiss DTI 6/20 thermal monocular. This enables birds to be readily detected by their body heat at up to c. 1 km range. Where birds were detected, images were recorded as videos.

The transects were walked once per month, from October 2024 to March 2025 inclusive, after dark using the thermal monocular to detect and identify the presence of target species. Birds were also detected and identified by sound, as appropriate. Surveys were conducted in pairs for health and safety reasons.

The survey area is shown in Appendix A, Figure 3.1, survey dates, times and observers are provided in Appendix B.1 and details of the weather conditions during surveys are provided in Appendix B.2.

2.3.3 Nocturnal migration surveys

Surveys for nocturnal migrants should be considered where a high level of migration movement is considered likely or known to occur.

There is no requirement in NS guidance[2] to conduct nocturnal vantage point surveys for migratory birds; however, it does state that: "*For species which are active at dawn and dusk or at night, other methods of recording or assessing activity needs to be employed. Night vision/infra-red equipment and survey on moonlit nights can establish presence of nocturnal species or presence and direction of feeding/migration movements both by calls any by sight (although we accept following birds beyond short distances is almost impossible, and that for most species nocturnal activity is likely to be underestimated in any attempted survey)".*

The desk study records returned records of several species that are known to migrate at night, and there are SPAs nearby whereby SCI species could overfly the Project Site during migration. Therefore, on this basis, nocturnal migration surveys were conducted during the autumn and spring migration periods, which are defined below.

The survey method was the same as that for the diurnal flight activity surveys described in the previously issued, Bird Survey Report Non-Breeding Season 2023/25, section 2.3 with some minor differences.

A Zeiss DTI 6/20 Thermal Monocular was used to search for migration birds during periods of darkness. This enables birds to be readily detected by their body heat at up to c. 1 km range. Where birds were detected, images were recorded as videos.

The autumn migration period is September to November, and the spring migration period is March to mid-May according to NS guidance[2]. BTO BirdTrack records were used to determine peak migration periods for primary target species likely to overfly the Project Site, which were subsequently used to determine the optimal period to conduct migration watch surveys. The optimal migration periods for the Project Site were mid-September to late November for autumn migration, and late February to mid-March for spring migration. The target species that were considered likely to be on migration within the vicinity of the Project Site included:

- Wildfowl: Greenland white-fronted goose, whooper swan, northern shoveler, Eurasian wigeon, mallard, Eurasian teal, tufted duck, common goldeneye, Eurasian coot; and
- Waders: northern lapwing, European golden plover.

As migration activity is often weather-related, weather conditions were closely monitored during each migration period to time surveys with periods of colder or warmer weather.

There is no prescribed level of survey effort for nocturnal migration surveys; however, to maximise the chances of detecting migration, two one-hour surveys pre-dawn and two one-

hour surveys post-dusk were conducted at VP3. The surveys were spread over multiple dates per migration period.

A total of 4 hours were conducted at VP3 and summarised in the table below.

The survey area is shown in Figure 4.1 in Appendix A. Survey dates, times, and corresponding weather conditions are provided in Appendix B.

Table 2-1: Summary of migration surveys undertaken during the autumn and spring migration periods

VP No.	Co-ordinates (x,y; ITM)	Hours of Survey (hh:mm)				
		Autumn Migration Period		Spring Migration Period		Total per VP
		Dawn	Dusk	Dawn	Dusk	
3	607816.3573, 711308.9654	01:00	01:00	01:00	01:00	04:00

2.4 Limitations

Feeding distribution, nocturnal golden plover, and migration vantage point surveys were all conducted under optimal weather conditions. Of the 60 total hours of non-breeding bird survey effort, only one hour (1.6%) was recorded under “poor visibility” (<1 km), and one hour (1.6%) under “moderate visibility” (1–3 km). This means that 96.8% of survey effort was carried out during periods of good visibility (>3 km).

Access to the substation area southwest of the Project boundary was restricted. Surveyors were unable to walk this section and instead observed the area from public roads and adjacent agricultural fields.

Visibility during feeding distribution surveys to Dovegrove Callows SPA, located west of the Project Site, was constrained due to lack of access to private lands. While every attempt was made to view the SPA from public roads, it was not possible to view all the lands within.

The first feeding distribution survey in October was affected by disturbance from construction vehicle activity along the amenity trail to the north of the Project boundary.

3.0 Results

3.1 Desk study

3.1.1 Designated sites

3.1.1.1 SPAs

Table 3-1 documents SPAs identified within 20 km of the Project Site and shows special conservation interest (SCI) species for which the site was designated, ROMS, and other important species listed on the standard data form, along with any SCI habitats. To provide focus, only species relevant to the current non-breeding season are shown.

Table 3-1: Details of designated ornithological sites within 20 km of the Project

Site Name and Code	Distance and Direction from Site at Closest Point (km)	Special Conservation Interest Species Relevant to the Non-Breeding Season	Regularly Occurring Migratory Species	Other Important Species	Special Conservation Interest Habitats
Dovegrove Callows SPA 004137	3.6 km southwest	• Greenland white-fronted goose	• N/A	• N/A	• N/A
All Saints Bog SPA 004103	5.1 km southwest	• Greenland white-fronted goose	• Greenland white-fronted goose	• Merlin	• N/A
Middle Shannon Callows SPA 004096	7.2 km northwest	• Northern lapwing • Whooper swan • Eurasian wigeon • European golden plover • Black-tailed godwit • Black-headed gull	• Eurasian teal • Tufted duck • Greenland white-fronted goose • Dunlin • Eurasian curlew • Redshank	• Hen harrier • Mute swan • Skylark	• Wetlands
River Little Brosna Callows SPA 004086	5.8 km west	• Whooper swan • Eurasian wigeon • Eurasian teal • Northern pintail • Northern shoveler	• Mallard • Common pochard • Dunlin • Eurasian curlew	• Mute Swan	• Wetlands

Site Name and Code	Distance and Direction from Site at Closest Point (km)	Special Conservation Interest Species Relevant to the Non-Breeding Season	Regularly Occurring Migratory Species	Other Important Species	Special Conservation Interest Habitats
		• European golden plover • Northern lapwing • Black-tailed godwit • Black-headed gull • Greenland white-fronted goose			
Slieve Bloom Mountains SPA 004160	11.8 km southeast	• Hen harrier	• N/A	• Merlin • Peregrine falcon	• N/A
River Suck Callows SPA 004097	17.2 km northwest	• Greenland white-fronted goose • Whooper swan • Eurasian wigeon • Northern lapwing • European golden plover	• Northern pintail • Eurasian teal • Black-headed gull • Eurasian curlew • Black-tailed godwit • Mallard	• Mute swan	• N/A
Mongan Bog SPA 004017	19.1 km northwest	• Greenland white-fronted goose •	• Common snipe • Eurasian curlew	• Red grouse	• N/A
Lough Derg (Shannon) SPA 004058	19.5 km southwest	• Great cormorant • Tufted duck • Common goldeneye	• Eurasian teal • Eurasian wigeon • Mallard • Greenland white-fronted goose Common pochard • Whooper swan Eurasian coot • Black-headed gull	• Mute swan • Little grebe	• N/A

3.1.1.2 Other nature conservation sites

A small section of the amenity route is within Lough Coura pNHA, which is not designated for any bird species.

There are three NHAs located within 20 km of the amenity route, grid route and extension area with site synopses that mention birds. Two NHAs (River Little Brosna Callows NHA and Suck River Callows NHA) are also SPAs, and the bird species for which they are designated are detailed above in Table 3-1. Details of the remaining NHA are presented in Table 3-2.

There are five pNHAs 20 km of the amenity route, grid route and extension area with site synopses that mention birds. Details of these pNHAs are presented in Table 3-2.

Table 3-2: Details of other nature conservation sites relevant to ornithology within 20 km of the Project

Site Name and Code	Distance/Direction from the Site at Closest Point (km)	Species of Interest
NHAs		
Arragh More Bog NHA 000640	14.1 km southwest	• Hen harrier
pNHAs		
Woodville Woods pNHA 000927	2.2 km south	• Common snipe
Lough Nahinch (Tipperary) pNHA 000936	17.3 km southwest	• Common snipe
Roscrea Bog pNHA 000583	18.8 km southeast	• Common snipe • Eurasian curlew • Reed bunting
Pallas Lough pNHA 000916	19.1 km northeast	• Western marsh harrier
Lough Nanag Esker pNHA 000910	> 20 km	• Wildfowl (site synopsis does not include season of relevance)
Nature Reserves / Ramsar Site		
Slieve Bloom	14 km southeast	• Hen harrier • Red grouse

Site Name and Code	Distance/Direction from the Site at Closest Point (km)	Species of Interest
Mountains Nature Reserve / Ramsar Site		• Skylark • Snow bunting • Merlin • Peregine Falcon • Common snipe • European golden plover • Northern lapwing • Eurasian curlew

3.1.2 Bird Records

The results from the desk study are listed below in Table 3-3.

Table 3-3: Relevant bird species records from the desk study

Location	Species	Source	Dataset	Date of Last Record
N01R	Black-headed gull	NBDC	Birds of Ireland	2010
N00U, N01Q, N01V, N01R	Common buzzard	NBDC	Birds of Ireland	2021
N01R	Common ringed plover	NBDC	Birds of Ireland	2010
N01R	Common snipe	NBDC	Birds of Ireland	2009
N01R	Eurasian curlew	NBDC	Birds of Ireland	2009
N01R	Great crested grebe	NBDC	Birds of Ireland	2010
N01R	Grey heron	NBDC	Birds of Ireland	2009
N00U	Grey wagtail	NBDC	Birds of Ireland	BoCCI4 Red
N01R	House martin	NBDC	Birds of Ireland	2009
N01R	Little grebe	NBDC	Bird Atlas 2007 – 2011	2011
N01R	Mallard	NBDC	Birds of Ireland	2009
N01R	Meadow pipit	NBDC	Birds of Ireland	2009
N01V, N01R	Northern lapwing	NBDC	Birds of Ireland	2022
N00U, N01R	Northern raven	NBDC	Birds of Ireland	2019
N01R	Peregrine falcon	NBDC	Birds of Ireland	2009
N01V	Yellowhammer	NBDC	Birds of Ireland	2021

The absence of records of species from the NBDC database does not necessarily imply that a species does not occur within the search area, rather that it has not formally been recorded as present.

There are no I-WeBS count sites within 2 km of the Project Site.

3.2 Field survey

3.2.1 Swan and goose feeding distribution surveys

The results of the feeding distribution surveys are shown in Figure 2.2 – 2.8 in Appendix A.

3.2.1.1 Target species

All records of target species are summarised in Table 3-4.

Across all feeding distribution surveys, whooper swan were sporadically recorded through the non-breeding season and were sighted on just 1/12 visits to the Site. Three birds were recorded resting on flooded bogland within the north of the Project Site boundary, approximately 200 m east from the N62 roadside.

Mute swan were recorded on 2/12 survey visits. Four mute swans, including one cygnet were recorded resting on the lake at Clooneen, north of the Project Site.

No Greenland white-fronted geese were recorded at Dovegrove Callows SPA notwithstanding the lack of accessibility to the SPA lands.

Table 3-4: Target species summary for swan and goose feeding distribution surveys

Month	Visit	Peak Count	
		Whooper swan	Mute swan
October	1	0	0
	2	0	0
November	1	0	0
	2	3	0
December	1	0	0
	2	0	0
January	1	0	0
	2	0	0
February	1	0	2 (1 juvenile)
	2	0	2
March	1	0	0
	2	0	0
Peak Count		**3**	**2**

3.2.1.2 Incidentals

Incidental species of note recorded during these surveys included the following:

- Raptors: common buzzard (peak count of two birds), common kestrel (peak count of one bird), Eurasian sparrowhawk (peak count of one bird);

- Gulls: lesser black-backed gull (peak count of 21 birds), black headed gull (peak count of eight birds);
- Waders: common snipe (peak count of one bird), northern lapwing (peak count of 27 birds);
- Wildfowl: great white egret (peak count of one bird), mallard (peak count of 22 birds), grey heron (peak count of one bird), little grebe (peak count of one bird), great crested grebe (peak count of one bird), teal (peak count of 35 birds); and
- Passerines: northern raven (peak count of one bird).

Of these incidental species recorded, northern lapwing are qualifying interests of nearby Middle Shannon Callows SPA and so additional discussion is provided below.

Black-headed gull

Black-headed gull were recorded on 2/12 survey visits, both in March. A peak count of eight birds was recorded at the lake at Clooneen, c.1 km from the Project Site. Both observations were made in the same location.

Northern Lapwing

Lapwing were recorded on 3/12 survey visits. A large group (peak count of 27 birds) was recorded in October at rest on the water in the lake at Clooneen, c.1 km from the Project Site The other recordings sighted smaller groups at the same location, and a small group of five birds on the edge of the Project Site to the east on a single occasion.

3.2.2 Nocturnal wader surveys

3.2.2.1 Target species

Across the six nocturnal wader surveys, northern lapwing (peak count of 13 birds) was recorded on two occasions, foraging in the south-east of the Project Site. Common snipe was recorded in small numbers (peak count of two birds) during four of the six survey visits, foraging within the south-east of the Project Site. No observations of European golden plover were recorded. Survey results are shown in Figure 3.2 – 3.3, Appendix A.

3.2.2.2 Incidental records

Incidental species of note recorded during these surveys included:

- Lesser black-backed gull (peak count of >50 birds) flying north-west from the lake at Clooneen, 1 km from the Project Site;
- Mallard – two birds flying from agricultural fields within the 500 m buffer of amenity trail, 1.2 km north of the Project Site; and
- Mute swan – five birds recorded at rest on the lake at Clooneen, 1.2 km from the Project Site.

3.2.3 Nocturnal migration surveys

3.2.3.1 Autumn migration surveys

Target species

Across the autumn migration watch surveys, target species recorded included: mallard (peak count of one bird) heard not seen in the northern area of the Project Site boundary. Common snipe (peak of count one bird) was recorded flushing from vegetation in the north of the Project Site. These observations were not considered to be migrants as flight lines were either unrecorded or short flights within the Project Site boundary. Survey results are shown in Figure 4.2 – 4.3, Appendix A

Incidental records

Incidental species of note recorded during these surveys included:

- Raptor: barn owl (peak count of one bird) – heard not seen.

3.2.3.2 Spring migration period

Target species

Across the spring migration watch surveys, target species recorded included: common snipe (peak count of one bird) and mallard (peak count of two birds). These observations were not considered to be migrants because only very low and short flights were recorded within the Project Site boundary. Survey results are shown in Figure 4.2 – 4.3, Appendix A.

Incidental records

No incidental species of note were recorded during these surveys.

4.0 Summary

4.1 Legal and conservation status of target species recorded

Table 4-1 provides a summary of the target species recorded during the baseline surveys, their activity within the survey area, as well as their legal and conservation status.

Table 4-1: Summary of target species results and legal/conservation status

Target Species	Legal and Conservation Status[11]	Qualifying or Listed Species for Nearby Nature Conservation Site	Relevant Population Estimates and Trends	Summary of Observations within the Survey Area
Whooper swan	Annex I; BoCCI4 amber	• Blackwater Callows SPA	ROI winter population 11,852 individuals[12]; increasing	Small number of whooper swan recorded within 1 km of the Site boundary on a single occasion across all surveys (peak count three birds).
Mute swan	BoCCI4 amber	• River Little Brosna Callows SPA • Middle Shannon Callows SPA • Lough Derg (Shannon) SPA • River Suck Callows SPA	ROI winter population 7,032 individuals; increasing[13]	Small numbers of mute swan recorded in February on the lake at Clooneen (peak count two birds) c. 1.2 km from the Project Site. One juvenile recorded.

[11] Gilbert, G., Stanbury, A. & Lewis, L., 2021. *Birds of Conservation Concern in Ireland 4: 2020–2026*. Belfast: RSPB Northern Ireland & BirdWatch Ireland.

[12] Burke, B., McElwaine, J.G., Fitzgerald, N., Kelly, S.B.A., McCulloch, N., Walsh, A.J. and Lewis, L.J. (2021). Population size, breeding success and habitat use of Whooper Swan Cygnus cygnus and Bewick's Swan Cygnus columbianus bewickii in Ireland: results of the 2020 International Swan Census. Irish Birds, 43, pp.57–70.

[13] Lewis, L.J., Burke, B., Fitzgerald, N., Tierney, T.D. and Kelly, S. (2019). *Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10–2015/16*. Irish Wildlife Manuals No. 106. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin

Target Species	Legal and Conservation Status[11]	Qualifying or Listed Species for Nearby Nature Conservation Site	Relevant Population Estimates and Trends	Summary of Observations within the Survey Area
Northern lapwing	BoCCI4 red	• Middle Shannon Callows SPA • River Little Brosna Callows SPA • River Suck Callows SPA	ROI winter population 69,823 individuals, declining[13]	Northern lapwing were recorded in medium-sized groups (peak count 27 birds) throughout the survey at rest on the lake at Clooneen, 1.2 km from Project Site, and a small flock of five birds on the eastern edge of the Project Site on a single occasion.
Mallard	BoCCI4 green	• River Little Brosna Callows and Lough Derg (Shannon) SPA	ROI winter population 18,810 individuals[13], stable[14]	Flocks of mallard (peak count 22 birds) were recorded foraging on lake at Clooneen approx. 1.2 km from the Project Site during diurnal feeding distribution surveys. Small numbers recorded during nocturnal wader survey (peak count two birds) flying north of amenity trail and single bird record heard during nocturnal migration survey (not thought to be on migration).
Common snipe	BoCCI4 amber	• Mongan Bog SPA • Woodville Woods pNHA • Lough Nahinch (Tipperary) pNHA • Slievebloom Nature Reserve	ROI winter population 883 individuals, declining[13]	Small numbers of snipe recorded (peak count two birds) consistently (4/6 months) during nocturnal wader surveys within 500 m survey buffer to southeast of Site. Peak count of one bird recorded near amenity trail on one occasion. Single birds were also recorded to the east of the N62 during migration surveys (not thought to be on migration).
Barn owl	BoCCI4 red	• None within 20 km of Project Site	ROI breeding population 562-702 pairs[14], declining[11]	One barn owl was heard during the autumn nocturnal migration survey.

[14] European Environment Agency (EEA), 2020, Article 12 web tool on population status and trends of birds under Article 12 of the Birds Directive. [online] Available at: https://nature-art12.eionet.europa.eu/

Target Species	Legal and Conservation Status[11]	Qualifying or Listed Species for Nearby Nature Conservation Site	Relevant Population Estimates and Trends	Summary of Observations within the Survey Area
Common buzzard	BoCCI4 green	• None within 20 km of Project Site	ROI breeding population 1,938 pairs, increasing[14]	Small numbers of buzzard flightlines (peak count two birds) were recorded as incidental targets north and south of Project Site during 4/12 of the swan and goose feeding distribution surveys.
Eurasian sparrowhawk	BoCCI4 amber	• None within 20 km of Project Site	ROI breeding population 11,859 individuals[14], stable but declining[11]	One Eurasian sparrowhawk was recorded in flight over the amenity trail approx.1.2 km from the Project Site, during a swan and goose feeding distribution survey in February 2025.
Common kestrel	BoCCI4 amber	• None within 20 km of Project Site	ROI breeding population 13,500 individuals, declining[14]	Kestrel (peak count one bird) was recorded in the survey area as incidental target during 1/12 of the swan and goose feeding distribution surveys near the amenity trail.
Lesser black backed gull	BoCCI4 amber	• None within 20 km of Project Site	ROI winter population 11,842 individuals[13], increasing[14]	Small flocks of lesser black backed gull (peak count six birds) were recorded as incidental targets during 1/12 of the swan and goose feeding distribution surveys near the amenity trail and so the southeast of the Site.
Black headed gull	BoCCI4 red	• Middle Shannon Callows SPA • River Little Brosna Callows SPA	ROI winter population 48,821 individuals[13], declining[11]	Small flocks of black headed gull (peak count eight birds) were recorded as incidental targets in the survey area during 2/12 of the swan and goose feeding distribution surveys near the lake at Clooneen.
Great white egret	No BoCCI4 status (non-regularly occuring)	• None within 20 km of Project Site	Non-regularly occurring; ROI winter population peak count 2011/12 – 2015/16 of one bird, no population trends available	A single great white egret was recorded as an incidental target on the lake at Clooneen, 1.2 km from the Project Site during a November swan and goose feeding distribution survey.
Little grebe	BoCCI4 amber	• Lough Derg (Shannon) SPA	ROI winter population 1,594 individuals, increasing[14]	Small numbers of little grebe (peak count two birds) were recorded throughout the non-breeding season across 6/12 swan and goose feeding distributions. All

Target Species	Legal and Conservation Status[11]	Qualifying or Listed Species for Nearby Nature Conservation Site	Relevant Population Estimates and Trends	Summary of Observations within the Survey Area
				records were of the birds on the lake at Clooneen, 1.2 km from the Project Site.
Great crested grebe	BoCCI4 amber	• None within 20 km of Project Site	ROI winter population 1,734 individuals, decreasing[14]	Great crested grebe (peak count one bird) were recorded on 2/12 swan and goose feeding distribution surveys. Both sightings recorded the birds on the lake at Clooneen, 1.2 km from the Project Site.
Eurasian teal	BoCCI4 amber	• Middle Shannon Callows SPA • Lough Derg (Shannon) SPA	ROI winter population 27,644 individuals, increasing[13]	A flock of teal (peak count of 35 birds) were recorded on 1/12 swan and goose feeding distribution in February. The birds were seen at rest on the water at Clooneen, 1.2 km from the Project Site.
Grey heron	BoCCI4 green	• None within 20 km of Project Site	ROI winter population 1,943 individuals, stable[13]	Small numbers of grey heron (peak count one bird) were recorded in the survey area during 2/12 swan and goose feeding distribution surveys. Recordings were located at the lake at Clooneen. One bird was on passage and the others were foraging in the water, 1.2 km from the Project Site.
Northern raven	BoCCI4 green	• None within 20 km of Project Site	ROI breeding population 55,878 pairs, stable[14]	Raven were recorded in small numbers (peak count one bird) on passage both south and north of the Project Site during 2/12 swan and goose feeding distribution surveys.

5.0 Discussion and Recommendations

The nocturnal migration surveys recorded small numbers of target species including mallard (peak count of two birds) and common snipe (peak count of one bird). Common snipe were flushed from grasslands, taking short flight lines within the Project Site boundary. A mallard flight line was recorded with the flight line ending within the Project Site boundary. Based on the height and lengths of the flight lines observed, the target species recorded during nocturnal migration surveys are not considered to be migrants and therefore, nocturnal collision risk is unlikely to represent a major constraint to the Project.

Small numbers of whooper swan (peak count of three birds) and mute swan (peak count of two birds) were recorded sporadically throughout the non-breeding season.

Whooper swans were recorded at rest on flooded bogland within the Project Site on a single occasion. As low numbers of swans were recorded very infrequently, there is no good evidence to suggest that the habitats within the Project Site are used consistently or are of great importance to both mute or whooper swan.

In relation to SCI bird species associated with nearby SPAs, a small number of northern lapwing (peak count of five birds) were recorded foraging within improved agricultural grasslands where flooding was located to the southeast of the Site boundary, predominantly outside the 500 m survey buffer during diurnal feeding distribution surveys. A peak count of 27 lapwing were also recorded at rest within the lake at Clooneen c. 1 km north of the Site on a single occasion; with smaller groups recorded on two other occasions at the same location. A small number of black-headed gull (peak count eight birds) were recorded at the lake at Clooneen c. 1 km north of the Site on two occasions. Based on the inconsistency of the sightings and the overall low number of recorded gulls, waders and wildfowl, the surrounding habitats to the Project Site do not appear to be consistently used by these bird groups and therefore are unlikely to represent a major constraint to the Project.

The nocturnal wader surveys recorded small numbers of target species. Northern lapwing (peak count of 13 birds) and common snipe (peak count of one bird) were both recorded in the southeast of the 500 m survey buffer. Of these, lapwing were only recorded on two occasions, whereas snipe were recorded on four occasions. Incidental recordings were made of lesser black backed gulls (peak count of >50 birds), mallard (peak count of two birds) and mute swan (peak count of five birds) but these were again either within the 500 m survey buffer or outside it. The inconsistency of observations plus the low number of waders recorded during the nocturnal surveys suggests it is unlikely that nocturnal foraging of waders or wildfowl represents a major constraint to the Project.

Overall, the results do not indicate any major constraints to the Project and there are no recommendations for additional surveys or analysis currently.

Appendix A Figures

Baseline Ornithology Report – Non Breeding Bird Surveys 2024/25

Cush Wind Farm Phase 2

Cush Wind Farm Ltd

SLR Project No.: 501.065415.00001

13 August 2025

604000 605000 606000 607000 608000 609000

713000 712000 711000 710000

R438 L3010 L3006 L3003 L1092 R439 N52 L30033 L70064 N52

T9 T10 T11

N

0 0.5 1
Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
NON-BREEDNG SEASON 2024 - 2025

SITE LAYOUT

FIGURE 1

Scale 1:20,000 @ A3

Date AUGUST 2025

501.V64760.00001.0021.1 Project Site

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602000 604000 606000 608000 610000 612000

714000 712000 710000

N

T10 T11 T9

Dovegrove Callows SPA

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Dovegrove Callows Special Protection Area (SPA)
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 500 m Buffer
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 1 km Buffer
- Transect Route



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
BREEDING SEASON 2024

FEEDING DISTRIBUTION: SURVEY AREA

FIGURE 2.1

Scale 1:35,000 @ A3

Date AUGUST 2025

501.V64760.00001.0022.1 Feeding Distribution Survey

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602000 604000 606000 608000 610000 612000

714000

712000

710000

N

T10 T11 T9

Dovegrove Callows SPA

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Dovegrove Callows Special Protection Area (SPA)
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 500 m Buffer
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 1 km Buffer

Species

- Lapwing

Number of Birds

- < 2
- 5 - 10
- 21 - 35



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
BREEDING SEASON 2024

FEEDING DISTRIBUTION: LAPWING

FIGURE 2.2

Scale 1:35,000 @ A3

Date AUGUST 2025

501.V64760.00001.0022.1 Feeding Distribution Survey

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602000 604000 606000 608000 610000 612000

714000

712000

710000

N

T10 T11 T9

Dovegrove Callows SPA

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Dovegrove Callows Special Protection Area (SPA)
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 500 m Buffer
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 1 km Buffer

Species

- Mallard

Number of Birds

- < 2
- 2 - 4
- 5 - 10
- 11 - 20
- 21 - 35



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
BREEDING SEASON 2024

FEEDING DISTRIBUTION: MALLARD

FIGURE 2.3

Scale 1:35,000 @ A3

Date AUGUST 2025

501.V64760.00001.0022.1 Feeding Distribution Survey

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602000 604000 606000 608000 610000 612000

714000

712000

710000

T10 T11 T9

Dovegrove Callows SPA

N

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Dovegrove Callows Special Protection Area (SPA)
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 500 m Buffer
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 1 km Buffer

Species

- Mute Swan

Number of Birds

- 2 - 4



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
BREEDING SEASON 2024

FEEDING DISTRIBUTION: MUTE SWAN

FIGURE 2.4

Scale 1:35,000 @ A3

Date AUGUST 2025

501.V64760.00001.0022.1 Feeding Distribution Survey

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602000 604000 606000 608000 610000 612000

714000

712000

710000

N

T10 T11 T9

Dovegrove Callows SPA

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Dovegrove Callows Special Protection Area (SPA)
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 500 m Buffer
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 1 km Buffer

Species

- Snipe

Number of Birds

- < 2



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
BREEDING SEASON 2024

FEEDING DISTRIBUTION: SNIPE

FIGURE 2.5

Scale 1:35,000 @ A3

Date AUGUST 2025

501.V64760.00001.0022.1 Feeding Distribution Survey

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602000 604000 606000 608000 610000 612000

714000

712000

710000

N

T10 T11 T9

Dovegrove Callows SPA

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Dovegrove Callows Special Protection Area (SPA)
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 500 m Buffer
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 1 km Buffer

Species

- Teal

Number of Birds

- 21 - 35



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
BREEDING SEASON 2024

FEEDING DISTRIBUTION: TEAL

FIGURE 2.6

Scale 1:35,000 @ A3

Date AUGUST 2025

501.V64760.00001.0022.1 Feeding Distribution Survey

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602000 604000 606000 608000 610000 612000

714000

712000

710000

N

T10 T11 T9

Dovegrove Callows SPA

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Dovegrove Callows Special Protection Area (SPA)
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 500 m Buffer
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 1 km Buffer

Species

- Whooper Swan

Number of Birds

- 2 - 4



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SLR

CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
BREEDING SEASON 2024

FEEDING DISTRIBUTION: WHOOPER SWAN

FIGURE 2.7

Scale 1:35,000 @ A3

Date AUGUST 2025

501.V64760.00001.0022.1 Feeding Distribution Survey

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602000 604000 606000 608000 610000 612000

714000

712000

710000

N

Scale: 1:10,000

N62

T9 T10 T11

Dovegrove Callows SPA

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Dovegrove Callows Special Protection Area (SPA)
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 500 m Buffer
- Site Boundary, Amenity Routes and Dovegrow Callows SPA 1 km Buffer

Incidental Species

- Black-headed Gull
- Buzzard
- Great Crested Grebe
- Great White Egret
- Grey Heron
- Kestrel
- Lesser Black-backed Gull
- Little Grebe
- Moorhen
- Raven
- Sparrowhawk



GALETECH ENERGY SERVICES

SLR

CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
BREEDING SEASON 2024

FEEDING DISTRIBUTION: INCIDENTAL SPECIES

FIGURE 2.8

Scale 1:35,000 @ A3

Date AUGUST 2025

501.V64760.00001.0022.1 Feeding Distribution Survey

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602000 604000 606000 608000 610000

714000 712000 710000

R433 L7016 L3010 L3003 L3006 L1092 R439 R438 T10 T11 T9 N52 L3033 L70064 L7006 L3011 L4077 L70065 Fivealley

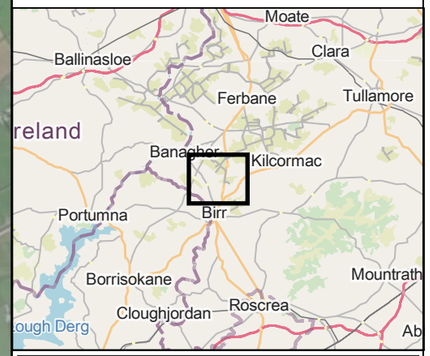
N

0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Site Boundary and Amenity Routes 500 m Buffer
- Transect Route



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
NON-BREEDING SEASON 2024 - 2025

NOCTURNAL WADER SURVEY AREA

FIGURE 3.1

Scale	Date
1:30,000 @ A3	AUGUST 2025

501.V64760.00001.0023.1 Nocturnal Wader Survey

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602000 604000 606000 608000 610000

714000 712000 710000

R433 L7016 L3010 L3003 L3006 L1092 R439 R438 N52 L3011 L30053 L70064 L7006 L4077 L70065

T10 T11 T9

SN L. SN SN SN L.

0 1 2

Kilometres

N

LEGEND

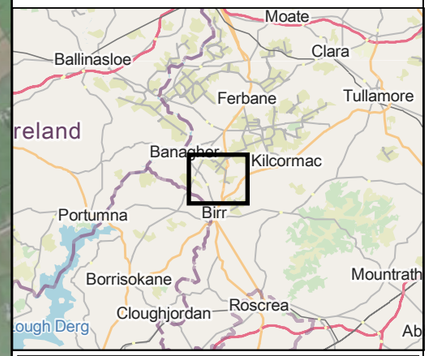
- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Site Boundary and Amenity Routes 500 m Buffer
- Transect Route

Species Record

- Lapwing
- Snipe

Species Flight Line

- Snipe



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
NON-BREEDING SEASON 2024 - 2025

NOCTURNAL WADER TARGET SPECIES

FIGURE 3.2

Scale 1:30,000 @ A3

Date AUGUST 2025

501.V64760.00001.0023.1 Nocturnal Wader Survey

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602000 604000 606000 608000 610000

714000 712000 710000

R433 L7016 L3010 R439 R438 L4077 L3011 L3006 L3003 L1092 L7006 L70064 L70065 L30033 N52 N62

MA MS LB PH

T9 T10 T11

Fivealley

0 1 2 Kilometres

N

LEGEND

Site Boundary

Proposed Turbine Location

Substation Area

Amenity Route Phase A

Amenity Route Phase B

Site Boundary and Amenity Routes 500 m Buffer

Transect Route

Species Record

Lesser Black-backed Gull

Mallard

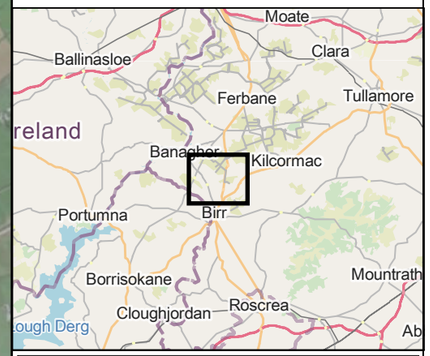
Mute Swan

Pheasant

Species Flight Line

Lesser Black-backed Gull

Mallard



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
NON-BREEDING SEASON 2024 - 2025

NOCTURNAL WADER INCIDENTAL SPECIES

FIGURE 3.3

Scale 1:30,000 @ A3

Date AUGUST 2025

501.V64760.00001.0023.1 Nocturnal Wader Survey

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603000 604000 605000 606000 607000 608000 609000 610000

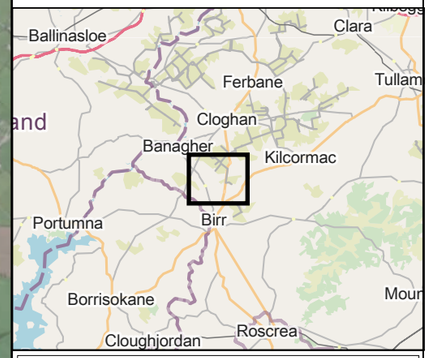
714000 713000 712000 711000 710000

L7016 R438 L3010 L3006 L3003 L1092 R439 N62 N52 L30033 L70064 T9 T10 T11

N

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Site Boundary and Amenity Routes 500 m Buffer
- Survey Viewpoint



0 1 2

Kilometres

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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
NON-BREEDING SEASON 2024 -2025

MIGRATION SURVEY SURVEY AREA

FIGURE 4.1

Scale 1:25,000 @ A3

Date AUGUST 2025

501.V64760.00001.0024.1 Migration Survey

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603000 604000 605000 606000 607000 608000 609000 610000

714000 713000 712000 711000 710000

L7016 R438 L3010 R438 L3006 L3003 L1092 R439 N62 L70064 L30033 N52

T9 T10 T11

N

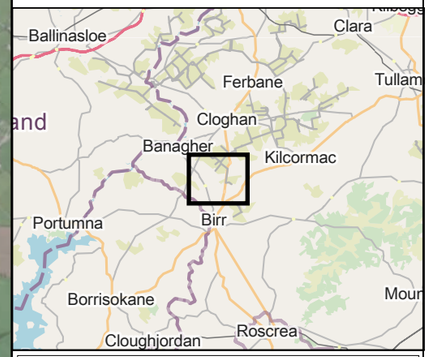
0 1 2

Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Site Boundary and Amenity Routes 500 m Buffer

Note
No Target Species Recorded



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
NON-BREEDING SEASON 2024 -2025

MIGRATION SURVEY TARGET SPECIES

FIGURE 4.2

Scale 1:25,000 @ A3

Date AUGUST 2025

501.V64760.00001.0024.1 Migration Survey

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603000 604000 605000 606000 607000 608000 609000 610000

714000 713000 712000 711000 710000

N

L7016 R438 L3010 L3006 L3003 L1092 R439 N62 N52 L70064 L30033

T9 T10 T11

0 1 2

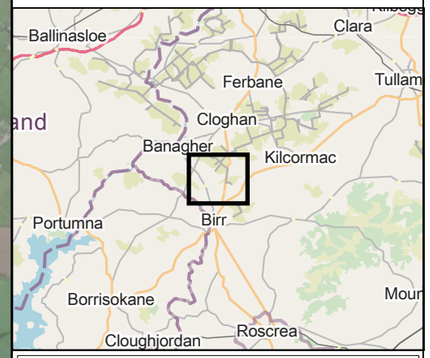
Kilometres

LEGEND

- Site Boundary
- Proposed Turbine Location
- Substation Area
- Amenity Route Phase A
- Amenity Route Phase B
- Site Boundary and Amenity Routes 500 m Buffer

Species Record

- MA Mallard
- RE Redwing
- SN Snipe



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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
NON-BREEDING SEASON 2024 -2025

**MIGRATION SURVEY
INCIDENTAL SPECIES**

FIGURE 4.3

Scale 1:25,000 @ A3

Date AUGUST 2025

501.V64760.00001.0024.1 Migration Survey

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580000 600000 620000

720000

700000

501.V64760.00001.0025.1 Special Protection Areas

LEGEND

- Site Boundary
- Amenity Route Phase A
- Amenity Route Phase B
- Site Boundary and Amenity Trails 20 km Buffer
- Special Protection Area (SPA)

Hydrological Connection

- Watercourse
- Waterbody and Wetland

N

Ballinasloe
River Suck Callows SPA
Culliaghmore
Mongan Bog SPA
Clara
Tullamore
Ferbane
Middle Shannon Callows SPA
Brosna
Drinagh River
Cloghan
Banagher
All Saints Bog SPA
Rapemills River
Boolinarig River
River Little Brosna Callows SPA
Dovegrove Callows SPA
Kilcormac
County Offaly
Monettia Bog
Slieve Bloom Mountains SPA
River Shannon
Portumna
Portumna Forest Park
Birr
Kinnitty Forest
Lough Derg (Shannon) SPA
Borrisokane
Roscrea
Cloughjordan
Mountrath
River Nore SPA

M6 N65 N62 N52 N80

Ireland
Dublin
Cork

0 5 10 Kilometres

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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
NON-BREEDING SEASON 2024 - 2025

SPECIAL PROTECTION AREAS AND HYDROLOGICAL CONNECTIONS WITHIN 20 KM

FIGURE 5

Scale 1:175,000 @ A3

Date AUGUST 2025

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580000 590000 600000 610000 620000 630000

730000 720000 710000

501.V64760.00001.0026.1 Other Nature Conservation Site

Morgan Bog Ramsar Site
Pilgrim's Road Esker pNHA
Mongan Bog NR
Pilgrim's Road Esker SAC
Doon Esker Wood pNHA
Killure Bog NHA
Ballinasloe
M6
Clonfinlough Esker pNHA
Mongan Bog SAC
Mongan Bog pNHA
River Shannon Callows pNHA
Clonlyon Glebe Bog pNHA
Fin Lough (Offaly) pNHA
Suck River Callows NHA
Culliaghmore
Lough Nanag Esker pNHA
Ferbane Bog SAC
Clorhane Wood pNHA
Fin Lough (Offaly) SAC
Grand Canal pNHA
Clara
N52
N62
Tullamore
Ferbane
Ferbane Bog pNHA
Moyclare Bog SAC
Moyclare Bog pNHA
River Shannon Callows SAC
River Shannon Callows pNHA
Clonfert Cathedral pNHA
Kilcormac Esker pNHA
Brosna
Drinagh River
Kilnaborris Bog NHA
Cloghan
Lough Boora pNHA
Pallas Lough pNHA
N80
Moorfield Bog NHA
River Shannon Callows pNHA
River Shannon
Banagher
Banagher (Domestic Dwelling, Occupied) pNHA
Monettia Bog
Ardgraigue Bog pNHA
Cloghanbeg pNHA
Clonaslee Eskers And Derry Bog pNHA
Kilcormac
Meeneen Bog NHA
Capparnilis River
All Saints Bog And Esker pNHA
County Offaly
Ardgraigue Bog SAC
All Saints Bog and Esker SAC
N65
Redwood Bog
Lough Coura pNHA
Capira/Derrew Bog NHA
Boolinarig River
Clonaslee Eskers and Derry Bog SAC
Ballymacegan Bog NHA
Redwood Bog pNHA
Redwood Bog SAC
River Little Brosna Callows NHA
Woodville Woods pNHA
Slieve Bloom Mountains SAC
Kinnitty (Domestic Dwelling, Occupied) pNHA
River Shannon Callows pNHA
Dovegrove Callows pNHA
Birr (Domestic Dwelling No.1, Occupied) pNHA
Slieve Bloom Mountains pNHA
Friar's Lough pNHA
Lorrha Bog NHA
Ballyduff/Clonfinane Bog pNHA
Killeen Bog NHA
Birr
Birr (Domestic Dwelling No. 2, Occupied) pNHA
Portumna
Kinnitty Forest
Camcor Wood pNHA
Lough Derg pNHA
Kilcarren-Firville Bog pNHA
Bracken's Dwelling, Near Whiteford pNHA
Derrykeel Meadows pNHA
Portumna Forest Park
Slieve Bloom Mountains Ramsar Site
Ballyduff/Clonfinane Bog SAC
Arragh More (Derrybreen) Bog SAC
Sharavogue Bog pNHA
Island Fen SAC
Kilcarren-Firville Bog SAC
Lisduff Fen SAC
Liskeenan Fen pNHA
Arragh More Bog NHA
Sharavogue Bog SAC
Fiagh Bog pNHA
Slieve Bloom Mountains pNHA
Spring Park Wetlands pNHA
Liskeenan Fen SAC
Lough Derg, North-east Shore SAC
N62
Lough Nahinch (Tipperary) pNHA
Cangort Bog NHA
Drumakeenan, Eagle Hill And Perry's Mill pNHA
Golden Grove Woods pNHA
Mountrath
Borrisokane
Scohaboy Bog NHA
St. Joseph's, Mountheaton pNHA
Drumakeenan National School pNHA
Scohaboy (Sopwell) Bog SAC
Miltown, Shinrone pNHA
Roscrea
N52
Cloughjordan
M7
0 5 10
Kilometres

LEGEND

- Site Boundary
- Amenity Route Phase A
- Amenity Route Phase B
- Site Boundary and Amenity Trails 20 km Buffer
- Nature Reserves (NR)
- RAMSAR Wetland Site
- Special Area of Conservation (SAC)
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)

Hydrological Connection

- Watercourse
- Waterbody and Wetland

Note
Only designations within 20 km have been labelled.

Ireland
Dublin
Cork

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CUSH WIND FARM PHASE 2

BIRD SURVEY REPORT
NON-BREEDING SEASON 2024 - 2025

OTHER NATURE CONSERVATION SITES AND HYDROLOGICAL CONNECTIONS WITHIN 20 KM

FIGURE 6

Scale 1:175,000 @ A3

Date AUGUST 2025

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Appendix B Survey Metadata

Baseline Ornithology Report – Non Breeding Bird Surveys 2024/25

Cush Wind Farm Phase 2

Cush Wind Farm Ltd

SLR Project No.: 501.065415.00001

13 August 2025

B.1 Survey Dates, Times and Surveyors

Surveyor initials are given in section 1.3.

Table B-1.1: Details of feeding distribution surveys

Date	Surveyor Initials	Start of Survey (hh:mm)	End of Survey (hh:mm)	Survey Duration (hh:mm)
04/10/2024	DN	09:14	12:30	03:06
18/10/2024	DN	10:10	14:10	04:00
06/11/2024	DN	09:05	12:40	03:35
25/11/2024	DN	12:45	16:15	03:30
05/12/2024	DN	12:50	16:05	03:15
19/12/2024	DN	09:00	13:10	04:10
14/01/2025	DN	13:35	16:35	03:00
27/01/2025	DN	11:10	14:10	03:00
11/02/2025	DN	13:20	17:20	04:00
21/02/2025	DN	08:30	12:30	04:00
03/03/2025	DN	15:30	18:30	03:00
19/03/2025	DN	07:15	11:15	04:00
Total hours (hh:mm)				**42:36**

Table B-1.2: Details of nocturnal wader surveys

Date	Surveyor Initials	Start of Survey (hh:mm)	End of Survey (hh:mm)	Survey Duration (hh:mm)
04/10/2024	DN/JM	18:00	20:49	02:49
18/10/2024	DN/FL	17:37	20:00	02:23
06/11/2024	DN/FL	17:15	19:50	02:35
25/11/2024	DN/FL	18:30	20:30	02:00
05/12/2024	DN/FL	18:30	20:30	02:00
19/12/2024	DN/DM	19:30	21:30	02:00
Total hours (hh:mm)				**13:37**

Table B-1.3: Details of nocturnal migration surveys undertaken from VP3

Date	Surveyor Initials	Start of Survey (hh:mm)	End of Survey (hh:mm)	Survey Duration (hh:mm)
11/11/2024	DN	17:25	18:25	01:00
12/11/2024	DN	06:15	07:15	01:00
03/03/2024	DN	18:55	19:55	01:00
20/03/2025	DN	05:20	06:20	01:00
Total hours (hh:mm)				**04:00**

B.2 Survey Weather

Weather keys are as follows:

- Wind speed: 0 = calm, 1 = light air, 2 = light breeze, 3 = gentle breeze, 4 = moderate breeze, 5 = fresh breeze, 6 = strong breeze, 7 = moderate gale, 8 = gale;
- Rain: 0 = none, 1 = drizzle, 2 = light showers/snow, 3 = heavy showers/snow, 4 = heavy rain/snow;
- Cloud height (height of clouds above average height of viewshed): 0 = <150 m, 2 = 150-500 m, 3 = >500 m;
- Visibility: 0 = <1km (poor), 1 = 1-3 km (moderate), 3 = >3 km (good);
- Snow (lying): 0 = none, 1 = on site, 2 = on higher ground; and
- Frost: 0 = none, 1 = on ground in morning, 2 = on ground all day.

Table B-2.1: Weather data collected during feeding distribution surveys

Date	Start of Survey (hh:mm)	End of Survey (hh:mm)	Survey Hour	Wind Speed (Beaufort)	Wind Direction	Rain	Cloud Cover (okta)	Cloud Height	Visibility	Snow	Frost	Temp. (°C)
04/10/2024	09:14	12:20	1	4	N	1	8	2	2	0	0	13
04/10/2024	09:14	12:20	2	5	N	1	8	2	2	0	0	14
04/10/2024	09:14	12:20	3	4	N	1	8	2	2	0	0	14
04/10/2024	09:14	12:20	4	4	N	1	8	2	2	0	0	14
18/10/2024	10:10	14:10	1	6	N	0	8	2	2	0	0	16
18/10/2024	10:10	14:10	2	5	N	0	8	2	2	0	0	16
18/10/2024	10:10	14:10	3	5	N	0	8	2	2	0	0	16
18/10/2024	10:10	14:10	4	5	N	0	8	2	2	0	0	16
06/11/2024	09:05	12:40	1	3	NW	0	6	2	2	0	0	15
06/11/2024	09:05	12:40	2	4	NW	0	4	2	2	0	0	15
06/11/2024	09:05	12:40	3	4	NW	0	4	2	2	0	0	17
06/11/2024	09:05	12:40	4	4	NW	0	4	2	2	0	0	17
25/11/2024	12:45	16:15	1	3	N	0	4	2	2	0	1	2
25/11/2024	12:45	16:15	2	3	N	0	4	2	2	0	1	3
25/11/2024	12:45	16:15	3	3	N	1	4	2	2	0	1	4
05/12/2024	12:50	16:05	1	4	N	0	5	2	2	0	0	6

Date	Start of Survey (hh:mm)	End of Survey (hh:mm)	Survey Hour	Wind Speed (Beaufort)	Wind Direction	Rain	Cloud Cover (okta)	Cloud Height	Visibility	Snow	Frost	Temp. (°C)
05/12/2024	12:50	16:05	2	6	N	3	8	2	2	0	0	6
05/12/2024	12:50	16:05	3	4	N	1	3	2	2	0	0	6
05/12/2024	12:50	16:05	4	6	N	2	8	2	2	0	0	6
05/12/2024	17:15	19:50	1	2	N	2	6	2	2	0	0	6
05/12/2024	17:15	19:50	2	2	N	0	3	2	2	0	0	5
05/12/2024	17:15	19:50	3	2	N	0	2	2	2	0	0	5
19/12/2024	09:00	13:10	1	3	N	0	5	2	2	0	0	4
19/12/2024	09:00	13:10	2	3	NE	0	6	2	2	0	0	5
19/12/2024	09:00	13:10	3	3	NE	0	5	2	2	0	0	6
19/12/2024	09:00	13:10	4	3	NE	0	5	2	2	0	0	6
14/01/2025	13:35	16:35	1	3	SW	0	5	2	2	0	0	10
14/01/2025	13:35	16:35	2	3	SW	0	5	2	2	0	0	10
14/01/2025	13:35	16:35	3	3	SW	0	5	2	2	0	0	9
27/01/2025	11:10	14:10	1	2	S	0	4	2	2	0	0	9
27/01/2025	11:10	14:10	2	2	S	0	4	2	2	0	0	9
27/01/2025	11:10	14:10	3	2	S	0	4	2	2	0	0	9
27/01/2025	18:30	20:30	1	2	S	0	4	2	2	0	0	8
27/01/2025	18:30	20:30	2	2	S	0	4	2	2	0	0	8
11/02/2025	13:20	17:20	1	2	W	0	8	2	2	0	0	5

Date	Start of Survey (hh:mm)	End of Survey (hh:mm)	Survey Hour	Wind Speed (Beaufort)	Wind Direction	Rain	Cloud Cover (okta)	Cloud Height	Visibility	Snow	Frost	Temp. (°C)
11/02/2025	13:20	17:20	2	2	W	1	8	2	2	0	0	5
11/02/2025	13:20	17:20	3	2	W	0	8	2	2	0	0	5
11/02/2025	13:20	17:20	4	2	W	0	8	2	2	0	0	5
11/02/2025	18:30	20:30	1	3	SW	0	7	2	2	0	0	4
11/02/2025	18:30	20:30	2	3	SW	0	7	2	2	0	0	4
21/02/2025	08:30	12:30	1	3	NE	2	8	2	2	0	0	9
21/02/2025	08:30	12:30	2	4	NE	2	8	2	2	0	0	10
21/02/2025	08:30	12:30	3	3	NE	1	7	2	2	0	0	10
21/02/2025	08:30	12:30	4	3	NE	1	8	2	2	0	0	10
03/03/2025	15:30	18:30	1	2	SW	0	5	2	2	0	0	9
03/03/2025	15:30	18:30	2	2	SW	0	5	2	2	0	0	9
03/03/2025	15:30	18:30	3	2	SW	0	4	2	2	0	0	9
19/03/2025	18:55	19:55	1	2	SW	0	4	2	2	0	0	9
19/03/2025	07:15	11:15	1	2	SW	0	3	2	2	0	0	12
19/03/2025	07:15	11:15	2	2	SW	0	3	2	2	0	0	12

Table B-2.2: Weather data collected during nocturnal wader surveys

Date	Start of Survey (hh:mm)	End of Survey (hh:mm)	Survey Hour	Wind Speed (Beaufort)	Wind Direction	Rain	Cloud Cover (okta)	Cloud Height	Visibility	Snow	Frost	Temp. (°C)
29/10/2024	18:00	20:49	1	2	NE	0	7	2	2	0	0	11
29/10/2024	18:00	20:49	2	2	NE	0	6	2	2	0	0	11
29/10/2024	18:00	20:49	3	2	NE	0	6	2	2	0	0	10
05/11/2024	17:37	20:00	1	1	NW	0	5	2	2	0	0	14
05/11/2024	17:37	20:00	2	1	NW	0	6	2	2	0	0	14
05/11/2024	17:37	20:00	3	1	NW	0	4	2	2	0	0	13
05/12/2024	12:50	16:05	1	4	N	0	5	2	2	0	0	6
05/12/2024	12:50	16:05	2	6	N	3	8	2	2	0	0	6
05/12/2024	12:50	16:05	3	4	N	1	3	2	2	0	0	6
05/12/2024	12:50	16:05	4	6	N	2	8	2	2	0	0	6
05/12/2024	17:15	19:50	1	2	N	2	6	2	2	0	0	6
05/12/2024	17:15	19:50	2	2	N	0	3	2	2	0	0	5
05/12/2024	17:15	19:50	3	2	N	0	2	2	2	0	0	5
27/01/2025	11:10	14:10	1	2	S	0	4	2	2	0	0	9
27/01/2025	11:10	14:10	2	2	S	0	4	2	2	0	0	9

Date	Start of Survey (hh:mm)	End of Survey (hh:mm)	Survey Hour	Wind Speed (Beaufort)	Wind Direction	Rain	Cloud Cover (okta)	Cloud Height	Visibility	Snow	Frost	Temp. (°C)
27/01/2025	11:10	14:10	3	2	S	0	4	2	2	0	0	9
27/01/2025	18:30	20:30	1	2	S	0	4	2	2	0	0	8
27/01/2025	18:30	20:30	2	2	S	0	4	2	2	0	0	8
11/02/2025	13:20	17:20	1	2	W	0	8	2	2	0	0	5
11/02/2025	13:20	17:20	2	2	W	1	8	2	2	0	0	5
11/02/2025	13:20	17:20	3	2	W	0	8	2	2	0	0	5
11/02/2025	13:20	17:20	4	2	W	0	8	2	2	0	0	5
11/02/2025	18:30	20:30	1	3	SW	0	7	2	2	0	0	4
11/02/2025	18:30	20:30	2	3	SW	0	7	2	2	0	0	4
20/03/2025	05:20	06:20	1	1	SW	0	2	2	2	0	0	3

Table B-2.3: Weather data collected during nocturnal migration surveys

Date	Start of Survey (hh:mm)	End of Survey (hh:mm)	Survey Hour	Wind Speed (Beaufort)	Wind Direction	Rain	Cloud Cover (okta)	Cloud Height	Visibility	Snow	Frost	Temp. (°C)
11/11/2024	17:25	18:25	1	2	S	0	8	0	0	0	0	6
12/11/2024	06:15	07:15	1	1	S	0	7	1	1	0	1	-1
03/03/2025	18:55	19:55	1	2	SW	0	4	2	2	0	0	9
20/03/2025	05:20	06:20	1	1	SW	0	2	2	2	0	0	3

Appendix C Bird species names

Baseline Ornithology Report – Non Breeding Bird Surveys 2024/25

Cush Wind Farm Phase 2

Cush Wind Farm Ltd

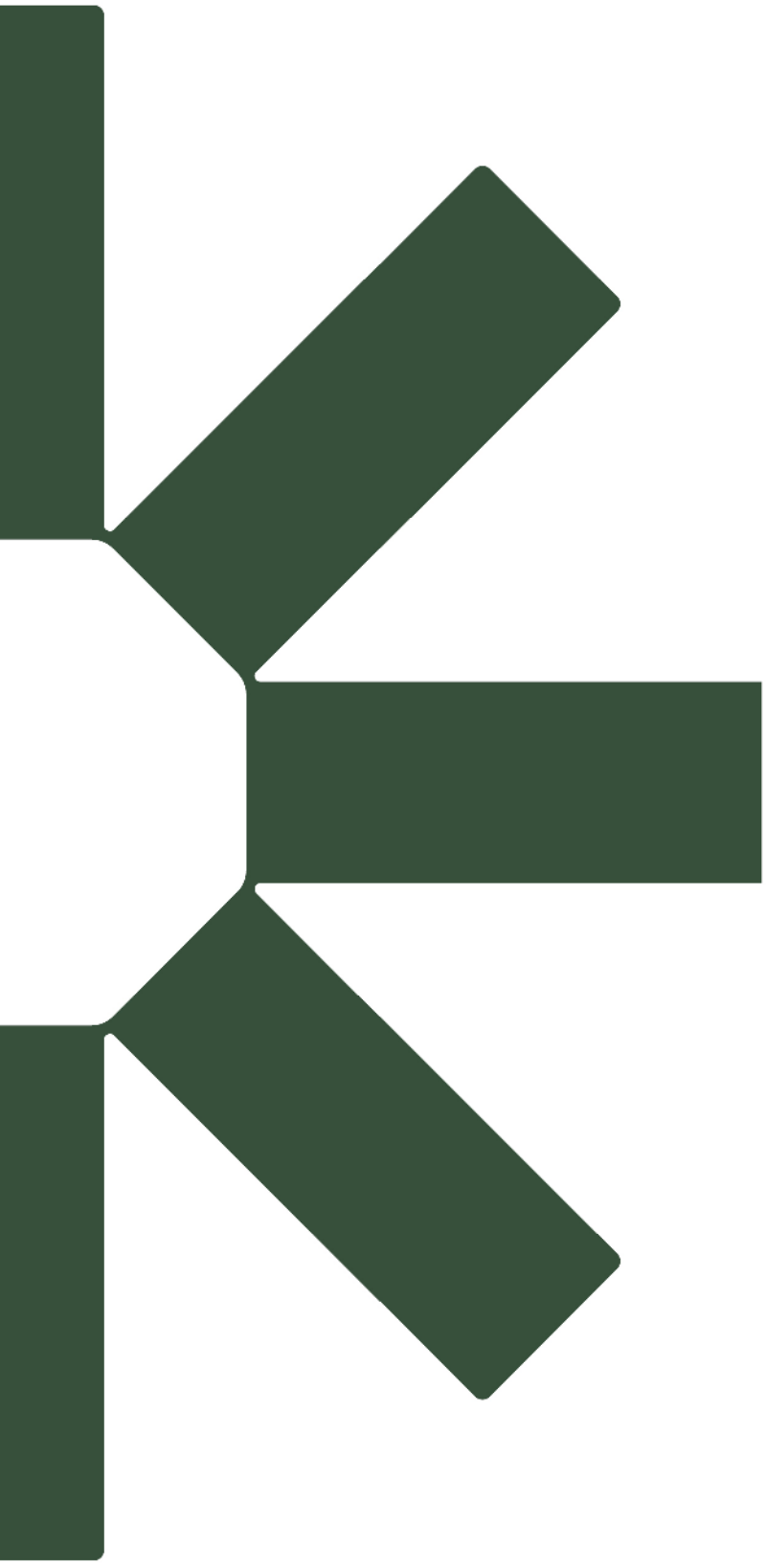
SLR Project No.: 501.065415.00001

13 August 2025

Table D-1: Names of bird species discussed in the report

BTO Code	Common Name	Latin Name
BH	Black-headed gull	*Chroicocephalus ridibundus*
BO	Barn owl	*Tyto alba*
BW	Black-tailed godwit	*Limosa limosa*
BZ	Common buzzard	*Buteo buteo*
CE	Corncrake	*Crex crex*
CA	Great cormorant	*Phalacrocorax carbo*
CO	Eurasian coot	*Fulica atra*
CU	Eurasian curlew	*Numenius arquata*
GG	Great crested grebe	*Podiceps cristatus*
HW	Great white egret	*Ardea alba*
GN	Common goldeneye	*Bucephala clangula*
GP	European golden plover	*Pluvialis apricaria*
H.	Grey heron	*Ardea cinerea*
HH	Hen harrier	*Circus cyaneus*
K.	Common kestrel	*Falco tinnunculus*
L.	Northern lapwing	*Vanellus vanellus*
LB	Lesser black-backed gull	*Larus fuscus*
LG	Little grebe	*Tachybaptus ruficollis*
MA	Mallard	*Anas platyrhynchos*
ML	Merlin	*Falco columbarius*
MP	Meadow pipit	*Anthus pratensis*
MR	Western marsh harrier	*Circus aeruginosus*
MS	Mute swan	*Cygnus olor*
NW	Greenland white-fronted goose	*Anser albifrons flavirostris*
PE	Peregrine Falcon	*Falco peregrinus*
PT	Northern pintail	*Anas acuta*
RB	Reed Bunting	*Emberiza schoeniclus*
RG	Red grouse	*Lagopus lagopus scoticus*
RK	Redshank	*Tringa totanus*
RP	Common ringed plover	*Charadrius hiaticula*
S.	Skylark	*Alauda arvensis*
SB	Snow bunting	*Plectrophenax nivalis*
SH	Eurasian sparrowhawk	*Accipiter nisus*
SN	Common snipe	*Gallinago gallinago*
SV	Northern shoveler	*Anas clypeata*

BTO Code	Common Name	Latin Name
T.	Eurasian teal	*Anas crecca*
TU	Tufted duck	*Aythya fuligula*
WN	Eurasian wigeon	*Mareca penelope*
WS	Whooper swan	*Cygnus cygnus*



Making Sustainability Happen

Bird Migration Survey Report

Cush Wind Farm

Cush Wind Farm Ltd

Clondargan, Stradone, Co. Cavan

Prepared by:

SLR Environmental Consulting (Ireland) Ltd

7 Dundrum Business Park, Windy Arbour, Dublin, D14 N2Y7

SLR Project No.: 501.065415.00001

Client Reference No: N/A

29 May 2024

Revision: 1

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
0	28 May 2024	Alice Magee	Dr Jonathon Dunn	Dr Jonathon Dunn
1	29 May 2024	Dr Jonathon Dunn	Sinéad Clifford	Dr Jonathon Dunn

Basis of Report

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Appendix A **Survey Dates, Times and Surveyors**
Appendix B **Weather data**
Appendix C **Flight Activity Survey Data**

1.0 Introduction

SLR Environmental Consulting (Ireland) Ltd (SLR) was commissioned by Cush Wind Farm Ltd to carry out bird migration watch surveys for the proposed eight turbine wind farm at Cush, Co. Offaly (hereafter 'the Project') during April 2024. The purpose of this report is to describe these surveys and the resulting ornithological baseline.

1.1 Background

No previous planning permission has been sought on the application site for the development of wind farms by Cush Wind Farm Ltd or any other party.

Bird surveys have been previously undertaken at the proposed Project site at Cush, Co. Offaly (hereafter 'the Project Site') by SLR for the breeding 2020, non-breeding 2020/21, breeding 2021, non-breeding 2021/22, breeding 2022 seasons, non-breeding 2022/23, breeding 2023, and non-breeding 2023/24 seasons.

The Project Site also includes a linear area that was previously surveyed for a proposed overhead line[1]. Flight activity surveys were carried out at two vantage point locations along the proposed overhead line route corridor during the breeding season in 2018.

These surveys were used to inform a planning application (including an Environmental Impact Assessment Report or 'EIAR' and Natura Impact Statement or 'NIS'), which was submitted to ABP in January 2024 (planning reference number ABP-313778-22).

Following the planning application, ABP received an ornithology-related submission from the Development Applications Unit (DAU) in March 2024, which related to migratory birds. The DAU response suggested that the risk to birds on migration of being involved in collisions with the proposed wind farm in its operational phase has not been satisfactorily evaluated.

1.2 Site Description

The Project Site is in the townland of Cush approximately 4 km north of Birr, Co. Offaly at approximate ITM coordinates 608237, 709946. The habitats within the Project Site are dominated by conifer plantations of varying age classes (c.327 ha), cutaway bog (c.102 ha) and agricultural grasslands (ca. 327 ha). The Project Site is not designated for nature conservation.

1.3 Scope of Work

The scope of survey work was based on existing knowledge of the area and took into account current NatureScot (NS; formerly Scottish Natural Heritage, SNH) Guidance[2]. The survey methods guidance is recognised as standard best practice guidance throughout the UK and Ireland for surveying birds to inform impact assessment for onshore wind farms.

With specific reference to the subject of this report, NS guidance statements that "*where a high level of migration movements are considered likely, or are known, to occur, sampling within this period should be stratified to ensure adequate data collection across the spring and autumn periods. Additional survey is not always necessary but may be required to cover this adequately in large areas or areas of high activity*".

[1] SLR (2018) *Cloghan Wind Farm and Long Oak Wind Farm Breeding Bird Survey Report 2018*. Prepared for Galetech Energy Services Ltd

[2] Scottish Natural Heritage (2017). *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms V2.* Scottish Natural Heritage, Inverness.

It also says that *"for species which are active at dawn and dusk or at night, other methods of recording or assessing activity need to be employed. Night vision/infra-red equipment and survey on moonlit nights can establish presence of nocturnal species or presence and direction of feeding/migration movements both by calls and by sight (although we accept following birds beyond short distances is almost impossible, and that for most species nocturnal activity is likely to be underestimated in any attempted survey)"*.

As the extensive suite of diurnal flight activity surveys carried out to date ought to have detected any diurnal migration, a focus was given to searching for evidence of crepuscular and nocturnal migration during the current surveys.

1.4 Target Species

All bird species observed were recorded, with a focus given to species that are Special Conservation Interests (SCIs) or Qualifying Interest (QIs) for any designated nature conservation site (primary target species). All other species were classified as secondary targets.

1.5 Terminology

For this report, "flight line" refers to the line drawn to record avian movement during a vantage point (VP) survey. A single flight line may be used to indicate the collective movement of a flock of birds. Each individual bird moving within the same flight line is referred to as "a flight". Note that the "cumulative number of flights" reflects the occupancy of the study area by a particular species. It is not equivalent to the total number of unique individuals and should not be used to infer abundance.

1.6 Purpose of this Report

This report outlines the surveys undertaken and methods used. It then summarises the survey data obtained and provides descriptions of the legal and conservation status of the species recorded.

The assessment of impacts resulting from the Project and the development of mitigation measures, if required, are beyond the scope of this report. However, this report will be used to inform responses to submissions received from the DAU pertaining to migratory birds and associated impact assessment.

2.0 Methodology

2.1 Field Surveys

2.1.1 Field Survey Team: Evidence of Technical Competence and Experience

2.1.1.1 Jonathon Dunn (JD) – Project Manager and Lead Ornithologist

Jonathon is an Associate Ornithologist with SLR and holds a BA (Hons) in Natural Sciences from the University of Cambridge, an MSc in Ecology Evolution and Conservation from Imperial College London and a PhD in Avian Ecology from Newcastle University. He is a Full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Jonathon is a highly skilled and experienced bird surveyor with eight years' post graduate experience as a professional consultant ecologist. Jonathon managed this project through liaison with the client, coordination of the survey team, supervision of the health and safety of the team, collating, quality controlling and assessing the survey data.

2.1.1.2 Darragh Nagle (DN) – Project Ecologist

Darragh is a Project Ecologist and graduated from University College Cork in 2020 with a BSc degree (Hons) in Ecology and Environmental Ecology. He is a qualifying member with CIEEM. Since joining SLR Darragh's field experience includes multiple diverse bird surveys on windfarm sites across Ireland with experience in vantage point, breeding wader, breeding raptor, feeding distribution, hen harrier roost *Circus cyaneus* and intertidal bird surveys. Darragh carried out migration watch VP surveys at the Project Site in April 2024.

2.1.2 Migration Watch Vantage Point (VP) Surveys

The three VP locations, 2 km viewing arcs and viewsheds were the same as used for previous flight activity surveys.

Note that the viewshed from VP3 mostly covers an area that is not under consideration for the current planning application and is outside the Project Site. Results from surveys carried out at this VP have been included to provide additional information on migration movements in the wider area.

The purpose of these surveys was to identify any evidence of migration, especially by qualifying interest (QI) species between the Project Site and any nearby Special Protection Areas (SPAs) around dawn or dusk.

A total of 18 hours of migration watch VP surveys were conducted from all VP locations combined during April 2024, as summarised in **Table 2-1**.

One dusk survey and one dawn survey were conducted from each VP. Dusk surveys commenced two hours before dusk and finished one hour after dusk, whereas dawn surveys commenced one hour before dawn and finished two hours after dawn.

A Helion 2 XP50 Pro Thermal Monocular was used during periods of darkness. This enables birds to be readily detected by their body heat at up to c. 350 m range. Where birds were detected, images were recorded as videos.

For each primary target species observation, the following details were recorded:

- Time of observation;
- Duration of flying bout;
- Species, age and sex (where determinable);

- Number of flights observed;
- Time spent within each height band; and
- Notes on observation.

Local circumstances may indicate that survey information should also be acquired on other species, especially those of regional conservation concern. Such species are termed secondary species. Recording of secondary species is subsidiary to recording of primary target species. A summary of observations of secondary target species was recorded at the end of each five-minute period during each VP watch to provide an index of flight activity for secondary target species within and around the Project Site, in accordance with current NS guidance.

Secondary target species included any other species not designated as primary targets.

For April 2024, height bands were determined allowing for the maximum rotor tip height of 200 m and a lowest rotor swept height of 28 m. The relation of the height bands to the latest turbine specification is shown below.

Flight heights were attributed to four distinct height bands for the non-breeding season as follows:

- 1 = <25 m (below the likely rotor swept area);
- 2 = 25 m to 160 m (potentially within the likely rotor swept area, at least in part);
- 3 = 160 m to 200 m (within the likely rotor swept area); and
- 4 = >200 m (above the likely rotor swept area).

Details of survey dates, times and observers are provided in **Appendix A** and details of weather conditions in **Appendix B**.

Table 2-1: Summary of Migration Surveys Undertaken During April 2024

Time Period	VP1 (hours)	VP2 (hours)	VP3 (hours)
Dusk	03:00	03:00	03:00
Dawn	03:00	03:00	03:00
Total hrs	**6:00**	**6:00**	**6:00**
VP locations ITM	608735 E 710130 N	605883 N 709097 N	607798 E 711305 N

2.2 Survey Limitations

There were no periods of poor visibility due to weather conditions during any of surveys i.e. less than 1 km. Therefore, weather conditions are not considered to be significant limitations to the survey data obtained. Details regarding weather conditions during surveys are provided in **Appendix B**.

The range of the thermal imaging camera is greater than that tip height of the proposed turbines and so any evidence of nocturnal migration ought to have been detected, if present.

3.0 Results

3.1 Migration Watch VP Surveys

A summary of the survey findings is provided in sections 3.1.1 and 3.1.2 for primary and secondary target species, respectively. Flight data for both primary and secondary target species are provided in **Appendix C**.

3.1.1 Primary Target Species

A total of four flight lines by three primary target species were recorded during the surveys.

Northern lapwing is the only species recorded during surveys that is a QI for any SPAs with 20 km of the Project Site. Flight activity is summarised in **Table 3-1.**

Table 3-1: Number of Primary Target Species Flights

Species	Number of flight lines by VP			Total number of flight lines	Time at risk height* (s)	Cumulative number of flights
	VP1	VP2	VP3 (area outside current planning application)			
Common snipe *Gallinago gallinago*	0	0	1	1	0	5
Mallard *Anas platyrhynchos*	2	0	0	2	0	4
Northern lapwing *Vanellus vanellus*	0	0	1	1	65	1
***** precautionary risk height assumed to be between 20 – 200 m						

A summary of flight activity by species is presented below.

3.1.1.1 Common snipe

One flight line consisting of five flights was recorded during the dawn survey from VP3, at the edge of the 500 m survey buffer for the Project Site. The flights were recorded of snipe foraging by the water in a bog pool, drumming and flying at an average height of 5 m, which is below potential collision heights.

3.1.1.2 Mallard

Two flight lines were recorded within the Project Site from VP1, with each flight line consisting of two flights. One flight line was recorded during the dusk survey and one flight line was recorded during the dawn survey. Both flight lines were below potential collision heights and were short, comprising of birds moving over the centre of the Project Site.

3.1.1.3 Northern lapwing

One flight line consisting of one flight was recorded during the dawn survey from VP3. The flight was within the Project Site at an average height of 20 m. Due to the low height of the flightline, it is not considered that this flight was migrating between the Project Site and any nearby SPAs.

3.1.2 Secondary target species

Secondary species activity at the Project Site is summarised in **Table 3-2**.

Table 3-2: Secondary Species Activity Summary

Species	Number of 5 min periods recorded	Peak count of birds recorded in any 5 min period	Comments
Common buzzard *Buteo buteo*	6	2	Activity within the Project Site only.
Grey heron *Ardea cinerea*	3	3	Activity within the Project Site, buffer & beyond.
Northern raven *Corvus corax*	3	1	Activity within the Project Site, buffer & beyond.

4.0 Summary and Conclusions

Migration watch VP surveys were carried out at Project Site during April 2024, which comprised one dusk survey and one dawn survey conducted at each of the three VP locations.

The following primary target species were recorded during flight activity surveys:

- Common snipe;
- Mallard; and
- Northern lapwing.

A total of four flight lines were recorded during surveys, which comprised two mallard flight lines, one common snipe flight line and one northern lapwing flight line. Northern lapwing is a QI for three SPAs within 20 km.

However, none of the recorded flight lines were considered to be of migrating birds, due to the low numbers of individuals recorded, short flight durations and very low flight heights.

Overall, no evidence of SCI or QI species migrating between the Project Site and any nearby SPAs was recorded during the migration watch VP surveys in April 2024.

The results of this survey agree with the results of previously conducted bird surveys and the baseline conditions reported in the 2024 EIAR and NIS.

5.0 Legal and Conservation Status of Target Species Recorded

Table 5-1 summarises the legal and conservation status of the target species recorded during the range of ornithology surveys mentioned above. All birds are protected by the Wildlife Acts 1976 (as amended) in Ireland.

Table 5-1: Legal and Conservation Status of Target Species

Primary or Secondary Target	Species (BTO Code)	Legal & Conservation Status in Ireland
Primary	Common snipe (SN)	BoCCI4 Red
	Mallard (MA)	BoCCI4 Amber
	Northern lapwing (L.)	BoCCI4 Red
Secondary	Common buzzard (BZ)	BoCCI4 Green

Primary or Secondary Target	Species (BTO Code)	Legal & Conservation Status in Ireland
	Grey heron (H.)	BoCCI4 Green
	Northern raven (RN)	BoCCI4 Green

Appendix A Survey Dates, Times and Surveyors[3]

Bird Migration Survey Report

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065415.00001

29 May 2024

[3] Surveyor initials can be found in Section 2.1.1

Table A-1: Details of migration watch VP surveys

Date	Surveyor	VP	Start (hh:mm)	End (hh:mm)	Survey Duration (hh:mm)
02/04/2024	DN	1	18:44	21:44	03:00
03/04/2024	DN	3	05:23	08:23	03:00
03/04/2024	DN	2	18:46	21:46	03:00
04/04/2024	DN	1	05:21	08:21	03:00
04/04/2024	DN	3	18:48	21:48	03:00
05/04/2024	DN	2	05:19	08:19	03:00
Total Hours					**18:00**

Appendix B Weather data

Bird Migration Survey Report

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065415.00001

29 May 2024

Table B-1: Weather data collected during migration watch VP surveys undertaken at VP1

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
02/04/2024	DN	18:44	21:44	1	2	E	1	6	2	2	0	0	9
02/04/2024	DN	18:44	21:44	2	2	E	0	6	2	1	0	0	8
02/04/2024	DN	18:44	21:44	3	2	E	0	6	2	0	0	0	7
04/04/2024	DN	05:21	08:21	1	1	E	0	8	2	0	0	0	6
04/04/2024	DN	05:21	08:21	2	1	E	0	8	2	2	0	0	6
04/04/2024	DN	05:21	08:21	3	1	E	0	8	2	2	0	0	6

Rain/ Precipitation	Cloud Cover	Visibility	Lying Snow	Frost
None 0	Expressed in oktas (n/8)	Poor (<1km) 0	None 0	None 0
Drizzle 1	Cloud Height	Moderate (1-3km) 1	On site 1	Ground 1
Light showers/snow 2	Height of cloud above	Good (>3km) 2	On higher ground 2	All day 2
Heavy showers/snow 3	average height of viewshed	Thermal camera used during periods of poor visibility due to darkness.		
Heavy rain/snow 4	<150m 0			
	150-500m 1			
	>500m 2			

Table B-2: Weather data collected during migration watch VP surveys undertaken at VP2

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
03/04/2024	DN	18:46	21:46	1	2	S	0	7	2	2	0	0	6
03/04/2024	DN	18:46	21:46	2	3	S	3	8	2	2	0	0	6
03/04/2024	DN	18:46	21:46	3	4	S	1	8	2	0	0	0	6
05/04/2024	DN	05:19	08:19	1	3	SE	2	7	2	0	0	0	6
05/04/2024	DN	05:19	08:19	2	3	SE	0	6	2	2	0	0	6
05/04/2024	DN	05:19	08:19	3	3	SE	0	5	2	2	0	0	6

Rain/ Precipitation	Cloud Cover	Visibility	Lying Snow	Frost
None 0	Expressed in oktas (n/8)	Poor (<1km) 0	None 0	None 0
Drizzle 1	Cloud Height	Moderate (1-3km) 1	On site 1	Ground 1
Light showers/snow 2	Height of cloud above	Good (>3km) 2	On higher ground 2	All day 2
Heavy showers/snow 3	average height of viewshed	Thermal camera used during periods of poor visibility due to darkness.		
Heavy rain/snow 4	<150m 0			
	150-500m 1			
	>500m 2			

Table B-3: Weather data collected during migration watch VP surveys undertaken at VP3

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
03/04/2024	DN	05:23	08:23	1	3	NW	0	8	2	0	0	0	6
03/04/2024	DN	05:23	08:23	2	3	NW	0	5	2	2	0	0	8
03/04/2024	DN	05:23	08:23	3	3	NW	0	4	2	2	0	0	8
04/04/2024	DN	18:48	21:48	1	3	E	2	8	2	2	0	0	11
04/04/2024	DN	18:48	21:48	2	3	SE	3	8	2	2	0	0	10
04/04/2024	DN	18:48	21:48	3	3	SE	2	8	2	2	0	0	10

Rain/ Precipitation	Cloud Cover	Visibility	Lying Snow	Frost
None 0	Expressed in oktas (n/8)	Poor (<1km) 0	None 0	None 0
Drizzle 1	Cloud Height	Moderate (1-3km) 1	On site 1	Ground 1
Light showers/snow 2	Height of cloud above	Good (>3km) 2	On higher ground 2	All day 2
Heavy showers/snow 3	average height of viewshed	Thermal camera used during periods of poor visibility due to darkness.		
Heavy rain/snow 4	<150m 0			
	150-500m 1			
	>500m 2			

Appendix C Flight Activity Survey Data[4]

Bird Migration Survey Report

Cush Wind Farm

Cush Wind Farm Ltd

SLR Project No.: 501.065415.00001

29 May 2024

[4] The key to BTO Codes can be found in Section 5.0.

Table C-1: Primary target species recorded during migration watch VP surveys at all VPs combined

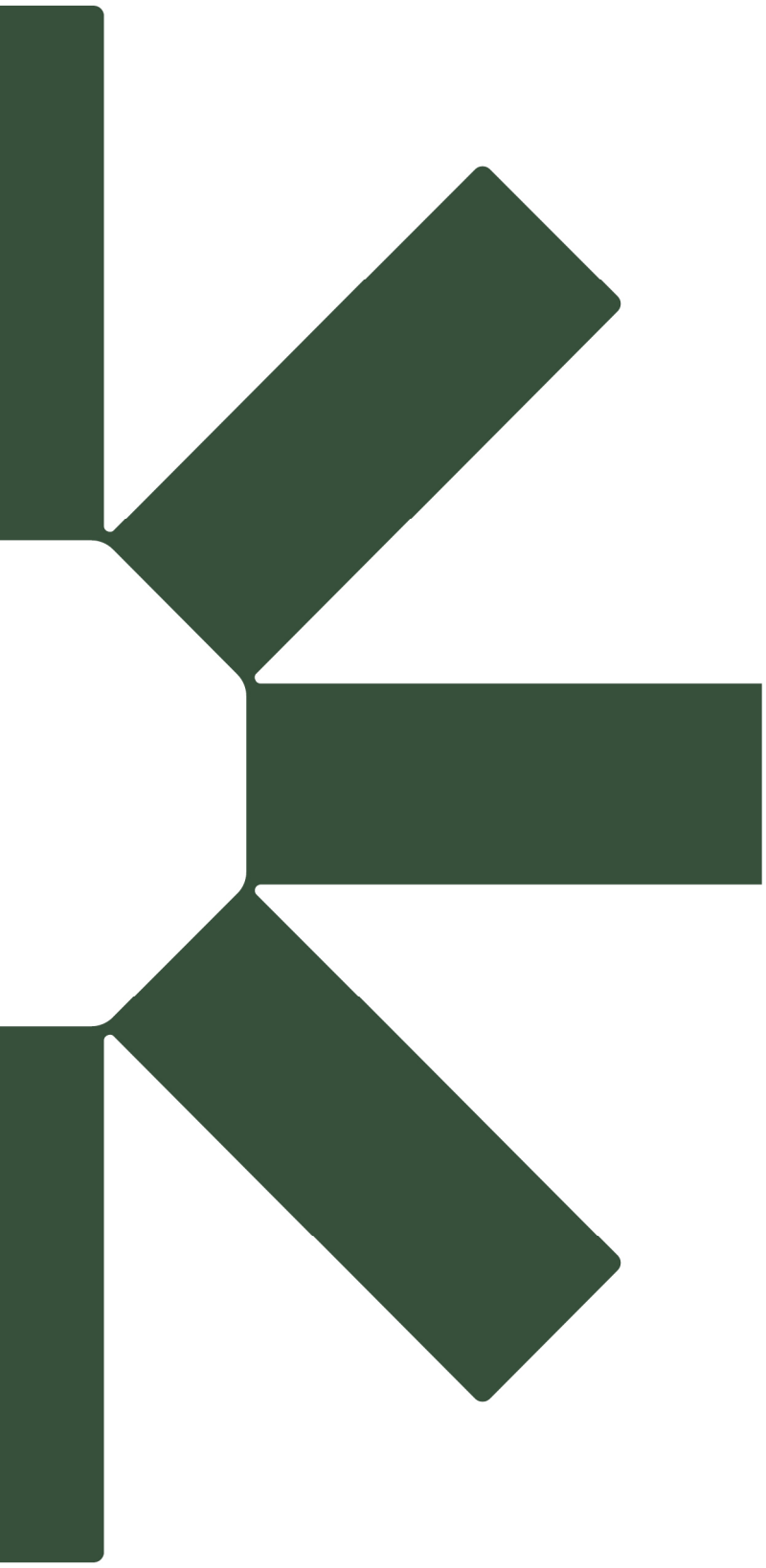
Date	Surveyor	VP	Flight ID	BTO Code	Num. Birds	Age [5]	Sex[6]	Obs. Time	Avg. flight height (m)	Flight time (s)
02/04/2024	DN	1	1	MA	2	AD	M	19:27	15	60
03/04/2024	DN	3	1	SN	5	AD	U	06:02	5	180
03/04/2024	DN	3	2	L.	2	AD	U	08:03	20	140
04/04/2024	DN	1	1	MA	2	AD	M	07:34	5	50

Table C-2: Secondary target species recorded during migration watch VP surveys at all VPs combined

Date	VP	Survey Start	Survey End	5 min period	BTO Code	Count
02/04/2024	1	05:19	08:19	19:00	RN	1
02/04/2024	1	05:19	08:19	19:20	H.	3
02/04/2024	1	05:19	08:19	19:20	BZ	1
02/04/2024	1	05:19	08:19	21:00	BZ	1
02/04/2024	1	05:19	08:19	21:10	RN	1
03/04/2024	3	05:23	08:23	07:00	H.	1
03/04/2024	2	18:46	21:46	19:20	BZ	2
03/04/2024	2	18:46	21:46	20:00	BZ	1
04/04/2024	1	05:21	08:21	07:00	RN	1
04/04/2024	1	05:21	08:21	07:20	BZ	1
04/04/2024	1	05:21	08:21	08:00	H.	1
05/04/2024	2	05:19	08:19	07:45	BZ	1

[5] Age letters refer to; AD =Adult, U=Unrecorded

[6] Sex letters refer to; M=Male, F=Female, U=Unrecorded



Making Sustainability Happen