



## **APPENDIX 7-4**

**BIRD SURVEY RESULTS –  
BREEDING SEASON 2020**

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## APPENDIX 7-4

### Bird Survey Report Breeding Season 2020

# BIRD SURVEY REPORT

## BREEDING SEASON 2020

**Seven Hills Wind Farm Phase I and II**

Prepared for: Seven Hills Wind Farm Ltd

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## 1.0 Introduction

SLR Consulting Ireland (SLR) was commissioned by Seven Hills Wind Farm Ltd. in April 2020 to carry out a breeding bird survey programme for the proposed Seven Hills Wind Farm Phases I and II during the breeding season in 2020. There are two phases within the current iteration of the wind farm design, hereafter referred to as Wind Farm I and Wind Farm II.

### 1.1 Background to the Commission

Planning permission was originally granted by An Bord Pleanála (ABP) for both of these developments (Phase 1 ABP Planning Ref: PL 20.244346 / 20.239759; Phase 2 ABP Planning Ref: PL 20.244347 / 241069), it was subsequently refused following the appeal process. The main reasons for refusal of planning for each of the developments cited by An Bord Pleanála are the issues relating to the lack of certainty in relation to the impact of the proposed development on European Sites in the vicinity of the proposed developments and the qualifying interests for which those European Sites are designated.

### 1.2 Site Description

The dominant habitat within the boundaries of the proposed Seven Hills Wind Farm I site is improved agricultural grassland and the site is not designated for nature conservation.

The proposed Seven Hills Wind Farm II site is a slightly more diverse area in terms of habitat composition with dominant habitats present being improved agricultural grassland, dry calcareous grassland and scrub. The site also does not hold any designations for nature conservation.

There are several Natura 2000 designated sites relating to birds located within 15km of each site. Please see Table 3-1 for further details of these.

### 1.3 Purpose of the Report

The aim of this report is to provide robust baseline ornithological survey data for the breeding period in 2020 at both phases of the wind farm at Seven Hills, Co. Roscommon. These data will be used to inform the ecological impact assessment and appropriate assessment for the proposed wind farm. The assessment of potential impacts is beyond the scope of this report.

This report follows on from the bird survey report for the breeding season in 2019 (SLR Consulting, 2020). As such, in order to glean a comprehensive representation of breeding bird activity at both proposed wind farm sites across the two breeding seasons, the 2019 report should be read alongside this report.

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## 2.0 Methodology

### 2.1 Desk-based Review

The majority of available data on both proposed wind farm sites relates to wintering birds with limited previous data available on breeding birds. The desk-based review collated all the available information to date on breeding birds in and around the wind farm development. This included a review of the following documents submitted as part of the original planning application:

- Proposed Seven Hills Windfarm Site: Ornithological Assessment Report June 2010. Forest, Environmental Research and Services Ltd. Included as Appendix 8.1 of the EIS (FERS, 2010); and
- Proposed Seven Hills Wind-farm (Phase II): Ornithological Assessment July 2011. Forest, Environmental Research and Services Ltd. Included as Appendix 8.1 of the EIS (FERS, 2010).

The websites of the National Parks and Wildlife Service (NPWS) [www.npws.ie](http://www.npws.ie) and the National Biodiversity Data Centre (NBDC) <http://maps.biodiversityireland.ie/#/Map> were also accessed for information on sites designated for nature conservation in the vicinity of the sites.

### 2.2 Field Surveys

The scope of breeding bird surveys for the proposed wind farm is based on recommendations given in Scottish Natural Heritage (SNH) 2017<sup>1</sup>. This survey methods guidance is recognised as standard best practice guidance throughout the UK and Ireland for surveying birds to inform impact assessment of onshore wind farms.

#### 2.2.1 Field Survey Team: Evidence of Technical Competence and Experience

##### **Sarah Ingham (SI) – Project Manager and Lead Ornithologist**

Sarah is a Senior Ecologist with SLR and holds a BSc in Zoology from Anglia Ruskin University, Cambridge, UK and an MSc in Biodiversity and Conservation from Trinity College Dublin. She is an Associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Sarah is a highly skilled and experienced bird surveyor with 11 years' post graduate experience as a professional consultant ecologist/ornithologist.

Sarah managed this project through liaison with the client, coordination of the survey team, supervision of the health and safety of the team, carrying out various bird surveys onsite throughout the survey season, collating, quality controlling and assessing the survey data and writing this report.

##### **Daniel Hulmes (DH) – Bird Surveyor**

Daniel is a Senior Field Ornithologist and Terrestrial Ecologist. He has worked on a wide range of projects involving the survey and monitoring of birds in the UK, Ireland and internationally. Furthermore, as part of his previous work as an Ecologist, he gained experience in managing projects which included a large amount of report writing, survey planning and client interaction.

Supervised by Sarah Ingham, Daniel assisted with breeding bird surveys at Seven Hills Wind Farm in June 2020.

##### **Jason Cahill (JC) – Assistant Bird Surveyor**

Jason joined SLR in February 2020, and this is his first long-term role in ecological consultancy. Jason holds a BSc (Hon) in Field Biology with Wildlife Tourism from Institute of Technology Tralee. Jason has experience with bird surveys, involving vantage point and transect surveys, data collection and input. Supervised by Sarah Ingham, Jason also assisted with bird surveys at Seven Hills Wind Farm in May 2020.

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<sup>1</sup> SNH (2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Version 2.

## 2.2.2 Flight Activity Surveys

Vantage point (VP) locations were the same as those used in each season since winter 2018-19, which were initially chosen based on locations used during previous surveys (see Section 3.1). 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 vantage point (VP). The Zones of Theoretical Visibility (ZTV) from each VP were calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTVs were calculated with a surface offset of 30m and from a viewing height of 1.8m above ground level. The terrain model was derived from EU-DEM data with a vertical accuracy of  $\pm 7m$ . VP locations and viewing arcs are shown in Figure 1 and VP viewsheds are shown in Figure 2.

A total of 36 hours of watches were undertaken at each of the six VP locations during the breeding season (monthly visits April - September inclusive). This equates to a total of six hours per VP per month. The VP survey effort undertaken during the breeding season of 2020 is given below in Table 2-1.

**Table 2-1: VP survey effort undertaken at the Seven Hills Wind Farm (WF) I and II sites April to September 2020 (hrs : mins)**

Month	WFI VP1	WFI VP2	WFII VP1	WFII VP2	WFII VP3	WFII VP4
April	6:00	6:00	6:00	6:00	6:00	6:00
May	6:00	6:00	6:00	6:00	6:00	6:00
June	6:00	6:00	6:00	6:00	6:00	6:00
July	6:00	6:00	6:00	6:00	6:00	6:00
August	6:00	6:00	6:00	6:00	6:00	6:00
September	6:00	6:00	6:00	6:00	6:00	6:00
<b>Total hrs</b>	<b>36:00</b>	<b>36:00</b>	<b>36:00</b>	<b>36:00</b>	<b>36:00</b>	<b>36:00</b>
VP grid locations (Figure 1)	587337 E 748665 N	585834 E 746017 N	588967 E 745061 N	587372 E 743512 N	590643 E 743279 N	592160 E 743701 N

It is good practice to ensure that where possible each monthly six-hour survey period should be split over more than a single day and spread across the day. As such, the six-hour survey periods were divided into three-hour blocks, the times of which were alternated across consecutive days e.g. on day 1, VP1 would be completed in the morning and VP2 would be completed in the afternoon and on day 2, VP2 would be completed in the morning and VP1 in the afternoon. In this way, it was possible to glean a clear picture of bird movements from each VP across the diurnal period. Details of survey dates, times and observers are provided in Appendix I and a record of weather conditions during surveys is provided in Appendix II.

VP watches aimed to quantify the flight activity of primary and secondary target species (as defined in Section 2.2.2.1) 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 site;
- The relative use by birds of different parts of the 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);
- 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, the recording height bands were determined based on the turbine specifications included in the previous application (tip height 135m, lowest rotor swept height 35m) plus a bit extra to allow some flexibility. Flight heights were therefore attributed to three distinct height bands as follows:

- 1 = < 30m (below the likely rotor swept area);
- 2 = 30m to 150m (the likely rotor swept area);
- 3 = > 150m (above the likely rotor swept area).

In addition, a summary of observations of secondary target species (see Section 2.2.2.1) 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 site, in accordance with current SNH 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 500m buffer or beyond;
- Flight behaviour; and
- Notes on observation.

#### 2.2.2.1 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 SNH Guidance (2017).

##### 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 terms, thereby enabling recording to focus on the species of greatest importance. This approach was also taken for the 2019 breeding bird surveys.

SNH guidelines state that “*in most circumstances the target species will be limited to those species which are afforded a higher level of legislative protection.*” Kestrel, buzzard and sparrowhawk are not subject to a higher level of legislative protection than any other bird species and were therefore not recorded as primary target species during the 2019 or 2020 breeding bird surveys.

Furthermore, primary target species were specifically limited to species upon which effects are most likely to be potentially significant in EIA terms, e.g. breeding species forming qualifying features for nearby SPAs or species listed on Annex I of the Birds Directive. 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. A precautionary approach was taken to the inclusion of Annex 1 species as primary target species with all Annex 1 raptor/owl species with any realistic potential to be present included as primary target species, although it was recognised that the likelihood of some of these species breeding in the vicinity of the sites was very low.

As such, the primary target species for these VP surveys included the following bird species:

- peregrine falcon *Falco peregrinus*;
- hen harrier *Circus cyaneus*;

- merlin *Falco columbarius*;
- short-eared owl *Asio flammeus*;
- lapwing *Vanellus vanellus*;
- golden plover *Pluvialis apricaria*;
- curlew *Numenius arquata*;
- black-headed gull *Chroicocephalus ridibundus*
- herring gull *Larus argentatus*.

Although lapwing, curlew, black-headed gull and herring gull are not listed under Annex I of the Birds Directive, the breeding populations of these species are Red-listed in Ireland under the Birds of Conservation Concern 2014-2019 (Colhoun and Cummins, 2013) as numbers of breeding pairs within the Irish landscape have suffered a serious decline in recent years. As such, any observations of these four species were also recorded as primary target species during the summer months.

### Secondary Target Species

Secondary target species included:

- Any other wildfowl, wader and gull species;
- Buzzard *Buteo buteo*;
- Sparrowhawk *Accipiter nisus*;
- Kestrel *Falco tinnunculus*;
- Raven *Corvus corax*;
- Grey heron *Ardea cinerea*; and
- Cormorant *Phalacrocorax carbo*.

### 2.2.3 Breeding Wader Surveys

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

Following a desktop assessment, it was determined that given that Wind Farm I is dominated by improved agricultural grassland habitat, Wind Farm I is not suitable for breeding waders and breeding wader surveys were therefore not undertaken there. Conversely, parts of Wind Farm II comprise a mosaic of wet grassland and rough, semi-improved agricultural grassland which is more suited to breeding waders. As such, a walked transect was undertaken covering potentially suitable habitat within the Wind Farm II site and a 500m buffer zone. The same transect route was repeated three times across the 2020 breeding season on 24 April, 18 May and 26 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:

- Lapwing – the total numbers of birds seen from the transect;
- 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).

Please see Figure 7 for an outline of the walked transect and Appendices I and II for metadata relating to these surveys.

### 2.2.4 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 seven stops were made along the driven transect around both wind farm sites overlooking potentially suitable breeding habitat.

The locations of these viewpoints are presented in Figure 8 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 site. It is also noted that suitable breeding habitat for Annex 1 raptors within the sites and 2 km buffer is very limited and visibility from the survey route was sufficient to cover the vast majority of potentially suitable breeding habitat within the survey area.

Suitable breeding habitat differs for each raptor species (Hardey *et al.*, 2013) and was limited within the survey area. Table 2-2 provides a summary of the potentially suitable raptor habitats within the 2km buffer zone of the sites and the approximate locations of these in relation to the viewpoints used during the survey.

**Table 2-2: Potentially suitable habitats for breeding raptors within the study area, the viewpoints the habitats can be seen from and the target raptor species which could be expected within these habitats**

Raptor Viewpoint No. (RVP)	Habitat type	Target raptor species
RVP1	Mixed deciduous woodland	Buzzard, sparrowhawk
RVP2; RVP3	Lowland heather moor	Hen harrier, merlin
RVP3; RVP5	Wet grassland with dense rush or bracken cover	Hen harrier
RVP6	Mature forestry plantation	Buzzard, sparrowhawk
RVP4	Quarries	Peregrine falcon, kestrel
RVP7	Rocky outcrops	Peregrine falcon, merlin, kestrel, buzzard

It is noted that the Cam Quarry lies adjacent to the Wind Farm II site to the north. Although the quarry faces could not be viewed from the driven transect, the quarry could be partially viewed from the R363 road to the north (RVP4). It is also noted that the airspace above the quarry lies within the viewshed of WFII VP1. If breeding peregrine falcons were present in the quarry, it is therefore expected that evidence would have been recorded during the breeding raptor survey and/or the VP surveys.

Survey timings followed those in Hardey *et al.* (2013), as per SNH guidelines. This survey was repeated along the same route monthly from April to July inclusive. Please see Appendices I and II for metadata relating to these surveys.

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

## 2.3 Survey Limitations

As shown in Figure 2, a small area at the western end of Wind Farm I and two small areas within the 500m buffer zone for Wind Farm II were not within the 2km viewsheds from any of the VPs. All turbine locations and the vast majority of the 500m buffer were visible from at least one VP however and the gaps in coverage are therefore not considered to represent a significant limitation.

The majority of vantage point surveys were undertaken in optimal weather conditions. However, there were 15 hours out of the total of 216 during which the visibility was recorded as moderate i.e. 1-3km. This comprises 7%

of the total survey season and in most cases all of the relevant 2km viewing arc was visible. As such, this does not significantly affect the validity of the data collected.

## 3.0 Results

### 3.1 Desk-based Review

#### 3.1.1 Natura 2000 Sites

There are no Special Protection Areas (SPA) within the proposed wind farm sites. However, there are a total of five SPAs within a 15 km<sup>2</sup> radius of the survey area.

The five SPAs within 15km are shown in Table 3-1, which also shows the species of special conservation interest (SSCI) for each site. The majority of SSCIs for which these sites are designated are wintering species. As such, for the purposes of this report which deals specifically with breeding birds, SSCI which are only present during the wintering season have been excluded from Table 3-1.

Corncrake *Crex crex* is a SSCI of the Middle Shannon Callows SPA. Upon their arrival to suitable breeding habitat in Ireland following migration from sub-Saharan Africa, corncrake, a site faithful species, then become sedentary, rarely if ever, moving from the habitat they have chosen for breeding once they find a mate (Duffy, 2018). As such, given that the Middle Shannon Callows SPA is at a distance of 11.4km from the proposed wind farm sites, dedicated corncrake surveys were not deemed necessary. There is also a lack of suitable habitat for corncrake (hay meadows) within the proposed wind farm sites.

**Table 3-1: SPAs within 15km of Seven Hills Wind Farms I and II and their qualifying interests (species present during the breeding season only)**

Site Name	Site Code	Distance/ Direction from Site Boundary	Features of Interest
Lough Croan Turlough SPA	004139	1.5km north	<ul style="list-style-type: none"> <li>Shoveler <i>Anas clypeata</i></li> <li>Wetland and Waterbirds</li> </ul>
River Suck Callows SPA	004097	1.7km west	<ul style="list-style-type: none"> <li>Wetland and Waterbirds</li> </ul>
Four Roads Turlough SPA	004140	1.9km north	<ul style="list-style-type: none"> <li>Wetland and Waterbirds</li> </ul>
Lough Ree SPA	004064	8km east	<ul style="list-style-type: none"> <li>Tufted Duck <i>Aythya fuligula</i></li> <li>Common Scoter <i>Melanitta nigra</i></li> <li>Common Tern <i>Sterna hirundo</i></li> <li>Black-headed Gull <i>Chroicocephalus ridibundus</i></li> <li>Wetland and Waterbirds</li> </ul>
Middle Shannon Callows SPA	004096	11.4km southeast	<ul style="list-style-type: none"> <li>Corncrake <i>Crex crex</i></li> <li>Lapwing <i>Vanellus vanellus</i></li> <li>Black-tailed Godwit <i>Limosa limosa</i></li> <li>Wetland and Waterbirds</li> </ul>

#### 3.1.2 Existing Site Data

To our knowledge, the only breeding season bird survey data available relating to the two proposed wind farm sites were collected on six site visits during the period April to June 2009 (FERS, 2010; FERS, 2011). Surveys

<sup>2</sup> 15 km is the maximum distance typically applied when considering wildfowl ranging from roost sites to foraging sites.

involved a walkover survey on each date, although precise survey area boundaries are unclear. The ornithological assessment for Phase I reports that 28 species were recorded within the (Phase I) wind farm site and buffer zone (the size of the buffer zone is not stated), of which 21 showed evidence of breeding. These included four species defined as 'important' species<sup>3</sup>, namely black-headed gull (red-listed), swallow *Hirundo rustica*, house sparrow *Passer domesticus* and starling *Sturnus vulgaris* (each amber-listed). Black-headed gull was not recorded as breeding within the site or buffer zone.

The ornithological assessment for Phase II reports that 57 species were recorded within the 'greater survey area', of which 53 showed evidence of breeding. The greater survey area is not defined but is thought to include both wind farm sites plus some of the surrounding area. 18 'important' species were recorded within the greater survey area including the red-listed species curlew, redshank *Tringa totanus* and black-headed gull and the amber listed mute swan *Cygnus olor*, teal *Anas crecca*, tufted duck, coot *Fulica atra*, snipe and kestrel. Of these, mute swan, teal, coot, curlew, snipe and redshank (a pair at Lough Feacle) showed evidence of breeding. A further nine amber listed passerine species were also recorded within the greater survey area.

## 3.2 Flight Activity Surveys

Flight lines of primary target species recorded at during the 2020 breeding season are mapped in Figures 3-6.

### 3.2.1 Primary Target Species

#### 3.2.1.1 Wind Farm I: Vantage Points 1 and 2

In total, three primary target species were recorded flying through Wind Farm I during the six-month survey period. The target species are shown in Table 3-2 together with the total number of birds seen from both VPs and the total number of flights recorded.

**Table 3-2: Target species and flights recorded from WFI VPs 1 and 2 – April to September 2020**

Target Species	Total number of birds recorded	Total number of flights recorded
Hen harrier	1	1
Black-headed gull	41	13
Herring gull	19	10
<b>Total</b>	<b>61</b>	<b>24</b>

All but two sightings of black-headed gull (Figure 3) and herring gull (Figure 4) were recorded on and around the Thomas Street Turlough, outside the 500m buffer zone to the south, which can be seen from VP2. The turlough was utilised by foraging and roosting gulls until it dried up in mid-May, after which the area became a mosaic of cattle and sheep grazing pastures with little bird activity for the rest of the season.

There were two records of black-headed gulls within the site and buffer zone, observed from VP1 in June. However, only one of these flew within the likely rotor swept area for a total of 15 seconds, while the other did not enter the likely rotor swept area during its flight.

A single female hen harrier was observed from Wind Farm I VP1 in April 2020. The bird was observed flying and soaring in height-bands 2 and 3 in a northerly direction away from the site and the 500m buffer. This was the

<sup>3</sup> i.e. species listed on the red or amber lists of birds of conservation concern (Birdwatch Ireland) in place at that time.

only Annex I primary target species recorded at either proposed wind farm site during the 2020 breeding season (Figure 5).

### 3.2.1.2 Wind Farm II: Vantage Points 1 – 4

In total, three primary target species were recorded flying through Wind Farm II during the six-month survey period. The primary target species are shown in Table 3-3 together with the total number of birds seen from all VPs and the total number of flights recorded.

**Table 3-3: Primary target species and flights recorded from WFII VP1 – VP4 – April to September 2020**

Target Species	Total number of birds recorded	Total number of flights recorded
Black-headed gull	44	19
Herring gull	5	5
Lapwing	23	1
<b>Total</b>	<b>72</b>	<b>25</b>

Black-headed gull was the most abundant and frequently recorded primary target species at Wind Farm II throughout the breeding season with 19 records of 44 birds. The majority of these birds were recorded from VP4 most likely on passage to and from the River Suck to the east of the site (Figure 3). All sightings of black-headed gull were recorded below the likely rotor swept area.

Herring gull was less abundant with only 5 sightings of lone birds throughout the entire season. These were recorded from VPs 1, 3 and 4 (Figure 4).

A single flock of 23 lapwing was recorded from VP4 in June on the edge of the 500m buffer (Figure 5).

### 3.2.2 Secondary Target Species

Summary details of the five secondary target species recorded throughout the season at Wind Farm I are presented in Table 3-4.

Raven was the most abundantly recorded secondary target species at Wind Farm I with 25 observations and a total of 39 birds. A total of 54% of these raven sightings (n=22) were recorded flying off site.

The second most abundant secondary target species recorded at Wind Farm I was lesser black-backed gull *Larus fuscus* with 17 observations of 32 individuals. A total of 25 of the 32 (78%) individuals of this species were also recorded flying off site, mainly over the Thomas Street Turlough.

A total of two secondary target raptor species were recorded at Wind Farm I during the breeding season, namely buzzard (n=2) and kestrel (n=1). These were recorded both onsite and within the 500m buffer of the wind farm site. All three sightings of secondary raptor species recorded at Wind Farm I were observed at heights of less than 30m, thus below the likely rotor swept area.

**Table 3-4: Secondary target species and flights recorded from WFI VPs 1 and 2 – April to September 2020**

Target Species	Total number of birds recorded	Total number of flights recorded
Lesser black-backed gull	32	17
Grey heron	2	2

Target Species	Total number of birds recorded	Total number of flights recorded
Buzzard	2	2
Kestrel	1	1
Raven	39	25
<b>Total</b>	<b>76</b>	<b>47</b>

As with Wind Farm I, raven was the most abundantly recorded secondary target species at Wind Farm II with 55 observations of 135 individuals. Flocks of between two and 25 birds were recorded as being on passage between breeding sites, with several juveniles recorded within these flocks. This suggests that raven are breeding in the vicinity of the site.

Lesser black-backed gull was the second most abundant secondary target species recorded at Wind Farm II with 26 observations of 50 birds. A total of 35 of the 50 lesser black-backed gulls (70%) observed were recorded below the likely rotor swept height.

There was a total of 13 observations of buzzard (n=14), nine lone kestrels and one sparrowhawk recorded at Wind Farm II. These were either on passage through the site or hunting onsite with 90% of observation recorded as being below the likely rotor swept area.

Other secondary target species recorded during the breeding season vantage point surveys at Wind Farm II were mallard *Anas platyrhynchos* (n=17), shelduck *Tadorna tadorna* (n= 5), grey heron (n=7), cormorant (n=3) and coot (n=1).

Summary details of the ten secondary target species recorded throughout the season at Wind Farm II are presented in Table 3-5.

**Table 3-5: Secondary target species and flights recorded from WFII VPs 1 - 4 - April to September 2020**

Target Species	Total number of birds recorded	Total number of flights recorded
Lesser black-backed gull	50	26
Mallard	17	8
Shelduck	5	3
Grey heron	7	7
Cormorant	3	1
Coot	1	1
Buzzard	14	13
Kestrel	9	9
Sparrowhawk	1	1
Raven	135	55
<b>Total</b>	<b>242</b>	<b>124</b>

### 3.2.3 Breeding Wader Surveys

The wader walkover surveys at WFII during April, May and June yielded no records of waders, breeding or otherwise.

Please see Figure 7 for transect route.

### 3.2.4 Breeding Raptor Surveys

A total of three species of raptor was recorded during the surveys. There was no raptor activity recorded during the June and July surveys.

Raptor activity in April was low with one sightings of kestrel and one of sparrowhawk. Both of these birds were engaged in hunting/foraging behaviour.

The majority of activity for the season was recorded during the May survey with a sighting of two pairs of buzzard recorded within the 2 km buffer to the north and northeast of Wind Farm I respectively. The individuals in both pairs were observed interacting with each other and engaging in a courtship display suggesting possible breeding within these two areas.

The remaining sighting recorded during May was of a kestrel within the 2km buffer to the south of Wind Farm II which was observed engaging in hunting behaviour.

There were no sightings of peregrine or hen harrier during the breeding raptor surveys throughout the entire 2020 breeding season.

Please see Figure 8 for the transect route and locations of recorded sightings.

---

## 4.0 Conclusions

Records of primary target species at both wind farm sites during the 2020 breeding season were low, with a single passing hen harrier at Wind Farm I in April being the only Annex I bird species recorded at either Wind Farms I or II.

Black-headed gull was the most abundant primary target species recorded at both wind farm sites throughout the season (WFI: n=41; WFII: n=44). From VPs overlooking Wind Farm I, black-headed gulls were observed primarily foraging and roosting the Thomas Street Turlough, outside the 500m buffer to the south, whilst water remained there until May only. Black-headed gulls recorded at Wind Farm II were observed mainly from VP4 on passage offsite within the 500m buffer to the south of the site. Although black-headed gull was recorded as secondary target species in 2019 and primary target species in 2020, the numbers recorded at WFII are similar across both years (WFII 2019: n=47; 2020: n=44). However, a large contrast in numbers of this species was observed between the two breeding seasons at WFI (WFI 2019: n=2; 2020: n=41). This is likely due to the fact that the Thomas Street Turlough dried up in April 2019, before the breeding season surveys began and as such, the area was not attractive to foraging and roosting black-headed gulls in 2019.

Herring gull was also recorded at both sites but was less abundant than black-headed gull at both sites (WFI: n=19; WFII: n=5). Similar to black-headed gull observations, herring gulls were primarily present at Thomas Street Turlough to the south of Wind Farm I and from VP4 to the south of Wind Farm II. Like black-headed gull, herring gull was also a secondary target species in 2019 and a primary target species in 2020. When compared with the 2019 records, the numbers of this species observed at each site in 2020 remain generally low, with approximately 60% fewer observations at WFI in 2019 than 2020 (WFI 2019: n=5; 2020: n=16), likely due to Thomas Street Turlough drying out earlier in 2019, as for black-headed gull. There were low numbers of herring gull recorded at WFII across both years, however, there were slightly more observations in 2019 than 2020 (WFII 2019: n=9; 2020: n=5).

Only one sighting of any wader species was recorded during the flight activity surveys throughout the 2020 breeding season with a single flock of 23 lapwing was recorded within the 500m buffer to the south of Wind Farm II in June. No waders were recorded during the breeding wader surveys. During the 2019 breeding season, in addition to lapwing (n=1), two further wader species were recorded, namely curlew (n=1) and snipe (n=1), but in very low numbers only.

The only raptor species recorded within 2km of either Wind Farm I or II during the breeding raptor surveys and VP surveys were buzzard, sparrowhawk and kestrel. Of these, two probable buzzard breeding territories were identified to the north of Wind Farm I. There were no records of peregrine falcon during either the breeding raptor surveys or VP surveys during the breeding season in 2020. There were three records of peregrine falcon in 2019, however, there were no confirmed breeding territories.

Direct comparison of survey results from 2019 and 2020 with previous breeding season survey results from 2009 is difficult due to differences in the survey methods used and potential differences in the areas surveyed. It is notable however that curlew, snipe and redshank were all recorded breeding within the 'greater survey area' in 2009 whereas there has only been one record each for curlew and snipe in 2019 (and no records in 2020) and no records of redshank in either 2019 or 2020. This could either indicate a decline in breeding wader populations since 2009 or it could simply reflect differences in the survey areas between years. No Annex I raptors were recorded breeding during either the surveys in 2009 or the surveys in 2019-20.

## 5.0 References

Colhoun and Cummins (2013) Birds of Conservation Concern in Ireland 2014–2019. *Irish Birds* 9: 523-544

Duffy, M. (2018) The Corncrake Conservation Project Annual Report 2018. NPWS.

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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

SLR (2020) Seven Hills Wind Farm Phase I and II Bird Survey Report Breeding Season 2019. Prepared for Seven Hills Wind Farm Ltd.

Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2. SNH Guidance. SNH, Battleby

## 6.0 Figures

**Figure 1: Vantage Points and Viewing Arcs**

**Figure 2: Viewsheds from Vantage Points Overlooking Wind Farms I and II – 30m Offset**

**Figure 3: Vantage Point Survey Results – Breeding Season 2020 – Black-headed Gull**

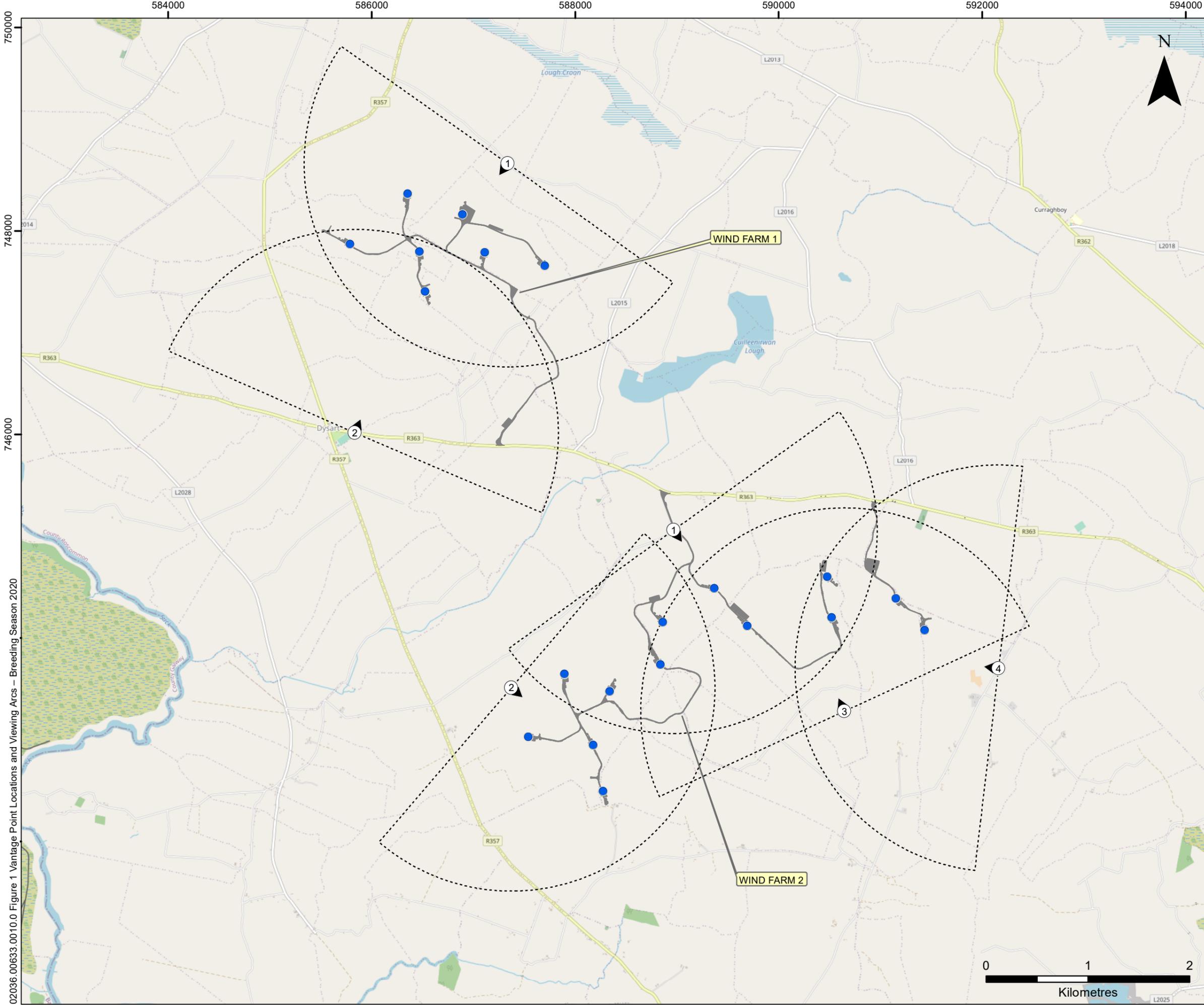
**Figure 4: Vantage Point Survey Results – Breeding Season 2020 – Herring Gull**

**Figure 5: Vantage Point Survey Results – Breeding Season 2020 – Hen Harrier**

**Figure 6: Vantage Point Survey Results – Breeding Season 2020 – Lapwing**

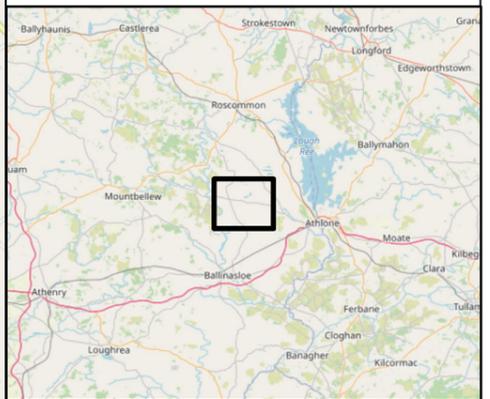
**Figure 7: Breeding Wader Walked Transect Survey Results – Breeding Season 2020**

**Figure 8: Breeding Raptor Driven Transect Survey Results – Breeding Season 2020**



**LEGEND**

- Turbine Location
- Site Infrastructure
- Vantage Point
- Vantage Points 2km View Arc



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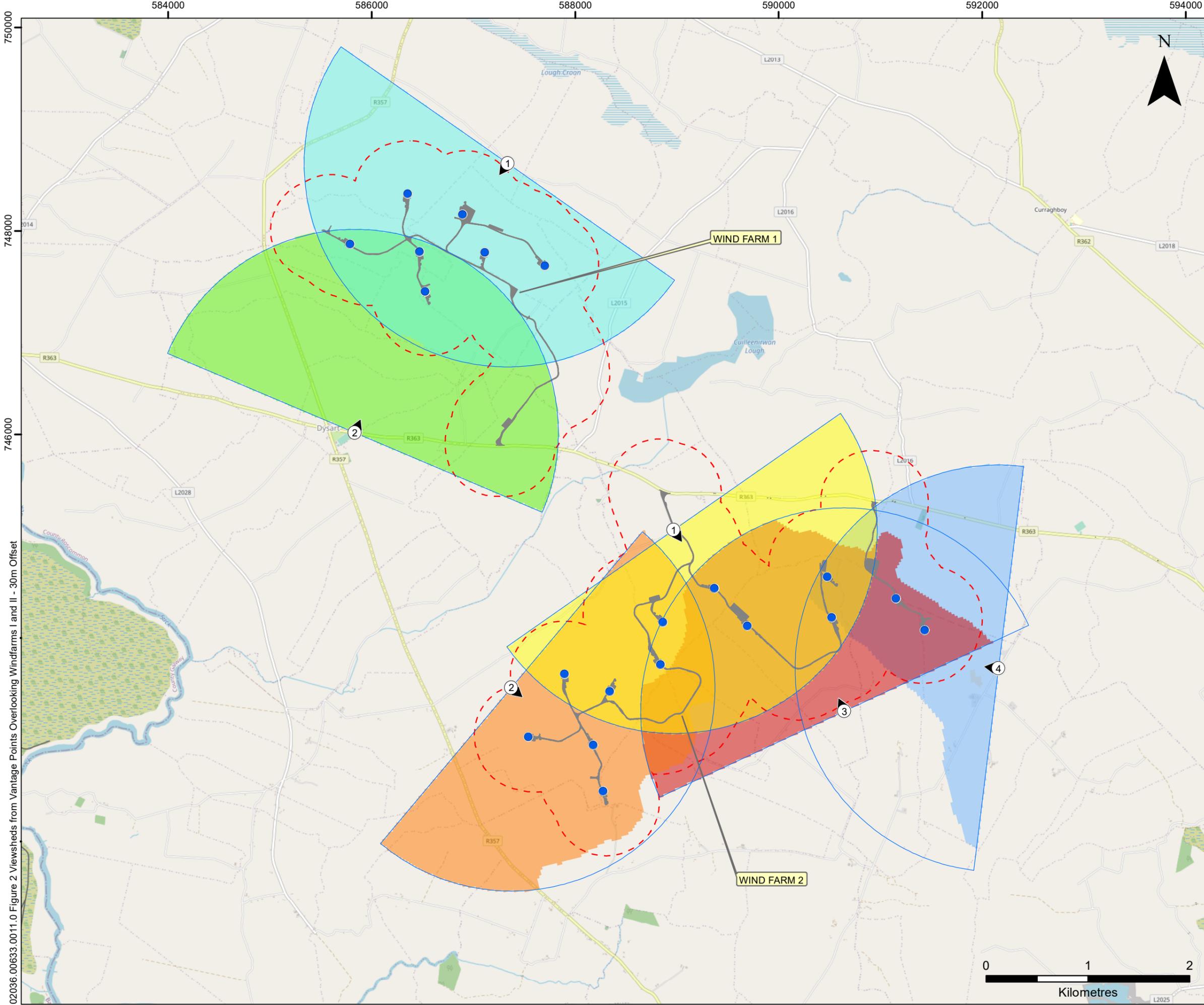
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**FIGURE 1 - VANTAGE POINT LOCATIONS AND VIEWING ARCS**



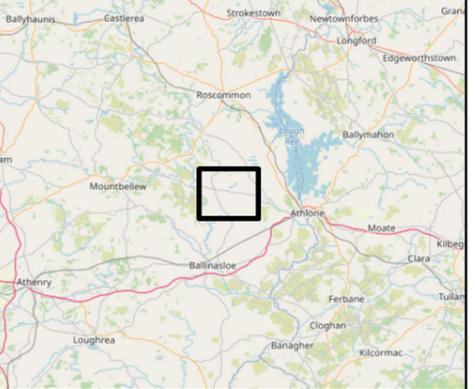
Scale 1:35,000 @ A3      Date MAY 2022

02036.00633.0010.0 Figure 1 Vantage Point Locations and Viewing Arcs - Breeding Season 2020



**NOTE**  
 1. The Zones of Theoretical Visibility (ZTV) was calculated using ArcMAP 10.5.1 Spatial Analyst. The ZTV is calculated with a surface offset 30m & 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.

- LEGEND**
- Turbine Location
  - Site Infrastructure
  - Site Infrastructure 500 m Buffer
  - Vantage Point
  - Distance of Viewing Arc
  - Theoretical Visibility from Wind Farm 1 VP1
  - Theoretical Visibility from Wind Farm 1 VP2
  - Theoretical Visibility from Wind Farm 2 VP1
  - Theoretical Visibility from Wind Farm 2 VP2
  - Theoretical Visibility from Wind Farm 2 VP3
  - Theoretical Visibility from Wind Farm 2 VP4



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**FIGURE 2 - VANTAGE POINTS OVERLOOKING WINDFARMS I AND II**

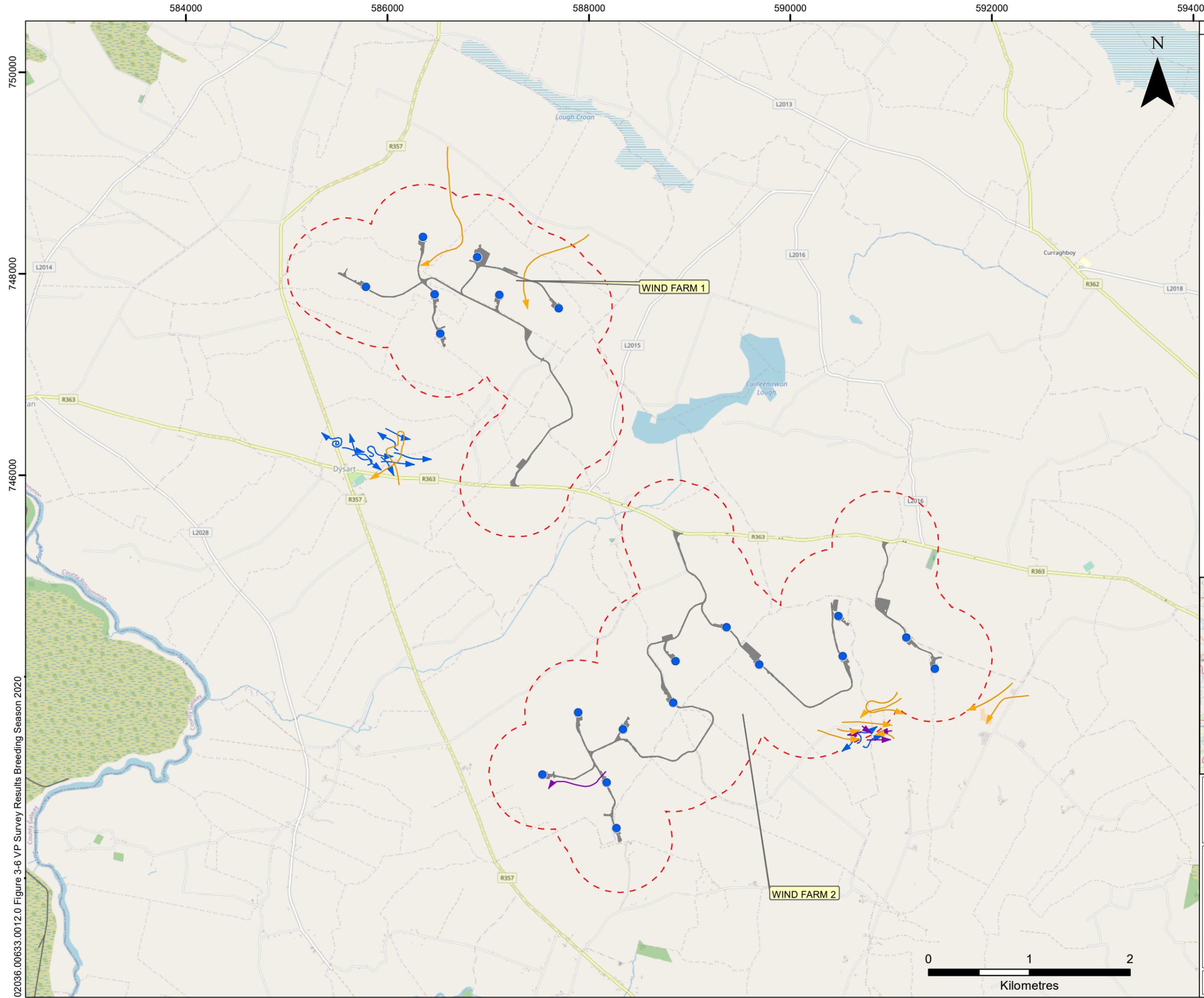
Scale 1:35,000 @ A3 Date MAY 2022



02036.00633.0011.0 Figure 2 Viewsheds from Vantage Points Overlooking Windfarms I and II - 30m Offset

750000  
748000  
746000

584000 586000 588000 590000 592000 594000



**LEGEND**

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer

**Flightline (Month)**

- April
- May
- June



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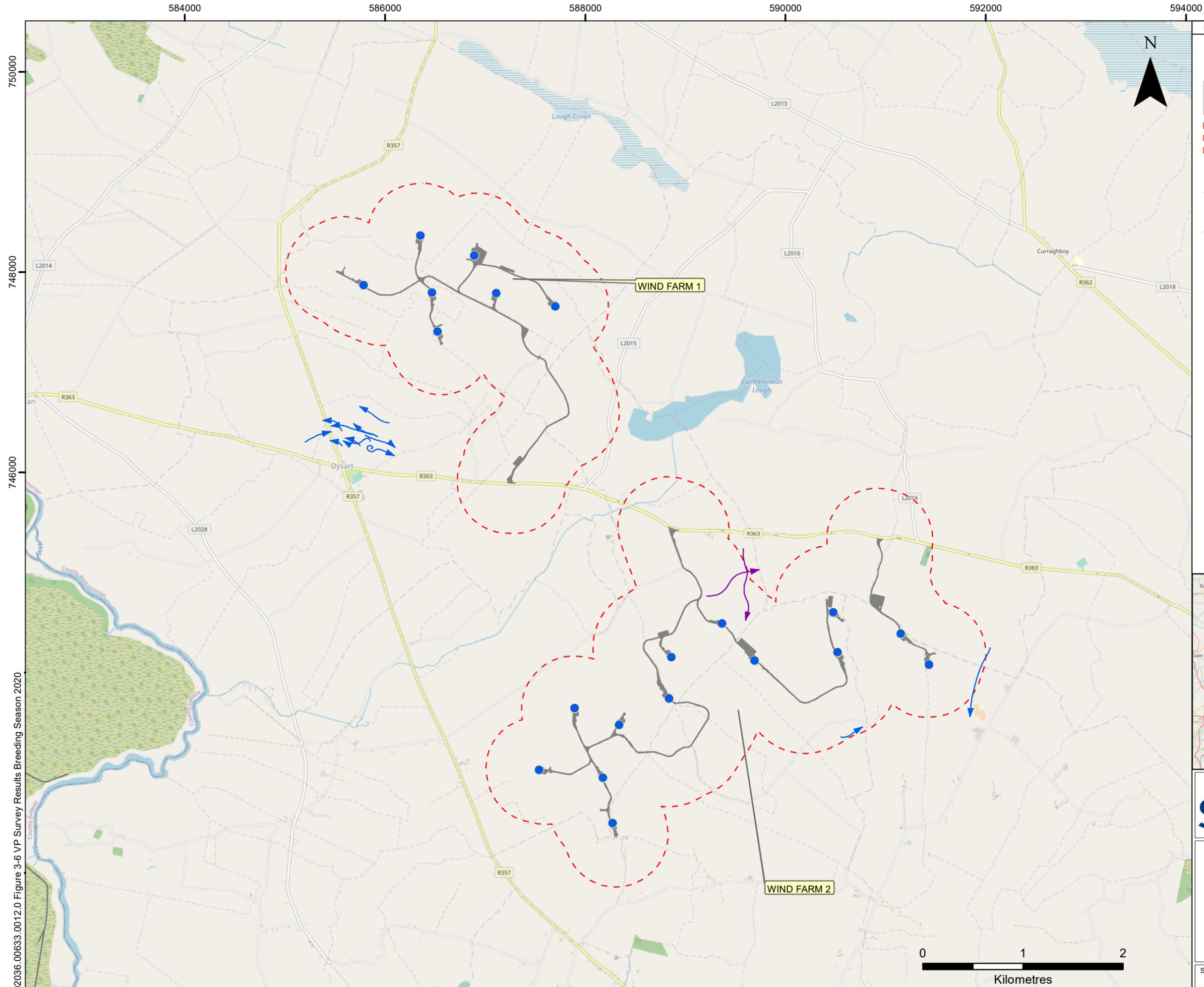
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**FIGURE 3 - FLIGHT-LINES BLACK-HEADED GULL**

Scale 1:35,000 @ A3      Date MAY 2022

02036.00633.0012.0 Figure 3-6 VP Survey Results Breeding Season 2020

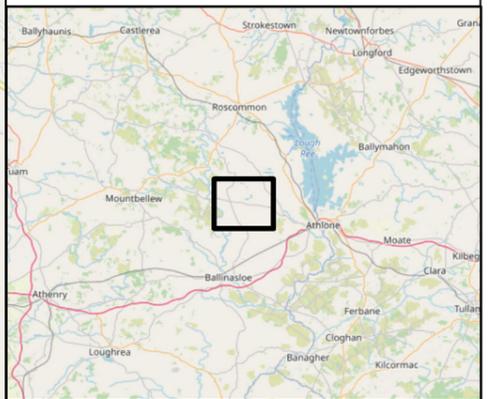


**LEGEND**

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer

**Flightline (Month)**

- April
- May



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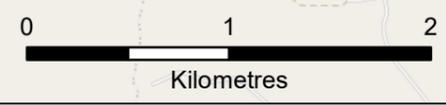
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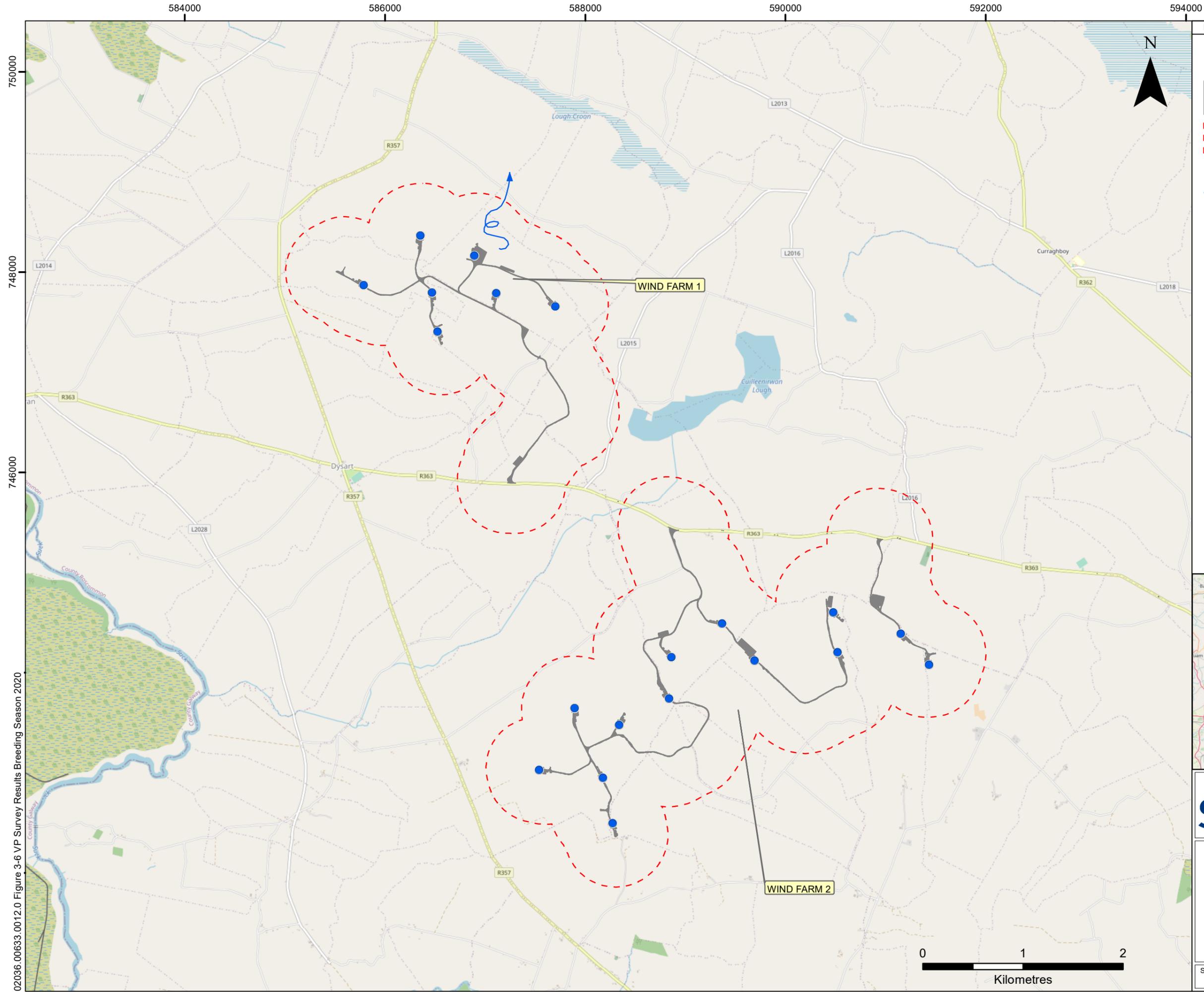
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**FIGURE 4 - FLIGHT-LINES HERRING GULL**

Scale 1:35,000 @ A3      Date MAY 2022

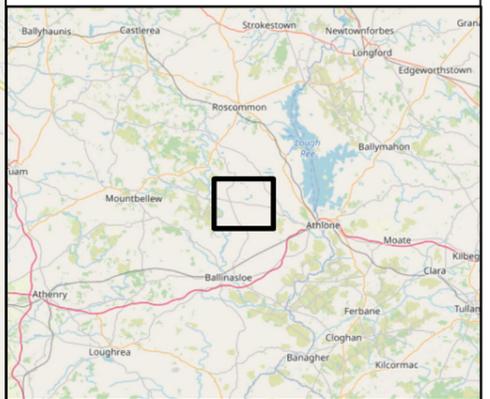


02036.00633.0012.0 Figure 3-6 VP Survey Results Breeding Season 2020



**LEGEND**

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Flightline (Month)**
- April



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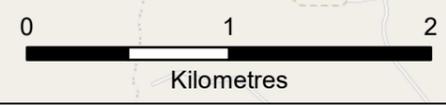
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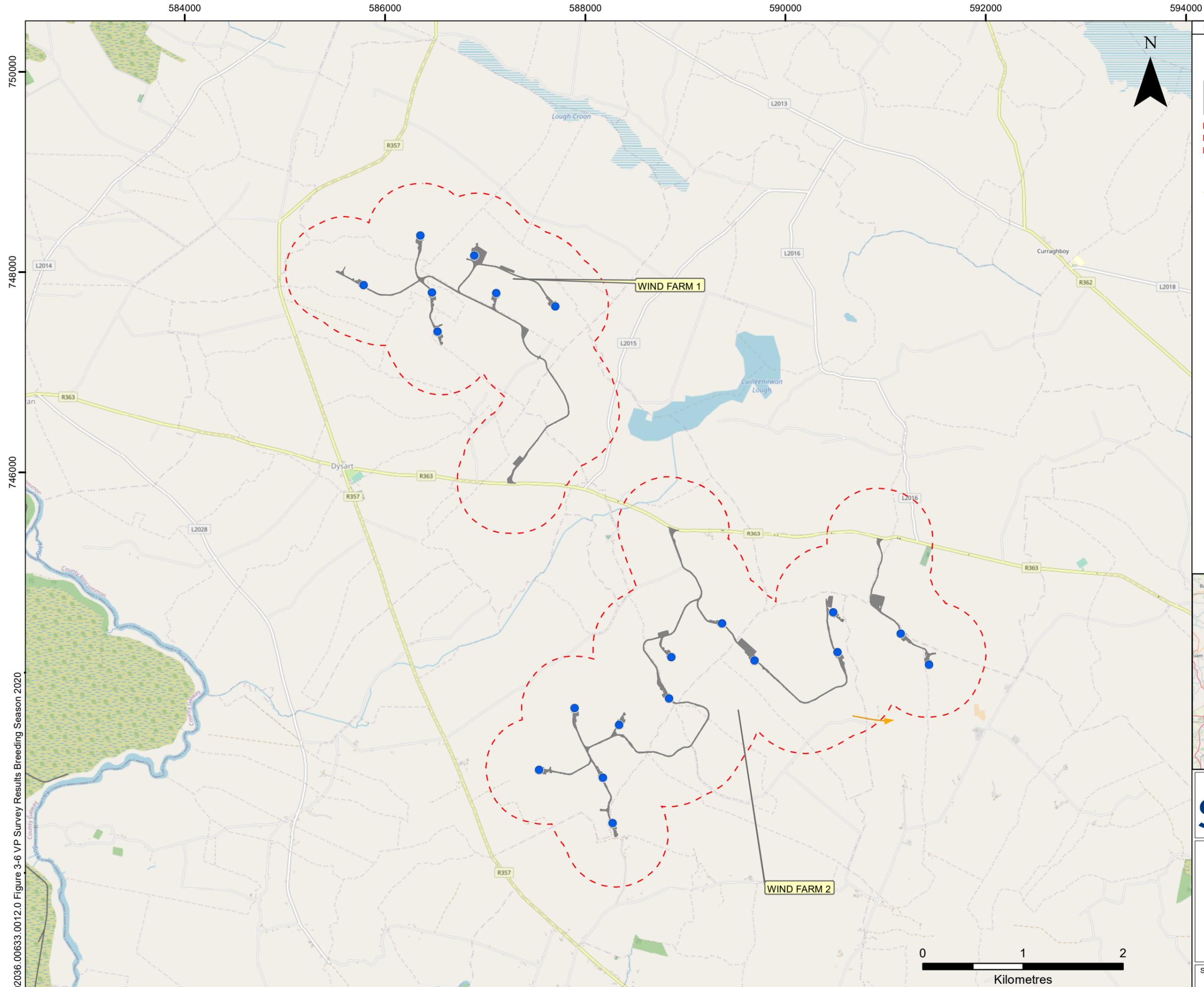
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**FIGURE 5 - FLIGHT-LINES HEN HARRIER**

Scale 1:35,000 @ A3      Date MAY 2022

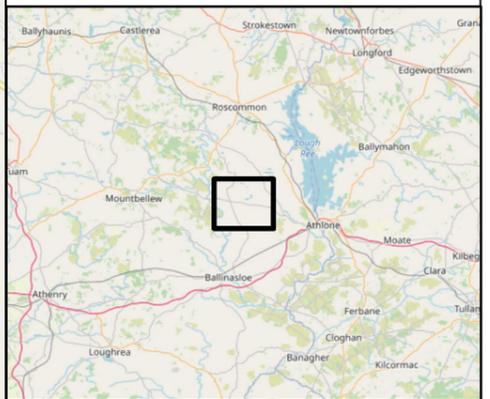


02036.00633.0012.0 Figure 3-6 VP Survey Results Breeding Season 2020



**LEGEND**

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Flightline (Month)**
- June



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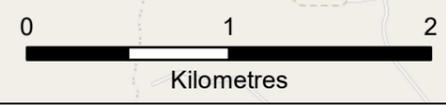
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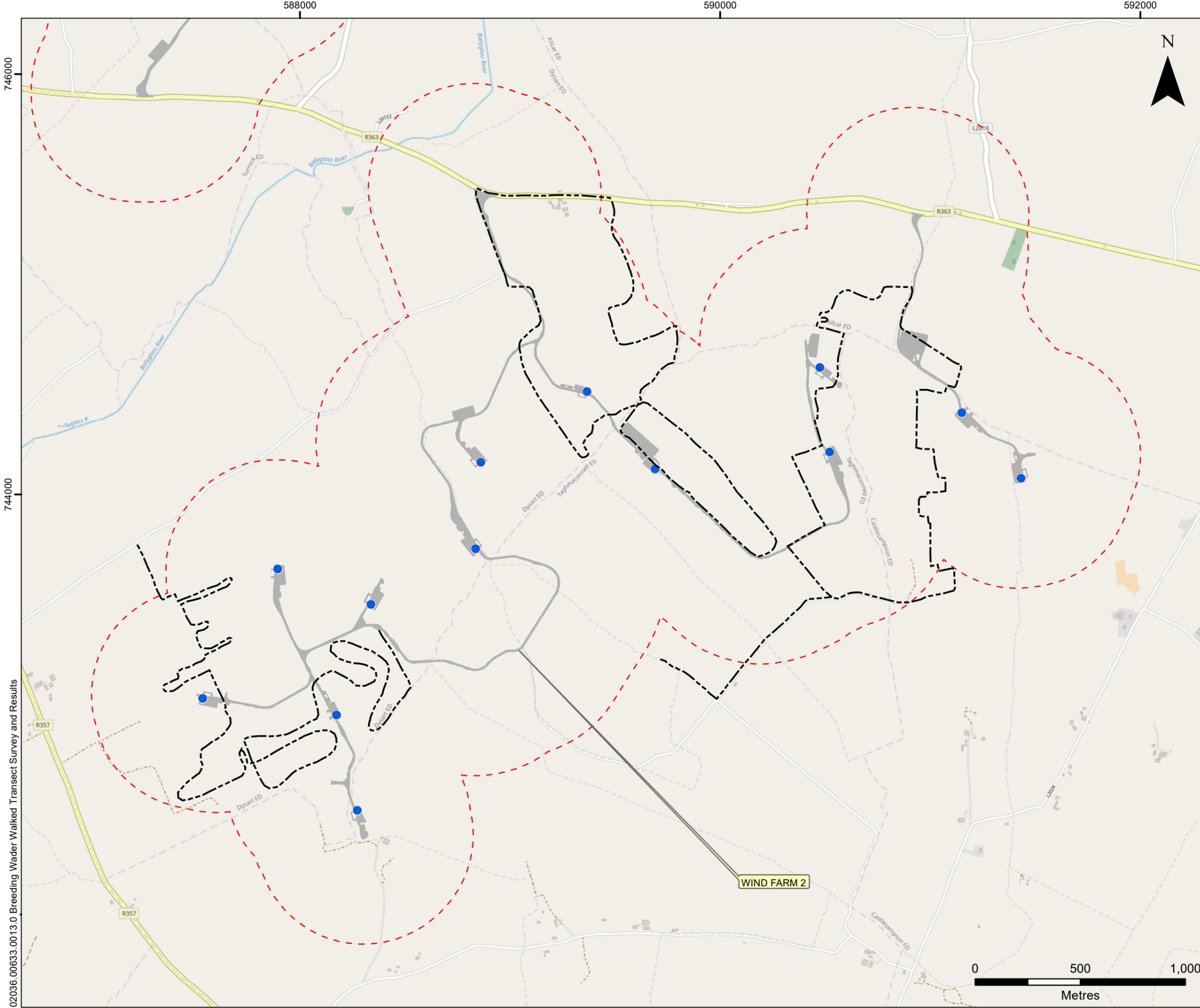
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**FIGURE 6 - FLIGHT-LINES LAPWING**

Scale 1:35,000 @ A3      Date MAY 2022



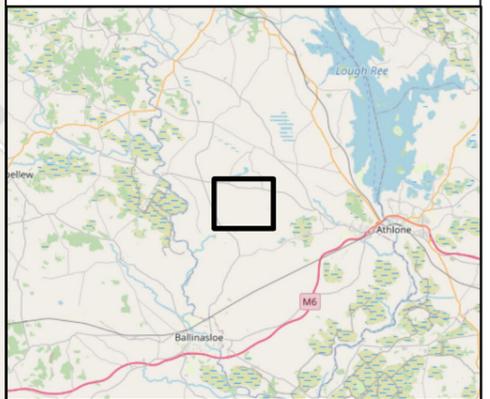
02036.00633.0012.0 Figure 3-6 VP Survey Results Breeding Season 2020



**LEGEND**

- Turbine Location
- Site Infrastructure
- Site Infrastructure 500 m Buffer
- Walked Transect

**Note:**  
No breeding wader bird species recorded throughout the season.

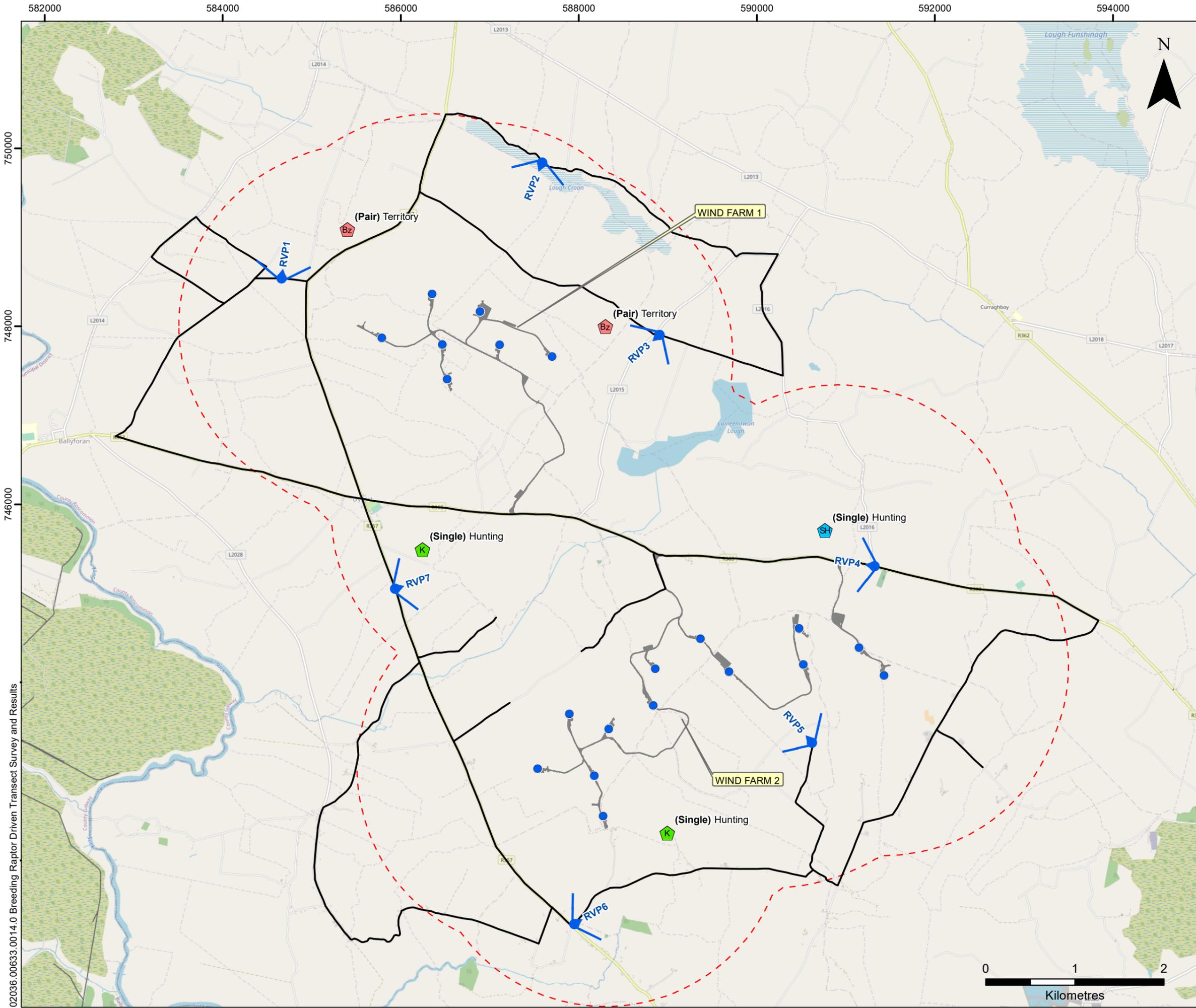


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**FIGURE 7 - BREEDING WADER WALKED TRANSECT RESULTS**

Scale 1:17,000 @ A3      Date MAY 2022

02036.00633.0013.0 Breeding Wader Walked Transect Survey and Results

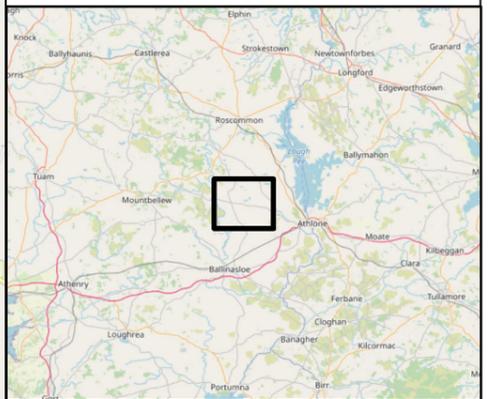


**LEGEND**

- Turbine Location
- Site Infrastructure
- Site Infrastructure 2 km Buffer
- Driven transect
- ↘ Raptor Viewpoint Locations (Stopping Point)

**Breeding Raptor Species**

- Bz Buzzard
- K Kestrel
- SH Sparrow hawk



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**FIGURE 8 - BREEDING RAPTOR DRIVEN TRANSECT SURVEY RESULTS**

Scale: 1:40,000 @ A3      Date: MAY 2022



02036.00633.0014.0 Breeding Raptor Driven Transect Survey and Results

# APPENDIX I

## Survey dates, times and observers

**Table AI-1: Details of VP surveys undertaken from Wind Farm I Vantage Point 1**

Date	Surveyor	Start	End	Survey Duration
14/04/2020	SI	10:30	13:30	3
15/04/2020	SI	13:00	16:00	3
18/05/2020	SI	14:00	17:00	3
19/05/2020	SI	13:30	16:30	3
02/06/2020	DH	09:10	12:10	3
19/06/2020	DH	13:30	16:30	3
15/07/2020	SI	10:30	13:30	3
16/07/2020	SI	13:00	16:00	3
18/08/2020	SI	10:00	13:00	3
19/08/2020	SI	13:00	16:00	3
10/09/2020	SI	10:30	13:30	3
11/09/2020	SI	12:50	15:50	3
<b>Total Hours</b>				<b>36</b>

**Table AI-2: Details of VP surveys undertaken from Wind Farm I Vantage Point 2**

Date	Surveyor	Start	End	Survey Duration
14/04/2020	SI	14:00	17:00	3
15/04/2020	SI	09:20	12:20	3
18/05/2020	SI	10:30	13:30	3
19/05/2020	SI	10:00	13:00	3
02/06/2020	DH	12:45	15:45	3
19/06/2020	DH	09:30	12:30	3
15/07/2020	SI	14:00	17:00	3
16/07/2020	SI	09:30	12:30	3
18/08/2020	SI	13:45	16:45	3
19/08/2020	SI	09:30	12:30	3
10/09/2020	SI	14:00	17:00	3
11/09/2020	SI	09:20	12:20	3
<b>Total Hours</b>				<b>36</b>

**Table AI-3: Details of VP surveys undertaken from Wind Farm II Vantage Point 1**

Date	Surveyor	Start	End	Survey Duration
16/04/2020	SI	09:30	12:30	3
27/04/2020	SI	16:00	19:00	3
20/05/2020	SI	10:00	13:00	3
21/05/2020	SI	14:00	17:00	3
03/06/2020	DH	09:15	12:15	3
23/06/2020	DH	09:20	12:20	3
20/07/2020	SI	12:15	15:15	3
21/07/2020	SI	13:00	16:00	3
24/08/2020	SI	14:00	17:00	3
27/08/2020	SI	09:00	12:00	3
23/09/2020	SI	10:00	13:00	3
24/09/2020	SI	13:00	16:00	3
<b>Total Hours</b>				<b>36</b>

**Table AI-4: Details of VP surveys undertaken from Wind Farm II Vantage Point 2**

Date	Surveyor	Start	End	Survey Duration
16/04/2020	SI	13:00	16:00	3
27/04/2020	SI	12:30	15:30	3
20/05/2020	SI	13:30	16:30	3
21/05/2020	SI	10:00	13:00	3
03/06/2020	DH	13:05	16:05	3
22/06/2020	DH	13:30	16:30	3
20/07/2020	SI	15:45	18:45	3
21/07/2020	SI	09:30	12:30	3
24/08/2020	SI	10:30	13:30	3
27/08/2020	SI	12:30	15:30	3
23/09/2020	SI	14:00	17:00	3
24/09/2020	SI	09:30	12:30	3
<b>Total Hours</b>				<b>36</b>

**Table AI-5: Details of VP surveys undertaken from Wind Farm II Vantage Point 3**

Date	Surveyor	Start	End	Survey Duration
28/04/2020	SI	09:30	12:30	3
29/04/2020	SI	12:45	15:45	3
22/05/2020	JC	10:20	13:20	3
23/05/2020	SI	14:00	17:00	3
04/06/2020	DH	09:30	12:30	3
23/06/2020	DH	13:30	16:30	3
27/07/2020	SI	10:30	13:30	3
28/07/2020	SI	13:00	16:00	3
25/08/2020	SI	09:30	12:30	3
26/08/2020	SI	13:15	16:15	3
25/09/2020	SI	09:30	12:30	3
28/09/2020	SI	13:30	16:30	3
<b>Total Hours</b>				<b>36</b>

**Table AI-6: Details of VP surveys undertaken from Wind Farm II Vantage Point 4**

Date	Surveyor	Start	End	Survey Duration
28/04/2020	SI	13:00	16:00	3
29/04/2020	SI	09:30	12:30	3
22/05/2020	JC	14:05	17:05	3
23/05/2020	SI	10:00	13:00	3
04/06/2020	DH	12:55	15:55	3
22/06/2020	DH	09:56	12:56	3
27/07/2020	SI	14:00	17:00	3
28/07/2020	SI	09:30	12:30	3
25/08/2020	SI	13:30	16:30	3
26/08/2020	SI	09:30	12:30	3
28/09/2020	SI	09:30	12:30	3
29/09/2020	SI	13:30	16:30	3
<b>Total Hours</b>				<b>36</b>

**Table AI-7: Details of breeding wader surveys undertaken at Wind Farm II during the 2020 bird breeding season**

Date	Surveyor	Start	End	Survey Duration
24/04/2020	SI	08:00	12:00	4
18/05/2020	SI	06:00	10:00	4
26/06/2020	DH	08:00	12:00	4
<b>Total Hours</b>				<b>12</b>

**Table AI-8: Details of breeding raptor surveys undertaken at Wind Farms I and II during the 2020 bird breeding season**

Date	Surveyor	Start	End	Survey Duration
30/04/2020	SI	13:00	18:00	5
25/05/2020	SI	10:00	13:00	3
25/06/2020	DH	09:00	12:00	3
13/07/2020	SI	10:00	13:00	3
<b>Total Hours</b>				<b>14</b>

## APPENDIX II

### Weather Data

**Table AII-1: Weather data collected during flight activity surveys undertaken at WFI VP1**

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
14/04/2020	SI	10:30	13:30	1	0	E	0	0	N/A	2	0	0	7
14/04/2020	SI	10:30	13:30	2	0	E	0	0	N/A	2	0	0	8
14/04/2020	SI	10:30	13:30	3	1	E	0	0	N/A	2	0	0	9
15/04/2020	SI	13:00	16:00	1	0	N/A	0	0	N/A	2	0	0	14
15/04/2020	SI	13:00	16:00	2	1	SE	0	0	N/A	2	0	0	16
15/04/2020	SI	13:00	16:00	3	1	SE	0	0	N/A	2	0	0	18
18/05/2020	SI	14:00	17:00	1	1	W	0	8	2	2	0	0	15
18/05/2020	SI	14:00	17:00	2	1	W	0	8	2	2	0	0	15
18/05/2020	SI	14:00	17:00	3	1	W	0	8	2	2	0	0	15
19/05/2020	SI	13:30	16:30	1	1	SW	0	8	2	2	0	0	14
19/05/2020	SI	13:30	16:30	2	1	SW	0	8	2	2	0	0	14
19/05/2020	SI	13:30	16:30	3	1	SW	0	5	2	2	0	0	15
02/06/2020	DH	09:10	12:10	1	2	SE	0	2	2	2	0	0	19
02/06/2020	DH	09:10	12:10	2	3	SE	0	3	2	2	0	0	21

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
02/06/2020	DH	09:10	12:10	3	3	SE	0	2	2	2	0	0	21
19/06/2020	DH	13:30	16:30	1	4	W	0	8	2	2	0	0	20
19/06/2020	DH	13:30	16:30	2	4	W	0	6	2	2	0	0	20
19/06/2020	DH	13:30	16:30	3	4	W	0	5	2	2	0	0	20
15/07/2020	SI	10:30	13:30	1	2	S	1	8	2	1	0	0	11
15/07/2020	SI	10:30	13:30	2	2	S	1	8	2	2	0	0	12
15/07/2020	SI	10:30	13:30	3	1	S	1	8	2	2	0	0	12
16/07/2020	SI	13:00	16:00	1	1	E	0	7	2	2	0	0	16
16/07/2020	SI	13:00	16:00	2	1	E	0	6	2	2	0	0	17
16/07/2020	SI	13:00	16:00	3	0	E	0	6	2	2	0	0	17
18/08/2020	SI	10:00	13:00	1	2	W	0	6	2	2	0	0	19
18/08/2020	SI	10:00	13:00	2	2	W	0	6	2	2	0	0	20
18/08/2020	SI	10:00	13:00	3	3	W	0	7	2	2	0	0	20
19/08/2020	SI	13:00	16:00	1	3	SE	2	8	2	2	0	0	16
19/08/2020	SI	13:00	16:00	2	3	SE	2	7	2	2	0	0	16

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
19/08/2020	SI	13:00	16:00	3	3	SE	2	7	2	2	0	0	16
10/09/2020	SI	10:30	13:30	1	1	W	0	8	2	2	0	0	12
10/09/2020	SI	10:30	13:30	2	1	W	1	8	2	2	0	0	12
10/09/2020	SI	10:30	13:30	3	1	W	0	8	2	2	0	0	13
11/09/2020	SI	12:50	15:50	1	2	SW	0	7	2	2	0	0	14
11/09/2020	SI	12:50	15:50	2	2	SW	0	6	2	2	0	0	15
11/09/2020	SI	12:50	15:50	3	2	SW	0	6	2	2	0	0	14
<b>Rain/ Precipitation</b>				<b>Cloud Cover</b>		<b>Visibility</b>		<b>Lying Snow</b>		<b>Frost</b>			
None	0			Expressed in oktas (n/8)		Poor (<1km)	0	None	0	None	0		
Drizzle	1			<b>Cloud Height</b>		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									
Heavy rain/snow	4			<150m	0								
				150-500m	1								
				>500m	2								

**Table AII-2: Weather data collected during flight activity surveys undertaken at WFI VP2**

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
14/04/2020	SI	14:00	17:00	1	1	W	0	1	2	2	0	0	15
14/04/2020	SI	14:00	17:00	2	1	W	0	1	2	2	0	0	16
14/04/2020	SI	14:00	17:00	3	1	W	0	1	2	2	0	0	16
15/04/2020	SI	09:20	12:20	1	1	SE	0	0	N/A	2	0	0	9
15/04/2020	SI	09:20	12:20	2	1	SE	0	0	N/A	2	0	0	11
15/04/2020	SI	09:20	12:20	3	1	SE	0	0	N/A	2	0	0	13
18/05/2020	SI	10:30	13:30	1	1	W	1	8	2	2	0	0	14
18/05/2020	SI	10:30	13:30	2	1	W	2	8	2	2	0	0	15
18/05/2020	SI	10:30	13:30	3	1	W	0	8	2	2	0	0	15
19/05/2020	SI	10:00	13:00	1	1	SW	1	8	2	2	0	0	13
19/05/2020	SI	10:00	13:00	2	1	SW	1	8	2	2	0	0	14
19/05/2020	SI	10:00	13:00	3	1	SW	0	8	2	2	0	0	15
02/06/2020	DH	12:45	15:15	1	3	S	0	4	2	2	0	0	21
02/06/2020	DH	12:45	15:15	2	3	S	0	4	2	2	0	0	21

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
02/06/2020	DH	12:45	15:15	3	3	S	0	4	2	2	0	0	21
19/06/2020	DH	09:30	12:30	1	4	S	1	8	2	2	0	0	18
19/06/2020	DH	09:30	12:30	2	4	S	0	8	2	2	0	0	20
19/06/2020	DH	09:30	12:30	3	4	SE	0	6	2	2	0	0	21
15/07/2020	SI	14:00	17:00	1	1	S	0	7	2	2	0	0	14
15/07/2020	SI	14:00	17:00	2	1	S	0	7	2	2	0	0	14
15/07/2020	SI	14:00	17:00	3	1	S	0	7	2	2	0	0	13
16/07/2020	SI	09:30	12:30	1	1	E	2	8	2	2	0	0	12
16/07/2020	SI	09:30	12:30	2	1	E	0	6	2	2	0	0	12
16/07/2020	SI	09:30	12:30	3	1	E	0	6	2	2	0	0	13
18/08/2020	SI	13:45	16:45	1	3	W	0	7	2	2	0	0	20
18/08/2020	SI	13:45	16:45	2	3	W	0	7	2	2	0	0	20
18/08/2020	SI	13:45	16:45	3	2	W	0	7	2	2	0	0	19
19/08/2020	SI	09:30	12:30	1	2	S	0	5	2	2	0	0	15
19/08/2020	SI	09:30	12:30	2	2	S	0	5	2	2	0	0	15

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
19/08/2020	SI	09:30	12:30	3	3	E	0	6	2	2	0	0	16
10/09/2020	SI	14:00	17:00	1	1	W	0	8	2	2	0	0	14
10/09/2020	SI	14:00	17:00	2	1	W	0	8	2	2	0	0	14
10/09/2020	SI	14:00	17:00	3	1	W	0	8	2	2	0	0	14
11/09/2020	SI	09:20	12:20	1	1	SW	0	8	2	2	0	0	12
11/09/2020	SI	09:20	12:20	2	1	SW	1	8	2	1	0	0	12
11/09/2020	SI	09:20	12:20	3	1	SW	1	8	2	2	0	0	14
<b>Rain/ Precipitation</b>				<b>Cloud Cover</b>		<b>Visibility</b>		<b>Lying Snow</b>		<b>Frost</b>			
None	0	Expressed in oktas (n/8)		Poor (<1km)	0	None	0	None	0	None	0		
Drizzle	1	<b>Cloud Height</b>		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											
Heavy rain/snow	4	<150m	0										
		150-500m	1										
		>500m	2										

**Table AII-3: Weather data collected during flight activity surveys undertaken at WFII VP1**

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
16/04/2020	SI	09:30	12:30	1	1	E	0	8	2	2	0	0	8
16/04/2020	SI	09:30	12:30	2	1	E	0	7	2	2	0	0	10
16/04/2020	SI	09:30	12:30	3	2	E	0	6	2	2	0	0	10
27/04/2020	SI	16:00	19:00	1	1	N	0	5	2	2	0	0	12
27/04/2020	SI	16:00	19:00	2	1	N	0	6	2	2	0	0	11
27/04/2020	SI	16:00	19:00	3	0	N/A	0	7	2	2	0	0	11
20/05/2020	SI	10:00	13:00	1	1	S	0	1	2	2	0	0	15
20/05/2020	SI	10:00	13:00	2	2	S	0	1	2	2	0	0	15
20/05/2020	SI	10:00	13:00	3	2	S	0	3	2	2	0	0	15
21/05/2020	SI	14:00	17:00	1	2	S	0	8	2	2	0	0	17
21/05/2020	SI	14:00	17:00	2	1	S	0	8	2	2	0	0	17
21/05/2020	SI	14:00	17:00	3	2	S	0	8	2	2	0	0	16
03/06/2020	DH	09:15	12:15	1	4	W	0	3	2	2	0	0	19
03/06/2020	DH	09:15	12:15	2	4	W	0	4	2	2	0	0	19

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
03/06/2020	DH	09:15	12:15	3	4	W	0	2	2	2	0	0	20
23/06/2020	DH	09:20	12:20	1	4	NW	1	8	2	2	0	0	15
23/06/2020	DH	09:20	12:20	2	4	NW	0	8	2	2	0	0	17
23/06/2020	DH	09:20	12:20	3	5	N	0	8	2	2	0	0	17
20/07/2020	SI	12:15	15:15	1	1	NW	0	4	2	2	0	0	15
20/07/2020	SI	12:15	15:15	2	1	NW	0	5	2	2	0	0	15
20/07/2020	SI	12:15	15:15	3	1	NW	0	4	2	2	0	0	15
21/07/2020	SI	13:00	16:00	1	1	SW	0	5	2	2	0	0	17
21/07/2020	SI	13:00	16:00	2	0	N/A	0	4	2	2	0	0	19
21/07/2020	SI	13:00	16:00	3	1	SW	0	7	2	2	0	0	18
24/08/2020	SI	14:00	17:00	1	2	SE	0	5	2	2	0	0	17
24/08/2020	SI	14:00	17:00	2	2	SE	0	5	2	2	0	0	17
24/08/2020	SI	14:00	17:00	3	2	SE	0	5	2	2	0	0	17
27/08/2020	SI	09:00	12:00	1	3	NE	2	8	2	2	0	0	13
27/08/2020	SI	09:00	12:00	2	4	NE	3	8	2	2	0	0	13

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
27/08/2020	SI	09:00	12:00	3	4	NE	2	8	2	2	0	0	14
23/09/2020	SI	10:00	13:00	1	1	N	0	4	2	2	0	0	12
23/09/2020	SI	10:00	13:00	2	1	W	0	4	2	2	0	0	12
23/09/2020	SI	10:00	13:00	3	2	W	0	3	2	2	0	0	13
24/09/2020	SI	13:00	16:00	1	1	E	0	8	2	2	0	0	8
24/09/2020	SI	13:00	16:00	2	1	E	0	7	2	2	0	0	10
24/09/2020	SI	13:00	16:00	3	2	E	0	6	2	2	0	0	10
<b>Rain/ Precipitation</b>				<b>Cloud Cover</b>		<b>Visibility</b>		<b>Lying Snow</b>		<b>Frost</b>			
None	0	Expressed in oktas (n/8)		Poor (<1km)	0	None	0	None	0	None	0		
Drizzle	1	<b>Cloud Height</b>		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											
Heavy rain/snow	4	<150m		0									
		150-500m		1									
		>500m		2									

**Table All-4: Weather data collected during flight activity surveys undertaken at WFII VP2**

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
16/04/2020	SI	13:00	16:00	1	2	E	0	2	2	2	0	0	13
16/04/2020	SI	13:00	16:00	2	2	E	0	2	2	2	0	0	13
16/04/2020	SI	13:00	16:00	3	4	E	0	1	2	2	0	0	13
27/04/2020	SI	12:30	15:30	1	0	N/A	2	8	2	2	0	0	12
27/04/2020	SI	12:30	15:30	2	1	N	0	7	2	2	0	0	12
27/04/2020	SI	12:30	15:30	3	0	N/A	0	5	2	2	0	0	12
20/05/2020	SI	13:30	16:30	1	3	S	0	6	2	2	0	0	16
20/05/2020	SI	13:30	16:30	2	3	S	0	6	2	2	0	0	16
20/05/2020	SI	13:30	16:30	3	3	S	0	7	2	2	0	0	16
21/05/2020	SI	10:00	13:00	1	1	SW	0	7	2	2	0	0	15
21/05/2020	SI	10:00	13:00	2	1	SW	0	5	2	2	0	0	16
21/05/2020	SI	10:00	13:00	3	1	SW	0	8	2	2	0	0	16
03/06/2020	DH	13:05	16:05	1	5	NW	0	6	2	2	0	0	19
03/06/2020	DH	13:05	16:05	2	5	NW	0	5	2	2	0	0	18

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
03/06/2020	DH	13:05	16:05	3	5	NW	0	5	2	2	0	0	18
22/06/2020	DH	13:30	16:30	1	5	W	3	8	2	2	0	0	20
22/06/2020	DH	13:30	16:30	2	5	W	3	8	2	2	0	0	20
22/06/2020	DH	13:30	16:30	3	5	W	3	8	2	2	0	0	18
20/07/2020	SI	15:45	18:45	1	2	NW	0	5	2	2	0	0	15
20/07/2020	SI	15:45	18:45	2	1	NW	0	4	2	2	0	0	16
20/07/2020	SI	15:45	18:45	3	1	NW	0	3	2	2	0	0	15
21/07/2020	SI	09:30	12:30	1	1	SW	0	6	2	2	0	0	14
21/07/2020	SI	09:30	12:30	2	1	SW	0	5	2	2	0	0	15
21/07/2020	SI	09:30	12:30	3	1	SW	0	5	2	2	0	0	16
24/08/2020	SI	10:30	13:30	1	1	S	0	2	2	2	0	0	16
24/08/2020	SI	10:30	13:30	2	2	S	0	2	2	2	0	0	16
24/08/2020	SI	10:30	13:30	3	2	S	0	3	2	2	0	0	17
27/08/2020	SI	12:30	15:30	1	4	NE	0	8	2	2	0	0	14
27/08/2020	SI	12:30	15:30	2	3	E	0	8	2	2	0	0	14

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
27/08/2020	SI	12:30	15:30	3	3	E	0	8	2	2	0	0	14
23/09/2020	SI	14:00	17:00	1	2	SW	0	2	2	2	0	0	14
23/09/2020	SI	14:00	17:00	2	3	SW	0	2	2	2	0	0	14
23/09/2020	SI	14:00	17:00	3	3	W	0	2	2	2	0	0	14
24/09/2020	SI	09:30	12:30	1	3	N	0	5	2	2	0	0	9
24/09/2020	SI	09:30	12:30	2	3	N	0	5	2	2	0	0	10
24/09/2020	SI	09:30	12:30	3	4	N	0	6	2	2	0	0	10
<b>Rain/ Precipitation</b>			<b>Cloud Cover</b>			<b>Visibility</b>			<b>Lying Snow</b>			<b>Frost</b>	
None	0	Expressed in oktas (n/8)			Poor (<1km)	0	None	0	None	0	None	0	
Drizzle	1	<b>Cloud Height</b>			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											
Heavy rain/snow	4	<150m	0										
		150-500m	1										
		>500m	2										

**Table AII-5: Weather data collected during flight activity surveys undertaken at WFII VP3**

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°C)
28/04/2020	SI	09:30	12:30	1	1	SE	0	0	N/A	2	0	0	11
28/04/2020	SI	09:30	12:30	2	1	SE	0	1	2	2	0	0	12
28/04/2020	SI	09:30	12:30	3	0	N/A	0	1	2	2	0	0	15
29/04/2020	SI	12:45	15:45	1	1	SE	0	0	N/A	2	0	0	11
29/04/2020	SI	12:45	15:45	2	1	SE	0	1	2	2	0	0	12
29/04/2020	SI	12:45	15:45	3	0	N/A	0	1	2	2	0	0	15
22/05/2020	JC	10:20	13:20	1	6	S	1	8	1	1	0	0	12
22/05/2020	JC	10:20	13:20	2	6	S	0	8	1	1	0	0	13
22/05/2020	JC	10:20	13:20	3	6	S	1	8	1	1	0	0	13
23/05/2020	SI	14:00	17:00	1	6	S	1	8	1	1	0	0	12
23/05/2020	SI	14:00	17:00	2	6	S	0	8	1	1	0	0	13
23/05/2020	SI	14:00	17:00	3	6	S	1	8	1	1	0	0	13
04/06/2020	DH	09:30	12:30	1	4	NW	1	8	2	2	0	0	16
04/06/2020	DH	09:30	12:30	2	4	NW	0	5	2	2	0	0	17
04/06/2020	DH	09:30	12:30	3	4	NW	0	5	2	2	0	0	17

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
23/06/2020	DH	13:30	16:30	1	5	N	0	8	2	2	0	0	19
23/06/2020	DH	13:30	16:30	2	5	N	2	8	2	2	0	0	20
23/06/2020	DH	13:30	16:30	3	5	NW	2	8	2	2	0	0	20
27/07/2020	SI	10:30	13:30	1	1	N	0	7	2	2	0	0	14
27/07/2020	SI	10:30	13:30	2	2	N	0	7	2	2	0	0	15
27/07/2020	SI	10:30	13:30	3	2	N	0	7	2	2	0	0	15
28/07/2020	SI	13:00	16:00	1	1	NW	0	4	2	2	0	0	17
28/07/2020	SI	13:00	16:00	2	1	NW	0	3	2	2	0	0	17
28/07/2020	SI	13:00	16:00	3	1	NW	0	3	2	2	0	0	17
25/08/2020	SI	09:30	12:30	1	1	N	0	7	2	2	0	0	12
25/08/2020	SI	09:30	12:30	2	1	N	2	8	2	2	0	0	12
25/08/2020	SI	09:30	12:30	3	2	N	2	8	2	2	0	0	13
26/08/2020	SI	13:15	16:15	1	4	W	0	4	2	2	0	0	18
26/08/2020	SI	13:15	16:15	2	4	W	0	4	2	2	0	0	18
26/08/2020	SI	13:15	16:15	3	3	W	0	4	2	2	0	0	18

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
25/09/2020	SI	09:30	12:30	1	3	N	0	4	2	2	0	0	11
25/09/2020	SI	09:30	12:30	2	3	NW	0	4	2	2	0	0	12
25/09/2020	SI	09:30	12:30	3	3	NW	0	5	2	2	0	0	12
28/09/2020	SI	13:30	16:30	1	4	NW	1	8	2	2	0	0	16
28/09/2020	SI	13:30	16:30	2	4	NW	0	5	2	2	0	0	17
28/09/2020	SI	13:30	16:30	3	4	NW	0	5	2	2	0	0	17
<b>Rain/ Precipitation</b>		<b>Cloud Cover</b>		<b>Visibility</b>		<b>Lying Snow</b>		<b>Frost</b>					
None	0	Expressed in oktas (n/8)		Poor (<1km)	0	None	0	None	0				
Drizzle	1	<b>Cloud Height</b>		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											
Heavy rain/snow	4	<150m	0										
		150-500m	1										
		>500m	2										

**Table AII-6: Weather data collected during flight activity surveys undertaken at WFII VP4**

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
28/04/2020	SI	13:00	16:00	1	1	SE	0	7	2	2	0	0	15
28/04/2020	SI	13:00	16:00	2	1	SE	2	7	2	2	0	0	16
28/04/2020	SI	13:00	16:00	3	1	SE	0	7	2	2	0	0	16
29/04/2020	SI	09:30	12:30	1	2	SW	3	8	2	1	0	0	10
29/04/2020	SI	09:30	12:30	2	2	SW	3	8	2	1	0	0	10
29/04/2020	SI	09:30	12:30	3	2	SW	2	8	2	1	0	0	10
22/05/2020	JC	14:05	17:05	1	6	S	0	7	2	2	0	0	13
22/05/2020	JC	14:05	17:05	2	6	S	0	7	2	2	0	0	16
22/05/2020	JC	14:05	17:05	3	6	S	0	7	2	2	0	0	16
23/05/2020	SI	10:00	13:00	1	6	S	1	8	1	1	0	0	11
23/05/2020	SI	10:00	13:00	2	6	S	0	8	1	1	0	0	12
23/05/2020	SI	10:00	13:00	3	6	S	1	8	1	1	0	0	13
04/06/2020	DH	12:55	15:55	1	4	NW	0	6	2	2	0	0	18
04/06/2020	DH	12:55	15:55	2	4	NW	0	5	2	2	0	0	18

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
04/06/2020	DH	12:55	15:55	3	4	NW	0	6	2	2	0	0	18
22/06/2020	DH	09:56	12:56	1	5	W	2	8	2	2	0	0	18
22/06/2020	DH	09:56	12:56	2	5	NW	3	8	2	2	0	0	19
22/06/2020	DH	09:56	12:56	3	5	W	3	8	2	2	0	0	19
27/07/2020	SI	14:00	17:00	1	1	N	0	6	2	2	0	0	16
27/07/2020	SI	14:00	17:00	2	1	N	0	7	2	2	0	0	17
27/07/2020	SI	14:00	17:00	3	1	N	0	7	2	2	0	0	17
28/07/2020	SI	09:30	12:30	1	1	NW	0	4	2	2	0	0	15
28/07/2020	SI	09:30	12:30	2	1	NW	0	4	2	2	0	0	16
28/07/2020	SI	09:30	12:30	3	1	NW	0	4	2	2	0	0	16
25/08/2020	SI	13:30	16:30	1	3	N	2	8	2	2	0	0	13
25/08/2020	SI	13:30	16:30	2	4	N	2	8	2	1	0	0	13
25/08/2020	SI	13:30	16:30	3	4	N	2	8	2	2	0	0	12
26/08/2020	SI	09:30	12:30	1	2	W	0	5	2	2	0	0	15
26/08/2020	SI	09:30	12:30	2	2	W	0	5	2	2	0	0	15

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
26/08/2020	SI	09:30	12:30	3	2	W	0	4	2	2	0	0	15
28/09/2020	SI	09:30	12:30	1	1	SE	0	7	2	2	0	0	11
28/09/2020	SI	09:30	12:30	2	1	SE	2	4	2	2	0	0	11
28/09/2020	SI	09:30	12:30	3	1	SE	0	4	2	2	0	0	12
29/09/2020	SI	13:30	16:30	1	1	S	0	4	2	2	0	0	15
29/09/2020	SI	13:30	16:30	2	1	S	2	7	2	2	0	0	16
29/09/2020	SI	13:30	16:30	3	1	S	0	7	2	2	0	0	16
<b>Rain/ Precipitation</b>			<b>Cloud Cover</b>			<b>Visibility</b>			<b>Lying Snow</b>			<b>Frost</b>	
None	0	Expressed in oktas (n/8)			Poor (<1km)	0	None	0	None	0	None	0	
Drizzle	1	<b>Cloud Height</b>			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											
Heavy rain/snow	4	<150m	0										
		150-500m	1										
		>500m	2										

**Table All-7: Weather data collected during the breeding wader surveys undertaken at WFII during the 2020 breeding season**

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
24/04/2020	SI	08:00	12:00	1	1	SE	0	7	2	2	0	0	10
24/04/2020	SI	08:00	12:00	2	1	SE	0	7	2	2	0	0	10
24/04/2020	SI	08:00	12:00	3	1	SE	0	7	2	2	0	0	11
24/04/2020	SI	08:00	12:00	4	1	SE	0	6	2	2	0	0	13
18/05/2020	SI	06:00	10:00	1	1	S	0	8	2	2	0	0	11
18/05/2020	SI	06:00	10:00	2	1	S	1	8	2	2	0	0	11
18/05/2020	SI	06:00	10:00	3	1	S	1	8	2	2	0	0	11
18/05/2020	SI	06:00	10:00	4	1	S	1	8	2	2	0	0	12
26/06/2020	DH	08:00	12:00	1	2	W	1	8	2	2	0	0	12
26/06/2020	DH	08:00	12:00	2	2	W	1	8	2	2	0	0	14
26/06/2020	DH	08:00	12:00	3	2	W	1	8	2	2	0	0	15
26/06/2020	DH	08:00	12:00	4	2	W	1	8	2	2	0	0	16
<b>Rain/ Precipitation</b>				<b>Cloud Cover</b>		<b>Visibility</b>		<b>Lying Snow</b>		<b>Frost</b>			
None	0	Expressed in oktas (n/8)		Poor (<1km)	0	None	0	None	0	None	0		
Drizzle	1	<b>Cloud Height</b>		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				

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
Heavy showers/snow	3		average height of viewshed										
Heavy rain/snow	4		<150m	0									
			150-500m	1									
			>500m	2									

**Table AII-8: Weather data collected during the breeding raptor surveys undertaken at WFI and II during the 2020 breeding season**

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
30/04/2020	SI	13:00	18:00	1	1	N	2	7	2	2	0	0	11
30/04/2020	SI	13:00	18:00	2	1	N	2	7	2	2	0	0	11
30/04/2020	SI	13:00	18:00	3	1	N	0	7	2	2	0	0	12
25/05/2020	SI	10:00	13:00	1	3	S	0	7	2	2	0	0	15
25/05/2020	SI	10:00	13:00	2	3	S	0	7	2	2	0	0	15
25/05/2020	SI	10:00	13:00	3	3	S	0	7	2	2	0	0	16
25/06/2020	DH	09:00	12:00	1	2	W	0	3	2	2	0	0	15
25/06/2020	DH	09:00	12:00	2	2	W	0	3	2	2	0	0	15
25/06/2020	DH	09:00	12:00	3	2	W	0	3	2	2	0	0	16
13/07/2020	SI	10:00	13:00	1	3	W	0	2	2	2	0	0	15
13/07/2020	SI	10:00	13:00	2	3	W	0	2	2	2	0	0	16
13/07/2020	SI	10:00	13:00	3	3	W	0	2	2	2	0	0	16
<b>Rain/ Precipitation</b>		<b>Cloud Cover</b>		<b>Visibility</b>		<b>Lying Snow</b>		<b>Frost</b>					
None	0	Expressed in oktas (n/8)		Poor (<1km)	0	None	0	None	0				
Drizzle	1	<b>Cloud Height</b>		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				

Date	Surveyor	Start	End	Survey Hour	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Snow	Frost	Temp (°c)
Heavy showers/snow	3		average height of viewshed										
Heavy rain/snow	4		<150m	0									
			150-500m	1									
			>500m	2									

## APPENDIX III

### Flight activity survey data

## Primary Target Species

**Table AIII-1: Primary target species flight activity data from WFI VP1**

Date	Surveyor	Flight ID	Species	Num. Birds	M/F	Age	Obs. Time	Flight time (s)	Likely Rotor Swept Height (Y/N)
14/04/2020	SI	1	HH	1	F	Ad	13:04	120	Y
19/06/2020	DH	1	BH	3	U	Ad	14:15	45	Y
19/06/2020	DH	2	BH	4	U	Ad	14:32	60	N

**Table AIII-2: Primary target species flight activity data from WFI VP2**

Date	Surveyor	Flight ID	Species	Num. Birds	M/F	Age	Obs. Time	Flight time (s)	Likely Rotor Swept Height (Y/N)
14/04/2020	SI	1	BH	10	U	Ad	14:01	45	N
14/04/2020	SI	2	HG	2	U	Ad	14:02	45	N
14/04/2020	SI	3	BH	3	U	Ad	14:11	45	N
14/04/2020	SI	4	HG	1	U	Ad	15:08	30	N
14/04/2020	SI	5	HG	3	U	Ad	15:15	45	N
14/04/2020	SI	6	BH	3	U	Ad	15:22	30	N
14/04/2020	SI	7	HG	2	U	Ad	15:31	45	N
14/04/2020	SI	8	HG	2	U	Ad	15:54	45	N
14/04/2020	SI	9	BH	4	U	Ad	16:04	30	N
14/04/2020	SI	10	HG	1	U	Ad	16:15	45	N
15/04/2020	SI	1	HG	3	U	Ad	09:24	45	N
15/04/2020	SI	2	HG	2	U	Ad	09:32	45	N
15/04/2020	SI	3	BH	4	U	Ad	09:50	30	N
15/04/2020	SI	4	HG	2	U	Ad	10:16	30	N
15/04/2020	SI	5	BH	1	U	Ad	10:26	30	N
15/04/2020	SI	6	BH	3	U	Ad	10:40	45	N

Date	Surveyor	Flight ID	Species	Num. Birds	M/F	Age	Obs. Time	Flight time (s)	Likely Rotor Swept Height (Y/N)
15/04/2020	SI	7	BH	1	U	Ad	11:00	45	N
15/04/2020	SI	8	BH	1	U	Ad	11:24	30	N
15/04/2020	SI	9	BH	2	U	Ad	11:44	30	N
15/04/2020	SI	10	HG	1	U	Ad	12:01	30	N
02/06/2020	DH	1	BH	2	U	Ad	14:04	45	N

**Table AIII-3: Primary target species flight activity data from WFII VP1**

Date	Surveyor	Flight ID	Species	Num. Birds	M/F	Age	Obs. Time	Flight time (s)	Likely Rotor Swept Height (Y/N)
27/04/2020	SI	1	HG	1	U	Ad	17:47	45	N
20/05/2020	SI	1	HG	1	U	Ad	11:47	30	N
20/05/2020	SI	2	HG	1	U	Ad	12:38	45	N

**Table AIII-4: Primary target species flight activity data from WFII VP2**

Date	Surveyor	Flight ID	Species	Num. Birds	M/F	Age	Obs. Time	Flight time (s)	Likely Rotor Swept Height (Y/N)
20/05/2020	SI	1	BH	2	U	Ad	16:11	45	N

**Table AIII-5: Primary target species flight activity data from WFII VP3**

Date	Surveyor	Flight ID	Species	Num. Birds	M/F	Age	Obs. Time	Flight time (s)	Likely Rotor Swept Height (Y/N)
28/04/2020	SI	1	HG	1	U	Ad	09:45	30	N
28/04/2020	SI	2	BH	1	U	Ad	10:06	45	N
28/04/2020	SI	3	BH	2	U	Ad	10:10	30	N
28/04/2020	SI	4	BH	2	U	Ad	11:34	45	N

Date	Surveyor	Flight ID	Species	Num. Birds	M/F	Age	Obs. Time	Flight time (s)	Likely Rotor Swept Height (Y/N)
28/04/2020	SI	5	BH	3	U	Ad	11:44	45	N
22/05/2020	JC	1	BH	5	U	Ad	10:41	30	N
22/05/2020	JC	2	BH	1	U	Ad	10:47	45	N
22/05/2020	JC	3	BH	1	U	Ad	11:04	30	N
22/05/2020	JC	4	BH	2	U	Ad	11:19	45	N
22/05/2020	JC	5	BH	1	U	Ad	11:31	30	N
22/05/2020	JC	6	BH	2	U	Ad	11:46	15	N
04/06/2020	DH	1	BH	2	U	Ad	unrecorded	45	N
04/06/2020	DH	2	BH	1	U	Ad	unrecorded	15	N
04/06/2020	DH	3	BH	1	U	Ad	unrecorded	45	Y
04/06/2020	DH	4	BH	3	U	Ad	unrecorded	15	N
04/06/2020	DH	5	BH	8	U	Ad	unrecorded	30	Y
04/06/2020	DH	6	BH	1	U	Ad	unrecorded	15	N
23/06/2020	DH	1	L	23	U	Ad	16:25	30	N

**Table AIII-6: Primary target species flight activity data from WFII VP4**

Date	Surveyor	Flight ID	Species	Num. Birds	M/F	Age	Obs. Time	Flight time (s)	Likely Rotor Swept Height (Y/N)
28/04/2020	SI	1	HG	1	U	Ad	13:34	45	N
04/06/2020	DH	1	BH	5	U	Ad	13:40	30	N
04/06/2020	DH	2	BH	1	U	Ad	15:03	30	Y

## Secondary Target Species

**Table AIII-1b: Secondary target species flight activity data from WFI VP1**

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
14/04/2020	10:30	13:30	RN	1	11:15-11:20	N
14/04/2020	10:30	13:30	RN	3	12:00-12:05	N
14/04/2020	10:30	13:30	RN	1	12:25-12:30	N
14/04/2020	10:30	13:30	RN	1	13:00-13:05	Y
15/04/2020	13:00	16:00	RN	1	13:40-13:45	N
15/04/2020	13:00	16:00	RN	1	14:10-14:15	N
15/04/2020	13:00	16:00	RN	3	14:20-14:25	N
19/05/2020	13:30	16:30	RN	1	14:25-14:30	N
02/06/2020	09:10	12:10	RN	1	unrecorded	Y
19/06/2020	09:56	12:56	LB	1	15:50-15:55	Y
19/06/2020	09:56	12:56	H	1	16:05-16:10	N
15/07/2020	10:30	13:30	RN	1	10:40-10:45	N
15/07/2020	10:30	13:30	K	1	11:55-12:00	N
16/07/2020	13:00	16:00	RN	2	13:30-13:35	N
16/07/2020	13:00	16:00	RN	1	14:10-14:15	N
16/07/2020	13:00	16:00	LB	1	15:40-15:45	N
18/08/2020	10:00	13:00	RN	1	10:15-10:20	N
18/08/2020	10:00	13:00	RN	2	11:05-11:10	N
18/08/2020	10:00	13:00	BZ	1	12:10-12:15	N
19/08/2020	13:00	16:00	RN	1	13:45-13:50	N
19/08/2020	13:00	16:00	H	1	14:10-14:15	N
19/08/2020	13:00	16:00	RN	2	15:25-15:30	N
11/09/2020	12:50	15:50	RN	2	13:30-13:35	N

**Table AIII-2b: Secondary target species flight activity data from WFI VP2**

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
14/04/2020	14:00	17:00	LB	1	14:10-14:15	N
14/04/2020	14:00	17:00	LB	2	14:20-14:25	N

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
14/04/2020	14:00	17:00	LB	2	15:50-15:55	N
14/04/2020	14:00	17:00	LB	2	16:00-16:05	N
14/04/2020	14:00	17:00	LB	1	16:05-16:10	N
15/04/2020	09:20	12:20	LB	1	9:30-9:35	N
15/04/2020	09:20	12:20	LB	1	10:25-10:30	N
15/04/2020	09:20	12:20	LB	3	10:30-10:35	N
15/04/2020	09:20	12:20	LB	3	10:30-10:35	N
15/04/2020	09:20	12:20	LB	2	10:40-10:45	N
15/04/2020	09:20	12:20	LB	3	10:40-10:45	N
15/04/2020	09:20	12:20	LB	1	10:50-10:55	N
15/04/2020	09:20	12:20	LB	3	10:50-10:55	N
15/04/2020	09:20	12:20	RN	5	11:05-11:10	N
15/04/2020	09:20	12:20	LB	3	12:05-12:10	N
18/05/2020	10:30	13:00	RN	1	10:55-11:00	N
02/06/2020	12:45	15:45	RN	1	15:20-15:25	N
19/06/2020	09:30	12:30	RN	1	10:05-10:10	N
19/06/2020	09:30	12:30	RN	1	10:45-10:50	Y
19/06/2020	09:30	12:30	RN	2	11:05-11:10	N
16/07/2020	09:30	12:30	LB	2	10:40-10:45	N
19/08/2020	09:30	12:30	RN	1	10:10-10:15	N
19/08/2020	09:30	12:30	RN	2	11:25-11:30	N
19/08/2020	09:30	12:30	BZ	1	12:05-12:10	N

**Table AIII-3b: Secondary target species flight activity data from WFII VP1**

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
16/04/2020	09:30	12:30	CA	3	10:25-10:30	N
16/04/2020	09:30	12:30	LB	1	10:45-10:50	Y
16/04/2020	09:30	12:30	LB	3	11:40-11:45	N
16/04/2020	09:30	12:30	RN	2	12:00-12:05	N
16/04/2020	09:30	12:30	RN	2	12:15-12:20	N
27/04/2020	16:00	19:00	CO	1	17:15-17:20	N
27/04/2020	16:00	19:00	LB	1	16:45-16:50	N

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
27/04/2020	16:00	19:00	LB	2	17:40-17:45	Y
27/04/2020	16:00	19:00	BZ	1	18:05-18:10	Y
27/04/2020	16:00	19:00	K	1	18:05-18:10	N
27/04/2020	16:00	19:00	RN	3	18:15-18:20	N
27/04/2020	16:00	19:00	H	1	18:35-18:40	N
20/05/2020	10:00	13:00	BZ	1	11:10-11:15	N
20/05/2020	10:00	13:00	BZ	1	12:40-12:45	N
21/05/2020	14:00	17:00	BZ	1	14:25-14:30	N
21/05/2020	14:00	17:00	BZ	2	14:30-14:35	N
21/05/2020	14:00	17:00	LB	3	15:40-15:45	N
21/05/2020	14:00	17:00	LB	4	15:40-15:45	N
21/05/2020	14:00	17:00	LB	4	15:40-15:45	N
03/06/2020	09:15	12:15	RN	1	9:40-9:45	N
03/06/2020	09:15	12:15	BZ	1	10:10-10:15	N
03/06/2020	09:15	12:15	BZ	1	10:20-10:25	N
03/06/2020	09:15	12:15	LB	2	11:05-11:10	N
03/06/2020	09:15	12:15	RN	1	11:50-11:55	Y
23/06/2020	13:30	16:30	SU	2	13:40-13:45	N
23/06/2020	13:30	16:30	SU	2	14:20-14:45	N
23/06/2020	13:30	16:30	SU	1	14:35-14:40	N
23/06/2020	13:30	16:30	RN	1	15:10-15:15	N
23/06/2020	13:30	16:30	RN	1	15:50-15:55	N
20/07/2020	12:15	15:15	LB	7	13:20-13:25	Y
20/07/2020	12:15	15:15	RN	1	13:45-13:50	Y
20/07/2020	12:15	15:15	SH	1	14:40-14:45	N
21/07/2020	13:00	16:00	RN	2	13:05-13:10	N
21/07/2020	13:00	16:00	LB	1	13:20-13:25	N

**Table AIII-4b: Secondary target species flight activity data from WFII VP2**

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
27/04/2020	12:30	15:30	RN	1	13:05-13:10	N
27/04/2020	12:30	15:30	K	1	14:40-14:45	N
20/05/2020	13:30	16:30	RN	1	13:40-13:45	N

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
20/05/2020	13:30	16:30	K	1	14:30-14:35	N
20/05/2020	13:30	16:30	BZ	1	15:20-15:25	N
21/05/2020	10:00	13:00	RN	1	10:05-10:10	N
21/05/2020	10:00	13:00	RN	2	10:20-10:25	N
21/05/2020	10:00	13:00	RN	2	10:45-10:50	N
21/05/2020	10:00	13:00	RN	2	11:10-11:15	N
21/05/2020	10:00	13:00	RN	4	11:30-11:35	N
21/05/2020	10:00	13:00	RN	1	12:30-12:35	N
03/06/2020	13:05	16:05	RN	2	14:15-14:20	N
03/06/2020	13:05	16:05	RN	1	14:50-14:55	N
23/06/2020	09:20	12:20	RN	1	9:45-9:50	Y
23/06/2020	09:20	12:20	LB	1	9:50-9:55	Y
23/06/2020	09:20	12:20	RN	1	9:55-10:00	N
23/06/2020	09:20	12:20	RN	1	10:35-10:40	Y
23/06/2020	09:20	12:20	RN	1	10:40-10:45	N
23/06/2020	09:20	12:20	LB	2	10:40-10:45	N
23/06/2020	09:20	12:20	RN	1	11:55-12:00	Y
20/07/2020	15:45	18:45	RN	3	15:50-15:55	N
20/07/2020	15:45	18:45	RN	2	16:05-16:10	N
20/07/2020	15:45	18:45	RN	1	16:25-16:30	N
20/07/2020	15:45	18:45	RN	3	16:35-16:40	N
20/07/2020	15:45	18:45	LB	1	16:50-16:55	N
20/07/2020	15:45	18:45	RN	1	16:55-17:00	N
20/07/2020	15:45	18:45	RN	25	16:55-17:00	N
20/07/2020	15:45	18:45	H	1	17:25-17:30	N
20/07/2020	15:45	18:45	RN	1	17:25-17:30	N
21/07/2020	09:30	12:30	RN	2	9:35-9:40	N
21/07/2020	09:30	12:30	RN	6	9:50-9:55	N
21/07/2020	09:30	12:30	RN	2	10:15-10:20	N
21/07/2020	09:30	12:30	RN	1	11:05-11:10	N
21/07/2020	09:30	12:30	RN	2	12:10-12:15	N
24/08/2020	10:30	13:30	RN	6	10:30-10:35	N
24/08/2020	10:30	13:30	RN	10	10:50-10:55	N
24/08/2020	10:30	13:30	RN	3	11:15-11:20	N

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
24/08/2020	10:30	13:30	RN	5	12:00-12:05	N
24/08/2020	10:30	13:30	RN	2	13:05-13:10	N
27/08/2020	12:30	15:30	RN	3	13:05-13:10	N
24/09/2020	09:30	12:30	RN	1	10:30-10:35	N
24/09/2020	09:30	12:30	H	1	11:15-11:20	N

**Table AIII-5b: Secondary target species flight activity data from WFII VP3**

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
28/04/2020	09:30	12:30	MA	2	9:35-9:40	N
28/04/2020	09:30	12:30	H	1	10:10-10:15	N
28/04/2020	09:30	12:30	RN	2	11:05-11:10	N
28/04/2020	09:30	12:30	H	1	11:30-11:35	N
28/04/2020	09:30	12:30	H	1	12:25-12:30	N
22/05/2020	10:20	13:20	MA	2	10:35-10:40	N
22/05/2020	10:20	13:20	LB	1	10:40-10:45	N
22/05/2020	10:20	13:20	MA	4	10:50-10:55	N
22/05/2020	10:20	13:20	RN	1	11:05-11:10	N
22/05/2020	10:20	13:20	MA	1	11:45-11:50	N
22/05/2020	10:20	13:20	H	1	12:00-12:05	N
22/05/2020	10:20	13:20	RN	1	12:15-12:20	N
22/05/2020	10:20	13:20	MA	2	12:25-12:30	N
22/05/2020	10:20	13:20	MA	12 - 14	12:35-12:40	N
22/05/2020	10:20	13:20	LB	1	12:50-12:55	N
22/05/2020	10:20	13:20	MA	3	12:50-12:55	N
22/05/2020	10:20	13:20	MA	3	13:00-13:05	N
04/06/2020	09:30	12:30	RN	1	10:35-10:40	N
04/06/2020	09:30	12:30	LB	1	unrecorded	N
04/06/2020	09:30	12:30	LB	2	unrecorded	N

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
25/08/2020	09:30	12:30	RN	4	10:05-10:10	N
25/08/2020	09:30	12:30	BZ	1	10:05-10:10	N
26/08/2020	13:15	16:15	BZ	1	13:45-13:50	N
25/09/2020	09:30	12:30	BZ	1	10:20-13:20	N

**Table AIII-6b: Secondary target species flight activity data from WFII VP4**

Date	Survey start	Survey end	Species	Count	5 min period	Likely Rotor Swept Height (Y/N)
22/05/2020	14:05	17:05	LB	1	14:35-14:40	N
22/05/2020	14:05	17:05	LB	2	15:05-15:10	N
22/05/2020	14:05	17:05	LB	1	16:15-16:20	N
22/05/2020	14:05	17:05	LB	2	16:20-16:25	N
04/06/2020	12:55	15:55	LB	2	13:20-13:25	N
04/06/2020	12:55	15:55	BZ	1	14:40-14:45	Y
22/06/2020	13:30	16:30	RN	1	13:45-13:50	Y
22/06/2020	13:30	16:30	LB	1	15:40-15:45	Y
22/06/2020	13:30	16:30	LB	2	15:50-15:55	Y
27/07/2020	14:00	17:00	RN	3	14:25-14:30	N
28/07/2020	09:30	12:30	LB	1	10:35-10:45	N
26/08/2020	09:30	12:30	K	1	9:45-9:50	N

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