APPENDIX E - YEAR 1 ORNITHOLOGY REPORT

Mynydd-Ty-Talwyn Wind Farm
Galileo Green Energy Wales Ltd.
Technical Appendix: Ornithology



avianecology

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1 INTRODUCTION

1.1.1 This Report has been prepared for the proposed Mynydd-Ty-Talwyn Wind Farm (hereafter 'Proposed Development').

1.1.2 It presents detailed methodologies and results of desk study and field surveys completed to establish baseline ornithological conditions and should be read with reference to the following figures:

- **Figure 1**: Ornithological Statutory Designated Sites.
- **Figure 2a&b**: VP Flight Activity Survey Plans.
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- **Figure 4a**: Target Species Flight Activity (Year 1).
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- **Figure 5g**: Other Species Records during MBBS (Year 2; Visit 3).
- **Figure 5h**: Other Species Records during MBBS (Year 2; Visit 4).
- **Figure 6**: Nightjar Survey Results (Year 2).
- **Confidential Figure C.1**: Breeding Raptor Survey Results (Year 1).
- **Confidential Figure C.2**: Breeding Raptor Survey Results (Year 2).

1.1.3 Information considered sensitive is presented in **Confidential Figures C.1 and C.2.** Such information will not be made publicly available but will be provided to Natural Resources Wales (NRW) and relevant Local Planning Authorities.

1.1.4 Only common species names are used throughout this report. Scientific names for all species referenced (and the conservation status as relevant) are provided in **Annex 1**.

1.2 Key Guidance

1.2.1 Ornithology survey methodologies and subsequent interpretation of results has made reference to the following key industry standard guidance:

- Brown, A.F. and Shepherd, K.B. (1993) *A method for censusing upland breeding waders*. Bird Study 40, 189-195.

- NatureScot (SNH, 2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms.* Version 2. March 2017.

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

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- NatureScot (SNH, 2000) *Windfarms and Birds - Calculating a theoretical collision risk assuming no avoiding action*. SNH Guidance Note.

- NatureScot (SNH, 2018) *Assessing significance of impacts from onshore wind farm outwith designated areas.* Guidance. Version 2 – February 2018.

- NatureScot (SNH, 2016) *Assessing connectivity with Special Protection Areas (SPAs)*. Guidance. Version 3 – June 2016.

1.2.2 In the absence of Welsh-specific guidance, baseline information gathering has been undertaken in accordance with NatureScot guidance (as listed above).

1.3 Target Species

1.3.1 Target species for survey were identified through desk study, the basis of their known or likely presence, their likely sensitivity to the Proposed Development and those which are afforded a higher level of legislative protection, which is in accordance with current NatureScot guidance (SNH, 2017 and 2018). Primarily, target species included those species listed on/as:

- Annex I of the EC Birds Directive (2009/147/EC);

- Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);

- Species on Section 7 of the Environment (Wales) Act 2016; and

- Red-listed Birds of Conservation Concern (BoCC) (Johnstone *et al.* 2022).

1.3.2 This has ensured inclusion of "*Priority bird species for assessment when considering the development of onshore wind farms in Scotland*" as per NatureScot guidance (SNH, 2018).

2 METHODOLOGY

2.1 Desk Study and Consultation

2.1.1 In accordance with NatureScot guidance (SNH, 2017), an initial desk study was undertaken to ascertain the presence of statutory designated sites in proximity to the Proposed Development, in order to identify possible target species to inform the requirements for survey.

2.1.2 The desk study included a review of the following key sources summarised in **Table 2.1.**

Table 2.1: Initial Desk study key sources and information sought.

Key Source	Date of Consultation	Information Sought	Study Area
Natural Resources Wales website https://naturalresources.wales/?lang=en	November 2022	Proximity to statutory designated sites.	Within 10km of the Site; extended to 20km for internationally designated sites with qualifying migratory waterfowl features (see **Figure 1**).
'MAGIC' website https://magic.defra.gov.uk/magicmap.aspx	November 2022	Proximity to statutory designated sites.	Within 10km of the Site; extended to 20km for internationally designated sites with qualifying migratory waterfowl features (see **Figure 1**).

2.2 Field Surveys

2.2.1 Detailed knowledge of bird populations, distributions and flight activity in order to assess the potential effects of the Proposed Development upon ornithological features, has been derived from field surveys undertaken between 2021 and 2023.

2.2.2 The scope of surveys undertaken was informed through proximity to designated sites, existing knowledge of sensitive species, and with reference to NatureScot guidance (SNH, 2017 and 2018).

2.2.3 The following ornithological field surveys were completed:

- Vantage Point (VP) flight activity surveys November 2021 to October 2022, and November 2022 to October 2023);
- Moorland breeding bird surveys (MBBS) (2022 and 2023);
- Annex 1/Schedule 1 breeding raptor and owl searches (2022 and 2023); and
- Nightjar surveys (2023).

VP Flight Activity Surveys

2.2.4 VP flight activity surveys were undertaken between November 2021 and October 2022, and November 2022 and October 2023 within the Site.

VP Locations and Viewsheds

2.2.5 Three VP locations (VP1, VP2/2a and VP3/3b) were used to provide a comprehensive visual coverage of the required VP survey area required for the Proposed Development in accordance with current NatureScot guidance (2017). During Year 1 surveys (November 2021 to October 2022) and for the first two survey months of Year 2 surveys (November and December 2022) VPs 1-3 were used, as illustrated

in **Figure 2a&b.** From, and including, January/February 2023 to November 2023, VP2a and VP3b were used to respectively replace VP2 and VP3 due to access restrictions. Information into the VPs used are detailed within **Table 2.2.**

Table 2.2: VP locations.

VP	Grid Reference	Orientation	Period Used
1	SS 88091 85072	West	Nov 2021 – Oct 2023
2	SS 84653 86206	North-north-east	Nov 2021 – Dec 2022
2a	SS 84488 86223	North-north-east	Jan – Oct 2023
3	SS 86829 86664	South-east	Nov 2021 – Oct 2023
3b	SS 86438 86038	South-east	Feb - Oct 2023

VP Survey Effort

2.2.6 The total survey effort (hours) completed at each VP location between 2021 and 2023 is summarised in **Table 2.3.**

2.2.7 Full details of all survey times and weather conditions are presented in **Annex 2.**

Table 2.3: VP flight activity survey effort – 2021 to 2023.

VP	2021		2022										Total (Year 1)
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
1	3	6	3	12	12	6	6	3	6	9	6	6	78
2	3	6	6	9	12	9	9	3	9	0	6	6	78
3	3	9	3	9	12	6	6	3	15	9	6	6	87
VP	**2022**		**2023**										**Total (Year 2)**
	Nov	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	
1	6	6	6	6	6	9	6	6	9	9	6	6	81
2/2a	0	6	12	6	6	9	6	6	9	9	6	6	81
3/3b	6	6	6	6	6	9	6	6	9	9	6	6	81

2.2.8 Survey effort in Year 1 (2021-2022) and Year 2 (2022-2023) exceeded the minimum recommended survey effort outlined within NatureScot guidance (SNH, 2017) i.e. a minimum of 72 hours per VP location divided between breeding and non-breeding seasons.

2.2.9 Survey times were dispersed throughout the day and were also completed in a range of weather conditions, but always conductive to survey and safe access.

2.2.10 In accordance with NatureScot guidance (SNH, 2017), flight lines were mapped for all target species passing through the VP survey area. Details of species, number of birds, flight height in bands, duration and direction were noted on standardised recording forms and field plans.

2.2.11 The following height bands (HT) were used in the field from November 2021 to March 2023 to record target species activity at, below or above collision risk height for subsequent use in the calculation of collision mortality risks.

- HT1: 0-60m;

- HT2: 61-90m;
- HT3: 91-180m;
- HT4: 181-200m; and
- HT5: >200.

2.2.12 Note the following height bands were used from April 2023 until October 2023 to account for potentially higher turbine tips.

- HT1: 0-40m;
- HT2: 41-90m;
- HT3: 91-180m;
- HT4: 181-200m;
- HT5: 201-280m;
- HT6: >280m.

Target Species

2.2.13 Target species for recording included all Annex 1/Schedule 1 raptors (plus kestrel from part-way through Year 1 following the species moving onto the BoCC Red List in Wales; Johnstone *et al.* (2002)), waders, swans, geese, ducks (excl. mallard and feral species) as observed during VP watches.

Secondary Species

2.2.14 Secondary species were also noted in approximately fifteen-minute summary intervals, with the number of birds present and general behaviour recorded in order to build an overall picture of activity. Fifteen-minute periods were considered appropriate to ensure surveyors were fully alert to target species activity, which took priority during survey.

2.2.15 Secondary species are defined here as commoner raptors (e.g. buzzard and sparrowhawk), all gulls, feral species, mallard, and raven along with any large concentrations of Schedule 1 or Red-listed passerines as observed during survey.

Moorland Breeding Bird Surveys

2.2.16 Moorland breeding bird surveys (MBBSs) were undertaken in 2022 and 2023.

2.2.17 The MBBS survey area in both survey years has comprised coverage of the Site and accessible areas of open habitats within 500m, as shown in **Figure 3.**

2.2.18 The methodology employed followed an adapted Brown and Shepherd (1993) method for censusing upland breeding waders, based upon the recommendations set out in Calladine *et al*. (2009) and as recommended in NatureScot guidance (SNH, 2017). The methodology is suitable for moorland and open country species including, waders, gulls, red grouse and some wildfowl species however,

incidental observations of any raptors, owls or notable passerines (i.e. Schedule 1, BoCC red-listed and Section 7 species[1,2]) were also recorded.

2.2.19 A series of four staggered visits were completed during each survey year, between April and July each year.

2.2.20 During each survey visit a pre-determined route was walked through the survey area, with all birds seen or heard, and their behaviours (e.g. displaying, carrying food etc.) were mapped in the field.

2.2.21 All surveys were undertaken during daylight hours and in fine conditions conducive to survey. Surveys were typically timed to capture the main period optimal for MBBS (08:30-18:00hrs), in accordance with standard guidance (NatureScot, 2017). This ensured that the time when target species (described above) are most active was appropriately covered by the survey period. Survey effort is summarised in **Table 2.4**. Surveys were sometimes undertaken over 2-3 days given the extent of the MBBS survey area. Full details of all survey times, field surveyors and weather conditions are presented in **Annex 2.**

Table 2.4: Moorland breeding bird survey effort.

Year	Visit	Date	Start Time (24hrs)	End Time (24hrs)
2022 (Year 1)	1	14/04/2022 15/04/2022	16:00 13:10	19:40 18:15
	2	31/05/2022	05:30	10:00
	3	26/06/2022	06:10	13:50
	4	06/07/2022	06:00	13:10
2023 (Year 2)	1	03/04/2023 15/04/2023	06:45 06:45	13:05 12:45
	2	02/05/2023 17/05/2023	06:30 07:30	12:40 12:55
	3	05/06/2023 19/06/2023	06:45 06:30	12:10 11:55
	4	03/07/2023 17/07/2023 25/07/2023	06:00 07:15 10:15	09:00 13:10 12:30

Annex 1/ Schedule 1 Breeding Raptor and Owl Searches

2.2.22 Breeding raptor and owl searches were undertaken in 2022 and 2023 with reference to species-specific methodologies outlined in Hardey *et al.* (2013), as per NatureScot guidance (SNH, 2017).

2.2.23 A series of search visits were made during each survey year, staggered across the core breeding season (March to July).

2.2.24 The breeding raptor and owl survey area in both survey years has comprised coverage of the Site and accessible areas within 2km, as shown in **Figure C1-2.**

2.2.25 All surveys were undertaken during daylight hours and in fine conditions conducive to survey. Some surveys were timed to include times close to dusk to capture any evidence of owls. Survey effort is

[1] Environment (Wales) Act 2016.
[2] Extended in Year 2 to include all passerines (see *Limitations* section for further information).

summarised in **Table 2.5**. Full details of all survey times, field surveyors and weather conditions are presented in **Annex 2.**

Table 2.5: Breeding raptor and owl search effort summary.

Year	Visit	Date	Start Time (24hrs)	End Time (24hrs)
2022(Year 1)	1	17/04/2022	09:40	16 10
	2	19/04/2022	08:00	15 40
	3	09/05/2022	10:00	16 30
	4	14/05/2022	11:00	16 30
	5	20/06/2022	10:00	14 00
	6	21/06/2022	10:30	15 00
2023 (Year 2)	1	27/03/2023	13:50	20 00
	2	30/03/2023	14:00	20 20
	3	10/04/2023	13:30	20 35
	4	07/05/2023	14:45	21 00
	5	19/05/2023	15:15	21 00
	6	13/06/2023	15:30	21 15
	7	26/06/2023	15:30	21 50
	8	12/07/2023	14:45	21 00

Nightjar Survey

2.2.26 Nightjar surveys were carried out with reference to species-specific methodologies outlined in Gilbert *et al.* (1998) and comprised two survey visits (one at dusk and one at dawn) in 2023, in favourable conditions.

2.2.27 The nightjar survey area has comprised coverage of the Site and accessible areas of suitable habitat (including clear-fell and regenerating plantation) within 500m, where accessible, as shown in **Figure 6.** Habitats within the survey area considered most suitable for nightjar were surveyed, and comprised any clear-felled areas within forestry, and young forestry typically less than 15 years old and open rides.

2.2.28 The survey was undertaken along a pre-determined transect through the survey area and stopping at listening points adjacent to suitable breeding habitats, where singing ('churring') males were listened for. The survey was targeted in those forestry habitats within, and adjoining, the west of the Site.

2.2.29 Survey effort is summarised in **Table 2.6**. Full details of all survey times, field surveyors and weather conditions are presented in **Annex 2.**

Table 2.6: Nightjar survey effort summary.

Year	Visit	Date	Start Time (24hrs)	End Time (24hrs)
2023 (Year 2)	1	28/06/2023	21:30	00:30
	2	30/06/2023	01:30	04:45

Field Survey Personnel

2.2.30 All field surveys have been completed by experienced and professional ornithologists named in **Annex 2**; all of whom are all fully conversant in recognised bird survey methodologies for proposed wind turbine developments.

Other Surveys

2.2.31 No further field surveys were undertaken. In accordance with standard NatureScot guidance (SNH, 2017) winter walkover surveys were not carried out, given the Site is not within 20km of any designated site with qualifying migratory goose interests. Furthermore, the ornithology surveys (VP flight activity surveys) were undertaken during the winter period which would have recorded any such bird use of the Site.

Field Survey Limitations

2.2.32 VP2 had to be relocated to VP2a, and VP3 to VP3b due to access restrictions in January 2023 and February 2023 respectively, during Year 2. The movement of VP2 to VP2a and VP3 to VP3b were modest alterations, with only slight changes to the viewsheds. These are not considered limitations given the VP viewshed coverage remained sufficient of the proposed layout at the time of survey.

2.2.33 For the Year 2 breeding season, different height bands were used, from those used in Year 1, given evolving turbine specification considerations.

2.2.34 Survey hours between some of the VPs did not match, although annual hours at each VP exceeded 72hours (and spread across the breeding and non-breeding seasons) which is the minimum requirement as per NatureScot guidance (SNH, 2017). No limitation in relation to VP hours is thus considered.

2.2.35 During the Year 1 MBBS only ground-nesting wetland species were recorded (although extended to include Red list passerines). During the Year 2 MBBS, the target species was extended to include all species, and included ground-nesting wetland species and all passerines. Considering all passerines is highly precautionary as passerines are not considered to be sensitive to wind farm developments, so the omission of these bird species during Year 1 MBBS is not considered a limitation.

2.2.36 Nightjar surveys were only undertaken in Year 2 (and not Year 1). Given the survey results obtained, one year of surveys is considered to have appropriately identified those habitats, within the survey area, most suitable for, and supporting, breeding nightjar.

2.2.37 Preliminary digital elevation models (DEM) of the VP viewshed coverage from the VPs were created using a 20m above the ground altitudinal cut off. The viewshed coverage at each VP location was ground-truthed onsite by surveyors, to ensure the viewshed coverage modelled was representative of the actual coverage, after factoring in the location of trees and hedgerows. The VP viewshed coverage was accordingly amended. The viewshed coverage shows that the vast majority of the VP survey area is visible with only very limited “blind spots” (which is typical due to undulating topography and trees). These are very minor in extent and flight activity of target species around these turbines would still have been observed.

2.2.38 All habitats within the Site were accessible for survey. Access to and observations of most areas outside the Site (including out to 2km for breeding raptor and owl searches) was possible from suitable locations within the site or public rights of way (PRoWs), scanning areas with the use of optics (telescope and binoculars). Given the good visibility across the survey area from within the Site and the PRoWs this is not considered a limitation to the results obtained.

2.2.39 A settling-in period was applied prior to the start of VP flight activity surveys to minimise the likelihood for surveyor presence to influence bird activity. Furthermore, VPs were located where viewshed visibility could be maximised, while keeping as inconspicuous to birds as possible (both VPs were positioned by field boundaries to avoid influencing bird activity).

2.2.40 Overall, no limitations to the dataset in establishing an accurate reflection of the levels of target species activity within proximity to the Proposed Development, and respective survey areas.

3 RESULTS

3.1 Desk Study

3.1.1 This section provides details of existing ornithological information and existing records of protected and notable bird species identified within and in proximity to the Site from desk study sources listed in **Table 3.1.**

Statutory Designated Sites for Nature Conservation

3.1.2 This section should be read with reference to **Figure 1.**

3.1.3 A review of the 'MAGIC' and NRW websites identifies that the Site does not form part of any statutory designated site for nature conservation with qualifying ornithological qualifying features.

3.1.4 **Table 3.1** summarises statutory designated sites with ornithological qualifying features. Distances specified within **Table 3.1** are taken from the Site boundary to the designation boundary at its nearest point.

3.1.5 There are no internationally designated sites with qualifying migratory waterfowl features located within 20km of the Site.

Table 3.1: Designated sites for nature conservation.
SSSI – Site of Special Scientific Interest.

Designated Site	Distance and Direction from the Site	Ornithological Qualifying Features
Eglwys Nunydd Reservoir SSSI	6.5km west	Reservoir supporting wintering wildfowl and passage migrants.
Margam Moors SSSI	8km west	Reservoir supporting wintering wildfowl and passage migrants.

3.2 Field Surveys

This section presents the results of baseline field surveys, including an overview of birds present within adopted survey areas and their distribution.

VP Flight Activity Surveys

Target Species

3.2.1 Target species flight activity recorded during the entire VP survey period (November 2021 to October 2022, and November 2022 to October 2023) from all VPs combined is summarised in **Table 3.2**. The

total number of flights, total number of birds and total flight duration recorded (across all height bands) is presented. This includes some flights which were detected outside of the VP survey area and which are not at-risk of collision from the Proposed Development. The most regularly recorded species was red kite (224 flights, including a displaying pair), lapwing (31 flights, including displaying birds) and grey heron (15 flights), with other target species recorded in modest numbers (≤6 flights).

3.2.2 Detailed flight records are presented in **Annex 3**, with flight lines illustrated in **Figures 4a-d.**

Table 3.2: Target species flight activity summary (all flights) across two years of survey.

Species	Total. no. of flights	Total. no. of birds	Total flight time (secs)[3]
Teal	4	30	1,980
Barn owl	1	1	75
Little egret	1	1	30
Golden plover	1	4	120
Grey heron	15	15	927
Kestrel[4]	4	5	705
Lapwing	31	206	13,294
Red kite	224	334	44,371
Merlin	6	6	180
Cormorant	1	1	60
Peregrine	1	1	45
Hen harrier	1	1	160

Secondary Species

3.2.3 The following secondary species were also recorded:

- Lesser black-backed gull;
- Great black-backed gull;
- Herring gull;
- Common gull;
- Black-headed gull;
- Buzzard;
- Sparrowhawk; and
- Raven.

Moorland Breeding Bird Surveys

3.2.4 In summary, the MBBS survey area supported a very narrow assemblage of breeding species considered typical of the locale and habitats present. The only ground-nesting wader recorded as breeding was lapwing, with four breeding pairs in both Year 1 and Year 2, with the location of the breeding lapwing pairs shown in **Figures 5a-b.** Of these, conclusive evidence of breeding (nest site

[3] Time multiplied by the number of birds.

[4] Note, kestrel was treated as target species part way through Year 1 (from September 2022) and throughout Year 2, given its move from the Amber List to Red List in Wales (Johnstone *et al.* (2022)). Eleven kestrel flights were recorded prior to September 2022 when it was treated as a secondary species.

and/or young recorded) was identified for two and one lapwing pair respectively in Year 1 and Year 2. All apart from one of the breeding pairs were within the Site boundary. All other breeding species recorded, were passerines, such as skylark and meadow pipit (which in accordance with NatureScot guidance (SNH, 2017) are not considered sensitive to wind farm developments). Records of other species recorded during the MBBS is provided in **Table 3.3**, and BoCC Amber and Red list species[5] records (those listed in **bold** in **Table 3.3**) are shown in **Figures 5c-5h**. Of those species recorded during the MBBS, all of those listed in **Table 3.3** are during Year 2, with only spotted flycatcher recorded in Year 1 (but see *Limitations* section).

Table 3.3: Other Species recorded during MBBS.

Species	Considered Breeding in Survey Area	No. territories Y1	No. territories/pairs Y2
Cuckoo	**Yes**	-	**4**
Stock dove	**Yes**	-	**2**
Wood pigeon	**Yes**	-	**1**
Snipe	**No**	-	-
Great spotted woodpecker	Yes	-	-
Green woodpecker	**Yes**	-	**2**
Grey heron	**No**	-	-
Jay	Yes	-	-
Carrion crow	Yes	-	-
Raven	Yes	-	-
Coal tit	**Yes**	-	**3**
Blue tit	Yes	-	-
Great tit	Yes	-	-
Skylark	**Yes**	-	**43**
Swallow	No	-	-
Willow warbler	**Yes**	-	**18**
Chiffchaff	Yes	-	-
Blackcap	Yes	-	-
Whitethroat	**Yes**	-	**6**
Goldcrest	**Yes**	-	**6**
Wren	**Yes**	-	**18**
Nuthatch	Yes	-	-
Treecreeper	Yes	-	-
Starling	**Yes**	-	**1**
Song thrush	**Yes**	-	**9**

[5] Regards Amber or Red listed species in the BoCC 5 for the UK, and BoCC 4 for Wales.

Species	Considered Breeding in Survey Area	No. territories Y1	No. territories/pairs Y2
Mistle thrush	**Yes**	-	**5**
Blackbird	Yes	-	-
Spotted flycatcher	**Yes**	**1**	-
Robin	Yes	-	-
Stonechat	Yes	-	-
Wheatear	**No**	-	-
House sparrow	**Yes**	-	**2**
Dunnock	**Yes**	-	**6**
Pied wagtail	Yes	-	-
Meadow pipit	**Yes**	-	**19**
Tree pipit	**Yes**	-	**1**
Chaffinch	Yes	-	-
Bullfinch	**Yes**	-	**1**
Linnet	**Yes**	-	**5**
Goldfinch	Yes	-	-

Annex 1 / Schedule 1 Breeding Raptor and Owl Searches

3.2.5 In Year 1 (2022) the survey area was found to support a goshawk breeding territory, with nest site located within the Site, red kite breeding territory ([redacted]) and two possible barn owl nest/roost sites within 2km of the Site (with one close to the Site boundary). These records are provided in **Confidential Figure C1**. Other records in Year 1 consisted of a male merlin and hunting kestrel (and another kestrel perched in a conifer), although there was no evidence of breeding of these two species within the survey area.

3.2.6 In Year 2 (2023) the survey area was found to support a red kite breeding territory (with nest site within the Site). This record is provided in **Confidential Figure C2**. Other records in Year 2 consisted of an over-flying kestrel, although there was no evidence of breeding within the survey area.

Nightjar Survey

3.2.7 [redacted] Furthermore, five nightjar flights and two female nightjars were also recorded in habitat associated with the churring males. The records from the surveys are provided in **Figure 6**.

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ANNEX 1: BIRD SPECIES SUMMARY

Table A1-1 provides a list of bird species referred to within this report. Both common and species names are presented along with a summary of each species relevant conservation status using the following abbreviations:

- Annex 1 - species listed on Annex 1 of the Birds Directive;
- S1, S1A, SA1 - species listed on Schedule 1, Schedule 1A or Schedule A1 respectively of the 1981 Wildlife and Countryside Act;
- BoCC - BoCCs as listed by leading bird conservation organisations in the UK, including the RSPB and BTO. Red and Amber categories are given (Stanbury *et al.*, 2021)[6];
- S7 - species listed in Section 7 of the Environment (Wales) Act 2016; and
- LBAP – species with action plans prepared as part of the Bridgend LBAP, 2002[7,8].

Table A1-1: Summary of bird species.

Common Name	Species Name	Conservation Status
Mallard	*Anas platyrhynchos*	BoCC – Amber (Green)
Teal	*Anas crecca*	BoCC - Amber
Grey heron	*Ardea cinerea*	BoCC – Green (Amber)
Little egret	*Egretta garzetta*	Annex 1
Nightjar	*Caprimulgus europaeus*	Annex 1, BoCC- Amber (Green), S7
Red grouse	*Lagopus lagopus*	BoCC – Green (Red), S7
Lapwing	*Vanellus vanellus*	BoCC- Red, S7, LBAP
Golden plover	*Pluvialis apricaria*	Annex 1, BoCC – Green (Red), S7
Black-headed gull	*Chroicocephalus ridibundus*	BoCC – Amber (Red), S7
Common gull	*Larus canus*	BoCC – Amber
Great black-backed gull	*Larus marinus*	BoCC - Amber
Lesser black-backed gull	*Larus fuscus*	BoCC – Amber (Red)
Herring gull	*Larus argentatus*	BoCC – Red, S7
Cormorant	*Phalacrocorax carbo*	-
Barn owl	*Tyto alba*	S1
Hen harrier	*Circus cyaneus*	S1, BoCC – Red
Sparrowhawk	*Accipiter nisus*	BoCC – Amber (Green)
Goshawk	*Accipiter gentilis*	BoCC – Green (Amber), S1

[6] Where the BoCC 4 Wales classification (from Johnstone *et al.* 2022) differs from the UK-wide list, the Welsh list classification is presented in brackets.
[7] www.bridgend.gov.uk/media/8721/bridgendlbapandes_v2-1.pdf (Accessed 01/09/2023).
[8] Note, although there are no specific Local Biodiversity Action Plans for species, the Neath Port Talbot Nature Partnership aims to protect and enhance species and habitats listed on Section 7 of the Environment (Wales) Act 2016 and/or European or UK legally protected species (see https://www.npt.gov.uk/5405 Accessed 01/09/2023).

Common Name	Species Name	Conservation Status
Red kite	*Milvus milvus*	Annex 1, S1, S1A
Buzzard	*Buteo buteo*	-
Kestrel	*Falco tinnunculus*	BoCC – Amber (Red), S7
Merlin	*Falco columbarius*	Annex 1, S1, BoCC – Red
Peregrine	*Falco peregrinus*	S1
Raven	*Corvus corax*	-
Skylark	*Alauda arvensis*	BoCC- Red (Amber), S7, LBAP
Meadow pipit	*Anthus pratensis*	BoCC – Amber (Red)
Cuckoo	*Cuculus canorus*	BoCC – Red, S7
Stock dove	*Columba oenas*	BoCC – Amber (Green)
Wood pigeon	*Columba palumbus*	BoCC – Amber (Green)
Snipe	*Gallinago gallinago*	BoCC – Amber
Great spotted woodpecker	*Dendrocopos major*	-
Green woodpecker	*Picus viridis*	BoCC – Green (Amber)
Grey heron	*Ardea cinerea*	BoCC – Green (Amber)
Jay	*Garrulus glandarius*	-
Carrion crow	*Corvus corone*	-
Coal tit	*Periparus ater*	BoCC – Green (Amber)
Blue tit	*Cyanistes caeruleus*	-
Great tit	*Parus major*	-
Swallow	*Hirundo rustica*	-
Willow warbler	*Phylloscopus trochilus*	BoCC – Amber (Red)
Chiffchaff	*Phylloscopus collybita*	-
Blackcap	*Sylvia atricapilla*	-
Whitethroat	*Curruca communis*	BoCC – Amber (Red)
Goldcrest	*Regulus regulus*	BoCC – Green (Red)
Wren	*Troglodytes troglodytes*	BoCC – Green (Amber)
Nuthatch	*Sitta europaea*	-
Treecreeper	*Certhia familaris*	-
Starling	*Sturnus vulagris*	BoCC – Red, S7
Song thrush	*Turdus philomelos*	BoCC – Amber (Green), S7
Mistle thrush	*Turdus viscivorus*	BoCC – Red (Amber)
Blackbird	*Turdus merula*	-
Spotted flycatcher	*Muscicapa striata*	BoCC – Red, S7, LBAP
Robin	*Erithacus rubecula*	-
Stonechat	*Saxicola rubicola*	-

Common Name	Species Name	Conservation Status
Wheatear	*Oenanthe oenanthe*	BoCC – Amber
House sparrow	*Passer domesticus*	BoCC – Red (Amber), S7
Dunnock	*Prunella modularis*	BoCC – Amber, S7
Pied wagtail	*Motacilla alba*	-
Tree pipit	*Anthus trivialis*	BoCC – Red, S7
Chaffinch	*Fringilla coelebs*	-
Bullfinch	*Pyrrhula pyrrhula*	BoCC – Amber, S7
Linnet	*Linaria cannabina*	BoCC – Red, S7
Goldfinch	*Carduelis carduelis*	-

ANNEX 2: ORNITHOLOGY FIELD SURVEY EFFORT

The following codes are used to record weather conditions within **Tables A2-1** to **A2-6**:

Wind Speed		**Wind Direction**		**Cloud Height**	
Calm	0	16 point compass		<150m	0
Light air	1			150-500m	1
Light breeze	2	**Rain**		>500m	2
Gentle breeze	3	None	0		
Moderate breeze	4	Drizzle/mist	1	**Frost**	
Fresh breeze	5	Light showers	2	None	0
Strong breeze	6	Heavy showers	3	Ground	1
Moderate gale	7	Heavy rain	4	All day	2
Fresh gale	8				
Strong gale	9	**Visibility**		**Snow**	
Whole gale	10	Poor	0	None	0
Storm	11	<1km	1	On site	1
		>1km	2	High ground	2
				Cloud cover	
				0-8 scale (with '0' no cloud & '8' 100% cloud)	

Field surveys were undertaken by the following named surveyors:

D. Rouse (DR), S. Viles (SV), S. Shutt (SS) and M. Hogan (MH).

Table A2-1: VP flight activity survey effort (November 2021 to October 2022, and November 2022 to June 2023).

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
29/11/2021	1	DR	08:45	11:45	3	0/0/0	NE/NE/NE	0/0/0	2/2/2	2/1/1	2/2/2	2/2/2	0/0/0
29/11/2021	2	DR	12:00	15:00	3	1/3/6	NE/NE/NE	0/0/2	4/6/8	1/1/0	2/2/0	1/2/2	0/0/0
30/11/2021	3	DR	08:00	11:00	3	4/4/4	NNE/NNE/NNE	0/0/0	7/7/7	2/1/1	2/2/2	2/2/2	0/0/0
09/12/2021	2	DR	08:30	11:30	3	2/3/4	WNW/WNW/WNW	0/0/0	8/7/7	1/1/1	2/2/2	2/2/2	0/0/0
09/12/2021	3	DR	11:45	14:45	3	6/8/9	ESE/ESE/ESE	1/2/4	8/8/8	1/0/0	1/0/0	2/2/1	0/0/0
14/12/2021	1	DR	09:00	12:00	3	6/6/7	NE/NE/NE	2/2/3	7/8/8	0/1/1	1/1/1	0/0/0	0/0/0
14/12/2021	2	DR	12:30	15:30	3	7/7/7	NE/NE/NE	3/3/4	8/8/8	0/0/0	1/1/0	0/0/0	0/0/0
15/12/2021	3	DR	09:00	12:00	3	2/2/2	NNE/NNE/NNE	0/0/0	8/8/8	0/0/0	0/0/0	0/0/0	0/0/0
20/12/2021	1	DR	09:10	12:10	3	3/3/4	NNE/NNE/NNE	1/1/2	3/4/5	1/1/1	1/1/1	0/0/0	0/0/0
20/12/2021	3	DR	12:30	15:30	3	4/4/4	NNE/NNE/NNE	2/2/2	5/5/5	1/1/1	1/1/1	0/0/0	0/0/0
19/01/2022	3	DR	09:00	12:00	3	2/3/3	S/S/S	2/2/2	8/8/8	1/1/1	2/2/1	0/0/0	0/0/0
19/01/2022	2	DR	12:15	15:15	3	4/4/8	E/E/E	0/0/0	6/6/7	2/2/2	2/1/1	0/0/0	0/0/0
27/01/2022	1	DR	07:45	10:45	3	2/2/2	NE/NE/NE	0/0/0	6/5/5	1/1/1	2/2/2	0/0/0	0/0/0
27/01/2022	2	DR	11:00	14:00	3	3/3/2	NE/NE/NE	0/0/0	7/7/6	1/2/2	2/2/2	0/0/0	0/0/0
03/02/2022	2	DR	11:15	14:15	3	2/2/2	S/S/S	0/0/1	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
03/02/2022	1	DR	07:45	10:45	3	4/4/4	S/S/S	0/1/0	8/8/8	0/1/1	1/1/1	0/0/0	0/0/0
07/02/2022	1	DR	08:00	11:00	3	0/0/0	SE/SE/SE	0/0/0	4/4/4	2/2/2	2/2/2	0/0/0	0/0/0
07/02/2022	3	DR	11:30	14:30	3	0/0/0	SE/SE/SE	0/0/1	3/3/3	2/2/2	2/2/2	0/0/0	0/0/0
16/02/2022	3	DR	14:30	17:30	3	5/6/6	S/S/S	3/3/4	8/8/8	1/1/0	1/1/0	0/0/0	0/0/0
16/02/2022	1	DR	07:30	10:30	3	4/4/4	S/S/S	2/2/2	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
16/02/2022	2	DR	11:00	14:00	3	4/4/5	S/S/S	2/2/3	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
17/02/2022	3	DR	14:10	17:10	3	5/5/6	SE/SE/SE	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
17/02/2022	1	DR	07:10	10:10	3	5/5/6	SE/SE/SE	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
17/02/2022	2	DR	10:40	13:40	3	6/6/6	S/S/SE	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
08/03/2022	1	DR	07:30	10:30	3	0/0/0	NNE/NNE/NNE	0/0/0	7/7/6	2/2/2	2/2/2	0/0/0	0/0/0
08/03/2022	2	DR	11:00	14:00	3	1/1/1	NNE/NNE/NNE	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
08/03/2022	3	DR	14:30	17:30	3	2/1/1	NE/NE/NE	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
15/03/2022	1	DR	07:00	10:00	3	1/1/1	NE/NE/NE	0/00	7/7/7	1/1/2	2/2/2	0/0/0	0/0/0
15/03/2022	2	DR	10:30	13:30	3	1/1/2	NE/NE/NE	0/01	5/5/5	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
15/03/2022	3	DR	14:00	17:00	3	1/1/1	NE/NNE/NNE	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
29/03/2022	2	DR	14:30	17:30	3	0/0/0	SE/SE/SE	0/0/0	6/6/7	2/2/2	2/2/2	0/0/0	0/0/0
30/03/2022	1	DR	09:00	12:00	3	0/0/0	S/S/S	0/0/0	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
29/03/2022	1	DR	11:00	14:00	3	0/0/0	SE/SE/SE	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
30/03/2022	2	DR	12:30	15:30	2	1/0/0	S/S/S	0/0/0	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
30/03/2022	3	DR	16:00	19:30	3	0/0/0	S/S/S	0/0/0	8/8/8	1/1/1	1/1/0	0/0/0	0/0/0
31/03/2022	3	DR	11:00	14:00	3	1/0/0	S/S/S	0/0/0	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
16/04/2022	3	SV	11:00	14:00	3	0/1/1	/-/NW/NW	0/0/0	3/2/2	2/2/2	2/2/2	0/0/0	0/0/0
16/04/2022	2	SV	14:30	17:30	3	1/1/1	NW/NW/NW	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
25/04/2022	2	DR	14:00	17:00	2	0/0/0	NE/NE/NE	0/0/0	2/2/1	2/2/2	2/2/2	0/0/0	0/00
27/04/2022	1	DR	14:00	17:00	3	1/1/1	NE/NE/NE	0/0/0	4/3/3	2/2/2	2/2/2	0/0/0	0/0/0
29/04/2022	3	DR	08:00	11:00	3	3/3/2	N/N/N	0/0/0	7/7/5	2/2/2	2/2/2	0/0/0	0/0/0
29/04/2022	2	DR	11:40	14:40	3	3/2/2	N/N/N	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
29/04/2022	1	DR	15:15	18:15	3	2/2/2	NE/NE/NE	0/0/0	2/2/2	2/2/2	2/2/2	0/0/0	0/0/0
01/05/2022	2	DR	10:00	13:00	3	2/2/2	N/N/N	1/1/2	8/8/8	2/2/1	2/2/1	0/0/0	0/0/0
03/05/2022	2	DR	15:00	18:00	3	0/1/1	NE/NE/NE	0/0/0	2/2/6	2/2/2	2/2/2	0/0/0	0/0/0
03/05/2022	3	DR	11:30	14:30	3	0/0/0	NE/NE/NE	0/0/0	4/2/2	2/2/2	2/2/2	0/0/0	0/0/0
03/05/2022	1	DR	8:00	11:00	3	0/0/0	NE/NE/NE	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
19/05/2022	3	DR	10:00	13:00	3	0/0/0	N/N/N	0/0/0	8/6/6	2/2/2	2/2/2	0/0/0	0/0/0
10/05/2022	2	DR	12:30	15:30	3	2/2/2	SE/SE/SE	1/1/1	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
10/05/2022	1	DR	9:00	12:00	3	2/2/2	SE/SE/SE	1/1/2	6/7/8	2/2/1	2/2/2	0/0/0	0/0/0
22/06/2022	3	DR	13:00	16:00	3	1/1/1	SE/SE/SE	0/0/0	0/0/0	2/2/2	2/2/2	0/0/0	0/0/0
22/06/2022	1	DR	9:30	12:30	3	1/1/1	S/S/S	0/0/0	0/0/0	2/2/2	2/2/2	0/0/0	0/0/0
23/06/2022	2	DR	9:30	11:30	3	1/1/1	N/N/N	0/0/0	7/5/5	2/2/2	2/2/2	0/0/0	0/0/0
01/07/2022	3	DR	15:00	18:00	3	4/4/4	S/S/S	1/1/1	3/3/4	1/1/1	2/2/2	0/0/0	0/0/0
02/07/2022	1	DR	15:00	18:00	3	3/3/3	SE/SE/SE	1/1/1	5/4/4	2/2/2	0/0/0	0/0/0	0/0/0
02/07/2022	2	DR	08:00	11:00	3	2/2/2	SE/SE/SE	2/2/2	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
02/07/2022	3	DR	11:30	14:30	3	2/3/3	SE/SE/SE	2/2/1	7/7/5	1/1/2	2/2/2	0/0/0	0/0/0
07/07/2022	2	DR	11:00	14:00	3	0/0/0	SE/SE/SE	0/0/0	0/0/0	2/2/2	2/2/2	0/0/0	0/0/0
07/07/2022	3	DR	14:30	17:30	3	0/0/0	SE/SE/SE	0/0/0	0/0/0	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
19/07/2022	2	DR	11:00	14:00	3	0/1/1	S/S/S	0/0/0	3/3/3	2/2/2	2/2/2	0/0/0	0/0/0
19/07/2022	3	DR	14:30	17:30	3	1/1/2	S/SSW/SSW	0/0/0	6/7/7	2/2/2	2/2/2	0/0/0	0/0/0
20/07/2022	1	DR	13:45	16:45	3	2/2/3	W/W/W	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
20/07/2022	3	DR	10:15	13:15	3	2/2/2	W/W/W	0/0/0	7/7/8	2/2/2	2/2/2	0/0/0	0/0/0
23/08/2022	3	DR	10:00	13:00	3	0/0/0	N/N/N	0/0/0	7/5/5	2/2/2	2/2/2	0/0/0	0/0/0
30/08/2022	1	DR	10:30	13:30	3	3/3/2	SE/SE/SE	0/1/1	7/8/8	2/2/2	2/2/2	0/0/0	0/0/0
30/08/2022	1	DR	14:30	17:30	3	3/3/4	SE/SE/SE	2/2/4	8/8/8	2/2/1	2/2/0	0/0/0	0/0/0
31/08/2022	1	DR	11:00	14:00	3	1/1/1	SE/S/S	0/0/0	1/1/0	2/2/2	2/2/2	0/0/0	0/0/0
28/08/2022	3	SV	10:30	13:30	3	2/1/1	W/W/W	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
28/08/2022	3	SV	14:00	17:00	3	2/0/0	W/-/-	0/0/0	6/5/6	2/2/2	2/2/2	0/0/0	0/0/0
21/09/2022	2	SS	12:30	15:30	3	2/2/2	SW/SW/SW	0/0/0	3/3/3	2/2/2	2/2/2	0/0/0	0/0/0
21/09/2022	2	SS	16:00	19:00	3	2/1/1	SW/SW/SW	0/0/0	3/2/2	2/2/2	2/2/2	0/0/0	0/0/0
22/09/2022	1	SS	12:00	15:00	3	3/4/4	SW/SW/SW	0/0/0	7/7/8	2/2/2	2/2/2	0/0/0	0/0/0
22/09/2022	1	SS	15:30	18:30	3	4/4/4	WSW/WSW/WSW	2/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
29/09/2022	3	SS	10:30	13:30	3	4/4/4	NNE/NNE/NNE	0/0/0	4/6/7	2/2/2	2/2/2	0/0/0	0/0/0
29/09/2022	3	SS	14:00	17:00	3	4/4/3	NNE/NNE/NNE	0/0/0	4/4/6	2/2/2	2/2/2	0/0/0	0/0/0
20/10/2022	1	SS	07:30	10:30	3	1/1/1	SE/SE/SE	0/0/0	8/8/7	2/1/2	1/1/2	0/0/0	0/0/0
20/10/2022	1	SS	11:00	14:00	3	2/2/1	SSE/SSE/SEE	0/0/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
06/10/2022	2	SS	07:30	10:30	3	4/4/4	WSW/WSW/WSW	0/0/0	7/6/6	2/2/2	2/2/2	0/0/0	0/0/0
06/10/2022	2	SS	11:00	14:00	3	4/4/4	WSW/WSW/WSW	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
27/10/2022	3	SS	08:30	11:30	3	3/3/3	SE/SE/SSE	0/0/0	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
27/10/2022	3	SS	12:00	15:00	3	2/2/2	S/S/S	0/0/0	7/8/8	2/2/2	2/2/2	0/0/0	0/0/0
29/11/2022	1	SS	08:00	11:00	3	2/2/2	NE/ENE/E	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
29/11/2022	1	SS	11:30	14:30	3	2/2/2	ESE/ESE/ESE	0/0/0	7/7/5	2/2/2	2/2/2	0/0/0	0/0/0
12/12/2022	2	SS	08:15	11:15	3	1/2/2	ENE/ENE/E	0/0/0	1/6/3	2/2/2	2/2/2	1/1/1	0/0/0
12/12/2022	2	SS	11:45	14:45	3	3/3/2	E/E/E	0/0/0	8/8/8	2/2/2	2/1/2	2/2/2	0/0/0
30/11/2022	3	SS	08:00	11:00	3	3/3/3	E/E/E	0/0/0	8/8/7	1/1/2	1/1/2	0/0/0	0/0/0
30/11/2022	3	SS	11:30	14:30	3	3/4/4	E/E/E	0/0/0	6/4/6	2/2/2	2/2/2	0/0/0	0/0/0
15/12/2022	1	SS	09:30	12:30	3	1/1/1	NE/NE/NNE	0/0/0	1/1/1	2/2/2	2/2/2	1/1/1	0/0/0
15/12/2022	1	SS	13:00	16:00	3	1/1/1	N/NE/NE	0/0/0	1/1/1	2/2/2	2/2/2	1/1/1	0/0/0

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
02/01/2023	2a	SS	09:30	12:30	3	2/2/2	WNW/W/W	0/0/0	5/3/4	2/2/2	2/2/2	0/0/0	0/0/0
02/01/2023	2a	SS	13:00	16:00	3	3/2/2	WSW/WSW/WSW	0/0/0	4/3/2	2/2/2	2/2/2	0/0/0	0/0/0
27/12/2022	3	SS	09:30	12:30	3	4/5/5	SSW/SSW/SSW	1/0/1	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
30/12/2022	3	SS	13:00	16:00	3	5/4/4	SSW/WSW/WSW	1/0/0	8/8/8	1/2/2	1/2/2	0/0/0	0/0/0
09/01/2023	1	SS	08:30	11:30	3	4/4/4	WNW/WNW/WNW	0/0/0	4/3/3	2/2/2	2/2/2	0/0/0	0/0/0
09/01/2023	1	SS	12:00	15:00	3	5/4/4	W/W/W	0/0/0	6/7/7	2/2/2	2/2/2	0/0/0	0/0/0
18/01/2023	2a	SS	08:30	11:30	3	2/2/2	WNW/NW/NW	0/0/0	7/5/8	2/2/2	2/2/2	1/1/1	1/1/1
18/01/2023	2a	SS	12:00	15:00	3	1/2/2	NW/NW/NW	0/0/0	7/6/4	2/2/2	2/2/2	1/1/1	1/1/1
16/01/2023	3	SS	08:30	11:30	3	2/3/3	NW/NW/NW	0/0/0	3/3/2	2/2/2	2/2/2	0/0/0	0/0/0
16/01/2023	3	SS	12:00	15:00	3	3/3/2	NW/NNW/NNW	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
08/02/2023	3b	SS	10:30	13:30	3	2/2/2	SE/S/S	0/0/0	2/2/2	2/2/2	2/2/2	1/0/0	0/0/0
08/02/2023	3b	SS	14:00	17:00	3	2/2/2	SW/SW/SW	0/0/0	2/4/7	2/2/2	2/2/2	0/0/0	0/0/0
23/02/2023	1	SS	11:00	14:00	3	3/3/3	NE/NE/NE	0/0/0	3/4/2	2/2/2	2/2/2	0/0/0	0/0/0
23/02/2023	1	SS	14:30	17:30	3	2/2/2	NE/NE/NNE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
13/02/2023	2a	SS	10:30	13:30	3	3/3/3	ESE/SE/ESE	0/0/0	7/6/6	2/2/2	2/2/2	0/0/0	0/0/0
13/02/2023	2a	SS	14:00	17:00	3	3/4/3	ESE/ESE/ESE	0/0/0	2/1/1	2/2/2	2/2/2	0/0/0	0/0/0
14/03/2023	3	SS	06:30	09:30	3	3/3/2	NNW/NNW/N	0/0/0	2/3/4	2/2/2	2/2/2	0/0/0	0/0/0
14/03/2023	3	SS	10:00	13:00	3	3/3/3	NW/NW/NW	0/0/0	4/4/3	2/2/2	2/2/2	0/0/0	0/0/0
17/03/2023	2a	SS	06:45	09:45	3	2/2/2	SE/SE/SSE	0/0/0	7/7/6	2/2/2	2/2/2	0/0/0	0/0/0
17/03/2023	2a	SS	10:15	13:15	3	2/2/2	SSE/SE/SSE	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
22/03/2023	1	SS	06:30	09:30	3	3/3/3	WSW/WSW/SW	0/0/0	8/7/7	2/2/2	1/1/1	0/0/0	0/0/0
22/03/2023	1	SS	10:00	13:00	3	3/4/3	SW/SW/SW	0/0/0	6/6/8	2/2/2	1/2/2	0/0/0	0/0/0
17/04/2023	1	SS	13:30	16:30	3	1/1/1	E/E/ESE	0/1/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
17/04/2023	1	SS	17:00	18:00	3	1/1/1	ESE/ENE/NE	0/0/0	8/7/7	2/2/2	2/2/2	0/0/0	0/0/0
29/04/2023	1	SS	17:30	20:30	3	3/3/2	S/S/S	0/0/0	4/6/6	2/2/2	2/2/2	0/0/0	0/0/0
19/04/2023	2a	SS	10:00	13:00	3	4/4/4	ENE/ENE/E	0/0/0	6/7/3	2/2/2	2/2/2	0/0/0	0/0/0
20/04/2023	2a	SS	13:30	16:30	3	4/4/4	E/E/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
20/04/2023	2a	SS	17:00	20:00	3	4/4/3	ENE/ENE/NE	0/0/0	3/2/1	2/2/2	2/2/2	0/0/0	0/0/0
04/04/2023	3b	SS	13:00	16:00	3	3/2/2	SE/SSE/S	0/0/0	2/3/2	2/2/2	2/2/2	0/0/0	0/0/0
04/04/2023	3b	SS	16:30	19:30	3	2/2/2	S/SSE/SE	0/0/0	4/4/6	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
19/04/2023	3b	SS	06:30	09:30	3	3/3/3	ENE/ENE/ENE	0/0/0	3/6/7	2/2/2	2/2/2	0/0/0	0/0/0
16/05/2023	1	SS	05:30	08:30	3	2/2/1	N/NNE/N	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
16/05/2023	1	SS	09:00	12:00	3	2/2/2	NW/WNW/WNW	0/0/0	1/6/6	2/2/2	2/2/2	0/0/0	0/0/0
10/05/2023	2a	SS	06:30	09:30	3	2/2/2	WNW/WNW/W	0/2/2	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
10/05/2023	2a	SS	10:00	13:00	3	3/3/3	W/WSW/WSW	2/0/0	8/7/6	1/1/2	1/1/2	0/0/0	0/0/0
01/05/2023	3b	SS	06:00	09:00	3	2/2/1	ENE/WNW/WNW	0/0/0	8/8/7	1/2/2	1/2/2	0/0/0	0/0/0
01/05/2023	3b	SS	09:30	12:30	3	1/2/2	WNW/WNW/WNW	0/0-2/2	7/5/6	2/2/2	2/2/2	0/0/0	0/0/0
14/06/2023	1	SS	14:45	17:45	3	2/2/2	SE/SW/WSW	0/0/0	1/1/2	2/2/2	2/2/2	0/0/0	0/0/0
14/06/2023	1	SS	18:45	21:15	3	2/2/2	W/WNW/NW	0/0/0	2/3/3	2/2/2	2/2/2	0/0/0	0/0/0
07/06/2023	2a	SS	14:30	17:30	3	3/3/3	E/ESE/ESE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
07/06/2023	2a	SS	18:00	21:00	3	3/2/2	E/E/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
02/06/2023	3b	SS	14:30	17:30	3	3/3/3	ENE/ENE/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
02/06/2023	3b	SS	18:00	21:00	3	3/3/3	ENE/ENE/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
05/07/2023	3b	SS	07:00	10:00	3	3/3/3	W/W/W	0/0/0	6/4/4	2/2/2	2/2/2	0/0/0	0/0/0
05/07/2023	3b	SS	10:30	13:30	3	3/4/4	W/W/W	0/0/0	7/7/6	2/2/2	2/2/2	0/0/0	0/0/0
19/07/2023	1	SS	06:00	09:00	3	2/2/3	NW/NW/WNW	0/0/0	4/2/7	2/2/2	2/2/2	0/0/0	0/0/0
19/07/2023	1	SS	09:30	12:30	3	3/3/3	WNW/WNW/WNW	0/0/0	5/5/6	2/2/2	2/2/2	0/0/0	0/0/0
21/07/2023	2a	SS	06:00	09:00	3	3/3/3	NW/WNW/WNW	0/0/0	5/5/5	2/2/2	2/2/2	0/0/0	0/0/0
21/07/2023	2a	SS	09:30	12:30	3	2/2/3	WNW/WNW/W	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
26/07/2023	1	SS	07:00	10:00	3	1/1/2	SW/SW/SSW	0/0/0	3/4/6	2/2/2	2/2/2	0/0/0	0/0/0
28/07/2023	2	SS	07:00	10:00	3	4/4/4	WNW/WNW/SW	0/0/1	7/8/6	2/2/2	2/2/2	0/0/0	0/0/0
28/07/2023	3b	SS	10:30	13:30	3	3/3/4	WSW/WSW/SW	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
09/08/2023	2a	SS	06:00	09:00	3	2/2/1	SE/S/SSW	0/0/0	3/7/7	2/2/2	2/2/2	0/0/0	0/0/0
09/08/2023	2a	SS	09:30	12:30	3	1/1/1	SSW/SSW/SW	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
15/08/2023	2a	SS	17:30	20:30	3	1/2/1	S/WSW/SSE	0/0/0	2/1/1	2/2/2	2/2/2	0/0/0	0/0/0
15/08/2023	3b	SS	14:00	17:00	3	2/3/2	SE/S/S	0/0/0	5/3/3	2/2/2	2/2/2	0/0/0	0/0/0
17/08/2023	1	SS	06:30	09:30	3	3/3/3	ENE/E/E	0/0/0	2/3/3	2/2/2	2/2/2	0/0/0	0/0/0
17/08/2023	1	SS	10:00	13:00	3	3/3/3	E/E/ESE	0/0/0	4/6/7	2/2/2	2/2/2	0/0/0	0/0/0
21/08/2023	1	SS	16:00	19:00	3	4/4/4	WSW/WSW/WSW	0/0/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
24/08/2023	3b	SS	12:30	15:30	3	2/2/2	W/WNW/WNW	0/0/0	7/6/7	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
24/08/2023	3b	SS	15:45	18:45	3	3/3/3	WNW/WNW/NW	0/0/0	4/5/3	2/2/2	2/2/2	0/0/0	0/0/0
04/09/2023	3b	SS	06:30	09:30	3	2/3/3	ENE/E/E	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
04/09/2023	3b	SS	10:00	13:00	3	3/4/4	E/E/E	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
15/09/2023	1	SS	07:15	10:15	3	2/2/2	ESE/ESE/ESE	0/0/0	6/6/7	2/2/2	2/2/2	0/0/0	0/0/0
15/09/2023	1	SS	10:45	13:45	3	3/2/2	ESE/SE/ESE	0/0/0	4/4/6	2/2/2	2/2/2	0/0/0	0/0/0
26/09/2023	2a	SS	12:00	15:00	3	4/4/4	SW/SW/SW	0/0/0	7/6/7	2/2/2	2/2/2	0/0/0	0/0/0
26/09/2023	2a	SS	15:30	18:30	3	4/4/4	SW/WSW/SW	0/0/0	6/7/7	2/2/2	2/2/2	0/0/0	0/0/0
04/10/2023	3b	SS	12:00	15:00	3	5/5/4	WSW/WSW/WSW	0/0/0	7/6/6	2/2/2	2/2/2	0/0/0	0/0/0
04/10/2023	3b	SS	15:30	18:30	3	5/4/4	WSW/WSW/WSW	0/0/0	5/6/7	2/2/2	2/2/2	0/0/0	0/0/0
06/10/2023	1	SS	12:00	15:00	3	4/4/4	WSW/WSW/WSW	0/0/0	8/8/7	2/2/2	2/2/2	0/0/0	0/0/0
06/10/2023	1	SS	15:30	18:30	3	4/3/3	WSW/WSW/WSW	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
10/10/2023	2a	SS	12:00	15:00	3	4/3/3	WSW/WSW/WSW	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
10/10/2023	2a	SS	15:30	18:30	3	4/4/4	WSW/WSW/WSW	0/0/0	5/5/7	2/2/2	2/2/2	0/0/0	0/0/0

Table A2-2: MBBS effort – 2022 (Year 1).

Date	Surveyor	Start Time (24h)	Finish Time (24h)	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
14/04/2022	SV	16:00	19:40	0	N/A	0	2	2	2	0	0
15/04/2022	SV	13:10	18:15	1	N	0	7	2	2	0	0
31/05/2022	SV	05:30	10:00	1	E	0	4	2	2	0	0
26/06/2022	SV	06:10	13:50	6	NE	0	5	2	2	0	0
06/07/2022	SV	06:00	13:10	2	SE	0	0	N/A	2	0	0

Table A2-3: MBBS effort – 2023 (Year 2).

Date	Surveyor	Start Time (24h)	Finish Time (24h)	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
03/04/2023	SS	06:45	13:05	4	E	0	3	2	2	0	0
15/04/2023	SS	06:45	12:45	1	N	0	1	2	2	0	0
02/05/2023	SS	06:30	12:40	2	ENE	0	6	2	2	0	0
17/05/2023	SS	07:30	12:55	1	ENE	0	1	2	2	0	0
05/06/2023	SS	06:45	12:10	3	ENE	0	1	2	2	0	0
19/06/2023	SS	06:30	11:55	2	SW	0	8	2	2	0	0

Table A2-4: Annex 1/Schedule 1 Raptor and Owl Search effort – 2022 (Year 1).

Date	Surveyor	Start Time (24h)	Finish Time (24h)	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
17/04/2022	SV	09:40	16:10	1	NW	0	2	2	2	0	0
19/04/2022	SV	08:00	15:40	1	NW	0	4	2	2	0	0
09/05/2022	DR	10:00	16:30	2	NE	0	4	2	2	0	0
14/05/2022	DR	11:00	16:30	0	SW	0	0	2	2	0	0
20/06/2022	DR	10:00	14:00	1	N	0	0	2	2	0	0
21/06/2022	DR	10:30	15:00	0	N	0	0	2	2	0	0

Table A2-5: Annex 1/Schedule 1 Raptor and Owl Search effort – 2023 (Year 2).

Date	Surveyor	Start Time (24h)	Finish Time (24h)	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
27/03/2023	SS	13:50	20:00	2	SE	0	6	2	2	0	0
30/03/2023	SS	14:00	20:20	4	WSW	0	7	2	2	0	0
10/04/2023	SS	13:30	20:35	4	WSW	0	7	2	2	0	0
07/05/2023	SS	14:45	21:00	2	WSW	0	7	2	2	0	0
19/05/2023	SS	15:15	21:00	2	NE	0	7	2	2	0	0
13/06/2023	SS	15:30	21:15	2	SE	0	0	0	2	0	0
26/06/2023	SS	15:30	21:50	3	SW	0	6	2	2	0	0

Table A2-6: Nightjar search effort – 2023 (Year 2).

Date	Surveyor	Start Time (24h)	Finish Time (24h)	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
28/06/2023	SS & MH	21:30	00:30	2	NW	0	7/8	2	1	0	0
30/06/2023	SH & MH	01:30	04:55	2	WNW	1	7/8	2	0	0	0

ANNEX 3: VP FLIGHT ACTIVITY SURVEY - TARGET SPECIES FLIGHTS

Table A4-1 presents details of target species flight lines recorded during VP flight activity surveys November 2021 to October 2022, and November 2022 to March 2023.

Table A4-1: Target species flights (Year 1 & Nov-22 to Mar-23 in Year 2).

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
29/11/2021	1	Grey heron	1	09:22	72	27	45	0	0	0	
29/11/2021	2	Red kite	1	12:31	60	60	0	0	0	0	Circling field.
09/12/2021	2	Barn owl	1	08:35	75	75	0	0	0	0	Adult female hunting in paddocks.
09/12/2021	2	Red kite	1	10:45	90	60	30	0	0	0	Circling above fields.
14/12/2021	1	Grey heron	1	08:10	30	30	0	0	0	0	Flew south-east from Park Slip NR.
14/12/2021	1	Red kite	1	11:00	90	0	0	90	0	0	Circling field.
14/12/2021	1	Teal	9	11:30	60	0	60	0	0	0	
20/12/2021	1	Teal	6	09:20	90	90	0	0	0	0	Mixed gender flock from Park Slip.
20/12/2021	1	Little egret	1	10:10	30	30	0	0	0	0	From Park Slip.
19/01/2022	3	Red kite	2	11:45	105	0	0	0	0	105	Two hovering over fields.
27/01/2022	1	Grey heron	1	07:45	60	0	60	0	0	0	
27/01/2022	1	Teal	6	09:00	60	0	60	0	0	0	
03/02/2022	1	Grey heron	1	08:00	60	0	60	0	0	0	
07/02/2022	3	Red kite	1	13:30	60	0	60	0	0	0	Hunting.
17/02/2022	1	Teal	9	08:00	60	0	60	0	0	0	
17/02/2022	1	Grey heron	1	08:30	90	0	90	0	0	0	
17/02/2022	1	Grey heron	1	09:45	60	0	60	0	0	0	
15/03/2022	1	Grey heron	1	07:45	60	60	0	0	0	0	
15/03/2022	3	Red kite	1	15:00	60	0	15	45	0	0	Circling fields.
30/03/2022	1	Grey heron	1	09:30	60	60	0	0	0	0	
16/04/2022	3	Red kite	1	12:30	80	0	50	30	0	0	
16/04/2022	3	Red kite	1	13:10	40	40	0	0	0	0	Very distant. View obscured.
16/04/2022	3	Red kite	1	13:20	50	50	0	0	0	0	Landed out of view in field.
16/04/2022	2	Red kite	1	14:35	40	10	30	0	0	0	Distant, then dropped into valley

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
16/04/2022	2	Red kite	1	14:45	170	110	60	0	0	0	
16/04/2022	2	Red kite	1	15:00	35	0	0	0	0	35	Circled high out of view.
16/04/2022	2	Merlin	1	15:40	20	20	0	0	0	0	Flew in from behind and landed on post. Female.
16/04/2022	2	Merlin	1	15:45	10	10	0	0	0	0	Same bird flew to dead tree and flushed by corvids at 15:52hr and flew into valley.
16/04/2022	2	Red kite	2	16:05	20	0	0	0	20	0	Distantly circling over valley and then lost from view.
16/04/2022	2	Red kite	1	16:55	10	0	10	0	0	0	Lost to view behind Mynydd-Ty-Talwyn.
25/04/2022	2	Red kite	2	16:00	60	0	0	60	0	0	Near woodland.
27/04/2022	1	Red kite	2	16:00	60	0	60	0	0	0	Two still active.
29/04/2022	2	Red kite	2	11:50	60	60	0	0	0	0	Two low near woods.
29/04/2022	3	Red kite	2	10:30	60	0	60	0	0	0	
01/05/2022	2	Merlin	1	11:00	30	30	0	0	0	0	Male.
01/05/2022	2	Red kite	1	11:15	60	0	60	0	0	0	
03/05/2022	2	Red kite	2	15:30	30	0	30	0	0	0	Two over woodland.
03/05/2022	1	Grey heron	1	08:45	60	30	30	0	0	0	
03/05/2022	1	Red kite	2	09:00	45	45	0	0	0	0	Over woodland.
10/05/2022	2	Lapwing	3	10:48	60	60	0	0	0	0	Over fields.
10/05/2022	1	Red kite	2	09:15	60	15	45	0	0	0	Two circling.
22/06/2022	1	Red kite	4	09:40	60	0	60	0	0	0	Four over fields, possible young.
23/06/2022	2	Lapwing	4	10:00	60	60	0	0	0	0	
23/06/2022	2	Red kite	2	10:30	30	0	30	0	0	0	
01/07/2022	3	Red kite	2	15:30	30	0	30	0	0	0	
01/07/2022	3	Lapwing	4	16:00	60	60	0	0	0	0	
02/07/2022	1	Grey heron	1	15:30	60	0	60	0	0	0	
02/07/2022	2	Merlin	1	08:15	30	30	0	0	0	0	Male into woods.
02/07/2022	2	Red kite	2	09:30	60	0	60	0	0	0	Circling over woods.
07/07/2022	2	Red kite	1	11:15	60	60	0	0	0	0	
19/07/2022	2	Red kite	2	14:30	60	0	60	0	0	0	Circling.
19/07/2022	2	Lapwing	3	15:40	30	0	30	0	0	0	
20/07/2022	3	Red kite	2	10:30	60	0	60	0	0	0	

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
20/07/2022	3	Grey heron	1	12:00	30	30	0	0	0	0	
23/08/2022	3	Red kite	1	10:30	30	0	30	0	0	0	
31/08/2022	1	Red kite	1	11:30	60	0	60	0	0	0	
28/08/2022	3	Red kite	3	14:05	120	0	75	45	0	0	
28/08/2022	3	Red kite	2	14:20	30	0	30	0	0	0	
28/08/2022	3	Red kite	2	14:30	40	0	40	0	0	0	
28/08/2022	3	Red kite	1	16:40	15	15	0	0	0	0	
28/08/2022	3	Red kite	1	16:45	40	0	40	0	0	0	Quartering.
22/09/2022	1	Red kite	1	12:31	75	45	30	0	0	0	
22/09/2022	1	Red kite	1	13:14	300	15	105	180	0	0	
22/09/2022	1	Red kite	1	13:14	240	30	150	60	0	0	
22/09/2022	1	Red kite	1	14:42	120	0	120	0	0	0	
22/09/2022	1	Red kite	1	14:49	90	90	0	0	0	0	
22/09/2022	1	Red kite	1	17:11	75	75	0	0	0	0	
22/09/2022	1	Red kite	2	17:14	120	0	15	105	0	0	
22/09/2022	1	Red kite	1	17:21	90	90	0	0	0	0	
22/09/2022	1	Red kite	1	17:29	330	300	30	0	0	0	
22/09/2022	1	Red kite	1	17:29	330	300	30	0	0	0	
22/09/2022	1	Red kite	2	17:45	165	165	0	0	0	0	
29/09/2022	3	Red kite	2	12:44	60	60	0	0	0	0	
29/09/2022	3	Red kite	1	13:01	30	30	0	0	0	0	
29/09/2022	3	Red kite	3	13:20	180	180	0	0	0	0	
29/09/2022	3	Red kite	1	14:14	240	195	45	0	0	0	
29/09/2022	3	Red kite	1	14:14	150	150	0	0	0	0	
29/09/2022	3	Red kite	1	14:28	60	0	15	45	0	0	
29/09/2022	3	Red kite	1	14:49	75	15	60	0	0	0	
29/09/2022	3	Red kite	3	15:17	90	0	15	30	45	0	
20/10/2022	1	Grey heron	1	09:40	60	60	0	0	0	0	
06/10/2022	2	Red kite	2	11:46	60	0	0	60	0	0	Circling together.
27/10/2022	3	Red kite	1	08:59	60	0	60	0	0	0	

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
27/10/2022	3	Red kite	1	09:54	90	30	60	0	0	0	
27/10/2022	3	Red kite	1	10:08	90	0	90	0	0	0	
27/10/2022	3	Red kite	1	10:19	150	0	150	0	0	0	
27/10/2022	3	Red kite	1	10:54	60	60	0	0	0	0	Flushed by quad bike.
27/10/2022	3	Red kite	1	11:04	210	0	210	0	0	0	
27/10/2022	3	Red kite	2	11:28	150	0	150	0	0	0	
27/10/2022	3	Red kite	1	12:40	30	30	0	0	0	0	
27/10/2022	3	Red kite	1	12:59	30	30	0	0	0	0	
27/10/2022	3	Red kite	1	13:26	360	225	60	75	0	0	
27/10/2022	3	Red kite	1	13:29	180	15	90	75	0	0	
27/10/2022	3	Red kite	1	14:24	90	45	45	0	0	0	
27/10/2022	3	Red kite	1	14:25	30	30	0	0	0	0	
29/11/2022	1	Red kite	1	14:01	30	30	0	0	0	0	Hunting.
30/11/2022	3	Red kite	2	08:00	30	30	0	0	0	0	
30/11/2022	3	Red kite	1	08:02	30	30	0	0	0	0	
30/11/2022	3	Red kite	1	08:31	240	135	105	0	0	0	
30/11/2022	3	Red kite	1	10:30	120	120	0	0	0	0	
30/11/2022	3	Red kite	2	11:32	60	0	60	0	0	0	
30/11/2022	3	Red kite	1	11:51	165	75	90	0	0	0	
30/11/2022	3	Red kite	1	12:03	45	45	0	0	0	0	
30/11/2022	3	Red kite	4	12:14	360	360	0	0	0	0	
30/11/2022	3	Red kite	1	12:29	75	75	0	0	0	0	
30/11/2022	3	Red kite	1	12:42	90	45	45	0	0	0	
30/11/2022	3	Red kite	1	12:51	60	60	0	0	0	0	
30/11/2022	3	Red kite	1	13:01	45	15	30	0	0	0	
30/11/2022	3	Red kite	1	13:21	60	45	15	0	0	0	
30/11/2022	3	Red kite	1	14:02	165	165	0	0	0	0	
30/11/2022	3	Red kite	2	14:19	360	180	180	0	0	0	
15/12/2022	1	Red kite	1	09:30	15	15	0	0	0	0	
15/12/2022	1	Lapwing	34	09:48	60	60	0	0	0	0	

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
15/12/2022	1	Lapwing	3	10:02	15	15	0	0	0	0	
15/12/2022	1	Lapwing	10	10:02	15	15	0	0	0	0	
15/12/2022	1	Lapwing	18	10:18	45	45	0	0	0	0	
15/12/2022	1	Golden plover	4	11:07	30	30	0	0	0	0	
15/12/2022	1	Lapwing	11	11:12	45	45	0	0	0	0	
15/12/2022	1	Red kite	1	12:07	45	45	0	0	0	0	
15/12/2022	1	Lapwing	20	12:19	45	45	0	0	0	0	
15/12/2022	1	Lapwing	4	12:27	30	30	0	0	0	0	
15/12/2022	1	Lapwing	5	13:00	45	45	0	0	0	0	
15/12/2022	1	Red kite	1	13:00	240	240	0	0	0	0	
15/12/2022	1	Lapwing	4	13:14	30	30	0	0	0	0	
15/12/2022	1	Lapwing	4	13:28	30	30	0	0	0	0	
15/12/2022	1	Lapwing	8	13:36	30	30	0	0	0	0	
15/12/2022	1	Red kite	1	13:44	225	225	0	0	0	0	
15/12/2022	1	Lapwing	1	13:56	30	30	0	0	0	0	
15/12/2022	1	Lapwing	4	13:58	30	30	0	0	0	0	
15/12/2022	1	Lapwing	4	14:06	30	30	0	0	0	0	
15/12/2022	1	Red kite	1	14:25	180	120	60	0	0	0	
15/12/2022	1	Red kite	1	14:38	45	45	0	0	0	0	
15/12/2022	1	Lapwing	5	14:42	45	45	0	0	0	0	
15/12/2022	1	Lapwing	22	15:14	45	45	0	0	0	0	
15/12/2022	1	Lapwing	12	15:24	15	15	0	0	0	0	
02/01/2023	2a	Kestrel	1	09:43	45	15	30	0	0	0	
02/01/2023	2a	Red kite	2	11:38	330	240	90	0	0	0	
02/01/2023	2a	Red kite	1	11:38	60	60	0	0	0	0	
02/01/2023	2a	Red kite	4	12:01	450	0	30	30	30	360	
27/12/2022	3	Red kite	1	09:30	60	60	0	0	0	0	
27/12/2022	3	Red kite	1	11:44	45	45	0	0	0	0	
27/12/2022	3	Red kite	2	11:52	30	30	0	0	0	0	
30/12/2022	3	Red kite	1	13:39	120	120	0	0	0	0	

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
30/12/2022	3	Red kite	3	13:46	180	180	0	0	0	0	Split into two and one.
30/12/2022	3	Red kite	2	13:49	540	540	0	0	0	0	
30/12/2022	3	Red kite	1	14:30	180	180	0	0	0	0	
30/12/2022	3	Red kite	2	15:01	300	45	255	0	0	0	Interacting.
16/01/2023	3	Red kite	2	08:30	45	45	0	0	0	0	
16/01/2023	3	Red kite	1	09:30	150	150	0	0	0	0	
16/01/2023	3	Red kite	2	12:00	45	45	0	0	0	0	
16/01/2023	3	Red kite	2	12:18	540	540	0	0	0	0	
16/01/2023	3	Red kite	1	12:19	180	180	0	0	0	0	
16/01/2023	3	Red kite	1	12:35	300	270	30	0	0	0	
16/01/2023	3	Red kite	1	14:02	520	520	0	0	0	0	
16/01/2023	3	Red kite	4	14:46	150	90	60	0	0	0	Circling together.
08/02/2023	3b	Red kite	3	10:30	270	270	270	0	0	0	Circling together.
08/02/2023	3b	Red kite	2	10:55	360	180	180	0	0	0	Display flight.
08/02/2023	3b	Red kite	2	11:30	660	570	90	0	0	0	Circling together.
08/02/2023	3b	Red kite	1	11:35	240	150	90	0	0	0	
08/02/2023	3b	Red kite	1	12:44	90	30	60	0	0	0	
08/02/2023	3b	Red kite	1	13:02	90	0	90	0	0	0	Circling, mobbed by raven.
08/02/2023	3b	Red kite	1	14:01	225	45	150	30	0	0	
08/02/2023	3b	Red kite	1	14:15	390	390	0	0	0	0	
08/02/2023	3b	Red kite	4	15:54	120	120	0	0	0	0	Flew together.
08/02/2023	3b	Red kite	1	15:54	180	180	0	0	0	0	
23/02/2023	1	Red kite	1	11:40	45	45	0	0	0	0	Hunting.
23/02/2023	1	Red kite	1	12:06	105	105	0	0	0	0	Circling over field to west.
23/02/2023	1	Red kite	1	15:54	30	30	0	0	0	0	Seen briefly over ridge.
23/02/2023	1	Red kite	2	16:05	120	120	0	0	0	0	Display together.
23/02/2023	1	Red kite	1	16:06	30	30	0	0	0	0	
13/02/2023	2a	Red kite	1	10:30	120	120	0	0	0	0	Hovering in the wind.
14/03/2023	3b	Red kite	1	06:41	30	30	0	0	0	0	
14/03/2023	3b	Red kite	1	06:51	180	180	0	0	0	0	

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
14/03/2023	3b	Red kite	2	06:51	165	15	150	0	0	0	
14/03/2023	3b	Red kite	1	07:43	30	30	0	0	0	0	Circled over ridge.
14/03/2023	3b	Lapwing	2	08:14	45	45	0	0	0	0	Displaying.
14/03/2023	3b	Red kite	2	09:13	90	90	0	0	0	0	Flying low along ridge.
14/03/2023	3b	Lapwing	4	10:16	45	45	0	0	0	0	Display flight.
14/03/2023	3b	Lapwing	2	11:15	30	30	0	0	0	0	Display flight.
14/03/2023	3b	Merlin	1	11:35	45	45	0	0	0	0	Quartering.
14/03/2023	3b	Red kite	1	12:15	75	75	0	0	0	0	Hunting.
14/03/2023	3b	Red kite	2	12:20	210	45	120	45	0	0	Flying together, display flight.
14/03/2023	3b	Red kite	1	12:44	180	75	105	0	0	0	Flew over, landed, mobbed by corvid.
17/03/2023	2a	Red kite	1	09:14	210	45	90	75	0	0	Flying over and circling.
22/03/2023	1	Red kite	1	07:58	90	90	0	0	0	0	
22/03/2023	1	Red kite	1	10:50	45	0	45	0	0	0	
22/03/2023	1	Red kite	1	11:35	135	30	105	0	0	0	

Table A4-2 presents details of target species flight lines recorded during VP flight activity surveys April 2023 to October 2023 (when height bands were altered).

Table A4-2: Target species flights (Apr-23 to Oct-23 in Year 2).

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-40m	41-90m	91-180m	181-200m	201-280m	>280m	Notes
17/04/2023	1	Red kite	1	14:43	45	0	45	0	0	0	0	
17/04/2023	1	Red kite	1	15:20	30	30	0	0	0	0	0	
17/04/2023	1	Red kite	1	15:22	30	30	0	0	0	0	0	
17/04/2023	1	Red kite	1	16:06	60	0	60	0	0	0	0	
17/04/2023	1	Red kite	1	18:29	195	195	0	0	0	0	0	Flew over landed in field to the west.
29/04/2023	1	Red kite	1	17:30	75	15	60	0	0	0	0	Circling, mobbed by corvid.
29/04/2023	1	Red kite	2	17:35	60	0	30	30	0	0	0	Circling together then flew east.
29/04/2023	1	Red kite	1	17:53	30	30	0	0	0	0	0	Flying over ridge to the north.
29/04/2023	1	Red kite	1	18:27	30	30	0	0	0	0	0	In north.
29/04/2023	1	Red kite	1	18:29	210	30	180	0	0	0	0	Flying over slowly to the west.
04/04/2023	3b	Lapwing	2	15:00	2220	0	0	0	0	0	0	Feeding for 37 minutes, then flew off.

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-40m	41-90m	91-180m	181-200m	201-280m	>280m	Notes
04/04/2023	3b	Red kite	1	15:37	1	45	0	0	0	0	0	Flying over ridge.
04/04/2023	3b	Lapwing	2	15:37	2	30	0	0	0	0	0	Mobbed red kite as it flew over.
04/04/2023	3b	Lapwing	4	16:30	45	30	15	0	0	0	0	Display flight/calling.
04/04/2023	3b	Red kite	1	17:13	120	0	15	105	0	0	0	Circling high over ridge.
04/04/2023	3b	Red kite	1	17:26	165	0	15	45	105	0	0	In north.
04/04/2023	3b	Lapwing	1	17:38	45	45	0	0	0	0	0	Flying along ridge, calling.
04/04/2023	3b	Lapwing	1	17:50	30	15	15	0	0	0	0	Display flight/calling.
04/04/2023	3b	Lapwing	2	17:55	135	15	120	0	0	0	0	
04/04/2023	3b	Lapwing	3	18:01	105	105	0	0	0	0	0	Flying down ridge.
04/04/2023	3b	Red kite	1	18:40	345	300	45	0	0	0	0	Landed in arable field.
19/04/2023	3b	Red kite	1	06:58	105	105	0	0	0	0	0	Landed in field briefly.
19/04/2023	3b	Red kite	2	07:06	30	30	0	0	0	0	0	Seen briefly, mobbed by corvid.
19/04/2023	3b	Red kite	1	07:12	90	90	0	0	0	0	0	Flying slowly into the wind.
10/05/2023	2a	Red kite	1	11:03	60	60	0	0	0	0	0	Flying slowly over.
10/05/2023	2a	Red kite	1	11:14	180	180	180	0	0	0	0	Quartering.
10/05/2023	2a	Red kite	1	12:27	365	260	75	30	0	0	0	Quartering ground mobbed by corvid close to sheep carcass.
01/05/2023	3b	Grey heron	1	07:48	60	0	60	0	0	0	0	
01/05/2023	3b	Red kite	1	09:58	30	0	0	30	0	0	0	Circling high.
01/05/2023	3b	Red kite	1	10:15	585	210	300	75	0	0	0	Flying along ridge to the east, occasionally being mobbed by corvid.
14/06/2023	1	Red kite	1	15:43	150	60	90	0	0	0	0	Circling slowly.
07/06/2023	2a	Red kite	1	17:16	150	150	0	0	0	0	0	Flying over slowly.
02/06/2023	3b	Red kite	1	15:11	15	15	0	0	0	0	0	Appeared briefly then flew below ridge.
02/06/2023	3b	Red kite	1	15:39	75	30	45	0	0	0	0	Flew towards ridge to north of VP.
02/06/2023	3b	Red kite	1	19:59	165	30	135	0	0	0	0	Flew below ridge to the east of VP.
28/07/2023	3b	Red kite	1	10:33	345	255	90	0	0	0	0	Flying over recently cut hay field
28/07/2023	3b	Red kite	1	11:13	75	75	0	0	0	0	0	Flew below ridge to south
28/07/2023	3b	Red kite	1	11:25	150	150	0	0	0	0	0	Flew below ridge to west
28/07/2023	3b	Red kite	1	13:04	60	60	0	0	0	0	0	Flying out over hay field

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-40m	41-90m	91-180m	181-200m	201-280m	>280m	Notes
05/07/2023	3b	Red kite	2	07:11	240	240	0	0	0	0	0	Flying slower over fields, together at first then flew in different directions
05/07/2023	3b	Red kite	1	12:10	45	45	0	0	0	0	0	Flying over recently cut hay field
05/07/2023	3b	Red kite	1	12:17	105	30	75	0	0	0	0	Flying to south of VP location
05/07/2023	3b	Red kite	1	12:36	30	30	0	0	0	0	0	Flying over recently cut hay field
05/07/2023	3b	Red kite	1	13:01	210	105	105	0	0	0	0	Flying over recently cut hay field, mobbed by raven to south of VP location
17/08/2023	1	Red kite	1	08:00	300	195	105	0	0	0	0	Flew in from the west, landed then flew north over wood
21/08/2023	1	Red kite	1	16:16	45	45	0	0	0	0	0	Flying over fields west of VP location
21/08/2023	1	Red kite	1	16:26	15	15	0	0	0	0	0	Landed in field took off
21/08/2023	1	Red kite	1	16:21	45	45	0	0	0	0	0	Landed by 2nd red kite
21/08/2023	1	Red kite	1	16:25	315	45	135	135	0	0	0	Flew south gaining height, circling high over valley to south east of VP location
21/08/2023	1	Red kite	1	16:46	180	0	0	180	0	0	0	Moving gradually east
17/08/2023	1	Red kite	1	10:44	75	75	0	0	0	0	0	Flew behind trees to west
09/08/2023	2a	Red kite	1	09:45	165	165	0	0	0	0	0	Flying over cut hey field
09/08/2023	2a	Red kite	1	10:20	120	120	0	0	0	0	0	Flying over cut hey field
09/08/2023	2a	Red kite	4	10:38	345	15	270	60	0	0	0	Circling together gaining height, one bird split and flew east
09/08/2023	2a	Red kite	1	12:02	240	120	60	60	0	0	0	Circling gaining height
09/08/2023	2a	Red kite	3	07:09	75	75	0	0	0	0	0	Flying over cut hey field. one landed in tree and one landed on pylon
09/08/2023	2a	Red kite	1	07:48	150	150	0	0	0	0	0	Flew over hey field several times joined by second bird from perch in tree.
09/08/2023	2a	Red kite	1	07:48	15	15	0	0	0	0	0	Flew over hey field several times joined by second bird from perch in tree.
09/08/2023	2a	Merlin	1	08:12	45	45	0	0	0	0	0	Flying over
18/08/2023	3b	Red kite	1	14:25	365	145	225	0	0	0	0	Circling slowly over fields
18/08/2023	3b	Red kite	1	15:11	30	30	0	0	0	0	0	Circled over hey field
18/08/2023	3b	Red kite	1	15:20	105	30	70	0	0	0	0	Circling high flew east
24/08/2023	3b	Red kite	1	12:46	585	540	45	0	0	0	0	Flying low over field, landed several times before flying off to east/south east
24/08/2023	3b	Hen harrier	1	14:23	160	160	0	0	0	0	0	Flying low, hunting. Landed in field to south of VP location. Female/juvenile

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-40m	41-90m	91-180m	181-200m	201-280m	>280m	Notes
24/08/2023	3b	Red kite	3	16:02	1080	960	120	0	0	0	0	Two birds circling over field to south of VP occasionally dropping onto field, joined by 3rd bird after 9 mins
24/08/2023	3b	Red kite	3	16:26	390	60	210	110	0	0	0	Circling together over fields to south of VP location
24/08/2023	3b	Red kite	1	16:59	75	15	60	0	0	0	0	Flew up from ridge to east
24/08/2023	3b	Red kite	1	17:07	840	840	0	0	0	0	0	Circling over fields to south of VP location, landed several times, flew low over ridge to south
24/08/2023	3b	Red kite	2	17:30	810	810	0	0	0	0	0	Circling over fields to south of VP location, landed several times
24/08/2023	3b	Cormorant	1	18:23	60	60	0	0	0	0	0	Flying over
24/08/2023	3b	Red kite	1	18:27	120	15	105	0	0	0	0	Circling
24/08/2023	3b	Peregrine	1	18:28	45	0	45	0	0	0	0	Flying over
04/09/2023	3b	Red kite	1	07:50	60	60	0	0	0	0	0	Circling over field to north of VP location
04/09/2023	3b	Red kite	1	08:07	700	660	40	0	0	0	0	Hunting over field to west of VP location, being mobbed by sparrowhawk
04/09/2023	3b	Red kite	1	08:31	150	150	0	0	0	0	0	Hunting north of VP location
04/09/2023	3b	Red kite	1	08:44	225	225	0	0	0	0	0	Circling over field to west of VP location
04/09/2023	3b	Red kite	1	10:57	45	45	0	0	0	0	0	Flew below ridge to east of VP location
04/09/2023	3b	Red kite	1	11:07	90	60	30	0	0	0	0	Circling to north of VP location
15/09/2023	1	Red kite	1	13:10	210	30	75	105	0	0	0	Circling to west of VP location climbing then descending
26/09/2023	2a	Grey heron	1	12:34	60	15	45	0	0	0	0	Appeared to land south east of VP location
04/10/2023	3b	Red kite	1	12:20	30	30	0	0	0	0	0	Flying into the wind below ridge to west
04/10/2023	3b	Red kite	2	12:36	150	150	0	0	0	0	0	Flying together into the wind
04/10/2023	3b	Red kite	2	13:02	60	60	0	0	0	0	0	Flying together into the wind
04/10/2023	3b	Red kite	2	13:52	150	15	60	75	0	0	0	Flying together into the wind
04/10/2023	3b	Red kite	1	14:55	210	120	75	15	0	0	0	Flying along ridge to the east, landing several times in sheep field to south east
04/10/2023	3b	Kestrel	1	16:01	300	300	0	0	0	0	0	Hunting
04/10/2023	3b	Red kite	2	16:03	120	120	0	0	0	0	0	Flying together to south east of VP location
04/10/2023	3b	Kestrel	2	16:10	60	60	0	0	0	0	0	Flying together
04/10/2023	3b	Red kite	2	16:19	300	195	105	0	0	0	0	Interacting with kestrel, flying together

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-40m	41-90m	91-180m	181-200m	201-280m	>280m	Notes
04/10/2023	3b	Kestrel	1	16:19	300	225	75	0	0	0	0	Flying together with red kite
04/10/2023	3b	Red kite	7	16:34	465	405	60	0	0	0	0	Flying slowly into wind occasionally landing in sheep field to south east of VP location
04/10/2023	3b	Red kite	3	17:04	60	60	0	0	0	0	0	Flying along ridge
04/10/2023	3b	Red kite	3	17:10	420	60	30	330	0	0	0	Circling high together
04/10/2023	3b	Red kite	4	17:10	165	165	0	0	0	0	0	Flying low together over ridge then turned south
06/10/2023	1	Red kite	2	13:52	120	120	0	0	0	0	0	Circling to west of VP location
06/10/2023	1	Red kite	4	14:02	360	255	105	0	0	0	0	Slowly to south
06/10/2023	1	Red kite	1	15:30	45	30	45	0	0	0	0	Circling over ridge to the west
06/10/2023	1	Red kite	5	15:56	120	60	60	0	0	0	0	Circling together then flew below ridge to the west
06/10/2023	1	Red kite	3	16:20	180	180	0	0	0	0	0	Following together
06/10/2023	1	Grey heron	1	16:48	105	30	45	30	0	0	0	Flying over
06/10/2023	1	Red kite	7	16:56	270	270	0	0	0	0	0	Flying over field recently sprayed with slurry and continued west-north west
10/10/2023	2a	Red kite	3	16:21	90	0	0	90	0	0	0	Flying together to west
10/10/2023	2a	Red kite	1	17:10	120	120	0	0	0	0	0	Flying over cut hey field

Legend

Site Boundary

10km Site Buffer

Designated Site

Site of Special Scientific Interest (SSSI)

Egiwys Nunydd Reservoir

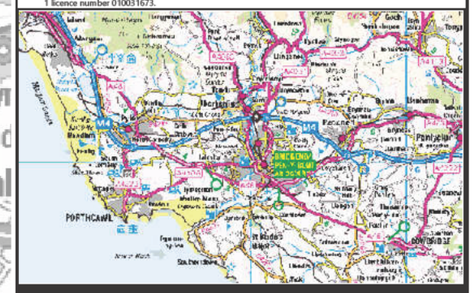
Margam Moors

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MYNYDD-TY-TALWYN

Figure 1: Ornithological Statutory Designated Sites

avian ecology

Avian Ecology Suite 3c Walnut Tree Farm Northwich Road Lower Stretton
WA4 4PG
Tel 0843 506 5116
www.avianecology.co.uk

0 2
kilometres

N W E S

Legend

Site Boundary

Indicative Turbine

Vantage Point (VP)

VP1 - SS8809185072

VP2 - SS8465386206

VP3 - SS8682986664

VP1 Viewshed

VP2 Viewshed

VP3 Viewshed

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Figure 2a: Vantage Point Flight Activity Survey Plan

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0 500

metres

N W E S

Legend

Site Boundary

Indicative Turbine

Vantage Point (VP)

VP1 - SS8809185072

VP2a - SS8448886223

VP3b - SS8643886038

VP1 Viewshed

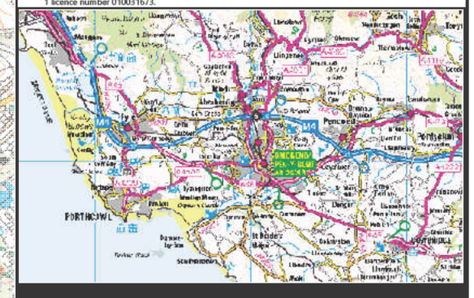
VP2 Viewshed

VP3 Viewshed

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Figure 2b: Vantage Point Flight Activity Survey Plan

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0 500 metres

N W E S

Legend

Site Boundary

500m Moorland Breeding Bird & Nightjar Survey Area

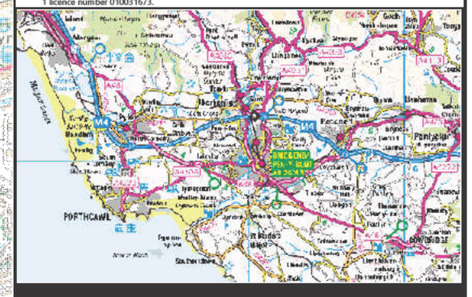
2km Breeding Raptor and Owl Survey Area

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Figure 3: Breeding Bird Survey Plan

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0 1
kilometres

N W E S

Legend

Site Boundary

Indicative Turbine

Target Species Flight Activity

BO - Barn owl

KT - Red kite

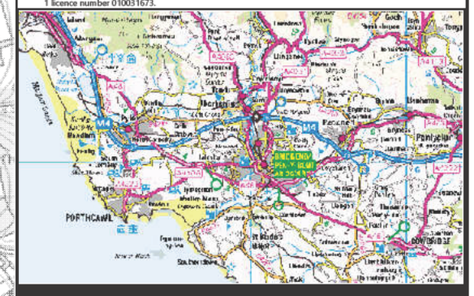
ML - Merlin

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Figure 4a: Target Species Flight Activity - Raptors & Owls (Year 1)

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0 500

metres

N W E S

Legend

Site Boundary

Indicative Turbine

Target Species Flight Activity

ET - Little egret

H. - Grey heron

L. - Lapwing

T. - Teal

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Figure 4b: Target Species Flight Activity - Others (Year 1)

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0 500

metres

N W E S

Legend

Site Boundary

Indicative Turbine

Target Species Flight Activity

K. - Kestrel

KT - Red kite

ML - Merlin

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Figure 4c: Target Species Flight Activity - Raptors & Owls (Year 2)

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WA4 4PG
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www avianecology co uk

0 500

meters

N W E S

Legend

Site Boundary

Indicative Turbine

Target Species Flight Activity

CA-Cormorant

GP-Golden plover

H.-Grey heron

L.-Lapwing

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Figure 4d: Target Species Flight Activity - Others (Year 2)

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0 500

meters

N W E S