Technical Appendix 7.1: Ornithology, including:

Annex A: Ornithological Legal Protection

Annex B: Ornithological Survey and Assessment Methodologies

Annex C: Ornithological Survey Effort and General Information

Annex D: Ornithological Survey Results

Annex E: Collision Risk Assessment

Document Quality Record

Version	Status	Person Responsible	Date
0.1	Draft	J. McPike	22/05/2024
0.2	Reviewed	N. Robinson	27/06/2024
1	Internal Approval	S. Sanders	08/07/2024
1.1	Draft	N. Robinson	13/08/2024
2	Internal Approval	S. Sanders	15/08/2024

M74 West Renewable Energy Park

Ornithology

Appendix 7.1

Date: 15 August 2024

Tel: 0141 342 5404

Web: www.macarthurgreen.com

Address: 93 South Woodside Road | Glasgow | G20 6NT

CONTENTS

1 INTRODUCTION 1

2 LEGAL PROTECTION 1

3 FIELD SURVEY METHODS 1

4 FIELD SURVEY RESULTS 1

4.1 Flight Activity 2

4.1.1 Flightlines Used in Collision Risk Modelling 2

4.1.2 Collision Risk Model Outputs 3

4.2 Moorland Breeding Birds 3

4.3 Winter Walkover 3

4.4 Scarce Breeding Birds 3

4.5 Black Grouse 4

1 INTRODUCTION

MacArthur Green was appointed by M74 West Limited (the Applicant) to undertake baseline ornithological surveys to inform the design and assessment of the proposed M74 West Renewable Energy Park, located near to Abington in South Lanarkshire (hereafter referred to as 'the Proposed Development).

Surveys were completed between September 2022 and August 2023.

This Technical Appendix summarises the methods employed and the results of those field surveys and is supported by the following Annexes:

- **Annex A**: Ornithological Legal Protection;
- **Annex B**: Ornithological Survey Methodologies;
- **Annex C**: Ornithological Survey Effort and Weather Data;
- **Annex D**: Ornithological Survey Results; and
- **Annex E**: Collision Risk Assessments.

Confidential information relating to species listed on Annex 1 of the EU Birds Directive or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) is detailed in **Confidential Technical Appendix 7.2 (EIAR Volume 5)**.

A range of surveys were adopted to accurately record baseline conditions within the Site and appropriate survey areas (detailed in **Annex B**). In this Technical Appendix, associated **Annexes A – E**, **Confidential Technical Appendix 7.2 (EIAR Volume 5)** and **Chapter 7: Ornithology (EIA Volume 2)**, the following terms are referred to:

- 'the Site' refers to the area within the red line boundary, as shown in **Figure 7.1 (EIA Volume 3a)**;
- 'survey area' is defined as the area covered during each ornithological field survey; and
- 'study area' is defined as the area of consideration of potential effects on individual species or species-groups for the purposes of assessment, as shown in **Figure 7.1 (EIA Volume 3a)**.

2 LEGAL PROTECTION

With limited exceptions, all wild birds and their eggs are protected by law. Specific levels of protection are determined by a species' inclusion on certain lists. **Annex A** to this report details the various levels of legal protection afforded to UK bird species.

3 TARGET SPECIES

Target species for survey and recording were drawn from the following lists and refined on the basis of their perceived sensitivity to onshore wind farm developments e.g. as set out in Annex 1 of NatureScot guidance (SNH, 2018[i]):

- Annex 1 of the EC Birds Directive;
- Schedule 1 of the Wildlife & Countryside Act 1981; and,
- Red-listed Birds of Conservation Concern (i.e. Stanbury *et al*., 2021[ii]).

Secondary species for survey and recording were defined as commoner raptors (buzzard, kestrel and sparrowhawk), gulls (excluding herring gull), Amber-listed waders[ii], feral species, mallard and raven, along with any large concentrations of Schedule 1 or Red-Listed passerines (from Stanbury *et al*., 2021[ii]) as recorded during survey.

4 FIELD SURVEY METHODS

The following surveys were undertaken between September 2022 and August 2023:

- Flight activity surveys (2022/2023 non-breeding season and 2023 breeding season);
- Winter walkover surveys (2022/2023 non-breeding season);
- Moorland breeding bird survey (2023 breeding season);
- Scarce breeding bird surveys (2023 breeding season); and,
- Black grouse surveys (2023 breeding season).

All survey methodologies have followed those recommended in NatureScot guidance (SNH 2017[iii]) and are described in detail within **Annex B**.

Survey areas have adequately covered the Site and a distance beyond the Site specific to that method, e.g. 2 km buffer for the scarce breeding bird surveys. Full details of survey areas are detailed within **Annex B**.

5 FIELD SURVEY RESULTS

All valid surveys were undertaken during suitable weather conditions (as described within **Annex B**). Where weather conditions deteriorated below acceptable conditions (see definitions in **Annex B**), surveys were either suspended or additional surveys were undertaken. In the case of flight activity surveys, any time where the visibility was <1 km was excluded from total survey effort and subsequent analysis (further detail in **section 5.1**).

All field surveys have been undertaken by experienced and professional ornithologists, with Schedule 1/Annex 1 surveys carried out by appropriately licensed surveyors. All survey data has been reviewed, inputted, and analysed by MacArthur Green.

A total of 88 bird species were recorded within, or adjacent to the Site over the course of ornithological surveys completed. Survey effort and results of the field surveys are detailed within **Annex C** and **Annex D**.

The following sections summarise the results from each survey undertaken.

5.1 Flight Activity

Flight activity surveys recorded all target species' flight activity within the Site and beyond, within areas of visibility, for use in the estimation of collision mortality risks for the Proposed Development (see **Annex E**).

Flights used in subsequent analysis have included those within the 'Collision Risk Analysis Area' (CRAA) for the Proposed Development, i.e. the area occupied by operational turbines, together with a 500 m buffer and which is considered to be suitably precautionary for the preferred candidate turbine specification.

Flight activity surveys across the 2022/2023 non-breeding season and 2023 breeding season were undertaken across a total of 10 VPs (in response to changes to the turbine layout across the project); seven VPs over the 2022/2023 non-breeding season and four VPs over the 2023 breeding season.

It should be noted that VP 6 and VP 7 do not subsequently provide coverage of the CRAA for the Proposed Development. Flight activity data obtained from these VPs has been presented for transparency, but has been excluded from collision analysis, given flight activity recorded is not 'at-risk'.

Valid flight activity survey effort[1] for all VPs is summarised in **Table 7-1-1**, with full details presented in **Annex C.** Detailed survey methodologies are presented in **Annex B**.

Table 7-1-1 Summary of Total Hours of Valid Survey per VP in each Season

Period	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10
2022/2023 non-breeding season	36	36	36	36	36	36	35.5	-	-	-
2023 breeding season	-	36	-	-	-	-	-	36	36	36

A total of 12 target species were recorded over the course of flight activity surveys, with the total number of flights recorded and the total number of birds recorded[2] from all VPs summarised in **Table 7-1-2.** Total bird seconds presented have been calculated for each observation as the product of flight duration and the number of birds recorded for each flight. This is then summed per species to give the total bird seconds recorded across the entire surveyed period, i.e. September 2022 to August 2023.

Further details of target species activity are provided in **Annex D**.

Table 7-1-2 Target Species Recorded and Total Number of Flights Recorded During Flight Activity Surveys (September 2022 to August 2023)

Species	Total number of flightlines recorded	Total number of birds recorded	Total bird seconds recorded
Curlew	58	106	4,915
Golden plover	6	174	31,754
Goshawk	1	1	20
Greylag goose	15	84	3,433
Herring gull	16	100	5,591
Lapwing	35	359	64,833
Merlin	2	2	48
Osprey	2	2	145
Peregrine falcon	1	1	15
Pink-footed goose	7	268	32,335
Red kite	45	48	10,731
Short-eared owl	4	4	990

5.1.1 Flightlines Used in Collision Risk Modelling

Only flightlines identified to be within the CRAA and recorded within the 2 km viewshed of the associated VP have been considered in the estimation of target species collision mortality risks for the Proposed Development.

Annex E provides details of the bird seconds from flights identified to be 'at- risk' and which is defined as:

- 'At-risk'– a flight having at least part of its duration (i) at Potential Collision Height (PCH)[3]; (ii) within the CRAA; and (iii) recorded within the 2 km viewshed of the associated VP; and
- 'At-PCH' is defined as the altitude between the minimum and maximum blade height[4], taken to be from 45 m to 200 m above the ground based on the preferred candidate turbine specification for the Proposed Development.

It should be noted that whilst golden plover, goshawk, merlin, osprey, peregrine and short-eared owl were recorded during flight activity surveys, no flights were identified as being 'at-risk'[5] and therefore collision mortality risks have not been estimated for those species and are concluded to be negligible at any population level.

Full survey results detailing the findings from each survey visit and all VPs (including target species' flightlines considered not 'at-risk' together with secondary species information recorded) can be found within **Annex D**. Only bird seconds for observations identified as within the CRAA and associated viewsheds of VPs 1-5 and VPs 8-10 are considered in the following discussions.

Full target species results are detailed within **Annex D** and collision risk calculations are detailed in **Annex E**.

[1] Hours where visibility was >1 km are not considered valid for use in collision risk modelling as less than half the 2 km viewshed can be seen.
[2] This includes flights that would not technically be 'at-risk' of collision i.e. recorded outwith the CRAA and/or not at Potential Collision Height (PCH) for the preferred candidate turbine specification.
[3] In some cases, only part of a total flight duration was recorded at PCH, and it is assumed that this proportion is applicable for that part of the flight within the CRAA and 2 km viewshed area.
[4] Where the actual rotor blade altitude differs from the pre-defined survey height bands, the collision risk model accounts for this difference on the assumption of an even flight distribution within each particular survey height band, and an adjustment can be made to estimate total flight duration at actual rotor blade altitude.
[5] i.e. the flights were either not within the CRAA and associated viewshed or were only recorded flying above 150m.

5.1.2 Collision Risk Model Outputs

Bird seconds for target species flights within the CRAA at PCH have been input into the NatureScot Collision Risk Model (CRM) (SNH, 2000[iv] and Band *et al*., 2007[v]) to calculate the predicted collision mortality risks per season. The CRM calculations for each species can be found in **Annex E**.

Table 7-1-3 and **Table 7-1-4** provide the estimated collision risks and number of seasons and years per collision for each species.

Table 7-1-3 Estimated Collision Mortality Risks

Species	2022/2023 non-breeding season	2023 breeding season	Annual
Curlew	0	0.139	0.139
Greylag goose	0.006	0	0.006
Herring gull	0	0.016	0.016
Lapwing	0.021	3.537	3.559
Pink-footed goose	0.108	0	0.108
Red kite	0.047	0.058	0.105

Table 7-1-4 Estimated Number of Seasons per Collision

Species	2022/2023 non-breeding season	2023 breeding season	Annual
Curlew	-	7.18	7.18
Greylag goose	176	-	176
Herring gull	-	64	64
Lapwing	47	0.28	0.28
Pink-footed goose	9.22	-	9.22
Red kite	21.1	17.4	9.54

5.2 Moorland Breeding Birds

One complete breeding bird season was surveyed in 2023, with the survey comprising four visits undertaken between April and July. Surveys recorded three target wader species that were considered to be breeding within the survey area (**Table 7-1-5**), comprising curlew, lapwing and redshank.

Territories of common sandpiper, oystercatcher and snipe were also recorded.

Observations of golden plover and ringed plover were also made, but neither species were not considered to be breeding.

Full details of the breeding bird survey visits are provided within **Annex C** and **Annex D**, with field survey methods presented in **Annex B**.

Table 7-1-5 Target Breeding Wader Territories 2023[6]

Species	Number of territories 2023
Curlew	13-22 (13-22)
Lapwing	6-12 (4-7)
Redshank	0-5 (0-5)

[6] Number of territories within or overlapping the 500 m study area shown in (brackets).

5.3 Winter Walkover

Winter walkover surveys were conducted during the 2022/2023 non-breeding season. Surveys recorded a total of 34 species of which six were considered to be target species (**Table 7-1-6**). Observations of snipe and woodcock (single birds) were also made.

Full details of the winter walkover surveys are provided within **Annex C** and **Annex D**, with the field survey methodology presented in **Annex B**.

Table 7-1-6 Winter Walkover: Target Species Records (number of birds recorded per visit) (2022 / 2023 Non-Breeding Season)

Species	2022/2023 non-breeding season Number of records	Total number of birds
Golden plover	1	10
Greylag goose	1	14
Merlin	1	1
Peregrine falcon	1	1
Red kite	5	5
Short-eared owl	1	1

5.4 Scarce Breeding Birds

Scarce breeding bird surveys were conducted during the 2023 (March to August) breeding season.

Peregrine falcon, red kite and short-eared owl were confirmed to be breeding within the survey area, with breeding activity summarised in **Table 7-1-7**. **Confidential Technical Appendix 7.2 (EIAR Volume 5)** contains full details of all breeding activity for these species.

Buzzard, kestrel, long-eared owl and sparrowhawk (secondary raptor species) were also recorded breeding within the survey area.

Observations of goshawk and osprey were recorded over the course of ornithological survey visits during the 2023 breeding season however, no breeding attempts were located and neither species was considered to be breeding within the survey area.

Full details of the scarce breeding bird surveys are provided within **Annex C** and **Annex D**, with the field survey methodology presented in **Annex B**.

Table 7-1-7 Scarce Breeding Bird Summary

Species	2023
Peregrine falcon	One territory, suspected to have failed.
Red kite	Two territories, minimum of four young fledged.
Short-eared owl	Minimum of three territories, success unknown.

5.5 Black Grouse

Surveys to identify any areas of black grouse activity, locate lek locations and establish lek size were conducted in the 2023 breeding season during April and May.

Surveys did not record any lek locations and no black grouse or signs of black grouse were recorded during any baseline survey visit.

Full details of the black grouse surveys are provided within **Annex C** and **Annex D**, with the field survey methodology presented in **Annex B**.

---

[i] SNH (2018) Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas. Scottish Natural Heritage (SNH).

[ii] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds*, **114**, pp. 723-747

[iii] SNH (2017) Recommended Bird Survey Methods to inform impact assessment of Onshore Windfarms. Scottish Natural Heritage (SNH).

[iv] SNH (2000). Windfarms and Birds: Calculating a theoretical collision risk assuming no avoiding action [Online]. Available at: https://www.nature.scot/doc/wind-farm-impacts-birds-calculating-theoretical-collision-risk-assuming-no-avoiding-action [Accessed 04th July 2024].

[v] Band, W., Madders, M. and Whitfield, D.P. (2007) Developing Field and Analytical Methods to Assess Avian Collision Risk at Wind Farms. In: De Lucas, M., Janss, G. and Ferrer, M., Eds., Birds and Wind Power, Quercus Editions, Madrid, 259-275.

ANNEX A. ORNITHOLOGICAL LEGAL PROTECTION

In Scotland, all wild birds are protected under the Wildlife and Countryside Act 1981 (the 'Act'), as amended by the Nature Conservation (Scotland) Act 2004. This protection also extends to their eggs and nests, with it being an offence to intentionally or recklessly[1]:

- Kill, injure or take any wild bird2;
- Take, damage, destroy or otherwise interfere with the nest of any wild bird while it is being built or is in use3;
- At any other time take, damage, destroy or otherwise interfere with any nest habitually used by any wild bird included in Schedule A1 (Protected Nests and Nest Sites for Birds: white-tailed eagle and golden eagle)4;
- Obstruct or prevent any wild bird from using its nest5; or
- Take or destroy an egg of any wild bird[6].

It is also an offence to have in possession or control any live or dead wild bird or any part thereof; or any egg or part of an egg of any wild bird[7].

Further special protection under this legislation is afforded to those species listed on Schedule 1 of the Act. For these species, it is an offence to:

- Intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or is in, on or near a nest containing eggs or young, or disturb the dependent young of such a bird[8];
- Intentionally or recklessly disturb any wild birds included on Schedule 1 which leks, while it is doing so[9] (capercaillie is the only bird this offence applies to in Scotland);
- Intentionally or recklessly harass any wild bird included in Schedule 1A[10]. Section 1, subsection 5B states, '*Subject to the provisions of this Part, any person who intentionally or recklessly harasses any wild bird included in Schedule 1A shall be guilty of an offence*'. At this time, Schedule 1A includes golden eagle, hen harrier, red kite and white-tailed eagle. This updated legislation was introduced on 16 March 2013; or
- Intentionally or recklessly take, damage, destroy or otherwise interfere with any nest and/or nest site habitually used by any bird on Schedule A1 at any time. At this time, Schedule A1 includes golden eagle and white-tailed eagle[11].

It is also an offence to knowingly cause or permit to be done an act which is made unlawful by any of the above provisions.

Further protection is described under the EU Birds Directive which requires member states to maintain wild bird species in favourable conservation status[12] and promote the conservation of bird species listed within Annex 1 of the Birds Directive through the protection of their habitat. This is achieved via the designation of Special Protection Areas (SPAs).

Red List bird species are those deemed to be globally threatened and to be suffering population declines within the UK. Although not legally enforceable, the conservation of Red List bird species represents a material consideration, in planning terms.

[1] Exceptions to these offences exist under various circumstances (e.g. controlling pest species; taking birds during specific season; and killing sick or injured birds etc.).
[2] Wildlife and Countryside Act 1981, Section 1(1)(a)
[3] Wildlife and Countryside Act 1981, Section 1(1)(b)
[4] Wildlife and Countryside Act 1981, Section 1(1)(ba)
[5] Wildlife and Countryside Act 1981, Section 1(1)(bb)
[6] Wildlife and Countryside Act 1981, Section 1(1)(c)
[7] Wildlife and Countryside Act 1981, Section 1(2)
[8] Wildlife and Countryside Act 1981, Section 1(5)
[9] Wildlife and Countryside Act 1981, Section 1(5A)
[10] Wildlife and Countryside Act 1981, Section 1(5B)
[11] This reflects the changes introduced by the Wildlife and Countryside Act 1981 (as amended by: Variation of Schedules A1 and 1A (Scotland) Order 2013.
[12] While the term 'favourable conservation status' is not used in the Birds Directive, EU court cases over recent years have progressively interpreted the concept as meaningful in a Birds Directive context.

ANNEX B. ORNITHOLOGICAL SURVEY METHODOLOGY

A range of ornithological surveys have been completed to inform the design and assessment of the Proposed Development. The methodologies used in these surveys are summarised in the sections below; more detailed descriptions are provided in the NatureScot guidance (SNH, 2017[i]) on which these surveys are based.

B.1 Flight Activity Surveys

The aims of the flight activity surveys are to: (1) to record flight activity within the vicinity of the Site in order to identify areas of importance to birds; and (2) to quantify flight activity within 500 m of proposed turbine locations in order to estimate the likelihood of collision (SNH 2017[i]).

Timing

- A survey period of 36 hours is recommended as the minimum level of sampling intensity at each Vantage Point (VP) for each season (breeding, non-breeding, migratory) (SNH 2017[i]);
- Watches were spread as evenly throughout the year as possible to ensure that temporally representative data are collected (see **Annex C**). Specific consideration was given to the period around dawn and twilight for breeding waders and to changing raptor behaviour across seasons (SNH 2017[i]);
- Watches were suspended and resumed to take account of changes in visibility (e.g. fluctuations in cloud base). Watches were undertaken in conditions of good ground visibility when the cloud base was higher than the most elevated ground being observed; and
- Watches were conducted in a range of weather conditions and were spread throughout the day (see **Annex C** and **Annex D**).

Field Methods

- Viewshed analysis was conducted using Arc GIS to confirm suitable Vantage Point (VP) locations and their associated visible areas at 20 m above ground level[1];
- Reconnaissance surveys were undertaken to refine VP locations;
- The VP locations and associated viewsheds are shown in **Figure 7.2** and **Figure 7.3 (EIAR Volume 3a)**;
- Care was taken to maximize the area visible whilst minimising disturbance to birds;
- Final VP locations were selected with the aim of achieving coverage of all the proposed turbine locations such that no turbine was more than 2 km from a VP, with VP locations updated where appropriate in response to changes in turbine layouts;
- A maximum 180˚ view arc was scanned by surveyors. This rule did not however apply when tracking migratory waterfowl or raptors across the Site; and
- Each watch lasted a maximum of three hours but was suspended and then resumed to take account of changes in visibility (e.g. fluctuations in the cloud base).

For each target and secondary species, the following data were recorded (SNH 2017[i]):

- The flightlines by individuals or flocks of birds;
- The time the target bird was detected and the duration (seconds) spent flying over a defined survey area (the viewshed);
- The birds' flight heights, defined into six prescribed height bands (0-20 m, 21-40 m, 41-100 m, 101-150 m, 151-200 m and >201 m) were recorded at the point of detection and at 15 second intervals thereafter. From this the proportion of time spent flying below, within (referred to as Potential Collision Height (PCH)) and above approximate rotor height could be estimated. The actual planned rotor height is 45 – 200 m above ground level. This difference is accounted for within the collision risk models on the assumption of even flight distribution within each height band;
- The route followed was plotted in the field onto 1:25,000 scale maps;
- Observations of target species took priority over recording secondary species if both species were present simultaneously;
- The number of birds recorded were the minimum number of individuals that could account for the activity observed; and
- Observers only recorded perched birds and birds on waterbodies once only on arrival at the VP. Thereafter only flying birds and newly noticed perched/swimming birds were included in the activity summaries.

B.2 Moorland Breeding Bird Survey

The moorland breeding bird survey methodology employed followed that detailed within NatureScot guidance (SNH 2017[i]), which is suitable for moorland and open country species including waders, gulls, red grouse and some wildfowl species. In summary, survey visits involved the following:

- Open upland (including hedgerows, scrub, isolated trees and copses) was surveyed using an intensive version of the Brown and Shepherd (1993[ii]) method for censusing upland breeding waders;
- The objectives were to map species registrations and breeding evidence within 500 m of Site and estimate the approximate breeding bird populations present within the survey area;
- After each survey visit one overview map was then produced showing all target species registrations. The maps from all four survey visits from that year were then compared, enabling the estimation of numbers of breeding territories. This was done by grouping registrations into territories using the methodology described by Bibby *et al.* (2000[iii]). Due to the cryptic nature of many breeding birds and the necessary assumptions made when plotting territories, a minimum and maximum number of territories is therefore identified for each species;
- The survey covered all areas within 500 m of the Site; and
- All wader, gulls, grouse and wildfowl species were recorded during survey visits.

Timing

- As recommended in Calladine *et al.* (2009[iv]), four survey visits were undertaken between April and July;
- Fieldwork was undertaken between sunrise and 1800hrs; and
- Fieldwork was not undertaken in conditions considered likely to affect bird detection rates, for example in winds greater than Beaufort Scale Force 4, persistent precipitation, poor visibility (less than 300 m), or in unusually hot weather.

Field Methods

- Walking routes which optimised ground visibility were used to cover the survey area;
- Surveyors paused at appropriate vantage and listening points;

[1] The viewsheds are based on a 5 m DTM to provide a representation of visibility from the observer locations; this is confirmed and refined through field survey visits.

- Isolated trees, copses and patches of scrub were approached and examined;
- Streams, ditches and hedgerows were walked;
- All other areas were approached to within 100 m;
- Species registrations were mapped at the first location that behaviour indicative of breeding was observed; and
- Standard British Trust for Ornithology (BTO) activity codes were used to record behaviours and breeding evidence.

B.3 Winter Walkover

Winter walkovers were undertaken over the non-breeding seasons to map wintering populations of birds within 500 m of the Site:

- The area was surveyed three times over the 2022/2023 non-breeding season;
- These surveys involved following a route that optimised ground coverage, such that observers walked within 250 m of every point; and
- Observers periodically stopped at appropriate viewing and listening points along the route and longer vantage point watches were included within the walkover to allow potentially important areas to be monitored in greater detail.

B.4 Scarce Breeding Bird Survey

The aim of the scarce breeding bird surveys was to determine the distribution of occupied nests/territories for target raptor and owl species within 2 km of the Site and record breeding success. Secondary species such as buzzard, sparrowhawk and kestrel were also noted but location of their nests was not the key focus of the surveys. Surveys were undertaken by experienced and licensed[2] field ornithologists. Extreme care was taken to avoid unnecessary disturbance to breeding birds.

Guidance from NatureScot (SNH 2017[i]), '*Bird Monitoring Methods*' (Gilbert *et al.*, 1998[v]) and '*Raptors: a field guide to survey and monitoring*' (Hardey *et al.* 2013[vi]) were all consulted to inform survey methodology and are referenced where appropriate in the species methodologies below.

Barn Owl

- The surveys followed methodology outlined in Gilbert *et al.* (1998[v]), as mentioned in NatureScot guidance (SNH 2017[i]);
- Surveys were undertaken within 1 km of the Site; and
- Surveyors checked for signs of occupation (moulted feathers, pellets) in all suitable buildings within this 1 km buffer.

Goshawk

Methodology outlined in Hardey *et al.* (2013[vi]) was used as guidance for the surveying of areas for potential goshawk breeding. Extreme care was taken not to disturb potential nests especially around the time of year when females were likely to be laying or incubating.

- Areas of suitable woodland were observed for the presence of nests. Searches for goshawk nests were focused on mature forestry blocks, although their presence was not ruled out of other wooded areas;
- Searches carried out between March and April focussed on observing territorial and nest building behaviours;
- Where nests were known to be present, scans were carried out between mid-March and May to confirm breeding. Scans were kept brief – carried out for between 5-10 minutes and from a distance; and
- When breeding was confirmed, searches for further nests were deferred until such a time as the young had hatched. Searches were then undertaken between late May and late June for evidence of provisioning young and then between late July and early August to watch for fledgling activity, this included listening for the begging calls of newly fledged young.

Hen Harrier

Methodology outlined in Hardey *et al.* (2013[vi]) was used as guidance for the surveying of areas for potential hen harrier breeding. Extreme care was taken not to disturb potential nests especially around the time of year when females were likely to be laying or in cold/wet weather when females were likely to be incubating or brooding. Areas of suitable habitat[3] were visited during four time periods across the breeding season to:

- Check for territory occupancy (between March and mid-April) – this consisted of watching over suitable habitat from a good vantage point for displaying males (and females) and checking all areas of suitable habitat to within 250 m (watching out for signs of kills);
- Locate incubating females (between mid-April and late May) by listening for female begging calls and watching for food passes between the male and female – surveyors watched for at least four hours as Hardey *et al.* (2013[vi]) notes that when the female is incubating it can be up to six hours between feeding visits from the male, but on average it is less than every four hours. Surveys were undertaken between 06:00 to 12:00 or 16:00 to 20:00;
- Check for young or breeding evidence (between late May and late June) again by listening for female begging calls and watching for food passes between male and female when the female is brooding and watching for the male and female provisioning the nest with food once brooding has ended– surveyors should watch for at least two hours as Hardey *et al.* (2013[vi]) notes that an adult bird will visit the nest every 1-2 hours. Surveyors should also watch for display behaviour which could indicate a failed breeding attempt;
- Check for fledged young (between late June and late August).

Merlin

Methodology outlined in Hardey *et al.* (2013[vi]) was used as guidance for the surveying of areas for potential merlin breeding.

- Areas of suitable nesting habitat (including forest edge where trees are >5 m high) were closely observed between 20th March and 30th April;
- Boulders, fence lines, isolated posts, stone dykes, grouse butts, hummocks, stream banks, crags, trees and recently burnt areas of heather were checked for signs of occupation (e.g. plucked prey, moulted feathers, pellets and faeces);

[2] All surveyors hold or are accredited under a NatureScot Schedule 1 Licence.

[3] Unsuitable habitat areas include: land above 600 m; improved pasture and arable land; extensive areas of degraded land with no heather cover and low vegetation; the vicinity of cliffs, rocky outcrops, boulder fields and scree; areas within 100 m of hill farms and occupied dwellings.

- If merlin were observed, or signs found, areas were visited at least twice to verify occupation of the territory; and
- Potential nest areas were watched for 4-6 hours if necessary.

Osprey

Methodology outlined in Hardey *et al.* (2013[vi]) and Gilbert *et al.* (1998[v]) was used as guidance for the surveying of areas for potential osprey breeding. Care was taken when carrying out the searches so as not to disturb any displaying or nesting birds, with any nests/potential nests checked from a distance.

- All wooded areas within the survey area were searched for the possible presence of nests, especially those located close to freshwater lochs and rivers that could provide feeding sites. Artificial platforms were also checked;
- If breeding was suspected, the location was visited between April and May until nesting was further confirmed;
- In line with the methods suggested by Gilbert *et al.* (1998[v]) and Hardey *et al.* (2013[vi]), proof of occupancy was determined by: two osprey seen on the same eyrie on more than one occasion (with a week separating observations), incubation, or feeding of chicks; and
- Further scans were undertaken between late May and early July to try and observe any young in the nests.

Peregrine Falcon

- Potential nest sites were visited and checked for evidence of occupation between March and April;
- Sites checked included crags and steep banks identified from OS maps and searches of the survey area;
- Surveyors checked for signs of occupation (e.g. faecal splash, fresh plucked prey);
- If occupied sites were found they were re-visited to verify incubation; and
- Searches were made for eyries. Where this was not possible sites were watched from a suitable vantage point for 3-4 hours or until a nest was located.

Red Kite

Care was taken not to disturb any birds, especially between mid-March and mid-April when disturbance to displaying red kites can cause them to move to another area (Hardey *et al.* 2013[vi]).

- Wooded areas were scanned from outside for the presence of nests, with signs occupation searched for between February and March;
- Potential territories were watched for 1-2 hours between March and April to observe any breeding or nest-building behaviour; and
- Where breeding was confirmed, nests were scanned to determine the breeding success between late April and late June/early July.

Short-Eared Owl

- At least two visits between early April and the end of May were carried out;
- Suitable habitat was visited and checked for evidence of hunting males, territorial activity and other signs of presence; and
- If breeding was confirmed, a further visit was made in June to watch birds, locate nest-sites and confirm breeding behaviour wherever possible.

B.5 Black Grouse Survey

The survey methodology used is detailed in NatureScot guidance (SNH 2017[i]). A summary is provided below.

- Breeding black grouse were surveyed within 1.5 km of the Site by counting total numbers of males and females at leks, most lekking activity taking place at or soon after dawn in spring.
- Known lek sites and other areas of suitable habitat which can host leks were identified and visited during April and May within 2 hours of dawn on calm dry days with good visibility;
- Visits involved listening and scanning for lekking black grouse from strategic locations (avoiding disturbance of leks) and during walks between these locations ensuring that all potential habitat was covered;
- The maximum count of males in the 2 hours around dawn gives the standard count estimate but the maximum number of females seen was also presented; and
- Leks that were at least 200 m apart within the same year were treated as separate leks.

[i] Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore windfarms.
[ii] Brown, A. F. and Shepherd, K. B. (1993) A method for censusing upland breeding waders. *Bird Study*, 40: 189-195.
[iii] Bibby, C. J., Neil D. Burgess, David A. Hill and Simon H. Mustoe (2000) *Bird Census Techniques*, 2nd Edition, London, Academic Press.
[iv] Calladine. J., Garner, G., Wernham, C., & Thiel, A. (2009) The influence of survey frequency on population estimates of moorland breeding birds. *Bird Study*, 56: 3, 381-388.
[v] Gilbert, G., Gibbons, D. W. and Evans, J. (1998) *Bird Monitoring Methods*. RSPB, Sandy.

[vi] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013) *Raptors: a field guide for surveys and monitoring* (3rd edition). The Stationery Office, Edinburgh.

ANNEX C. ORNITHOLOGICAL SURVEY EFFORT

Table C-1 shows the system used for recording weather conditions on all ornithological survey visits.

Table C-1 Key to Meteorological Conditions Recorded During all Surveys

Wind speed				Rain		Cloud cover		Cloud height	
Calm	0	Moderate gale	7	None	0	In eighths		<150m	0
Light air	1	Fresh gale	8	Drizzle/Mist	1	*e.g.*	3/8	150-500m	1
Light breeze	2	Strong gale	9	Light showers	2			>500m	2
Gentle breeze	3	Whole gale	10	Heavy showers	3				
Moderate breeze	4	Storm	11	Heavy rain	4				
Fresh breeze	5	Hurricane	12	**Snow**		**Frost**		**Visibility**	
Strong breeze	6			None	0	None	0	Poor (<1km)	0
				On site	1	Ground	1	Moderate (1-2km)	1
				High ground	2	All day	2	Good (>2km)	2

C.1 Flight Activity Surveys

Flight activity surveys were undertaken during the 2022/2023 non-breeding season and 2023 breeding season. Details of the flight activity surveys undertaken across each Vantage Point (VP) location are supplied in **Table C-2**. Survey hours per VP per season are summarised in **Technical Appendix 7.1, Table 7-1-1** and the associated weather data recorded is detailed in **Table C-3**.

Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-2 Summary of Flight Activity Surveys Undertaken at M74 West Renewable Energy Park (sorted chronologically)

Date	Season	Observer	VP	Survey start time	Survey finish time	No. hours[1] surveyed
20/09/2022	2022/2023 NBR	TH	2	0930	1230	3
20/09/2022	2022/2023 NBR	JRM	1	1000	1300	3
20/09/2022	2022/2023 NBR	TH	2	1300	1500	2
20/09/2022	2022/2023 NBR	JRM	1	1330	1530	2
21/09/2022	2022/2023 NBR	TH	4	0850	1150	3
21/09/2022	2022/2023 NBR	JRM	3	0915	1215	3
21/09/2022	2022/2023 NBR	TH	4	1220	1450	2.5
21/09/2022	2022/2023 NBR	JRM	3	1245	1445	2
22/09/2022	2022/2023 NBR	TH	6	0930	1230	3
22/09/2022	2022/2023 NBR	TH	6	1300	1500	2
23/09/2022	2022/2023 NBR	JRM	7	0900	1200	3
23/09/2022	2022/2023 NBR	TH	5	0915	1215	3
23/09/2022	2022/2023 NBR	JRM	7	1230	1430	2
23/09/2022	2022/2023 NBR	TH	5	1245	1445	2
04/10/2022	2022/2023 NBR	EB	7	0955	1255	3
04/10/2022	2022/2023 NBR	EB	7	1325	1525	1
12/10/2022	2022/2023 NBR	TH	5	1000	1300	3
12/10/2022	2022/2023 NBR	TH	5	1330	1530	2
14/10/2022	2022/2023 NBR	JRM	1	0900	1200	3
14/10/2022	2022/2023 NBR	TH	2	0900	1200	3
14/10/2022	2022/2023 NBR	JRM	1	1230	1430	2
14/10/2022	2022/2023 NBR	TH	2	1230	1430	2
28/10/2022	2022/2023 NBR	TH	4	0945	1245	3
28/10/2022	2022/2023 NBR	TH	4	1315	1515	2
07/11/2022	2022/2023 NBR	JR	4	0905	1205	1.5
07/11/2022	2022/2023 NBR	JR	4	1235	1435	1.5
08/11/2022	2022/2023 NBR	JR	6	0800	1100	2
08/11/2022	2022/2023 NBR	JR	6	1130	1330	2
09/11/2022	2022/2023 NBR	JR	1	0830	1130	3
09/11/2022	2022/2023 NBR	JR	1	1200	1400	2
23/11/2022	2022/2023 NBR	JR	2	0930	1230	3
23/11/2022	2022/2023 NBR	TH	3	0930	1230	3
23/11/2022	2022/2023 NBR	JR	2	1300	1500	2
23/11/2022	2022/2023 NBR	TH	3	1300	1500	2
25/11/2022	2022/2023 NBR	JR	7	0810	1110	3
25/11/2022	2022/2023 NBR	TH	5	0815	1115	3
25/11/2022	2022/2023 NBR	JR	7	1140	1340	2
25/11/2022	2022/2023 NBR	TH	5	1145	1345	2
05/12/2022	2022/2023 NBR	EB	7	0945	1245	3
05/12/2022	2022/2023 NBR	EB	7	1315	1515	2
15/12/2022	2022/2023 NBR	MW	1	0815	1115	3
15/12/2022	2022/2023 NBR	MW	3	1145	1345	2
19/12/2022	2022/2023 NBR	MW	3	0900	1200	3
19/12/2022	2022/2023 NBR	MW	3	1230	1430	2
20/12/2022	2022/2023 NBR	MW	1	0800	1000	2
20/12/2022	2022/2023 NBR	MW	3	1030	1330	3
21/12/2022	2022/2023 NBR	MW	4	0800	1100	3
21/12/2022	2022/2023 NBR	MW	4	1130	1330	2
22/12/2022	2022/2023 NBR	MW	6	0900	1200	3
22/12/2022	2022/2023 NBR	MW	6	1230	1430	2
23/12/2022	2022/2023 NBR	MW	5	0815	1115	3
23/12/2022	2022/2023 NBR	MW	5	1145	1345	2
12/01/2023	2022/2023 NBR	JRM	3	0800	1100	3
12/01/2023	2022/2023 NBR	JRM	3	1130	1330	2
13/01/2023	2022/2023 NBR	JRM	4	0830	1130	3
13/01/2023	2022/2023 NBR	JRM	4	1200	1400	2
16/01/2023	2022/2023 NBR	JRM	7	0930	1230	3
16/01/2023	2022/2023 NBR	EB	5	0945	1245	3
16/01/2023	2022/2023 NBR	JRM	7	1300	1500	2
16/01/2023	2022/2023 NBR	EB	5	1315	1515	2
18/01/2023	2022/2023 NBR	JRM	6	0830	1130	3
18/01/2023	2022/2023 NBR	JRM	6	1200	1400	2
23/01/2023	2022/2023 NBR	EB	1	1000	1300	2.5
23/01/2023	2022/2023 NBR	TH	2	1000	1300	2.5
23/01/2023	2022/2023 NBR	EB	1	1330	1530	2
23/01/2023	2022/2023 NBR	TH	2	1330	1530	2
27/01/2023	2022/2023 NBR	MW	6	0800	1100	3
27/01/2023	2022/2023 NBR	MW	6	1130	1330	2
15/02/2023	2022/2023 NBR	MW	2	0730	1030	3
15/02/2023	2022/2023 NBR	MW	2	1100	1300	2
16/02/2023	2022/2023 NBR	MW	3	0830	1130	3
16/02/2023	2022/2023 NBR	MW	3	1200	1400	2
17/02/2023	2022/2023 NBR	MW	4	1230	1530	3
24/02/2023	2022/2023 NBR	MW	7	0715	1015	3

[1] Note: only valid hours (i.e. where visibility was at least 1 km) are presented in this column.

Date	Season	Observer	VP	Survey start time	Survey finish time	No. hours[1] surveyed
24/02/2023	2022/2023 NBR	MW	7	1045	1245	2
27/02/2023	2022/2023 NBR	MW	1	0800	1100	3
27/02/2023	2022/2023 NBR	TH	6	0920	1220	3
27/02/2023	2022/2023 NBR	EB	7	0930	1230	3
27/02/2023	2022/2023 NBR	MW	1	1130	1430	3
27/02/2023	2022/2023 NBR	TH	6	1250	1550	3
27/02/2023	2022/2023 NBR	EB	7	1300	1600	3
28/02/2023	2022/2023 NBR	MW	1	0745	1045	3
28/02/2023	2022/2023 NBR	EB	5	0915	1215	3
28/02/2023	2022/2023 NBR	MW	1	1115	1315	2
28/02/2023	2022/2023 NBR	EB	5	1245	1445	2
03/03/2023	2022/2023 NBR	TH	2	0930	1230	3
03/03/2023	2022/2023 NBR	TH	2	1300	1600	3
08/03/2023	2022/2023 NBR	HEC	4	0920	1220	3
08/03/2023	2022/2023 NBR	TH	5	0920	1220	3
08/03/2023	2022/2023 NBR	HEC	4	1250	1550	3
08/03/2023	2022/2023 NBR	TH	5	1250	1550	3
13/03/2023	2022/2023 NBR	EB	6	0915	1215	3
13/03/2023	2022/2023 NBR	HEC	4	0940	1240	3
13/03/2023	2022/2023 NBR	EB	6	1245	1545	3
13/03/2023	2022/2023 NBR	HEC	4	1310	1340	0.5
13/03/2023	2022/2023 NBR	HEC	7	1405	1505	0.5
15/03/2023	2022/2023 NBR	TH	1	0920	0950	0.5
15/03/2023	2022/2023 NBR	HEC	3	0920	1220	3
15/03/2023	2022/2023 NBR	TH	2	1000	1300	3
15/03/2023	2022/2023 NBR	HEC	3	1250	1550	3
15/03/2023	2022/2023 NBR	TH	2	1330	1600	2.5
16/03/2023	2023 BR	HEC	8	0905	1205	3
16/03/2023	2023 BR	TH	2	0915	1215	3
16/03/2023	2023 BR	HEC	8	1235	1535	3
16/03/2023	2023 BR	TH	2	1245	1545	3
17/03/2023	2023 BR	TH	9	0920	1220	3
17/03/2023	2023 BR	HEC	10	0930	1230	3
17/03/2023	2023 BR	TH	9	1250	1550	3
17/03/2023	2023 BR	HEC	10	1300	1600	3
04/04/2023	2023 BR	ENS	10	0900	1200	3
04/04/2023	2023 BR	ENS	10	1230	1530	3
14/04/2023	2023 BR	HEC	9	0810	1110	3
14/04/2023	2023 BR	JB	10	0810	1110	3
20/04/2023	2023 BR	EB	2	0915	1215	3
20/04/2023	2023 BR	HEC	8	0915	1215	3
20/04/2023	2023 BR	EB	2	1245	1545	3
20/04/2023	2023 BR	HEC	8	1245	1545	3
02/05/2023	2023 BR	HEC	2	0930	1230	3
02/05/2023	2023 BR	HEC	2	1300	1600	3
03/05/2023	2023 BR	HEC	8	0900	1200	3
03/05/2023	2023 BR	HEC	8	1230	1530	3
04/05/2023	2023 BR	HEC	9	0935	1235	3
04/05/2023	2023 BR	HEC	9	1305	1605	3
05/05/2023	2023 BR	JB	9	0730	1030	3
05/05/2023	2023 BR	TH	10	0730	1030	3
08/06/2023	2023 BR	HEC	2	0750	1050	3
08/06/2023	2023 BR	JR	8	0750	1050	3
08/06/2023	2023 BR	HEC	2	1120	1420	3
08/06/2023	2023 BR	JR	8	1120	1420	3
26/07/2023	2023 BR	TH	9	0915	1215	3
26/07/2023	2023 BR	TH	9	1245	1545	3
31/07/2023	2023 BR	MW	10	0700	1000	3
31/07/2023	2023 BR	HEC	2	0830	1130	3
31/07/2023	2023 BR	JR	8	0830	1130	3
31/07/2023	2023 BR	MW	10	1030	1330	3
31/07/2023	2023 BR	HEC	2	1200	1500	3
31/07/2023	2023 BR	JR	8	1200	1500	3
02/08/2023	2023 BR	HEC	9	0920	1220	3
02/08/2023	2023 BR	TH	10	0920	1220	3
02/08/2023	2023 BR	HEC	9	1250	1550	3
02/08/2023	2023 BR	TH	10	1250	1550	3
03/08/2023	2023 BR	HEC	8	0925	1225	3
03/08/2023	2023 BR	TH	2	0930	1230	3
03/08/2023	2023 BR	HEC	8	1255	1555	3
03/08/2023	2023 BR	TH	2	1300	1600	3
11/08/2023	2023 BR	JRM	10	0700	1000	3
11/08/2023	2023 BR	JRM	10	1030	1330	3
16/08/2023	2023 BR	MW	9	0630	0930	3
16/08/2023	2023 BR	MW	9	1000	1300	3

Table C-3 Meteorological Conditions during Flight Activity Surveys at M74 West Renewable Energy Park (sorted chronologically)

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
20/09/2022	TH	2	0930	1230	1	2	SW	0	7	2	2	0	0
20/09/2022	TH	2	0930	1230	2	2	SW	0	4	2	2	0	0
20/09/2022	TH	2	0930	1230	3	3	SW	0	5	2	2	0	0
20/09/2022	JRM	1	1000	1300	1	2	SW	0	7	2	2	0	0
20/09/2022	JRM	1	1000	1300	2	2	SW	0	5	2	2	0	0
20/09/2022	JRM	1	1000	1300	3	2	SW	0	6	2	2	0	0
20/09/2022	TH	2	1300	1500	1	2	SW	0	6	2	2	0	0
20/09/2022	TH	2	1300	1500	2	2	SW	0	7	2	2	0	0
20/09/2022	JRM	1	1330	1530	1	2	SW	0	7	2	2	0	0
20/09/2022	JRM	1	1330	1530	2	2	SW	0	7	2	2	0	0
21/09/2022	TH	4	0850	1150	1	3	S	0	4	2	2	0	0
21/09/2022	TH	4	0850	1150	2	3	S	0	5	2	2	0	0
21/09/2022	TH	4	0850	1150	3	3	S	0	5	2	2	0	0
21/09/2022	JRM	3	0915	1215	1	3	SSW	0	7	2	2	0	0
21/09/2022	JRM	3	0915	1215	2	3	SSW	0	6	2	2	0	0
21/09/2022	JRM	3	0915	1215	3	4	SSW	0	6	2	2	0	0
21/09/2022	TH	4	1220	1450	1	3	S	0	7	2	2	0	0
21/09/2022	TH	4	1220	1450	2	4	S	0	7	2	2	0	0
21/09/2022	TH	4	1220	1450	3	4	S	0	7	2	2	0	0
21/09/2022	JRM	3	1245	1445	1	5	SSW	0	7	2	2	0	0
21/09/2022	JRM	3	1245	1445	2	4	SSW	0	7	2	2	0	0
22/09/2022	TH	6	0930	1230	1	3	SW	3	8	1	1	0	0
22/09/2022	TH	6	0930	1230	2	2	SW	2	8	1	1	0	0
22/09/2022	TH	6	0930	1230	3	2	SW	1	8	2	2	0	0
22/09/2022	TH	6	1300	1500	1	2	SW	0	8	2	2	0	0
22/09/2022	TH	6	1300	1500	2	2	SW	0	8	2	2	0	0
23/09/2022	JRM	7	0900	1200	1	3	WSW	0	6	2	2	0	0
23/09/2022	JRM	7	0900	1200	2	4	WNW	0	6	2	2	0	0
23/09/2022	JRM	7	0900	1200	3	4	WNW	0	5	2	2	0	0
23/09/2022	TH	5	0915	1215	1	2	W	0	3	2	2	0	0
23/09/2022	TH	5	0915	1215	2	2	W	2	5	2	2	0	0
23/09/2022	TH	5	0915	1215	3	2	W	0	5	2	2	0	0
23/09/2022	JRM	7	1230	1430	1	4	WNW	0	6	2	2	0	0
23/09/2022	JRM	7	1230	1430	2	4	WNW	0	5	2	2	0	0
23/09/2022	TH	5	1245	1445	1	2	W	0	4	2	2	0	0
23/09/2022	TH	5	1245	1445	2	2	W	0	5	2	2	0	0
04/10/2022	EB	7	0955	1255	1	6	SW	4	8	1	1	0	0
04/10/2022	EB	7	0955	1255	2	6	SW	4	8	1	1	0	0
04/10/2022	EB	7	0955	1255	3	5	SW	1	8	1	2	0	0
04/10/2022	EB	7	1325	1525	1	5	SW	2	8	0	1	0	0
04/10/2022	EB	7	1325	1525	2	4	SW	1	8	1	1	0	0
12/10/2022	TH	5	1000	1300	1	4	SW	2	8	1	1	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
12/10/2022	TH	5	1000	1300	2	4	SW	2	5	2	2	0	0
12/10/2022	TH	5	1000	1300	3	4	SW	0	5	2	2	0	0
12/10/2022	TH	5	1330	1530	1	3	W	0	6	2	2	0	0
12/10/2022	TH	5	1330	1530	2	3	W	0	6	2	2	0	0
14/10/2022	JRM	1	0900	1200	1	2	SW	2	7	1	2	0	0
14/10/2022	JRM	1	0900	1200	2	2	SW	0	4	2	2	0	0
14/10/2022	JRM	1	0900	1200	3	3	WSW	0	6	2	2	0	0
14/10/2022	TH	2	0900	1200	1	3	S	2	7	2	2	0	0
14/10/2022	TH	2	0900	1200	2	3	SW	0	5	2	2	0	0
14/10/2022	TH	2	0900	1200	3	3	SW	0	5	2	2	0	0
14/10/2022	JRM	1	1230	1430	1	3	W	0	6	2	2	0	0
14/10/2022	JRM	1	1230	1430	2	3	W	0	6	2	2	0	0
14/10/2022	TH	2	1230	1430	1	4	SW	2	5	2	2	0	0
14/10/2022	TH	2	1230	1430	2	3	SW	0	5	2	2	0	0
28/10/2022	TH	4	0945	1245	1	6	SW	2	8	2	2	0	0
28/10/2022	TH	4	0945	1245	2	6	SW	1	7	2	2	0	0
28/10/2022	TH	4	0945	1245	3	6	SW	0	7	2	2	0	0
28/10/2022	TH	4	1315	1515	1	5	SW	0	6	2	2	0	0
28/10/2022	TH	4	1315	1515	2	5	SW	0	7	2	2	0	0
07/11/2022	JR	4	0905	1205	1	4	SW	4	8	1	1	0	0
07/11/2022	JR	4	0905	1205	2	4	SW	4	8	1	1	0	0
07/11/2022	JR	4	0905	1205	3	4	SW	4	8	1	1	0	0
07/11/2022	JR	4	1235	1435	1	3	SW	3	8	1	2	0	0
07/11/2022	JR	4	1235	1435	2	4	SW	4	8	1	1	0	0
07/11/2022	JR	4	1235	1435	1	3	SW	3	8	1	2	0	0
07/11/2022	JR	4	1235	1435	2	4	SW	4	8	1	1	0	0
08/11/2022	JR	6	0800	1100	1	2	S	3	7	1	2	0	0
08/11/2022	JR	6	0800	1100	2	3	S	4	8	1	1	0	0
08/11/2022	JR	6	0800	1100	3	3	SSE	4	8	1	1	0	0
08/11/2022	JR	6	1130	1330	1	4	SSE	3	7	1	2	0	0
08/11/2022	JR	6	1130	1330	2	4	SSE	3	7	1	2	0	0
09/11/2022	JR	1	0830	1130	1	2	SW	0	3	2	2	0	0
09/11/2022	JR	1	0830	1130	2	2	SW	0	2	2	2	0	0
09/11/2022	JR	1	0830	1130	3	3	SW	0	2	2	2	0	0
09/11/2022	JR	1	1200	1400	1	2	SW	0	2	2	2	0	0
09/11/2022	JR	1	1200	1400	2	2	SW	0	1	2	2	0	0
23/11/2022	JR	2	0930	1230	1	4	SE	4	8	1	1	0	0
23/11/2022	JR	2	0930	1230	2	3	SSW	3	8	2	2	0	0
23/11/2022	JR	2	0930	1230	3	3	SSW	0	5	2	2	0	0
23/11/2022	TH	3	0930	1230	1	4	SE	2	8	1	1	0	0
23/11/2022	TH	3	0930	1230	2	3	SE	1	8	2	2	0	0
23/11/2022	TH	3	0930	1230	3	3	SE	0	5	2	2	0	0
23/11/2022	JR	2	1300	1500	1	2	SSW	0	3	2	2	0	0
23/11/2022	JR	2	1300	1500	2	2	SSW	2	3	2	2	0	0
23/11/2022	TH	3	1300	1500	1	3	SE	0	2	2	2	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
23/11/2022	TH	3	1300	1500	2	3	SE	0	2	2	2	0	0
25/11/2022	JR	7	0810	1110	1	5	SSW	0	3	2	2	0	0
25/11/2022	JR	7	0810	1110	2	4	SSW	0	5	2	2	0	0
25/11/2022	JR	7	0810	1110	3	4	SSW	0	4	2	2	0	0
25/11/2022	TH	5	0815	1115	1	3	S	0	6	2	2	0	0
25/11/2022	TH	5	0815	1115	2	2	S	0	4	2	2	0	0
25/11/2022	TH	5	0815	1115	3	2	S	0	5	2	2	0	0
25/11/2022	JR	7	1140	1340	1	5	SW	0	4	2	2	0	0
25/11/2022	JR	7	1140	1340	2	4	SW	0	3	2	2	0	0
25/11/2022	TH	5	1145	1345	1	2	S	0	4	2	2	0	0
25/11/2022	TH	5	1145	1345	2	2	S	0	4	2	2	0	0
05/12/2022	EB	7	0945	1245	1	3	WSW	0	7	2	2	0	0
05/12/2022	EB	7	0945	1245	2	3	WSW	0	7	2	2	0	0
05/12/2022	EB	7	0945	1245	3	4	WSW	1	8	2	2	0	0
05/12/2022	EB	7	1315	1515	1	4	SW	1	7	2	2	0	0
05/12/2022	EB	7	1315	1515	2	4	SW	1	8	2	2	0	0
15/12/2022	MW	1	0815	1115	1	1	N	0	1	2	2	2	1
15/12/2022	MW	1	0815	1115	2	1	N	0	1	2	2	2	1
15/12/2022	MW	1	0815	1115	3	2	NE	0	1	2	2	2	1
15/12/2022	MW	3	1145	1345	1	1	NE	0	1	2	2	2	1
15/12/2022	MW	3	1145	1345	2	1	NE	0	1	2	2	2	1
19/12/2022	MW	3	0900	1200	1	5	SW	3	8	2	2	0	0
19/12/2022	MW	3	0900	1200	2	5	SW	3	8	2	2	0	0
19/12/2022	MW	3	0900	1200	3	5	SW	2	8	2	2	0	0
19/12/2022	MW	3	1230	1430	1	6	SW	3	8	2	2	0	0
19/12/2022	MW	3	1230	1430	2	6	SW	4	8	2	1	0	0
20/12/2022	MW	1	0800	1000	1	5	SSW	0	6	2	2	0	0
20/12/2022	MW	1	0800	1000	2	6	SSW	0	5	2	2	0	0
20/12/2022	MW	3	1030	1330	1	6	SSW	0	5	2	2	0	0
20/12/2022	MW	3	1030	1330	2	6	SSW	0	5	2	2	0	0
20/12/2022	MW	3	1030	1330	3	6	SSW	0	6	2	2	0	0
21/12/2022	MW	4	0800	1100	1	5	SW	4	8	2	2	0	0
21/12/2022	MW	4	0800	1100	2	5	SW	3	8	2	2	0	0
21/12/2022	MW	4	0800	1100	3	6	SW	4	8	2	2	0	0
21/12/2022	MW	4	1130	1330	1	6	SW	4	8	2	2	0	0
21/12/2022	MW	4	1130	1330	2	7	SW	3	8	2	2	0	0
22/12/2022	MW	6	0900	1200	1	4	W	0	8	2	2	0	0
22/12/2022	MW	6	0900	1200	2	4	W	2	8	2	2	0	0
22/12/2022	MW	6	0900	1200	3	4	W	0	7	2	2	0	0
22/12/2022	MW	6	1230	1430	1	5	W	0	7	2	2	0	0
22/12/2022	MW	6	1230	1430	2	5	W	2	8	2	2	0	0
23/12/2022	MW	5	0815	1115	1	2	ENE	0	8	2	2	1	0
23/12/2022	MW	5	0815	1115	2	3	ENE	0	8	2	2	1	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
23/12/2022	MW	5	0815	1115	3	3	ENE	0	8	2	2	0	0
23/12/2022	MW	5	1145	1345	1	3	ENE	0	8	2	2	0	0
23/12/2022	MW	5	1145	1345	2	3	ENE	0	8	2	2	0	0
12/01/2023	JRM	3	0800	1100	1	3	S	3	8	1	1	0	0
12/01/2023	JRM	3	0800	1100	2	3	S	3	8	1	1	0	0
12/01/2023	JRM	3	0800	1100	3	5	SW	2	7	2	2	0	0
12/01/2023	JRM	3	1130	1330	1	6	SW	0	7	2	2	0	0
12/01/2023	JRM	3	1130	1330	2	6	SW	0	6	2	2	0	0
13/01/2023	JRM	4	0830	1130	1	5	WNW	0	7	2	2	0	0
13/01/2023	JRM	4	0830	1130	2	6	WNW	2	5	2	2	0	0
13/01/2023	JRM	4	0830	1130	3	5	WNW	0	6	2	2	0	0
13/01/2023	JRM	4	1200	1400	1	5	WNW	0	6	2	2	0	0
13/01/2023	JRM	4	1200	1400	2	5	WNW	0	3	2	2	0	0
16/01/2023	JRM	7	0930	1230	1	2	W	0	1	2	2	0	1
16/01/2023	JRM	7	0930	1230	2	2	W	0	1	2	2	0	1
16/01/2023	JRM	7	0930	1230	3	3	WNW	0	1	2	2	0	1
16/01/2023	EB	5	0945	1245	1	0	-	0	0	2	2	2	1
16/01/2023	EB	5	0945	1245	2	1	SW	0	0	2	2	2	1
16/01/2023	EB	5	0945	1245	3	1	SW	0	1	2	2	2	1
16/01/2023	JRM	7	1300	1500	1	3	WNW	0	2	2	2	0	1
16/01/2023	JRM	7	1300	1500	2	4	WNW	0	2	2	2	0	1
16/01/2023	EB	5	1315	1515	1	2	SW	0	1	2	2	2	1
16/01/2023	EB	5	1315	1515	2	2	SW	0	2	2	2	2	1
18/01/2023	JRM	6	0830	1130	1	2	NW	0	6	2	2	0	1
18/01/2023	JRM	6	0830	1130	2	2	NW	0	7	2	2	0	1
18/01/2023	JRM	6	0830	1130	3	2	NW	0	4	2	2	0	1
18/01/2023	JRM	6	1200	1400	1	3	NW	0	3	2	2	0	1
18/01/2023	JRM	6	1200	1400	2	2	NW	0	3	2	2	0	1
23/01/2023	EB	1	1000	1300	1	4	SW	0	8	1	1	0	0
23/01/2023	EB	1	1000	1300	2	4	SW	0	8	1	1	0	0
23/01/2023	EB	1	1000	1300	3	4	SW	0	8	1	2	0	0
23/01/2023	TH	2	1000	1300	1	3	S	0	8	1	1	0	0
23/01/2023	TH	2	1000	1300	2	3	S	0	8	1	1	0	0
23/01/2023	TH	2	1000	1300	3	3	S	0	8	1	2	0	0
23/01/2023	EB	1	1330	1530	1	3	SW	0	8	1	1	0	0
23/01/2023	EB	1	1330	1530	2	3	SW	0	8	1	2	0	0
23/01/2023	TH	2	1330	1530	1	3	S	0	8	1	1	0	0
23/01/2023	TH	2	1330	1530	2	3	S	0	8	1	2	0	0
27/01/2023	MW	6	0800	1100	1	3	NW	0	2	2	2	1	0
27/01/2023	MW	6	0800	1100	2	3	NW	0	2	2	2	1	0
27/01/2023	MW	6	0800	1100	3	3	NW	0	3	2	2	1	0
27/01/2023	MW	6	1130	1330	1	3	NW	0	3	2	2	1	0
27/01/2023	MW	6	1130	1330	2	3	NW	0	3	2	2	1	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
15/02/2023	MW	2	0730	1030	1	4	WSW	0	8	2	2	0	0
15/02/2023	MW	2	0730	1030	2	4	WSW	4	8	2	2	0	0
15/02/2023	MW	2	0730	1030	3	5	WSW	4	8	2	2	0	0
15/02/2023	MW	2	1100	1300	1	5	WSW	4	8	2	2	0	0
15/02/2023	MW	2	1100	1300	2	5	WSW	0	8	2	2	0	0
16/02/2023	MW	3	0830	1130	1	2	SW	0	8	2	2	0	0
16/02/2023	MW	3	0830	1130	2	2	SW	0	8	1	1	0	0
16/02/2023	MW	3	0830	1130	3	3	SW	0	8	2	2	0	0
16/02/2023	MW	3	1200	1400	1	3	SW	0	8	2	2	0	0
16/02/2023	MW	3	1200	1400	2	4	WSW	2	8	2	2	0	0
17/02/2023	MW	4	1230	1530	1	6	WNW	0	5	2	2	0	0
17/02/2023	MW	4	1230	1530	2	6	WNW	3	6	2	2	0	0
17/02/2023	MW	4	1230	1530	3	6	WNW	2	6	2	2	0	0
24/02/2023	MW	7	0715	1015	1	3	NW	3	8	2	2	0	0
24/02/2023	MW	7	0715	1015	2	3	NW	0	8	2	2	0	0
24/02/2023	MW	7	0715	1015	3	4	NW	0	8	2	2	0	0
24/02/2023	MW	7	1045	1245	1	4	NW	0	5	2	2	0	0
24/02/2023	MW	7	1045	1245	2	4	NW	0	5	2	2	0	0
27/02/2023	MW	1	0800	1100	1	3	NE	0	8	2	2	0	0
27/02/2023	MW	1	0800	1100	2	4	NE	0	8	2	2	0	0
27/02/2023	MW	1	0800	1100	3	4	NE	0	8	2	2	0	0
27/02/2023	TH	6	0920	1220	1	2	NE	0	8	2	2	0	0
27/02/2023	MW	1	0800	1100	3	4	NE	0	8	2	2	0	0
27/02/2023	TH	6	0920	1220	1	2	NE	0	8	2	2	0	0
27/02/2023	TH	6	0920	1220	2	2	NE	0	8	2	2	0	0
27/02/2023	TH	6	0920	1220	3	2	E	0	6	2	2	0	0
27/02/2023	EB	7	0930	1230	1	3	S	0	8	2	2	0	0
27/02/2023	EB	7	0930	1230	2	3	S	0	8	2	2	0	0
27/02/2023	EB	7	0930	1230	3	4	S	0	8	2	2	0	0
27/02/2023	MW	1	1130	1430	1	4	NE	0	8	2	2	0	0
27/02/2023	MW	1	1130	1430	2	5	NE	0	8	2	2	0	0
27/02/2023	MW	1	1130	1430	3	3	NE	0	8	2	2	0	0
27/02/2023	TH	6	1250	1550	1	2	E	1	7	2	2	0	0
27/02/2023	TH	6	1250	1550	2	2	E	2	8	2	2	0	0
27/02/2023	TH	6	1250	1550	3	3	E	0	8	2	2	0	0
27/02/2023	EB	7	1300	1600	1	3	S	0	8	2	2	0	0
27/02/2023	EB	7	1300	1600	2	4	S	0	8	2	2	0	0
27/02/2023	EB	7	1300	1600	3	3	S	0	8	2	2	0	0
28/02/2023	MW	1	0745	1045	1	3	NNE	1	8	1	1	0	0
28/02/2023	MW	1	0745	1045	2	3	NNE	0	8	2	2	0	0
28/02/2023	MW	1	0745	1045	3	4	NNE	0	8	2	2	0	0
28/02/2023	EB	5	0915	1215	1	3	N	1	8	1	1	0	0
28/02/2023	EB	5	0915	1215	2	3	N	0	8	2	2	0	0
28/02/2023	EB	5	0915	1215	3	4	N	0	8	2	2	0	0
28/02/2023	MW	1	1115	1315	1	4	NNE	1	8	1	1	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
28/02/2023	MW	1	1115	1315	2	5	NNE	0	8	2	2	0	0
28/02/2023	EB	5	1245	1445	1	4	NE	0	8	2	2	0	0
28/02/2023	EB	5	1245	1445	2	4	NE	0	8	2	2	0	0
03/03/2023	TH	2	0930	1230	1	3	NE	0	8	2	2	0	2
03/03/2023	TH	2	0930	1230	2	2	NE	0	8	2	2	0	2
03/03/2023	TH	2	0930	1230	3	2	NE	0	8	2	2	0	2
03/03/2023	TH	2	1300	1600	1	2	NE	0	8	2	2	0	2
03/03/2023	TH	2	1300	1600	2	2	NE	0	8	2	2	0	2
03/03/2023	TH	2	1300	1600	3	3	NE	0	8	2	2	0	2
08/03/2023	HEC	4	0920	1220	1	2	NW	0	1	2	2	1	0
08/03/2023	HEC	4	0920	1220	2	3	NW	0	1	2	2	1	0
08/03/2023	HEC	4	0920	1220	3	3	NW	0	3	2	2	1	0
08/03/2023	TH	5	0920	1220	1	2	E	0	3	2	2	1	0
08/03/2023	TH	5	0920	1220	2	2	E	0	3	2	2	1	0
08/03/2023	TH	5	0920	1220	3	2	E	0	3	2	2	0	0
08/03/2023	HEC	4	1250	1550	1	4	WNW	0	4	2	2	0	0
08/03/2023	HEC	4	1250	1550	2	4	WNW	0	4	2	2	0	0
08/03/2023	HEC	4	1250	1550	3	4	NW	0	5	2	2	0	0
08/03/2023	TH	5	1250	1550	1	3	E	0	4	2	2	0	0
08/03/2023	TH	5	1250	1550	2	1	E	0	4	2	2	0	0
08/03/2023	TH	5	1250	1550	3	1	E	0	5	2	2	0	0
13/03/2023	EB	6	0915	1215	1	4	SSW	1	8	2	2	0	0
13/03/2023	EB	6	0915	1215	2	4	SSW	1	8	1	2	0	0
13/03/2023	EB	6	0915	1215	3	4	SSW	1	8	1	2	0	0
13/03/2023	EB	6	0915	1215	2	4	SSW	1	8	1	2	0	0
13/03/2023	EB	6	0915	1215	3	4	SSW	1	8	1	2	0	0
13/03/2023	HEC	4	0940	1240	1	4	SW	2	8	1	1	0	0
13/03/2023	HEC	4	0940	1240	2	5	SW	2	8	1	1	0	0
13/03/2023	HEC	4	0940	1240	3	5	SW	2	8	1	1	0	0
13/03/2023	EB	6	1245	1545	1	3	SSW	0	8	2	2	0	0
13/03/2023	EB	6	1245	1545	2	4	SSW	0	8	2	2	0	0
13/03/2023	EB	6	1245	1545	3	4	SSW	1	8	1	1	0	0
13/03/2023	HEC	4	1310	1340	1	5	SW	2	8	2	2	0	0
13/03/2023	HEC	7	1405	1505	1	5	SW	2	8	0	1	0	0
15/03/2023	TH	1	0920	0950	1	2	S	0	8	2	2	2	1
15/03/2023	HEC	3	0920	1220	1	2	N	0	8	1	2	1	1
15/03/2023	HEC	3	0920	1220	2	2	N	0	8	1	2	1	1
15/03/2023	HEC	3	0920	1220	3	3	N	0	8	1	2	0	1
15/03/2023	TH	2	1000	1300	1	2	S	0	8	2	2	2	1
15/03/2023	TH	2	1000	1300	2	2	S	0	8	2	2	2	1
15/03/2023	TH	2	1000	1300	3	2	S	0	8	2	2	2	1
15/03/2023	HEC	3	1250	1550	1	3	N	0	8	1	2	0	1
15/03/2023	HEC	3	1250	1550	2	3	NNW	0	8	1	2	0	1
15/03/2023	HEC	3	1250	1550	3	3	NNW	2	8	1	2	0	1
15/03/2023	TH	2	1330	1600	1	2	S	0	8	2	2	2	1

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
15/03/2023	TH	2	1330	1600	2	2	S	2	8	1	2	2	1
15/03/2023	TH	2	1330	1600	3	2	S	2	8	1	2	2	1
16/03/2023	HEC	8	0905	1205	1	5	N	4	8	1	2	0	0
16/03/2023	HEC	8	0905	1205	2	5	N	3	8	1	2	0	0
16/03/2023	HEC	8	0905	1205	3	5	N	2	8	1	2	0	0
16/03/2023	TH	2	0915	1215	1	4	S	4	8	2	2	0	0
16/03/2023	TH	2	0915	1215	2	4	S	2	8	2	2	0	0
16/03/2023	TH	2	0915	1215	3	3	S	2	8	1	2	0	0
16/03/2023	HEC	8	1235	1535	1	5	N	1	8	1	2	0	0
16/03/2023	HEC	8	1235	1535	2	5	N	1	8	1	2	0	0
16/03/2023	HEC	8	1235	1535	3	5	N	1	8	1	1	0	0
16/03/2023	TH	2	1245	1545	1	3	S	1	8	1	2	0	0
16/03/2023	TH	2	1245	1545	2	3	S	1	8	1	2	0	0
16/03/2023	TH	2	1245	1545	3	3	S	2	8	1	2	0	0
17/03/2023	TH	9	0920	1220	1	3	S	1	8	2	2	0	0
17/03/2023	TH	9	0920	1220	2	3	S	0	8	2	2	0	0
17/03/2023	TH	9	0920	1220	3	3	S	2	7	2	2	0	0
17/03/2023	HEC	10	0930	1230	1	3	NE	1	8	1	2	0	0
17/03/2023	HEC	10	0930	1230	2	2	NE	1	8	2	2	0	0
17/03/2023	HEC	10	0930	1230	3	3	NE	2	8	2	2	0	0
17/03/2023	TH	9	1250	1550	1	2	S	1	7	2	2	0	0
17/03/2023	TH	9	1250	1550	2	3	S	1	7	2	2	0	0
17/03/2023	TH	9	1250	1550	3	3	S	1	7	2	2	0	0
17/03/2023	HEC	10	1300	1600	1	3	NNE	2	8	2	2	0	0
17/03/2023	HEC	10	1300	1600	2	3	NNE	0	8	2	2	0	0
17/03/2023	HEC	10	1300	1600	3	3	NNE	2	7	2	2	0	0
04/04/2023	ENS	10	0900	1200	1	3	SW	0	5	2	2	0	0
04/04/2023	ENS	10	0900	1200	2	3	SW	0	5	2	2	0	0
04/04/2023	ENS	10	0900	1200	3	3	SW	0	5	2	2	0	0
04/04/2023	ENS	10	1230	1530	1	3	SW	0	7	2	2	0	0
04/04/2023	ENS	10	1230	1530	2	2	SW	0	7	2	2	0	0
04/04/2023	ENS	10	1230	1530	3	2	SW	0	7	2	2	0	0
14/04/2023	HEC	9	0810	1110	1	3	S	0	2	2	2	0	0
14/04/2023	HEC	9	0810	1110	2	3	S	0	3	2	2	0	0
14/04/2023	HEC	9	0810	1110	3	3	S	0	4	2	2	0	0
14/04/2023	JB	10	0810	1110	1	1	S	0	1	2	2	0	0
14/04/2023	JB	10	0810	1110	2	1	S	0	3	2	2	0	0
14/04/2023	JB	10	0810	1110	3	1	S	0	3	2	2	0	0
20/04/2023	EB	2	0915	1215	1	3	NE	0	0	2	2	0	0
20/04/2023	EB	2	0915	1215	2	3	NE	0	1	2	2	0	0
20/04/2023	EB	2	0915	1215	3	4	NE	0	0	2	2	0	0
20/04/2023	HEC	8	0915	1215	1	3	NE	0	0	2	2	0	0
20/04/2023	HEC	8	0915	1215	2	3	NE	0	1	2	2	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
20/04/2023	HEC	8	0915	1215	3	3	NE	0	1	2	2	0	0
20/04/2023	EB	2	1245	1545	1	4	NE	0	0	2	2	0	0
20/04/2023	EB	2	1245	1545	2	4	NE	0	0	2	2	0	0
20/04/2023	EB	2	1245	1545	3	4	NE	0	0	2	2	0	0
20/04/2023	HEC	8	1245	1545	1	4	NE	0	1	2	2	0	0
20/04/2023	HEC	8	1245	1545	2	4	NE	0	1	2	2	0	0
20/04/2023	HEC	8	1245	1545	3	4	NNE	0	1	2	2	0	0
02/05/2023	HEC	2	0930	1230	1	3	SE	0	8	1	2	0	0
02/05/2023	HEC	2	0930	1230	2	3	S	0	8	1	2	0	0
02/05/2023	HEC	2	0930	1230	3	4	S	0	8	1	2	0	0
02/05/2023	HEC	2	1300	1600	1	4	S	0	7	1	2	0	0
02/05/2023	HEC	2	1300	1600	2	4	S	0	6	2	2	0	0
02/05/2023	HEC	2	1300	1600	3	4	S	0	7	2	2	0	0
03/05/2023	HEC	8	0900	1200	1	2	SE	0	8	2	2	0	0
03/05/2023	HEC	8	0900	1200	2	2	SE	0	8	2	2	0	0
03/05/2023	HEC	8	0900	1200	3	3	S	0	7	2	2	0	0
03/05/2023	HEC	8	1230	1530	1	2	S	0	8	2	2	0	0
03/05/2023	HEC	8	1230	1530	2	2	S	0	8	2	2	0	0
03/05/2023	HEC	8	1230	1530	3	3	S	0	7	2	2	0	0
04/05/2023	HEC	9	0935	1235	1	4	E	0	6	2	2	0	0
04/05/2023	HEC	9	0935	1235	2	4	E	0	6	2	2	0	0
04/05/2023	HEC	9	0935	1235	3	4	E	0	5	2	2	0	0
04/05/2023	HEC	9	1305	1605	1	5	E	0	4	2	2	0	0
04/05/2023	HEC	9	1305	1605	2	5	SE	0	4	2	2	0	0
04/05/2023	HEC	9	1305	1605	1	5	E	0	4	2	2	0	0
04/05/2023	HEC	9	1305	1605	2	5	SE	0	4	2	2	0	0
04/05/2023	HEC	9	1305	1605	3	5	E	0	5	2	2	0	0
05/05/2023	JB	9	0730	1030	1	0	NE	1	7	2	2	0	0
05/05/2023	JB	9	0730	1030	2	2	NE	0	5	2	2	0	0
05/05/2023	JB	9	0730	1030	3	2	NE	0	6	2	2	0	0
05/05/2023	TH	10	0730	1030	1	2	E	1	7	2	2	0	0
05/05/2023	TH	10	0730	1030	2	2	E	0	8	2	2	0	0
05/05/2023	TH	10	0730	1030	3	2	E	0	8	2	2	0	0
08/06/2023	HEC	2	0750	1050	1	4	E	0	8	2	2	0	0
08/06/2023	HEC	2	0750	1050	2	4	E	0	7	2	2	0	0
08/06/2023	HEC	2	0750	1050	3	4	E	0	5	2	2	0	0
08/06/2023	JR	8	0750	1050	1	3	ENE	0	8	2	2	0	0
08/06/2023	JR	8	0750	1050	2	3	ENE	0	7	2	2	0	0
08/06/2023	JR	8	0750	1050	3	3	E	0	4	2	2	0	0
08/06/2023	HEC	2	1120	1420	1	4	E	0	3	2	2	0	0
08/06/2023	HEC	2	1120	1420	2	4	E	0	3	2	2	0	0
08/06/2023	HEC	2	1120	1420	3	4	E	0	2	2	2	0	0
08/06/2023	JR	8	1120	1420	1	3	E	0	3	2	2	0	0
08/06/2023	JR	8	1120	1420	2	3	ESE	0	3	2	2	0	0
08/06/2023	JR	8	1120	1420	3	3	ESE	0	3	2	2	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
26/07/2023	TH	9	0915	1215	1	3	SW	0	6	2	2	0	0
26/07/2023	TH	9	0915	1215	2	2	SW	0	7	2	2	0	0
26/07/2023	TH	9	0915	1215	3	2	SW	1	8	2	2	0	0
26/07/2023	TH	9	1245	1545	1	3	S	1	8	2	2	0	0
26/07/2023	TH	9	1245	1545	2	4	S	0	8	2	2	0	0
26/07/2023	TH	9	1245	1545	3	4	S	0	8	2	2	0	0
31/07/2023	MW	10	0700	1000	1	3	SW	4	8	2	2	0	0
31/07/2023	MW	10	0700	1000	2	3	SW	3	8	2	2	0	0
31/07/2023	MW	10	0700	1000	3	3	SW	0	8	2	2	0	0
31/07/2023	HEC	2	0830	1130	1	3	SSW	1	8	1	1	0	0
31/07/2023	HEC	2	0830	1130	2	3	SSW	1	8	1	1	0	0
31/07/2023	HEC	2	0830	1130	3	3	SSW	1	8	1	1	0	0
31/07/2023	JR	8	0830	1130	1	2	S	1	8	1	1	0	0
31/07/2023	JR	8	0830	1130	2	2	SW	1	8	1	1	0	0
31/07/2023	JR	8	0830	1130	3	3	SW	1	8	1	1	0	0
31/07/2023	MW	10	1030	1330	1	3	SW	3	8	2	2	0	0
31/07/2023	MW	10	1030	1330	2	3	SW	0	8	2	2	0	0
31/07/2023	MW	10	1030	1330	3	3	SW	3	8	2	2	0	0
31/07/2023	HEC	2	1200	1500	1	4	SSW	1	8	1	1	0	0
31/07/2023	HEC	2	1200	1500	2	4	SSW	1	8	1	1	0	0
31/07/2023	HEC	2	1200	1500	3	4	SSW	1	8	1	1	0	0
31/07/2023	JR	8	1200	1500	1	3	WSW	1	8	1	1	0	0
31/07/2023	JR	8	1200	1500	2	3	WSW	2	8	1	2	0	0
31/07/2023	JR	8	1200	1500	3	3	WSW	1	8	1	1	0	0
02/08/2023	HEC	9	0920	1220	1	4	NE	2	8	1	2	0	0
02/08/2023	HEC	9	0920	1220	2	5	NE	4	8	1	1	0	0
02/08/2023	HEC	9	0920	1220	3	5	NE	3	8	1	1	0	0
02/08/2023	TH	10	0920	1220	1	2	NE	2	8	2	2	0	0
02/08/2023	TH	10	0920	1220	2	3	NE	3	8	2	2	0	0
02/08/2023	TH	10	0920	1220	3	3	NE	3	8	2	2	0	0
02/08/2023	HEC	9	1250	1550	1	5	NE	3	8	1	2	0	0
02/08/2023	HEC	9	1250	1550	2	6	ENE	2	8	1	2	0	0
02/08/2023	HEC	9	1250	1550	3	6	ENE	3	8	1	1	0	0
02/08/2023	TH	10	1250	1550	1	3	NE	3	8	2	2	0	0
02/08/2023	TH	10	1250	1550	2	3	NE	3	8	2	2	0	0
02/08/2023	TH	10	1250	1550	3	3	NE	2	8	2	2	0	0
03/08/2023	HEC	8	0925	1225	1	3	NW	0	6	2	2	0	0
03/08/2023	HEC	8	0925	1225	2	4	NW	0	7	2	2	0	0
03/08/2023	HEC	8	0925	1225	3	4	NW	0	8	2	2	0	0
03/08/2023	TH	2	0930	1230	1	2	NW	0	5	2	2	0	0
03/08/2023	TH	2	0930	1230	2	2	NW	0	5	2	2	0	0
03/08/2023	TH	2	0930	1230	3	2	NW	0	8	2	2	0	0
03/08/2023	HEC	8	1255	1555	1	3	NW	0	7	2	2	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
03/08/2023	HEC	8	1255	1555	2	3	NW	0	8	2	2	0	0
03/08/2023	HEC	8	1255	1555	3	4	NW	0	8	2	2	0	0
03/08/2023	TH	2	1300	1600	1	3	NW	0	8	2	2	0	0
03/08/2023	TH	2	1300	1600	2	3	NW	0	7	2	2	0	0
03/08/2023	TH	2	1300	1600	3	3	NW	0	7	2	2	0	0
11/08/2023	JRM	10	0700	1000	1	3	SW	0	5	2	2	0	0
11/08/2023	JRM	10	0700	1000	2	3	SW	0	4	2	2	0	0
11/08/2023	JRM	10	0700	1000	3	4	SW	0	4	2	2	0	0
11/08/2023	JRM	10	1030	1330	1	4	SW	0	3	2	2	0	0
11/08/2023	JRM	10	1030	1330	2	3	SW	0	6	2	2	0	0
11/08/2023	JRM	10	1030	1330	3	3	SW	0	5	2	2	0	0
16/08/2023	MW	9	0630	0930	1	2	SSW	0	8	2	2	0	0
16/08/2023	MW	9	0630	0930	2	3	SSW	0	6	2	2	0	0
16/08/2023	MW	9	0630	0930	3	3	SSW	0	8	2	2	0	0
16/08/2023	MW	9	1000	1300	1	4	SSW	0	8	2	2	0	0
16/08/2023	MW	9	1000	1300	2	2	SSW	0	8	2	2	0	0
16/08/2023	MW	9	1000	1300	3	2	SSW	0	8	2	2	0	0

C.2 Breeding Wader Survey.

A breeding wader survey was undertaken during the 2023 breeding season. **Table C-4** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-4 Meteorological Conditions during Breeding Wader Survey Visits at M74 West Renewable Energy Park (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
04/04/2023	1	EB	0930	1500	1	4	S	0	8	2	2	0	0
04/04/2023	1	HEC	0930	1430	1	3	S	0	7	2	2	0	0
04/04/2023	1	TH	0930	1445	1	3	S	0	4	2	2	0	0
04/04/2023	1	EB	0930	1500	2	4	S	0	8	2	2	0	0
04/04/2023	1	HEC	0930	1430	2	4	SSW	0	8	2	2	0	0
04/04/2023	1	TH	0930	1445	2	3	S	0	5	2	2	0	0
04/04/2023	1	EB	0930	1500	3	4	S	0	8	2	2	0	0
04/04/2023	1	HEC	0930	1430	3	4	SSW	0	8	2	2	0	0
04/04/2023	1	TH	0930	1445	3	4	S	0	5	2	2	0	0
04/04/2023	1	EB	0930	1500	4	4	S	0	8	2	2	0	0
04/04/2023	1	HEC	0930	1430	4	4	S	0	8	2	2	0	0
04/04/2023	1	TH	0930	1445	4	3	S	0	5	2	2	0	0
04/04/2023	1	EB	0930	1500	5	3	S	0	8	2	2	0	0
04/04/2023	1	HEC	0930	1430	5	3	S	0	8	2	2	0	0
04/04/2023	1	TH	0930	1445	5	3	S	0	4	2	2	0	0
04/04/2023	1	EB	0930	1500	6	4	S	0	8	2	2	0	0
04/04/2023	1	TH	0930	1445	6	3	S	0	4	2	2	0	0
05/04/2023	1	HEC	0900	1300	1	4	SSE	2	8	1	2	0	0
05/04/2023	1	EB	0900	1315	1	3	S	0	8	2	2	0	0
05/04/2023	1	HEC	0900	1300	2	3	SSE	0	8	1	2	0	0
05/04/2023	1	EB	0900	1315	2	4	S	0	8	2	2	0	0
05/04/2023	1	HEC	0900	1300	3	4	S	2	8	1	2	0	0
05/04/2023	1	EB	0900	1315	3	4	SSW	0	8	2	2	0	0
05/04/2023	1	HEC	0900	1300	4	3	S	0	8	1	2	0	0
05/04/2023	1	EB	0900	1315	4	4	SSW	1	8	2	2	0	0
05/04/2023	1	EB	0900	1315	5	4	S	0	8	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
29/05/2023	2	HEC	0845	1400	1	2	SW	0	2	2	2	0	0
29/05/2023	2	TH	0845	1345	1	1	W	0	2	2	2	0	0
29/05/2023	2	HEC	0845	1400	2	2	SW	0	3	2	2	0	0
29/05/2023	2	TH	0845	1345	2	2	W	0	3	2	2	0	0
29/05/2023	2	HEC	0845	1400	3	2	W	0	4	2	2	0	0
29/05/2023	2	TH	0845	1345	3	2	W	0	3	2	2	0	0
29/05/2023	2	HEC	0845	1400	4	2	NW	0	4	2	2	0	0
29/05/2023	2	TH	0845	1345	4	2	NW	0	4	2	2	0	0
29/05/2023	2	HEC	0845	1400	5	3	NW	0	3	2	2	0	0
29/05/2023	2	TH	0845	1345	5	2	NW	0	4	2	2	0	0
29/05/2023	2	HEC	0845	1400	6	3	NW	0	3	2	2	0	0
30/05/2023	2	TH	0930	1445	1	2	W	0	0	2	2	0	0
30/05/2023	2	TH	0930	1445	2	2	W	0	1	2	2	0	0
30/05/2023	2	TH	0930	1445	3	1	W	0	0	2	2	0	0
30/05/2023	2	TH	0930	1445	4	1	NW	0	1	2	2	0	0
30/05/2023	2	TH	0930	1445	5	2	NW	0	1	2	2	0	0
30/05/2023	2	TH	0930	1445	6	2	NW	0	1	2	2	0	0
31/05/2023	2	TH	1000	1545	1	2	NE	0	2	2	2	0	0
31/05/2023	2	TH	1000	1545	2	2	NE	0	1	2	2	0	0
31/05/2023	2	TH	1000	1545	3	1	Variable	0	1	2	2	0	0
31/05/2023	2	TH	1000	1545	4	1	Variable	0	1	2	2	0	0
31/05/2023	2	TH	1000	1545	5	2	Variable	0	2	2	2	0	0
31/05/2023	2	TH	1000	1545	6	2	Variable	0	2	2	2	0	0
06/06/2023	3	EB	0900	1500	1	2	ESE	0	8	2	2	0	0
06/06/2023	3	HEC	0900	1500	1	2	S	0	8	1	2	0	0
06/06/2023	3	EB	0900	1500	2	2	ESE	0	7	2	2	0	0
06/06/2023	3	HEC	0900	1500	2	3	SSE	0	7	2	2	0	0
06/06/2023	3	EB	0900	1500	3	3	ESE	0	4	2	2	0	0
06/06/2023	3	HEC	0900	1500	3	4	SSW	0	7	2	2	0	0
06/06/2023	3	EB	0900	1500	4	3	ESE	0	3	2	2	0	0
06/06/2023	3	HEC	0900	1500	4	4	S	0	4	2	2	0	0
06/06/2023	3	EB	0900	1500	5	3	ESE	0	2	2	2	0	0
06/06/2023	3	HEC	0900	1500	5	4	ESE	0	5	2	2	0	0
06/06/2023	3	EB	0900	1500	6	3	ESE	0	2	2	2	0	0
06/06/2023	3	HEC	0900	1500	6	4	ENE	0	3	2	2	0	0
07/06/2023	3	EB	0850	1450	1	3	ENE	0	7	2	2	0	0
07/06/2023	3	EB	0850	1450	2	4	ENE	0	5	2	2	0	0
07/06/2023	3	EB	0850	1450	3	3	ENE	0	4	2	2	0	0
07/06/2023	3	EB	0850	1450	4	3	ENE	0	3	2	2	0	0
07/06/2023	3	EB	0850	1450	5	3	ENE	0	3	2	2	0	0
07/06/2023	3	EB	0850	1450	6	5	ENE	0	2	2	2	0	0
07/06/2023	3	HEC	0900	1500	1	3	NNE	0	7	1	2	0	0
07/06/2023	3	HEC	0900	1500	2	4	NE	0	7	2	2	0	0
07/06/2023	3	HEC	0900	1500	3	4	E	0	5	2	2	0	0
07/06/2023	3	HEC	0900	1500	4	4	E	0	6	2	2	0	0
07/06/2023	3	HEC	0900	1500	5	4	E	0	5	2	2	0	0
07/06/2023	3	HEC	0900	1500	6	4	E	0	3	2	2	0	0
26/07/2023	4	EB	0910	1510	1	3	W	0	7	2	2	0	0
26/07/2023	4	EB	0910	1510	2	4	W	0	7	2	2	0	0
26/07/2023	4	EB	0910	1510	3	3	W	0	8	2	2	0	0
26/07/2023	4	EB	0910	1510	4	3	W	0	8	2	2	0	0
26/07/2023	4	EB	0910	1510	5	3	W	0	7	2	2	0	0
26/07/2023	4	EB	0910	1510	6	4	W	0	8	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
28/07/2023	4	EB	0900	1400	1	3	SSW	0	8	2	2	0	0
28/07/2023	4	HEC	0900	1400	1	3	S	0	7	1	2	0	0
28/07/2023	4	JRM	0900	1400	1	3	SW	0	8	2	2	0	0
28/07/2023	4	EB	0900	1400	2	3	SSW	0	8	2	2	0	0
28/07/2023	4	HEC	0900	1400	2	3	SSW	0	8	2	2	0	0
28/07/2023	4	JRM	0900	1400	2	3	SW	0	8	2	2	0	0
28/07/2023	4	EB	0900	1400	3	3	S	0	7	2	2	0	0
28/07/2023	4	HEC	0900	1400	3	4	S	0	6	2	2	0	0
28/07/2023	4	JRM	0900	1400	3	3	SSW	1	8	2	2	0	0
28/07/2023	4	EB	0900	1400	4	3	SSW	0	8	2	2	0	0
28/07/2023	4	HEC	0900	1400	4	4	S	0	7	2	2	0	0
28/07/2023	4	JRM	0900	1400	4	3	SSW	0	7	2	2	0	0
28/07/2023	4	EB	0900	1400	5	3	SSW	0	7	2	2	0	0
28/07/2023	4	HEC	0900	1400	5	4	SSW	0	7	2	2	0	0
28/07/2023	4	JRM	0900	1400	5	3	SSW	0	7	2	2	0	0

C.3 Winter Walkover Surveys

Winter walkover surveys were undertaken during the 2022/2023 non-breeding season. **Table C-5** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-5 Meteorological Conditions During Winter Walkover Surveys at M74 West Renewable Energy Park (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
24/11/2022	1	JR	0750	1320	1	3	S	0	3	2	2	0	0
24/11/2022	1	JR	0750	1320	2	3	S	0	6	2	2	0	0
24/11/2022	1	JR	0750	1320	3	4	S	0	7	2	2	0	0
24/11/2022	1	JR	0750	1320	4	4	S	0	8	2	2	0	0
24/11/2022	1	JR	0750	1320	5	4	S	2	8	2	1	0	0
24/11/2022	1	JR	0750	1320	6	4	S	4	8	2	1	0	0
24/11/2022	1	TH	0800	1400	1	4	S	4	8	1	1	0	0
24/11/2022	1	TH	0800	1400	2	3	S	0	6	2	2	0	0
24/11/2022	1	TH	0800	1400	3	4	S	1	6	2	2	0	0
24/11/2022	1	TH	0800	1400	4	5	S	0	8	2	2	0	0
24/11/2022	1	TH	0800	1400	5	5	S	3	8	1	1	0	0
24/11/2022	1	TH	0800	1400	6	5	S	0	6	2	2	0	0
17/01/2023	2	JRM	0900	1400	1	2	W	0	3	2	2	0	1
17/01/2023	2	EB	0900	1400	1	2	SSW	0	5	2	2	2	1
17/01/2023	2	JRM	0900	1400	2	2	W	0	3	2	2	0	1
17/01/2023	2	EB	0900	1400	2	3	SW	0	4	2	2	2	1
17/01/2023	2	JRM	0900	1400	3	2	W	0	1	2	2	0	1
17/01/2023	2	EB	0900	1400	3	3	SW	0	3	2	2	2	1
17/01/2023	2	JRM	0900	1400	4	3	W	0	4	2	2	0	1
17/01/2023	2	EB	0900	1400	4	4	SSW	0	2	2	2	2	1
17/01/2023	2	JRM	0900	1400	5	3	W	0	4	2	2	0	1
17/01/2023	2	EB	0900	1400	5	3	SW	0	4	2	2	2	1
06/02/2023	3	EB	0900	1400	1	4	S	0	8	2	2	0	0
06/02/2023	3	TH	0900	1400	1	4	S	0	8	2	2	0	0
06/02/2023	3	EB	0900	1400	2	4	S	0	7	2	2	0	0
06/02/2023	3	TH	0900	1400	2	4	S	0	6	2	2	0	0
06/02/2023	3	EB	0900	1400	3	4	S	0	7	2	2	0	0
06/02/2023	3	TH	0900	1400	3	4	S	0	6	2	2	0	0
06/02/2023	3	EB	0900	1400	4	3	S	0	8	2	2	0	0
06/02/2023	3	TH	0900	1400	4	3	S	0	7	2	2	0	0
06/02/2023	3	EB	0900	1400	5	3	S	0	8	2	2	0	0
06/02/2023	3	TH	0900	1400	5	3	S	0	8	2	2	0	0

C.4 Scarce Breeding Bird Surveys

Scarce breeding bird surveys were undertaken during the 2023 breeding season. **Table C-6** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-6 Meteorological Conditions during Scarce Breeding Bird Surveys at M74 West Renewable Energy Park (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
20/03/2023	1	JRM	0715	1315	1	2	SW	0	8	0	2	0	0
20/03/2023	1	JRM	0715	1315	2	2	SW	2	8	0	1	0	0
20/03/2023	1	JRM	0715	1315	3	2	SSW	2	8	0	1	0	0
20/03/2023	1	JRM	0715	1315	4	2	S	3	8	0	1	0	0
20/03/2023	1	JRM	0715	1315	5	2	S	3	8	0	1	0	0
20/03/2023	1	JRM	0715	1315	6	2	S	3	8	0	1	0	0
21/03/2023	1	JRM	0700	1300	1	2	S	1	8	1	1	0	0
21/03/2023	1	JRM	0700	1300	2	2	S	2	8	2	1	0	0
21/03/2023	1	JRM	0700	1300	3	3	S	2	8	2	2	0	0
21/03/2023	1	JRM	0700	1300	4	3	SSW	3	7	0	0	0	0
21/03/2023	1	JRM	0700	1300	5	4	SW	1	7	1	0	0	0
21/03/2023	1	JRM	0700	1300	6	4	SW	3	8	2	1	0	0
05/04/2023	2	JRM	0700	1300	1	4	S	2	8	2	2	0	0
05/04/2023	2	JRM	0700	1300	2	4	S	0	7	2	2	0	0
05/04/2023	2	JRM	0700	1300	3	3	S	2	8	2	2	0	0
05/04/2023	2	JRM	0700	1300	4	3	S	0	8	1	2	0	0
05/04/2023	2	JRM	0700	1300	5	4	S	3	8	1	2	0	0
05/04/2023	2	JRM	0700	1300	6	4	S	3	8	1	2	0	0
06/04/2023	2	JRM	0700	1300	1	3	WNW	0	7	2	2	0	0
06/04/2023	2	JRM	0700	1300	2	3	WNW	0	7	2	2	0	0
06/04/2023	2	JRM	0700	1300	3	4	WNW	0	6	2	2	0	0
06/04/2023	2	JRM	0700	1300	4	4	WNW	0	6	2	2	0	0
06/04/2023	2	JRM	0700	1300	5	5	WNW	0	5	2	2	0	0
06/04/2023	2	JRM	0700	1300	6	5	WNW	0	4	2	2	0	0
07/04/2023	2	JRM	0800	1400	1	1	NE	0	0	2	2	1	0
07/04/2023	2	JRM	0800	1400	2	1	ESE	0	0	2	2	0	0
07/04/2023	2	JRM	0800	1400	3	2	SE	0	1	2	2	0	0
07/04/2023	2	JRM	0800	1400	4	2	SE	0	2	2	2	0	0
07/04/2023	2	JRM	0800	1400	5	2	SE	0	3	2	2	0	0
07/04/2023	2	JRM	0800	1400	6	2	SE	0	4	2	2	0	0
10/04/2023	2	JRM	0700	1300	1	4	SW	4	7	2	2	0	0
10/04/2023	2	JRM	0700	1300	2	4	SW	0	4	2	2	0	0
10/04/2023	2	JRM	0700	1300	3	4	SW	0	4	2	2	0	0
10/04/2023	2	JRM	0700	1300	4	4	SW	0	3	2	2	0	0
10/04/2023	2	JRM	0700	1300	5	4	SW	0	3	2	2	0	0
10/04/2023	2	JRM	0700	1300	6	4	SW	0	5	2	2	0	0
01/05/2023	3	JRM	0710	1310	1	3	W	0	8	1	2	0	0
01/05/2023	3	JRM	0710	1310	2	3	WNW	1	8	1	2	0	0
01/05/2023	3	JRM	0710	1310	3	2	WNW	2	8	2	2	0	0
01/05/2023	3	JRM	0710	1310	4	2	WNW	2	8	2	2	0	0
01/05/2023	3	JRM	0710	1310	5	2	WNW	0	7	2	2	0	0
01/05/2023	3	JRM	0710	1310	6	3	W	0	7	2	2	0	0
02/05/2023	3	JRM	0810	1410	1	2	SSE	0	8	2	2	0	0
02/05/2023	3	JRM	0810	1410	2	2	SSE	0	8	2	2	0	0
02/05/2023	3	JRM	0810	1410	3	3	SSE	0	8	2	2	0	0
02/05/2023	3	JRM	0810	1410	4	3	SSE	0	8	2	2	0	0
02/05/2023	3	JRM	0810	1410	5	3	S	0	7	2	2	0	0
02/05/2023	3	JRM	0810	1410	6	3	S	0	7	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
03/05/2023	3	JRM	0815	1415	1	2	E	0	8	2	2	0	0
03/05/2023	3	JRM	0815	1415	2	2	ESE	0	8	2	2	0	0
03/05/2023	3	JRM	0815	1415	3	2	SSE	0	8	2	2	0	0
03/05/2023	3	JRM	0815	1415	4	3	SSE	0	8	2	2	0	0
03/05/2023	3	JRM	0815	1415	5	3	SSE	0	8	2	2	0	0
03/05/2023	3	JRM	0815	1415	6	3	SSE	0	8	2	2	0	0
04/05/2023	3	JRM	0730	1330	1	3	E	0	6	2	2	0	0
04/05/2023	3	JRM	0730	1330	2	4	ESE	0	6	2	2	0	0
04/05/2023	3	JRM	0730	1330	3	4	ESE	0	6	2	2	0	0
04/05/2023	3	JRM	0730	1330	4	4	ESE	0	5	2	2	0	0
04/05/2023	3	JRM	0730	1330	5	5	E	0	5	2	2	0	0
04/05/2023	3	JRM	0730	1330	6	5	E	0	4	2	2	0	0
12/06/2023	4	JRM	0715	1315	1	1	NNE	0	6	2	2	0	0
12/06/2023	4	JRM	0715	1315	2	1	NNE	0	6	2	2	0	0
12/06/2023	4	JRM	0715	1315	3	1	NNE	0	6	2	2	0	0
12/06/2023	4	JRM	0715	1315	4	1	NNE	0	6	2	2	0	0
12/06/2023	4	JRM	0715	1315	5	1	N	0	5	2	2	0	0
12/06/2023	4	JRM	0715	1315	6	1	N	0	5	2	2	0	0
13/06/2023	4	JRM	0530	1130	1	1	Variable	0	2	2	2	0	0
13/06/2023	4	JRM	0530	1130	2	1	Variable	0	2	2	2	0	0
13/06/2023	4	JRM	0530	1130	3	1	Variable	0	1	2	2	0	0
13/06/2023	4	JRM	0530	1130	4	1	Variable	0	1	2	2	0	0
13/06/2023	4	JRM	0530	1130	5	1	Variable	0	2	2	2	0	0
13/06/2023	4	JRM	0530	1130	6	1	Variable	0	2	2	2	0	0
14/06/2023	4	JRM	0400	1000	1	1	S	0	3	2	2	0	0
14/06/2023	4	JRM	0400	1000	2	1	S	0	2	2	2	0	0
14/06/2023	4	JRM	0400	1000	3	1	SSE	0	1	2	2	0	0
14/06/2023	4	JRM	0400	1000	4	1	SE	0	2	2	2	0	0
14/06/2023	4	JRM	0400	1000	5	2	SE	0	2	2	2	0	0
14/06/2023	4	JRM	0400	1000	6	2	ESE	0	2	2	2	0	0
19/07/2023	5	JR	0730	1330	1	2	NW	0	5	2	2	0	0
19/07/2023	5	JR	0730	1330	2	2	NW	0	4	2	2	0	0
19/07/2023	5	JR	0730	1330	3	2	NW	0	4	2	2	0	0
19/07/2023	5	JR	0730	1330	4	2	NW	0	4	2	2	0	0
19/07/2023	5	JR	0730	1330	5	2	NW	3	5	2	2	0	0
19/07/2023	5	JR	0730	1330	6	1	WNW	0	6	2	2	0	0
20/07/2023	5	JR	0720	1320	1	1	NW	1	2	2	2	0	0
20/07/2023	5	JR	0720	1320	2	1	NW	0	4	2	2	0	0
20/07/2023	5	JR	0720	1320	3	2	NW	0	5	2	2	0	0
20/07/2023	5	JR	0720	1320	4	2	NW	0	4	2	2	0	0
20/07/2023	5	JR	0720	1320	5	2	NW	0	6	2	2	0	0
20/07/2023	5	JR	0720	1320	6	2	NW	0	6	2	2	0	0
07/08/2023	6	JRM	0830	1430	1	3	WNW	0	7	2	2	0	0
07/08/2023	6	JRM	0830	1430	2	3	W	0	7	2	2	0	0
07/08/2023	6	JRM	0830	1430	3	3	W	0	6	2	2	0	0
07/08/2023	6	JRM	0830	1430	4	4	W	0	7	2	2	0	0
07/08/2023	6	JRM	0830	1430	5	4	W	3	7	2	2	0	0
07/08/2023	6	JRM	0830	1430	6	4	W	3	7	2	2	0	0

C.5 Black Grouse Surveys

Black grouse surveys were undertaken during the 2023 breeding season. **Table C-7** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-7 Meteorological Conditions during Black Grouse Surveys at M74 West Renewable Energy Park (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
14/04/2023	1	HEC	0510	0810	1	2	S	0	1	2	2	1	0
14/04/2023	1	JB	0510	0810	1	2	S	0	1	2	2	1	0
14/04/2023	1	HEC	0510	0810	2	1	S	0	1	2	2	1	0
14/04/2023	1	JB	0510	0810	2	1	S	0	0	2	2	1	0
14/04/2023	1	HEC	0510	0810	3	2	S	0	1	2	2	1	0
14/04/2023	1	JB	0510	0810	3	1	S	0	1	2	2	1	0
05/05/2023	2	JB	0430	0730	1	5	NE	1	8	1	1	0	0
05/05/2023	2	TH	0430	0730	1	5	E	1	8	1	1	0	0
05/05/2023	2	JB	0430	0730	2	3	NE	0	7	2	2	0	0
05/05/2023	2	TH	0430	0730	2	3	E	1	8	2	2	0	0
05/05/2023	2	JB	0430	0730	3	2	NE	0	8	2	2	0	0
05/05/2023	2	TH	0430	0730	3	3	E	1	8	2	2	0	0

ANNEX D. ORNITHOLOGICAL SURVEY RESULTS

D.1 Flight Activity Records: Target Species

In accordance with NatureScot guidance (2017), target species are those which may be considered to be at risk from the potential effects of wind farms. All flights of target species within the turbine area and the surrounding area were mapped and are detailed in **Table D-1.**

Table D-1 Details of Target Species Recorded during Flight Activity Surveys (sorted chronologically)

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20 m	21-40 m	41-100 m	101-150 m	151-200 m	>201 m	0-20 m	21-40 m	41-100 m	101-150 m	151-200 m	>201 m
20/9/2022	1	JRM	1039	Pink-footed goose	42	180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	180.000	0.000	0.000
20/9/2022	1	JRM	1345	Red kite	1	720	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	150.000	510.000	60.000	0.000
20/9/2022	2	TH	1042	Pink-footed goose	42	120	0.000	0.000	0.000	51.192	0.000	0.000	0.000	0.000	0.000	68.808	0.000	0.000
20/9/2022	2	TH	1301	Red kite	1	180	0.000	23.523	11.761	17.642	17.642	0.000	0.000	36.477	18.239	27.358	27.358	0.000
21/9/2022	4	TH	1054	Pink-footed goose	50	150	0.000	0.000	0.000	0.000	64.083	0.000	0.000	0.000	0.000	0.000	85.917	0.000
23/9/2022	7	JRM	0935	Osprey	1	45	0.000	0.000	0.000	0.000	0.000	0.000	15.000	15.000	15.000	0.000	0.000	0.000
23/9/2022	7	JRM	0940	Osprey	1	100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	70.000	0.000	0.000	0.000
23/9/2022	7	JRM	1013	Red kite	1	160	0.000	0.000	0.000	0.000	0.000	0.000	45.000	60.000	55.000	0.000	0.000	0.000
23/9/2022	7	JRM	1014	Golden plover	2	10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.000	0.000	0.000
23/9/2022	7	JRM	1250	Red kite	1	330	0.000	0.000	0.000	0.000	0.000	0.000	15.000	60.000	135.000	120.000	0.000	0.000
23/9/2022	7	JRM	1259	Pink-footed goose	30	120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	120.000	0.000
12/10/2022	5	TH	1234	Red kite	1	165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	75.000	90.000	0.000	0.000
12/10/2022	5	TH	1410	Red kite	1	75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	75.000	0.000	0.000	0.000	0.000
12/10/2022	5	TH	1428	Red kite	1	150	0.000	23.972	11.986	23.972	0.000	0.000	0.000	36.028	18.014	36.028	0.000	0.000
14/10/2022	1	JRM	0955	Golden plover	50	120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	75.000	45.000	0.000	0.000	0.000
14/10/2022	1	JRM	1000	Golden plover	40	180	0.000	0.000	0.000	0.000	0.000	0.000	30.000	90.000	60.000	0.000	0.000	0.000
14/10/2022	1	JRM	1047	Golden plover	15	30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	0.000	0.000	0.000	0.000
14/10/2022	1	JRM	1055	Red kite	1	360	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	360.000	0.000	0.000	0.000
14/10/2022	1	JRM	1110	Golden plover	60	300	0.000	0.000	0.000	0.000	0.000	0.000	75.000	195.000	30.000	0.000	0.000	0.000
14/10/2022	1	JRM	1156	Merlin	1	21	21.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14/10/2022	2	TH	0952	Greylag goose	1	40	24.833	0.000	0.000	0.000	0.000	0.000	15.167	0.000	0.000	0.000	0.000	0.000
7/11/2022	4	TH	1319	Red kite	1	212	0.000	76.754	134.569	0.000	0.000	0.000	0.000	0.246	0.431	0.000	0.000	0.000
23/11/2022	2	JR	1111	Herring gull	1	32	0.000	30.792	0.000	0.000	0.000	0.000	0.000	1.208	0.000	0.000	0.000	0.000
23/11/2022	2	JR	1139	Golden plover	7	12	0.000	12.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23/11/2022	2	JR	1451	Merlin	1	27	27.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5/12/2022	7	EB	1042	Greylag goose	3	45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	45.000
5/12/2022	7	EB	1113	Greylag goose	3	70	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.000
5/12/2022	7	EB	1322	Herring gull	25	65	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	50.000	15.000	0.000	0.000
5/12/2022	7	EB	1339	Greylag goose	7	65	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	45.000	20.000
5/12/2022	7	EB	1344	Herring gull	9	20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	20.000	0.000	0.000	0.000
5/12/2022	7	EB	1412	Herring gull	19	40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	10.000
20/12/2022	3	MW	1117	Red kite	1	35	18.146	0.000	0.000	0.000	0.000	0.000	16.854	0.000	0.000	0.000	0.000	0.000
12/1/2023	3	JRM	1140	Red kite	1	190	52.135	89.374	0.000	0.000	0.000	0.000	17.865	30.626	0.000	0.000	0.000	0.000
16/1/2023	5	EB	0951	Pink-footed goose	25	95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	95.000
16/1/2023	5	EB	1009	Herring gull	20	75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	45.000	0.000	0.000
16/1/2023	5	EB	1107	Herring gull	8	42	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	42.000	0.000	0.000	0.000
16/1/2023	5	EB	1242	Lapwing	8	155	0.000	0.000	0.000	0.000	0.000	0.000	50.000	60.000	45.000	0.000	0.000	0.000
16/1/2023	5	EB	1322	Lapwing	5	67	0.000	0.000	0.000	0.000	0.000	0.000	7.000	60.000	0.000	0.000	0.000	0.000
16/1/2023	7	JRM	1357	Red kite	1	45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.000	30.000	0.000	0.000	0.000
27/2/2023	6	TH	0952	Red kite	1	270	0.000	0.000	0.000	0.000	0.000	0.000	105.000	75.000	75.000	15.000	0.000	0.000
27/2/2023	6	TH	1327	Red kite	1	225	0.000	0.000	0.000	0.000	0.000	0.000	60.000	30.000	105.000	30.000	0.000	0.000
27/2/2023	7	EB	1021	Herring gull	3	135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	75.000	30.000	0.000

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20 m	21-40 m	41-100 m	101-150 m	151-200 m	>201 m	0-20 m	21-40 m	41-100 m	101-150 m	151-200 m	>201 m
27/2/2023	7	EB	1116	Pink-footed goose	40	98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.000
27/2/2023	7	EB	1307	Red kite	1	62	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	45.000	17.000	0.000
27/2/2023	7	EB	1509	Red kite	1	78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	48.000	0.000	0.000	0.000
28/2/2023	5	EB	0952	Lapwing	35	85	0.000	0.000	0.000	0.000	0.000	0.000	40.000	45.000	0.000	0.000	0.000	0.000
28/2/2023	5	EB	0953	Red kite	1	68	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.000	0.000	0.000	0.000	0.000
28/2/2023	5	EB	0957	Lapwing	1	52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	52.000	0.000	0.000	0.000
28/2/2023	5	EB	1001	Red kite	1	55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.000	45.000	0.000	0.000	0.000
28/2/2023	5	EB	1024	Red kite	1	95	0.000	0.000	0.000	0.000	0.000	0.000	50.000	45.000	0.000	0.000	0.000	0.000
28/2/2023	5	EB	1116	Red kite	1	510	0.000	0.000	0.000	0.000	0.000	0.000	0.000	75.000	435.000	0.000	0.000	0.000
28/2/2023	5	EB	1119	Red kite	1	105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	105.000	0.000	0.000	0.000
28/2/2023	5	EB	1250	Pink-footed goose	39	60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	60.000	0.000
28/2/2023	5	EB	1326	Lapwing	32	25	0.000	0.000	0.000	0.000	0.000	0.000	25.000	0.000	0.000	0.000	0.000	0.000
28/2/2023	5	EB	1332	Lapwing	32	75	0.000	0.000	0.000	0.000	0.000	0.000	30.000	45.000	0.000	0.000	0.000	0.000
28/2/2023	5	EB	1353	Greylag goose	1	6	0.000	0.000	0.000	0.000	0.000	0.000	6.000	0.000	0.000	0.000	0.000	0.000
28/2/2023	5	EB	1403	Red kite	1	29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.000	14.000	0.000	0.000	0.000
3/3/2023	2	TH	1043	Greylag goose	2	45	0.000	0.000	25.137	12.568	0.000	0.000	0.000	0.000	4.863	2.432	0.000	0.000
8/3/2023	4	HEC	0921	Curlew	3	75	75.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/3/2023	4	HEC	0958	Curlew	2	62	12.904	13.764	0.000	0.000	0.000	0.000	17.096	18.236	0.000	0.000	0.000	0.000
8/3/2023	4	HEC	1013	Lapwing	1	44	7.825	15.128	0.000	0.000	0.000	0.000	7.175	13.872	0.000	0.000	0.000	0.000
8/3/2023	4	HEC	1014	Lapwing	1	56	15.000	41.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/3/2023	4	HEC	1037	Red kite	1	102	0.000	0.000	67.876	0.000	0.000	0.000	0.000	0.000	34.124	0.000	0.000	0.000
8/3/2023	4	HEC	1038	Red kite	1	45	0.000	0.000	0.000	45.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/3/2023	4	HEC	1046	Curlew	1	47	0.000	0.000	47.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/3/2023	4	HEC	1047	Curlew	3	17	0.000	17.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/3/2023	4	HEC	1110	Curlew	2	22	22.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/3/2023	4	HEC	1135	Lapwing	1	57	0.000	0.000	34.378	0.000	0.000	0.000	0.000	0.000	22.622	0.000	0.000	0.000
8/3/2023	5	TH	1017	Red kite	1	360	6.792	20.377	33.961	81.506	20.377	0.000	8.208	24.623	41.039	98.494	24.623	0.000
8/3/2023	5	TH	1217	Red kite	1	30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	0.000	0.000	0.000	0.000
8/3/2023	5	TH	1356	Red kite	1	40	0.000	0.000	0.000	0.000	0.000	0.000	15.000	25.000	0.000	0.000	0.000	0.000
13/3/2023	4	HEC	0950	Lapwing	1	12	0.000	11.339	0.000	0.000	0.000	0.000	0.000	0.661	0.000	0.000	0.000	0.000
13/3/2023	4	HEC	1001	Curlew	2	5	5.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13/3/2023	4	HEC	1021	Curlew	2	58	28.000	30.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13/3/2023	4	HEC	1108	Lapwing	1	22	22.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13/3/2023	4	HEC	1108	Lapwing	1	36	15.000	21.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13/3/2023	4	HEC	1152	Lapwing	1	29	14.000	15.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13/3/2023	4	HEC	1207	Lapwing	4	32	0.000	15.000	17.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13/3/2023	4	HEC	1313	Lapwing	3	44	0.000	30.000	14.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13/3/2023	6	EB	1442	Herring gull	4	32	0.000	0.000	0.000	0.000	0.000	0.000	15.000	17.000	0.000	0.000	0.000	0.000
13/3/2023	6	EB	1453	Herring gull	1	13	0.000	0.000	0.000	0.000	0.000	0.000	13.000	0.000	0.000	0.000	0.000	0.000
17/3/2023	9	TH	1021	Greylag goose	3	50	0.000	0.000	50.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17/3/2023	10	HEC	1010	Lapwing	1	32	0.000	0.000	0.000	0.000	0.000	0.000	0.000	32.000	0.000	0.000	0.000	0.000
17/3/2023	10	HEC	1026	Curlew	2	37	0.000	0.000	0.000	0.000	0.000	0.000	22.000	15.000	0.000	0.000	0.000	0.000
17/3/2023	10	HEC	1121	Curlew	1	11	0.000	0.000	0.000	0.000	0.000	0.000	11.000	0.000	0.000	0.000	0.000	0.000
17/3/2023	10	HEC	1137	Curlew	1	40	0.000	0.000	0.000	0.000	0.000	0.000	25.000	15.000	0.000	0.000	0.000	0.000
17/3/2023	10	HEC	1224	Curlew	1	24	0.000	0.000	0.000	0.000	0.000	0.000	24.000	0.000	0.000	0.000	0.000	0.000
17/3/2023	10	HEC	1301	Red kite	1	236	0.000	0.630	2.675	0.000	0.000	0.000	0.000	44.370	188.325	0.000	0.000	0.000
17/3/2023	10	HEC	1311	Curlew	7	109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	49.000	60.000	0.000	0.000	0.000
17/3/2023	10	HEC	1336	Curlew	2	57	0.000	0.000	0.000	0.000	0.000	0.000	15.000	42.000	0.000	0.000	0.000	0.000
17/3/2023	10	HEC	1525	Red kite	1	45	0.000	0.000	0.000	0.000	0.000	0.000	15.000	30.000	0.000	0.000	0.000	0.000
4/4/2023	10	ENS	0915	Lapwing	2	23	0.000	0.000	0.000	0.000	0.000	0.000	15.000	8.000	0.000	0.000	0.000	0.000
4/4/2023	10	ENS	0926	Lapwing	1	16	0.000	0.000	0.000	0.000	0.000	0.000	16.000	0.000	0.000	0.000	0.000	0.000

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20 m	21-40 m	41-100 m	101-150 m	151-200 m	>201 m	0-20 m	21-40 m	41-100 m	101-150 m	151-200 m	>201 m
4/4/2023	10	ENS	0933	Red kite	1	126	0.000	0.000	14.432	16.979	4.245	0.000	0.000	0.000	36.568	43.021	10.755	0.000
4/4/2023	10	ENS	0939	Curlew	2	28	0.000	0.000	0.000	0.000	0.000	0.000	15.000	13.000	0.000	0.000	0.000	0.000
4/4/2023	10	ENS	0941	Curlew	1	33	0.000	0.000	0.000	0.000	0.000	0.000	18.000	15.000	0.000	0.000	0.000	0.000
4/4/2023	10	ENS	1035	Lapwing	1	10	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4/4/2023	10	ENS	1040	Lapwing	3	38	38.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4/4/2023	10	ENS	1049	Peregrine falcon	1	15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.000	0.000	0.000	0.000	0.000
4/4/2023	10	ENS	1108	Lapwing	3	28	0.000	15.000	13.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4/4/2023	10	ENS	1113	Red kite	1	89	0.000	0.000	7.295	14.348	0.000	0.000	0.000	0.000	22.705	44.652	0.000	0.000
4/4/2023	10	ENS	1119	Red kite	2	101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71.000	30.000	0.000	0.000
4/4/2023	10	ENS	1237	Lapwing	1	35	10.298	7.723	0.000	0.000	0.000	0.000	9.702	7.277	0.000	0.000	0.000	0.000
4/4/2023	10	ENS	1305	Red kite	1	61	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	31.000	0.000	0.000
4/4/2023	10	ENS	1322	Red kite	1	171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	96.000	75.000	0.000	0.000
4/4/2023	10	ENS	1336	Curlew	1	8	0.000	0.000	0.000	0.000	0.000	0.000	8.000	0.000	0.000	0.000	0.000	0.000
14/4/2023	9	HEC	0811	Lapwing	2	23	15.000	8.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14/4/2023	9	HEC	0811	Lapwing	1	55	30.000	25.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14/4/2023	9	HEC	0814	Curlew	3	53	0.000	47.926	0.000	0.000	0.000	0.000	0.000	5.074	0.000	0.000	0.000	0.000
14/4/2023	9	HEC	0832	Lapwing	1	32	1.965	29.472	0.000	0.000	0.000	0.000	0.035	0.528	0.000	0.000	0.000	0.000
14/4/2023	9	HEC	0910	Lapwing	3	28	28.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14/4/2023	9	HEC	0912	Curlew	6	37	7.000	30.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14/4/2023	9	HEC	0940	Lapwing	2	105	15.000	90.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14/4/2023	9	HEC	0941	Curlew	1	5	5.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14/4/2023	9	HEC	1004	Curlew	3	51	0.000	0.000	44.087	0.000	0.000	0.000	0.000	0.000	6.913	0.000	0.000	0.000
14/4/2023	10	JB	0828	Curlew	2	11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.000	0.000	0.000	0.000
14/4/2023	10	JB	0832	Red kite	1	44	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.000	15.000	0.000	0.000	0.000
14/4/2023	10	JB	0901	Red kite	2	544	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	45.000	469.000	0.000	0.000
14/4/2023	10	JB	0926	Curlew	1	20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	20.000	0.000	0.000	0.000
14/4/2023	10	JB	1007	Curlew	1	29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.000	0.000	0.000	0.000
14/4/2023	10	JB	1056	Curlew	1	20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	20.000	0.000	0.000	0.000
14/4/2023	10	JB	1101	Curlew	1	13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.000	0.000	0.000	0.000
20/4/2023	2	EB	1031	Red kite	1	85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.000	75.000	0.000	0.000	0.000
20/4/2023	8	HEC	1018	Curlew	1	6	6.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2/5/2023	2	HEC	1201	Red kite	1	210	36.714	18.357	73.427	0.000	0.000	0.000	23.286	11.643	46.573	0.000	0.000	0.000
2/5/2023	2	HEC	1228	Greylag goose	4	15	0.000	0.000	12.238	0.000	0.000	0.000	0.000	0.000	2.762	0.000	0.000	0.000
4/5/2023	9	HEC	0938	Lapwing	3	45	45.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4/5/2023	9	HEC	1000	Lapwing	1	136	70.544	55.693	0.000	0.000	0.000	0.000	5.456	4.307	0.000	0.000	0.000	0.000
4/5/2023	9	HEC	1008	Curlew	1	32	32.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4/5/2023	9	HEC	1012	Curlew	1	120	69.505	41.703	0.000	0.000	0.000	0.000	5.495	3.297	0.000	0.000	0.000	0.000
4/5/2023	9	HEC	1116	Curlew	1	21	21.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4/5/2023	9	HEC	1140	Greylag goose	4	33	33.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4/5/2023	9	HEC	1224	Curlew	2	27	27.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4/5/2023	9	HEC	1311	Lapwing	1	51	21.000	30.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4/5/2023	9	HEC	1453	Curlew	3	42	27.000	15.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4/5/2023	9	HEC	1520	Lapwing	1	20	0.000	20.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5/5/2023	9	JB	0753	Herring gull	2	13	4.618	0.000	0.000	0.000	0.000	0.000	8.382	0.000	0.000	0.000	0.000	0.000
5/5/2023	9	JB	0758	Herring gull	1	17	14.486	1.931	0.000	0.000	0.000	0.000	0.514	0.069	0.000	0.000	0.000	0.000
5/5/2023	9	JB	0807	Lapwing	1	9	7.326	0.000	0.000	0.000	0.000	0.000	1.674	0.000	0.000	0.000	0.000	0.000
5/5/2023	9	JB	0924	Curlew	2	32	26.565	0.000	0.000	0.000	0.000	0.000	5.435	0.000	0.000	0.000	0.000	0.000
5/5/2023	10	TH	0849	Curlew	1	90	0.000	0.000	0.000	0.000	0.000	0.000	30.000	0.000	60.000	0.000	0.000	0.000
5/5/2023	10	TH	0902	Curlew	1	20	0.000	0.000	0.000	0.000	0.000	0.000	20.000	0.000	0.000	0.000	0.000	0.000
5/5/2023	10	TH	0941	Curlew	1	10	0.000	0.000	0.000	0.000	0.000	0.000	10.000	0.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	0811	Short-eared owl	1	90	90.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20 m	21-40 m	41-100 m	101-150 m	151-200 m	>201 m	0-20 m	21-40 m	41-100 m	101-150 m	151-200 m	>201 m
8/6/2023	8	JR	0812	Curlew	2	26	0.000	26.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	0820	Lapwing	4	600	0.000	435.047	0.000	0.000	0.000	0.000	0.000	164.953	0.000	0.000	0.000	0.000
8/6/2023	8	JR	0837	Curlew	1	45	0.000	45.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	0847	Curlew	1	93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.000	18.000	60.000	0.000	0.000
8/6/2023	8	JR	0852	Curlew	1	40	0.000	15.000	25.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	0917	Curlew	1	19	0.000	19.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	0922	Curlew	1	34	0.000	34.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	0930	Curlew	1	41	0.000	0.000	0.000	0.000	0.000	0.000	11.000	30.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	0936	Short-eared owl	1	300	300.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	0957	Short-eared owl	1	300	156.150	0.000	0.000	0.000	0.000	0.000	143.850	0.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	1013	Herring gull	1	80	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.000	15.000	0.000	0.000	0.000
8/6/2023	8	JR	1018	Short-eared owl	1	300	300.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	1024	Curlew	1	31	0.000	15.882	0.000	0.000	0.000	0.000	0.000	15.118	0.000	0.000	0.000	0.000
8/6/2023	8	JR	1045	Herring gull	1	120	75.000	45.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	1156	Curlew	1	40	0.000	0.000	0.000	0.000	0.000	0.000	25.000	15.000	0.000	0.000	0.000	0.000
8/6/2023	8	JR	1321	Curlew	2	21	0.000	0.000	0.000	0.000	0.000	0.000	21.000	0.000	0.000	0.000	0.000	0.000
26/7/2023	9	TH	0951	Curlew	2	75	0.000	0.000	15.000	60.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26/7/2023	9	TH	1133	Curlew	1	60	0.000	0.000	0.000	0.000	53.264	0.000	0.000	0.000	0.000	0.000	6.736	0.000
26/7/2023	9	TH	1251	Lapwing	60	90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	60.000
31/7/2023	2	HEC	1123	Lapwing	140	340	11.921	11.921	111.264	0.000	0.000	0.000	18.079	18.079	168.736	0.000	0.000	0.000
31/7/2023	8	JR	1103	Herring gull	2	80	0.000	0.000	1.925	23.104	5.776	0.000	0.000	0.000	3.075	36.896	9.224	0.000
31/7/2023	8	JR	1214	Herring gull	1	67	67.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31/7/2023	8	JR	1424	Herring gull	2	71	0.000	46.825	0.000	0.000	0.000	0.000	0.000	24.175	0.000	0.000	0.000	0.000
31/7/2023	10	MW	0922	Curlew	1	110	0.000	0.000	0.000	0.000	0.000	0.000	20.000	90.000	0.000	0.000	0.000	0.000
31/7/2023	10	MW	1040	Curlew	1	95	2.272	3.895	0.000	0.000	0.000	0.000	32.728	56.105	0.000	0.000	0.000	0.000
31/7/2023	10	MW	1214	Red kite	1	78	0.000	0.000	0.000	0.000	0.000	0.000	18.000	60.000	0.000	0.000	0.000	0.000
2/8/2023	9	HEC	0924	Curlew	2	48	26.698	16.019	0.000	0.000	0.000	0.000	3.302	1.981	0.000	0.000	0.000	0.000
2/8/2023	9	HEC	1002	Curlew	1	44	22.755	11.770	0.000	0.000	0.000	0.000	6.245	3.230	0.000	0.000	0.000	0.000
2/8/2023	9	HEC	1018	Greylag goose	6	11	5.412	0.000	0.000	0.000	0.000	0.000	5.588	0.000	0.000	0.000	0.000	0.000
2/8/2023	9	HEC	1205	Curlew	4	63	0.000	14.469	46.301	0.000	0.000	0.000	0.000	0.531	1.699	0.000	0.000	0.000
2/8/2023	9	HEC	1313	Curlew	5	27	7.231	5.785	0.000	0.000	0.000	0.000	7.769	6.215	0.000	0.000	0.000	0.000
2/8/2023	9	HEC	1455	Greylag goose	1	59	30.000	29.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2/8/2023	10	TH	0932	Curlew	2	40	0.000	0.000	0.000	0.000	0.000	0.000	40.000	0.000	0.000	0.000	0.000	0.000
2/8/2023	10	TH	1011	Curlew	4	60	3.304	9.913	0.000	0.000	0.000	0.000	11.696	35.087	0.000	0.000	0.000	0.000
2/8/2023	10	TH	1031	Curlew	2	25	0.000	0.000	0.000	0.000	0.000	0.000	10.000	15.000	0.000	0.000	0.000	0.000
2/8/2023	10	TH	1031	Greylag goose	7	20	0.000	16.773	0.000	0.000	0.000	0.000	0.000	3.227	0.000	0.000	0.000	0.000
2/8/2023	10	TH	1144	Curlew	2	45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.000	15.000	0.000	0.000	0.000
2/8/2023	10	TH	1404	Curlew	1	150	0.000	16.869	42.171	25.303	0.000	0.000	0.000	13.131	32.829	19.697	0.000	0.000
11/8/2023	10	JRM	0715	Greylag goose	18	40	1.664	0.999	0.000	0.000	0.000	0.000	23.336	14.001	0.000	0.000	0.000	0.000
11/8/2023	10	JRM	0716	Greylag goose	6	30	0.000	0.000	0.000	0.000	0.000	0.000	15.000	15.000	0.000	0.000	0.000	0.000
11/8/2023	10	JRM	0919	Greylag goose	18	55	5.554	14.811	0.000	0.000	0.000	0.000	9.446	25.189	0.000	0.000	0.000	0.000
11/8/2023	10	JRM	1055	Red kite	1	320	0.000	0.000	0.000	0.000	0.000	0.000	0.000	110.000	150.000	60.000	0.000	0.000
11/8/2023	10	JRM	1101	Goshawk	1	20	0.000	0.000	0.000	0.000	0.000	0.000	20.000	0.000	0.000	0.000	0.000	0.000
11/8/2023	10	JRM	1105	Red kite	1	50	0.000	0.000	0.000	0.000	0.000	0.000	5.000	45.000	0.000	0.000	0.000	0.000
11/8/2023	10	JRM	1110	Red kite	1	1370	121.832	203.053	203.053	28.427	0.000	0.000	178.168	296.947	296.947	41.573	0.000	0.000
11/8/2023	10	JRM	1145	Red kite	1	450	0.000	3.620	4.524	12.668	6.334	0.000	0.000	56.380	70.476	197.332	98.666	0.000
11/8/2023	10	JRM	1303	Red kite	2	600	0.000	3.480	10.439	17.399	15.079	0.000	0.000	41.520	124.561	207.601	179.921	0.000
11/8/2023	10	JRM	1313	Red kite	1	210	0.000	0.000	0.000	0.000	0.000	0.000	30.000	90.000	90.000	0.000	0.000	0.000

D.2 Moorland Breeding Bird Records

A moorland breeding bird survey was undertaken during the 2023 breeding season and focussed on recording activity of upland wader species within the survey area. Details of species registrations are presented in **Table D-2**. The survey methodology is detailed in **Annex B** and survey timing/weather conditions in **Annex C**.

Table D-2 Wader Registrations Recorded during Moorland Breeding Bird Survey Visits

Date	Observer	Species	No. recorded	Notes
16/03/2023	TH	Curlew	2	Observed near quarry whilst driving to survey location.
17/03/2023	TH	Curlew	2	-
17/03/2023	TH	Lapwing	-	Heard only; south-west of survey location.
20/03/2023	JRM	Curlew	2	Pair; calling.
20/03/2023	JRM	Curlew	2	Pair; calling.
20/03/2023	JRM	Curlew	2	Pair; calling.
20/03/2023	JRM	Lapwing	1	Displaying.
20/03/2023	JRM	Lapwing	2	Displaying.
20/03/2023	JRM	Lapwing	1	-
20/03/2023	JRM	Lapwing	1	-
20/03/2023	JRM	Lapwing	1	Displaying.
20/03/2023	JRM	Oystercatcher	2	Pair; copulating.
20/03/2023	JRM	Oystercatcher	2	Pair.
20/03/2023	JRM	Oystercatcher	7	-
20/03/2023	JRM	Snipe	1	Displaying.
21/03/2023	JRM	Curlew	1	-
21/03/2023	JRM	Snipe	1	Displaying.
04/04/2023	EB	Curlew	2	-
04/04/2023	EB	Curlew	1	Calling.
04/04/2023	EB	Curlew	1	Singing.
04/04/2023	EB	Curlew	2	Singing.
04/04/2023	EB	Lapwing	1	-
04/04/2023	HEC	Curlew	1	-
04/04/2023	HEC	Curlew	2	-
04/04/2023	HEC	Curlew	1	Singing.
04/04/2023	HEC	Curlew	1	Singing.
04/04/2023	HEC	Curlew	2	-
04/04/2023	HEC	Curlew	1	-
04/04/2023	HEC	Curlew	2	Singing.
04/04/2023	HEC	Curlew	2	Singing.
04/04/2023	HEC	Curlew	1	Singing.
04/04/2023	HEC	Curlew	1	Calling.
04/04/2023	HEC	Curlew	1	-
04/04/2023	HEC	Curlew	2	-
04/04/2023	HEC	Curlew	1	Calling.
04/04/2023	HEC	Curlew	2	-
04/04/2023	HEC	Curlew	1	Calling.
04/04/2023	HEC	Curlew	1	Calling.
04/04/2023	HEC	Lapwing	1	-
04/04/2023	HEC	Lapwing	3	-
04/04/2023	HEC	Oystercatcher	2	-
04/04/2023	HEC	Snipe	1	Singing.
04/04/2023	TH	Curlew	1	-
04/04/2023	TH	Curlew	2	-
04/04/2023	TH	Curlew	3	-
04/04/2023	TH	Curlew	1	-
04/04/2023	TH	Curlew	2	-
04/04/2023	TH	Lapwing	2	-
04/04/2023	TH	Lapwing	1	-
04/04/2023	TH	Oystercatcher	2	Calling.
05/04/2023	EB	Curlew	1	-
05/04/2023	EB	Lapwing	2	-
05/04/2023	EB	Lapwing	2	-
05/04/2023	EB	Lapwing	1	-
05/04/2023	EB	Oystercatcher	1	Calling.
05/04/2023	EB	Oystercatcher	2	Calling.
05/04/2023	EB	Oystercatcher	2	Calling.
05/04/2023	EB	Oystercatcher	2	Calling.
05/04/2023	EB	Oystercatcher	1	-
05/04/2023	EB	Oystercatcher	2	-
05/04/2023	EB	Oystercatcher	1	-
05/04/2023	EB	Oystercatcher	2	-
05/04/2023	EB	Oystercatcher	2	-
05/04/2023	EB	Oystercatcher	1	-
05/04/2023	HEC	Curlew	2	-
05/04/2023	HEC	Curlew	3	-
05/04/2023	HEC	Curlew	1	-
05/04/2023	HEC	Curlew	1	Singing.
05/04/2023	HEC	Curlew	1	Singing.
05/04/2023	HEC	Curlew	1	Singing.
05/04/2023	HEC	Curlew	1	Singing.
05/04/2023	HEC	Curlew	1	Singing.
05/04/2023	HEC	Curlew	1	Singing.
05/04/2023	HEC	Lapwing	1	-
05/04/2023	HEC	Lapwing	2	-
05/04/2023	HEC	Lapwing	4	-
05/04/2023	HEC	Oystercatcher	2	-
05/04/2023	HEC	Oystercatcher	2	-
05/04/2023	HEC	Oystercatcher	2	-
05/04/2023	HEC	Oystercatcher	2	-
05/04/2023	HEC	Oystercatcher	2	-
05/04/2023	HEC	Oystercatcher	1	-
05/04/2023	HEC	Oystercatcher	2	-
05/04/2023	HEC	Oystercatcher	2	-
05/04/2023	JRM	Curlew	1	Singing.
05/04/2023	JRM	Curlew	2	Pair; singing.
05/04/2023	JRM	Curlew	2	Pair.
05/04/2023	JRM	Curlew	1	Calling.
05/04/2023	JRM	Lapwing	1	Displaying.
05/04/2023	JRM	Lapwing	2	Pair.
05/04/2023	JRM	Oystercatcher	2	Pair.
06/04/2023	JRM	Curlew	2	Pair; singing.
06/04/2023	JRM	Curlew	5	Singing.
06/04/2023	JRM	Snipe	1	Displaying.
07/04/2023	JRM	Curlew	1	-
07/04/2023	JRM	Curlew	2	Pair; singing.
07/04/2023	JRM	Curlew	1	-

Date	Observer	Species	No. recorded	Notes
07/04/2023	JRM	Golden plover	300	Minimum count; sizeable flock (several hundred birds) circling over hills just north of 2 km survey area and map boundary.
07/04/2023	JRM	Lapwing	1	-
07/04/2023	JRM	Lapwing	1	-
07/04/2023	JRM	Oystercatcher	1	-
07/04/2023	JRM	Redshank	1	Calling.
10/04/2023	JRM	Curlew	2	Pair; singing.
10/04/2023	JRM	Oystercatcher	2	Pair.
10/04/2023	JRM	Snipe	1	Singing.
14/04/2023	HEC	Oystercatcher	-	-
14/04/2023	JB	Oystercatcher	-	-
01/05/2023	JRM	Common sandpiper	1	Heard only near Duneaton Water; singing.
01/05/2023	JRM	Curlew	2	Pair; singing.
01/05/2023	JRM	Curlew	1	Displaying.
01/05/2023	JRM	Curlew	1	-
01/05/2023	JRM	Curlew	1	Heard only near Red Moss; singing.
01/05/2023	JRM	Curlew	1	Heard only near Red Moss; singing.
01/05/2023	JRM	Lapwing	1	-
01/05/2023	JRM	Lapwing	2	Pair.
01/05/2023	JRM	Lapwing	1	Displaying.
01/05/2023	JRM	Lapwing	1	Displaying.
01/05/2023	JRM	Oystercatcher	1	-
01/05/2023	JRM	Oystercatcher	2	Pair.
01/05/2023	JRM	Oystercatcher	1	-
01/05/2023	JRM	Oystercatcher	2	Pair.
01/05/2023	JRM	Redshank	1	-
01/05/2023	JRM	Redshank	1	-
01/05/2023	JRM	Ringed plover	1	-
02/05/2023	JRM	Curlew	2	Pair; singing.
02/05/2023	JRM	Curlew	1	Mobbing buzzard.
02/05/2023	JRM	Curlew	1	Singing.
02/05/2023	JRM	Curlew	2	Pair.
02/05/2023	JRM	Curlew	1	Heard only; Black Hill.
02/05/2023	JRM	Golden plover	50	-
02/05/2023	JRM	Lapwing	2	Displaying.
02/05/2023	JRM	Lapwing	4	Displaying.
02/05/2023	JRM	Lapwing	1	Displaying.
02/05/2023	JRM	Oystercatcher	2	Pair.
03/05/2023	JRM	Curlew	1	Singing.
03/05/2023	JRM	Curlew	1	Singing.
03/05/2023	JRM	Curlew	2	Pair.
03/05/2023	JRM	Curlew	2	Pair.
03/05/2023	JRM	Curlew	1	Singing.
03/05/2023	JRM	Lapwing	1	-
03/05/2023	JRM	Snipe	1	Singing.
05/05/2023	JB	Curlew	-	-
05/05/2023	JB	Curlew	-	-
05/05/2023	JB	Lapwing	-	-
05/05/2023	JB	Oystercatcher	-	-
05/05/2023	JB	Oystercatcher	-	-
29/05/2023	HEC	Curlew	2	-
29/05/2023	HEC	Curlew	2	-
29/05/2023	HEC	Curlew	2	-
29/05/2023	HEC	Curlew	1	-
29/05/2023	HEC	Curlew	1	Singing.
29/05/2023	HEC	Curlew	2	Calling.
29/05/2023	HEC	Curlew	2	-
29/05/2023	HEC	Curlew	1	-
29/05/2023	HEC	Curlew	1	-
29/05/2023	HEC	Lapwing	4	Calling.
29/05/2023	HEC	Lapwing	2	-
29/05/2023	HEC	Lapwing	3	Juveniles.
29/05/2023	HEC	Lapwing	1	-
29/05/2023	HEC	Oystercatcher	1	-
29/05/2023	HEC	Oystercatcher	2	-
29/05/2023	HEC	Oystercatcher	4	Calling.
29/05/2023	HEC	Oystercatcher	1	-
29/05/2023	HEC	Oystercatcher	1	-
29/05/2023	HEC	Oystercatcher	2	-
29/05/2023	HEC	Oystercatcher	1	-
29/05/2023	HEC	Oystercatcher	1	-
29/05/2023	HEC	Oystercatcher	2	-
29/05/2023	HEC	Oystercatcher	2	-
29/05/2023	HEC	Oystercatcher	1	-
29/05/2023	TH	Curlew	1	Calling.
29/05/2023	TH	Curlew	1	Calling.
29/05/2023	TH	Curlew	1	Calling.
29/05/2023	TH	Curlew	1	Calling.
29/05/2023	TH	Curlew	1	Calling.
29/05/2023	TH	Curlew	2	Calling.
29/05/2023	TH	Curlew	1	-
29/05/2023	TH	Curlew	1	Calling.
29/05/2023	TH	Curlew	1	Calling.
29/05/2023	TH	Curlew	2	Calling.
29/05/2023	TH	Oystercatcher	1	Calling.
29/05/2023	TH	Redshank	1	-
30/05/2023	TH	Curlew	1	-
30/05/2023	TH	Curlew	2	-
30/05/2023	TH	Curlew	1	Calling.
30/05/2023	TH	Curlew	1	Calling.
30/05/2023	TH	Lapwing	4	Calling.
30/05/2023	TH	Lapwing	1	-
30/05/2023	TH	Oystercatcher	2	-
30/05/2023	TH	Oystercatcher	1	Calling.
30/05/2023	TH	Oystercatcher	1	-
30/05/2023	TH	Oystercatcher	1	Calling.
30/05/2023	TH	Oystercatcher	2	Calling.
31/05/2023	TH	Curlew	1	Calling.
31/05/2023	TH	Curlew	1	Calling.
31/05/2023	TH	Curlew	2	Calling.
31/05/2023	TH	Curlew	1	Calling.
31/05/2023	TH	Curlew	1	Calling.
31/05/2023	TH	Lapwing	2	-
31/05/2023	TH	Oystercatcher	1	-
31/05/2023	TH	Oystercatcher	1	-

Date	Observer	Species	No. recorded	Notes
31/05/2023	TH	Oystercatcher	3	-
31/05/2023	TH	Oystercatcher	1	-
31/05/2023	TH	Oystercatcher	1	-
31/05/2023	TH	Oystercatcher	1	-
31/05/2023	TH	Redshank	4	-
06/06/2023	EB	Curlew	1	Singing.
06/06/2023	EB	Curlew	2	Singing.
06/06/2023	EB	Curlew	2	Adult pair; alarm calling over a nest with four eggs.
06/06/2023	EB	Curlew	2	Calling.
06/06/2023	EB	Curlew	1	Calling.
06/06/2023	EB	Curlew	2	Calling.
06/06/2023	EB	Curlew	1	Calling.
06/06/2023	EB	Lapwing	2	Calling.
06/06/2023	EB	Lapwing	2	-
06/06/2023	EB	Lapwing	1	-
06/06/2023	EB	Oystercatcher	2	Calling.
06/06/2023	EB	Oystercatcher	2	Calling.
06/06/2023	EB	Oystercatcher	1	Calling.
06/06/2023	EB	Oystercatcher	1	-
06/06/2023	EB	Redshank	3	-
06/06/2023	EB	Redshank	2	Calling.
06/06/2023	EB	Ringed plover	2	-
06/06/2023	EB	Snipe	1	Flushed.
06/06/2023	HEC	Curlew	2	-
06/06/2023	HEC	Curlew	1	-
06/06/2023	HEC	Curlew	2	Calling.
06/06/2023	HEC	Curlew	1	-
06/06/2023	HEC	Curlew	2	Calling.
06/06/2023	HEC	Curlew	1	-
06/06/2023	HEC	Curlew	2	Calling.
06/06/2023	HEC	Curlew	2	Calling.
06/06/2023	HEC	Curlew	1	-
06/06/2023	HEC	Curlew	1	Calling.
06/06/2023	HEC	Curlew	2	Alarm calling.
06/06/2023	HEC	Curlew	1	Calling.
06/06/2023	HEC	Curlew	1	-
06/06/2023	HEC	Curlew	1	-
06/06/2023	HEC	Curlew	2	Calling.
06/06/2023	HEC	Curlew	1	-
06/06/2023	HEC	Curlew	1	-
06/06/2023	HEC	Lapwing	4	Alarm calling.
06/06/2023	HEC	Oystercatcher	1	-
06/06/2023	HEC	Oystercatcher	1	-
06/06/2023	HEC	Oystercatcher	2	-
06/06/2023	HEC	Oystercatcher	1	Calling.
06/06/2023	HEC	Oystercatcher	2	-
06/06/2023	HEC	Ringed plover	1	-
06/06/2023	HEC	Snipe	1	Singing.
07/06/2023	EB	Common sandpiper	2	Calling.
07/06/2023	EB	Curlew	1	Calling.
07/06/2023	EB	Curlew	1	Singing.
07/06/2023	EB	Curlew	2	Singing.
07/06/2023	EB	Curlew	1	Calling.
07/06/2023	EB	Curlew	2	Calling.

Date	Observer	Species	No. recorded	Notes
07/06/2023	EB	Curlew	1	Calling.
07/06/2023	EB	Curlew	2	Singing.
07/06/2023	EB	Curlew	1	Calling.
07/06/2023	EB	Curlew	1	Singing.
07/06/2023	EB	Curlew	2	Singing.
07/06/2023	EB	Curlew	2	Singing.
07/06/2023	EB	Oystercatcher	2	Calling.
07/06/2023	EB	Oystercatcher	2	-
07/06/2023	EB	Oystercatcher	1	Calling.
07/06/2023	EB	Oystercatcher	2	Calling.
07/06/2023	EB	Oystercatcher	2	Calling.
07/06/2023	EB	Oystercatcher	2	Calling.
07/06/2023	EB	Oystercatcher	2	Calling.
07/06/2023	EB	Oystercatcher	1	Calling.
07/06/2023	EB	Oystercatcher	2	Calling.
07/06/2023	EB	Oystercatcher	4	-
07/06/2023	EB	Oystercatcher	1	Calling.
07/06/2023	HEC	Curlew	1	-
07/06/2023	HEC	Lapwing	6	-
07/06/2023	HEC	Lapwing	3	Alarm calling.
07/06/2023	HEC	Lapwing	5	-
07/06/2023	HEC	Oystercatcher	4	-
07/06/2023	HEC	Oystercatcher	2	-
07/06/2023	HEC	Oystercatcher	14	-
07/06/2023	HEC	Oystercatcher	2	Alarm calling.
07/06/2023	HEC	Oystercatcher	1	-
07/06/2023	HEC	Oystercatcher	6	-
07/06/2023	HEC	Oystercatcher	1	-
07/06/2023	HEC	Oystercatcher	6	-
07/06/2023	HEC	Oystercatcher	4	-
07/06/2023	HEC	Oystercatcher	2	Alarm calling.
07/06/2023	HEC	Oystercatcher	1	-
07/06/2023	HEC	Oystercatcher	2	Calling.
07/06/2023	HEC	Redshank	1	-
07/06/2023	HEC	Redshank	2	Alarm calling.
12/06/2023	JRM	Curlew	2	Pair; alarm calling.
12/06/2023	JRM	Lapwing	1	-
12/06/2023	JRM	Redshank	1	Heard only; calling.
13/06/2023	JRM	Curlew	2	Pair.
13/06/2023	JRM	Curlew	2	Pair; alarm calling.
13/06/2023	JRM	Curlew	2	Pair; alarm calling.
13/06/2023	JRM	Curlew	2	Pair; alarm calling.
13/06/2023	JRM	Curlew	2	Pair; singing.
13/06/2023	JRM	Curlew	5	-
13/06/2023	JRM	Lapwing	1	-
13/06/2023	JRM	Oystercatcher	-	-
14/06/2023	JRM	Common sandpiper	1	-
14/06/2023	JRM	Curlew	2	Pair; alarm calling.
14/06/2023	JRM	Curlew	3	Singing.
14/06/2023	JRM	Curlew	2	Pair; alarm calling.
14/06/2023	JRM	Curlew	2	Pair; alarm calling.
14/06/2023	JRM	Lapwing	2	Pair; alarm calling and mobbing a carrion crow.
14/06/2023	JRM	Oystercatcher	2	Pair; alarm calling.
14/06/2023	JRM	Oystercatcher	2	Pair; alarm calling.

Date	Observer	Species	No. recorded	Notes
14/06/2023	JRM	Redshank	1	Heard only; singing.
19/07/2023	JR	Curlew	4	Family; adults alarm calling.
19/07/2023	JR	Oystercatcher	6	Family; adult pair alarm calling with 4 young.
20/07/2023	JR	Curlew	2	Pair; calling.
20/07/2023	JR	Curlew	4	-
20/07/2023	JR	Lapwing	2	Pair; calling.
20/07/2023	JR	Oystercatcher	4	Calling.
20/07/2023	JR	Oystercatcher	2	Pair; alarm calling.
20/07/2023	JR	Oystercatcher	2	Pair; alarm calling.
20/07/2023	JR	Oystercatcher	2	Pair; calling.
20/07/2023	JR	Oystercatcher	2	Pair; calling.
26/07/2023	EB	Curlew	1	Calling.
26/07/2023	EB	Oystercatcher	1	-
26/07/2023	EB	Oystercatcher	1	-
26/07/2023	EB	Oystercatcher	3	-
26/07/2023	EB	Oystercatcher	2	Calling.
26/07/2023	EB	Oystercatcher	4	-
26/07/2023	EB	Oystercatcher	4	-
26/07/2023	EB	Oystercatcher	1	Calling.
26/07/2023	EB	Oystercatcher	3	Took off in flight.
28/07/2023	EB	Curlew	1	Calling.
28/07/2023	EB	Lapwing	40	-
28/07/2023	EB	Oystercatcher	3	-
28/07/2023	EB	Redshank	2	Calling.
28/07/2023	EB	Snipe	1	-
28/07/2023	EB	Snipe	1	-
28/07/2023	HEC	Curlew	1	Singing.
28/07/2023	HEC	Curlew	1	Singing.
28/07/2023	HEC	Lapwing	80	-
28/07/2023	HEC	Oystercatcher	1	-
28/07/2023	HEC	Oystercatcher	1	Calling.
28/07/2023	JRM	Curlew	3	Family; adult with two juveniles; adult alarm calling due to a nearby stoat.
28/07/2023	JRM	Oystercatcher	1	Alarm calling.
28/07/2023	JRM	Oystercatcher	2	Pair.
28/07/2023	JRM	Snipe	1	Flushed.
31/07/2023	MW	Snipe	-	Heard only.
31/07/2023	JR	Curlew	2	Observed near quarry whilst driving from survey location.
31/07/2023	JR	Lapwing	10	Observed near quarry whilst driving from survey location.
31/07/2023	JR	Redshank	1	Observed near quarry whilst driving from survey location.
07/08/2023	JRM	Curlew	1	Heard only.
07/08/2023	JRM	Lapwing	3	-
07/08/2023	JRM	Oystercatcher	3	Calling.
07/08/2023	JRM	Oystercatcher	1	Perched on post.
11/08/2023	JRM	Curlew	1	Juvenile; feeding in field.

D.3 Winter Walkover Records

Table D-3 details all the species recorded. Refer to **Annex B** for survey methodology and **Annex C** for weather data.

Table D-3 Winter Walkover Survey Records: 2022/2023 Non-Breeding Season

Date	Observer	Survey visit	Species	No. recorded	Notes
24/11/2022	JR	1	Carrion crow	-	-
24/11/2022	JR	1	Fieldfare	200	-
24/11/2022	JR	1	Goldcrest	-	-
24/11/2022	JR	1	Golden plover	10	Calling.
24/11/2022	JR	1	Kestrel	1	-
24/11/2022	JR	1	Meadow pipit	-	-
24/11/2022	JR	1	Merlin	1	Alarm calling; flushed from gully.
24/11/2022	JR	1	Raven	-	-
24/11/2022	JR	1	Raven	-	-
24/11/2022	JR	1	Red grouse	2	Flushed on Wildshaw Hill; calling.
24/11/2022	JR	1	Red grouse	1	At Wildshaw Burn; calling.
24/11/2022	JR	1	Red grouse	1	At Red Moss; calling.
24/11/2022	JR	1	Red kite	1	-
24/11/2022	JR	1	Snipe	1	Flushed and calling.
24/11/2022	JR	1	Starling	-	-
24/11/2022	TH	1	Buzzard	1	Aggressive interaction with a red kite.
24/11/2022	TH	1	Carrion crow	-	-
24/11/2022	TH	1	Common gull	-	-
24/11/2022	TH	1	Fieldfare	60	In flight, Netherton Farm.
24/11/2022	TH	1	Grey heron	-	-
24/11/2022	TH	1	Greylag goose	14	-
24/11/2022	TH	1	Jackdaw	-	-
24/11/2022	TH	1	Lesser black-backed gull	-	-
24/11/2022	TH	1	Magpie	-	-
24/11/2022	TH	1	Mallard	2	Pair near East Thirstone Burn.
24/11/2022	TH	1	Meadow pipit	-	-
24/11/2022	TH	1	Raven	-	-
24/11/2022	TH	1	Red grouse	2	At Craighead Hill.
24/11/2022	TH	1	Red kite	1	Aggressive interaction with buzzard.
24/11/2022	TH	1	Red kite	1	-
24/11/2022	TH	1	Red kite	1	-
24/11/2022	TH	1	Robin	-	-
24/11/2022	TH	1	Rook	-	-
24/11/2022	TH	1	Woodpigeon	-	-
24/11/2022	TH	1	Wren	-	-
17/01/2023	EB	2	Buzzard	1	In flight, near Wildshaw Burn.
17/01/2023	EB	2	Carrion crow	-	-
17/01/2023	EB	2	Common gull	19	In flight, M74 road.
17/01/2023	EB	2	Fieldfare	50	Flock near West Thirstone Burn.
17/01/2023	EB	2	Kestrel	1	Took off from post beside B7078.
17/01/2023	EB	2	Raven	-	-
17/01/2023	EB	2	Starling	-	-
17/01/2023	EB	2	Woodpigeon	-	-
17/01/2023	EB	2	Wren	-	-
17/01/2023	JRM	2	Buzzard	1	Took flight; Netherton Farm.

Date	Observer	Survey visit	Species	No. recorded	Notes
17/01/2023	JRM	2	Buzzard	1	Perched near Maidencotts.
17/01/2023	JRM	2	Carrion crow	-	-
17/01/2023	JRM	2	Fieldfare	20	Flock near Maidencotts.
17/01/2023	JRM	2	Jackdaw	-	-
17/01/2023	JRM	2	Kestrel	1	Perched on overhead line beside B7078.
17/01/2023	JRM	2	Meadow pipit	-	-
17/01/2023	JRM	2	Reed bunting	-	-
17/01/2023	JRM	2	Starling	-	-
17/01/2023	JRM	2	Woodcock	1	Flushed.
17/01/2023	JRM	2	Wren	-	-
06/02/2023	EB	3	Buzzard	1	In flight, Maidencotts.
06/02/2023	EB	3	Buzzard	1	In flight, Maidencotts.
06/02/2023	EB	3	Buzzard	1	In flight, Duneaton Bridge.
06/02/2023	EB	3	Buzzard	1	Perched at Whitrae Wood.
06/02/2023	EB	3	Canada goose	3	Near East Thirstone Burn.
06/02/2023	EB	3	Carrion crow	-	-
06/02/2023	EB	3	Common gull	50	In flight, Maidencotts.
06/02/2023	EB	3	Common gull	8	In flight, Maidencotts.
06/02/2023	EB	3	Goldfinch	-	-
06/02/2023	EB	3	Goosander	-	-
06/02/2023	EB	3	Jackdaw	-	-
06/02/2023	EB	3	Lesser black-backed gull	1	In flight, Littlegill.
06/02/2023	EB	3	Magpie	-	-
06/02/2023	EB	3	Mallard	2	Near East Thirstone Burn.
06/02/2023	EB	3	Oystercatcher	25	-
06/02/2023	EB	3	Raven	-	-
06/02/2023	EB	3	Red kite	1	-
06/02/2023	EB	3	Reed bunting	-	-
06/02/2023	EB	3	Rook	-	-
06/02/2023	EB	3	Short-eared owl	1	Flushed; resettled nearby.
06/02/2023	EB	3	Wren	-	-
06/02/2023	TH	3	Buzzard	1	In flight, Maidencotts.
06/02/2023	TH	3	Buzzard	1	In flight, Nether Abington.
06/02/2023	TH	3	Carrion crow	-	-
06/02/2023	TH	3	Common gull	30	In flight, Kiln Burn.
06/02/2023	TH	3	Common gull	4	In flight, Abington Strip.
06/02/2023	TH	3	Cormorant	1	In flight, Abington Services.
06/02/2023	TH	3	Goldfinch	-	-
06/02/2023	TH	3	Great tit	-	-
06/02/2023	TH	3	Jackdaw	-	
06/02/2023	TH	3	Magpie	-	-
06/02/2023	TH	3	Mallard	2	Pair on Duneaton Water.
06/02/2023	TH	3	Meadow pipit	-	-
06/02/2023	TH	3	Peregrine falcon	1	-
06/02/2023	TH	3	Rook	-	-

D.4 Scarce Breeding Bird Records

Table D-4 details all records of raptors and owls recorded during surveys, however only Annex 1[1] or Schedule 1[2] species are considered to be scarce breeding birds (i.e. target species). Refer to **Annex B** for survey methodology, **Annex C** for weather data and **Confidential Technical Appendix 7.2** for confidential data relating to peregrine falcon, red kite and short-eared owl recorded during surveys.

Table D-4 Raptor and Owl Records: 2023 Breeding Season

Date	Observer	Species	No.recorded	Sex	Age	Notes
17/03/2023	HEC	Buzzard	-	-	-	-
17/03/2023	TH	Buzzard	3	-	-	-
20/03/2023	JRM	Buzzard	1	-	-	-
20/03/2023	JRM	Buzzard	1	-	-	-
20/03/2023	JRM	Kestrel	1	-	-	Male; hunting.
21/03/2023	JRM	Buzzard	1	-	-	-
21/03/2023	JRM	Buzzard	1	-	-	-
21/03/2023	JRM	Buzzard	1	-	-	-
21/03/2023	JRM	Buzzard	1	-	-	-
04/04/2023	EB	Buzzard	2	-	-	-
04/04/2023	EB	Buzzard	1	-	-	-
04/04/2023	EB	Kestrel	1	-	-	-
04/04/2023	HEC	Buzzard	3	-	-	-
04/04/2023	HEC	Kestrel	1	-	-	-
04/04/2023	TH	Buzzard	3	-	-	-
04/04/2023	TH	Kestrel	1	-	-	-
04/04/2023	ENS	Buzzard	3	-	-	-
05/04/2023	EB	Buzzard	1	-	-	-
05/04/2023	EB	Buzzard	1	-	-	-
05/04/2023	EB	Buzzard	2	-	-	-
05/04/2023	HEC	Buzzard	4	-	-	-
05/04/2023	JRM	Buzzard	2	-	-	Pair.
05/04/2023	JRM	Buzzard	1	-	-	Probable nesting area in small copse south of Knock Leaven.
05/04/2023	JRM	Buzzard	1	-	-	-
05/04/2023	JRM	Kestrel	1	-	-	Hunting.
06/04/2023	JRM	Buzzard	2	-	-	Nesting in Dod Wood.
06/04/2023	JRM	Buzzard	2	-	-	In flight; Harten Hill; pair.
06/04/2023	JRM	Kestrel	2	-	-	Pair; suspected to be nesting in small conifer belt near Red Moss.
07/04/2023	JRM	Buzzard	1	-	-	-
07/04/2023	JRM	Buzzard	2	-	-	In flight; Jack's Law.
07/04/2023	JRM	Buzzard	2	-	-	In flight; Fagyad Hill; displaying.
07/04/2023	JRM	Kestrel	1	-	-	In flight; Whitrae Wood; hunting.
10/04/2023	JRM	Buzzard	4	-	-	In flight, Dod Wood.
10/04/2023	JRM	Kestrel	1	-	-	In flight; Wildshaw Hill; hunting.
14/04/2023	HEC	Buzzard	2	-	-	-
14/04/2023	HEC	Kestrel	1	-	-	In flight, White Rig.
20/04/2023	EB	Buzzard	5	-	-	-
20/04/2023	HEC	Buzzard	2	-	-	-
20/04/2023	HEC	Buzzard	2	-	-	-
01/05/2023	JRM	Buzzard	1	-	-	-

[1] Annex 1 of the EU Bird Directive.

[2] Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).

Date	Observer	Species	No.recorded	Sex	Age	Notes
01/05/2023	JRM	Buzzard	2	-	-	Pair in Dod Wood.
01/05/2023	JRM	Buzzard	1	-	-	In flight; Whiterae Wood; hunting.
01/05/2023	JRM	Buzzard	1	-	-	In flight, west of White Rig.
01/05/2023	JRM	Buzzard	1	-	-	In flight; Fagyad Hill; hunting.
01/05/2023	JRM	Kestrel	1	-	-	-
02/05/2023	JRM	Buzzard	2	-	-	Probable nesting area in small, roadside copse south-west of Dod Wood.
02/05/2023	JRM	Buzzard	5	-	-	In flight, Greenfield Law.
02/05/2023	JRM	Buzzard	6	-	-	In flight, Black Hill.
02/05/2023	JRM	Kestrel	1	-	-	In flight; roadside conifer belt south of White Rig; mobbing crow near a probable nesting area.
02/05/2023	HEC	Buzzard	1	-	-	-
02/05/2023	HEC	Buzzard	2	-	-	-
03/05/2023	JRM	Buzzard	5	-	-	In flight, Duneaton Bridge.
03/05/2023	JRM	Buzzard	1	-	-	In flight; Fagyad Hill; hunting.
03/05/2023	JRM	Buzzard	2	-	-	In flight; Low Gilkerscleugh; pair.
03/05/2023	JRM	Buzzard	1	-	-	-
03/05/2023	JRM	Buzzard	1	-	-	-
03/05/2023	JRM	Buzzard	1	-	-	-
03/05/2023	JRM	Buzzard	1	-	-	Hunting.
03/05/2023	JRM	Kestrel	1	-	-	-
03/05/2023	JRM	Kestrel	1	-	-	-
03/05/2023	HEC	Buzzard	1	-	-	-
03/05/2023	HEC	Buzzard	2	-	-	-
03/05/2023	HEC	Buzzard	1	-	-	-
03/05/2023	HEC	Buzzard	2	-	-	-
03/05/2023	HEC	Kestrel	1	-	-	Male; perched on trees near Craighead Road.
04/05/2023	HEC	Buzzard	2	-	-	-
05/05/2023	TH	Buzzard	-	-	-	-
05/05/2023	JB	Kestrel	2	-	-	Aggressive interaction between 2 males.
29/05/2023	HEC	Buzzard	1	-	-	-
29/05/2023	HEC	Kestrel	2	-	-	Pair; calling.
29/05/2023	HEC	Kestrel	1	-	-	-
29/05/2023	TH	Buzzard	-	-	-	-
30/05/2023	TH	Buzzard	2	-	-	-
30/05/2023	TH	Buzzard	1	-	-	-
30/05/2023	TH	Buzzard	1	-	-	-
30/05/2023	TH	Kestrel	1	-	-	-
31/05/2023	TH	Buzzard	1	-	-	-
31/05/2023	TH	Buzzard	1	-	-	-
31/05/2023	TH	Buzzard	1	-	-	-
31/05/2023	TH	Kestrel	-	-	-	-
06/06/2023	EB	Buzzard	1	-	-	-
06/06/2023	EB	Kestrel	1	-	-	-
06/06/2023	EB	Kestrel	1	-	-	-
06/06/2023	HEC	Buzzard	1	-	-	-
06/06/2023	HEC	Buzzard	1	-	-	-
06/06/2023	HEC	Buzzard	1	-	-	-
06/06/2023	HEC	Kestrel	1	-	-	Female.
07/06/2023	EB	Buzzard	-	-	-	-
07/06/2023	EB	Kestrel	1	-	-	-
07/06/2023	HEC	Buzzard	2	-	-	-
07/06/2023	HEC	Kestrel	3	-	-	-
07/06/2023	HEC	Long-eared owl	1	-	-	Juvenile; begging calls heard only from nesting wood.
08/06/2023	HEC	Buzzard	2	-	-	-
08/06/2023	HEC	Kestrel	2	-	-	-
08/06/2023	JR	Buzzard	1	-	-	-
08/06/2023	JR	Buzzard	1	-	-	-
08/06/2023	JR	Buzzard	1	-	-	-
08/06/2023	JR	Buzzard	1	-	-	-
08/06/2023	JR	Kestrel	1	-	-	Male.
08/06/2023	JR	Kestrel	1	-	-	Male.
12/06/2023	JRM	Buzzard	-	-	-	Nesting at Dod Wood.
12/06/2023	JRM	Buzzard	-	-	-	Nesting at Moor Plantation.
12/06/2023	JRM	Buzzard	1	-	-	In flight; Dod Wood; aggressive interaction with a red kite.
12/06/2023	JRM	Kestrel	1	-	-	Mobbing a buzzard near Moor Plantation; probably nesting in the area.
13/06/2023	JRM	Buzzard	-	-	-	-
13/06/2023	JRM	Kestrel	1	-	-	In flight; Wildshaw Hill; hunting.
13/06/2023	JRM	Kestrel	3	-	-	In flight; roadside conifer belt south of White Rig; family (adult with 2 fledged juveniles).
14/06/2023	JRM	Buzzard	4	-	-	In flight; Drake Law.
14/06/2023	JRM	Buzzard	1	-	-	In flight; Abington Plantation; hunting.
14/06/2023	JRM	Buzzard	-	-	-	Nesting in Whitrae Wood.
19/07/2023	JR	Buzzard	1	-	-	In flight, Craighead Hill.
19/07/2023	JR	Buzzard	-	-	-	Nesting in Dod Wood.
19/07/2023	JR	Buzzard	-	-	-	Nesting in small plantation south of Wildshaw Hill.
19/07/2023	JR	Kestrel	3	-	-	Near Craighead Hill; family; adult with 2 juveniles.
19/07/2023	JR	Osprey	1	Male	Adult	-
20/07/2023	JR	Buzzard	-	-	-	Family at Moor Plantation.
20/07/2023	JR	Buzzard	-	-	-	Family; nesting in strip of woodland south of Craighead.
20/07/2023	JR	Buzzard	3	-	-	In flight; Fagyad Hill; family.
20/07/2023	JR	Osprey	1	Male	Adult	-
20/07/2023	JR	Osprey	1	Male	Adult	-
26/07/2023	EB	Buzzard	10	-	-	-
26/07/2023	EB	Osprey	1	-	-	-
26/07/2023	EB	Sparrowhawk	1	-	-	In flight; Maidencotts; male.
26/07/2023	TH	Buzzard	4	-	-	-
26/07/2023	TH	Kestrel	-	-	-	-
28/07/2023	EB	Buzzard	1	-	-	In flight; Outer Law; calling.
28/07/2023	EB	Buzzard	1	-	-	In flight, Backstane Hill.
28/07/2023	EB	Buzzard	1	-	-	In flight; Netherton Farm; calling.
28/07/2023	EB	Kestrel	2	-	-	In flight, Backstane Hill.
28/07/2023	EB	Kestrel	1	-	-	In flight, Thirstone Quarry.
28/07/2023	HEC	Buzzard	2	-	-	-
28/07/2023	HEC	Buzzard	1	-	-	-
28/07/2023	HEC	Buzzard	2	-	-	In flight, West Thirstone Burn.
28/07/2023	HEC	Buzzard	2	-	-	In flight; Red Moss; calling.
28/07/2023	HEC	Buzzard	1	-	-	In flight; Red Moss; calling.
28/07/2023	HEC	Buzzard	1	-	-	Calling near Black Burn.
28/07/2023	HEC	Buzzard	1	-	-	In flight, east of Thirstone Quarry.

Date	Observer	Species	No.recorded	Sex	Age	Notes
28/07/2023	HEC	Kestrel	1	-	-	-
28/07/2023	HEC	Kestrel	1	-	-	-
28/07/2023	HEC	Kestrel	1	-	-	In flight, Red Moss.
28/07/2023	HEC	Kestrel	1	-	-	In flight; Red Moss; female.
28/07/2023	HEC	Kestrel	1	-	-	In flight, east of Thirstone Quarry.
28/07/2023	JRM	Buzzard	16	-	-	-
28/07/2023	JRM	Kestrel	5	-	-	-
31/07/2023	HEC	Kestrel	1	-	-	Hunting.
02/08/2023	TH	Buzzard	1	-	-	-
02/08/2023	TH	Kestrel	-	-	-	-
02/08/2023	HEC	Buzzard	1	-	-	-
02/08/2023	HEC	Kestrel	1	-	-	-
02/08/2023	HEC	Kestrel	1	-	-	Hunting.
02/08/2023	HEC	Kestrel	3	-	-	-
03/08/2023	HEC	Buzzard	1	-	-	-
07/08/2023	JRM	Buzzard	1	-	-	Perched in small wood south of Knock Leaven; calling.
07/08/2023	JRM	Buzzard	2	-	-	At Dod Wood; family.
07/08/2023	JRM	Buzzard	2	-	-	In flight; Black Hill; family.
07/08/2023	JRM	Buzzard	3	-	-	In flight; Fagyad Hill; family.
07/08/2023	JRM	Kestrel	1	-	-	Alarm calling in small wood near Knock Leaven.
07/08/2023	JRM	Kestrel	1	-	-	Juvenile; in strip of woodland south of Craighead.
07/08/2023	JRM	Kestrel	2	-	-	In flight; Drake Law; family.
07/08/2023	JRM	Sparrowhawk	3	-	-	Family; adult male bringing in food to 2 noisy, fledged juveniles at Low Gilkerscleugh.
11/08/2023	JRM	Buzzard	-	-	-	-
11/08/2023	JRM	Kestrel	2	-	-	In flight; Duneaton Bridge; juvenile males interacting and chasing carrion crows.
11/08/2023	JRM	Kestrel	1	-	-	In flight, Netherton Farm.
11/08/2023	JRM	Kestrel	2	-	-	Landed on overhead line south of Netherton Farm.
16/08/2023	MW	Buzzard	-	-	-	-
16/08/2023	MW	Kestrel	-	-	-	-
16/08/2023	MW	Sparrowhawk	-	-	-	-

D.5 Black Grouse Records

No black grouse or evidence of black grouse was recorded during target surveys or during any other surveys during the baseline survey period. Refer to **Annex B** for survey methodology and **Annex C** for weather data.

D.6 Bird Species Index

A total of 88 bird species or signs was recorded at, or adjacent, to the Site during the ornithological surveys.

Table D-5 comprises a list of all these species along with their conservation status.

Table D-5 All Bird Species Recorded at M74 West Renewable Energy Park (September 2022 to August 2023)

Species	Conservation status	Species	Conservation status
Blackbird	BoCC[3] Green	Long-eared owl	BoCC Green
Blackcap	BoCC Green	Long-tailed tit	BoCC Green
Black-headed gull	BoCC Amber	Magpie	BoCC Green
Blue tit	BoCC Green	Mallard	BoCC Amber
Buzzard	BoCC Green	Meadow pipit	BoCC Amber
Canada goose	No status	Merlin	Annex 1, Schedule 1, BoCC Red
Carrion crow	BoCC Green	Mistle thrush	BoCC Red
Chaffinch	BoCC Green	Nuthatch	BoCC Green
Chiffchaff	BoCC Green	Osprey	Annex 1, Schedule 1, BoCC Amber
Coal tit	BoCC Green	Oystercatcher	BoCC Amber
Collared dove	BoCC Green	Peregrine falcon	Annex 1, Schedule 1, BoCC Green
Common crossbill	Schedule 1, BoCC Green	Pheasant	No status
Common gull	BoCC Amber	Pied wagtail	BoCC Green
Common sandpiper	BoCC Amber	Pink-footed goose	BoCC Amber
Common whitethroat	BoCC Amber	Raven	BoCC Green
Cormorant	BoCC Green	Red grouse	BoCC Green
Cuckoo	BoCC Red	Red kite	Annex 1, Schedule 1, BoCC Green
Curlew	BoCC Red	Red-legged partridge	No status
Dipper	BoCC Amber	Redshank	BoCC Amber
Dunnock	BoCC Amber	Redwing	Schedule 1, BoCC Amber
Feral pigeon	BoCC Green	Reed bunting	BoCC Amber
Fieldfare	Schedule 1, BoCC Red	Ring ouzel	BoCC Red
Goldcrest	BoCC Green	Ringed plover	BoCC Red
Golden plover	Annex 1, BoCC Green	Robin	BoCC Green
Goldfinch	BoCC Green	Rook	BoCC Amber
Goosander	BoCC Green	Sand martin	BoCC Green
Goshawk	Schedule 1, BoCC Green	Sedge warbler	BoCC Amber
Great black-backed gull	BoCC Amber	Short-eared owl	Annex 1, BoCC Amber
Great spotted woodpecker	BoCC Green	Siskin	BoCC Green
Great tit	BoCC Green	Skylark	BoCC Red
Grey heron	BoCC Green	Snipe	BoCC Amber
Grey wagtail	BoCC Amber	Song thrush	BoCC Amber
Greylag goose	BoCC Amber	Sparrowhawk	BoCC Amber
Herring gull	BoCC Red	Starling	BoCC Red
House martin	BoCC Red	Stonechat	BoCC Green
House sparrow	BoCC Red	Swallow	BoCC Green
Jackdaw	BoCC Green	Swift	BoCC Red
Jay	BoCC Green	Treecreeper	BoCC Green
Kestrel	BoCC Amber	Wheatear	BoCC Amber
Lapwing	BoCC Red	Whinchat	BoCC Red
Lesser black-backed gull	BoCC Amber	Willow warbler	BoCC Amber
Lesser redpoll	BoCC Red	Woodcock	BoCC Red
Linnet	BoCC Red	Woodpigeon	BoCC Green
Little grebe	BoCC Green	Wren	BoCC Green

[3] BoCC – Birds of Conservation Concern (Stanbury *et al.* 2021).

ANNEX E. COLLISION RISK ASSESSMENT

Delaunay Triangulation[1] from the proposed turbine locations was used to create a wind farm area[2] and from this the Collision Risk Analysis Area (CRAA) was created using a 500 metre (m) buffer (**Figure 7.1**). Using the larger 500 m area around the turbines accounts for possible inaccuracies in the recording of flightlines and ensures the assessment is precautionary.

The ultimate aim is to have 100 % coverage of the turbines and associated CRAA by the viewsheds, however in practice this is often unachievable as a result of the topography of a survey area, presence of mature forestry and limitations of access to Vantage Point (VP) locations outwith access permissions. For the Proposed Development, although some small areas of the CRAA remain 'unseen' at 20 m above ground level (**Figure 7.2** and **7.3, EIAR Volume 3a**), the habitat within these areas is of sufficient similarity such that the survey data collected and subsequently assessed are considered to be representative of the whole CRAA. In addition, there were no records made during field surveys which would suggest that any areas 'unseen' from VPs adopted for survey were of differing importance for target species. Furthermore, the flying time at risk height (secsHahr^{-1}) for each species is calculated as a single mean activity rate within the entirety of the CRAA.

On account of the final turbine layout for the Proposed Development flight activity data recorded from VP 6 and 7 (**Figure 7.2, EIAR Volume 3a**) have been excluded from analysis as the viewsheds of these VPs do not overlap with the CRAA; covering the area to the south west of the turbine array.

Flight activity recorded from these VPs is therefore not identified as being 'at risk'. Flight activity data collected from all VPs is however presented within **Technical Appendix 7.1, Annex X (EIAR Volume 4)**, for transparency and to provide additional species context.

Table E-1, Table E2 and **Table E-3** present the parameters which apply to each Collision Risk Model (CRM).

Table E-1 Wind Farm Parameters

Size of wind farm envelope	1148.24	hectares (ha)
Number of turbines	23	turbines
Rotor diameter	155	metres (m)
Hub height	122.5	m
Max. rotor depth	0.879984753	m (at 15° pitch angle)
Max. chord	3.4	m
Pitch	15	degrees (°)
Rotation period	3.16	seconds (secs)
Turbine operation time	85	percent (%)
Risk height: highest	200	m
Risk height: lowest	45	m
Flight risk volume	1779767392	m^3

Table E-2 CRM Parameters per Species

Species	Length (m)	Wingspan (m)	Assumed flight speed, v (ms^{-1})	Avoidance rate	Probability of collision	Bird transit time (secs)
Curlew	0.6	1	13	0.98	0.085	0.114
Greylag goose	0.66	1.95	12	0.99	0.097	0.128
Herring gull	0.64	1.5	12.8	0.98	0.089	0.119
Lapwing	0.31	0.87	11.9	0.98	0.069	0.100
Pink-footed goose	0.675	1.52	17.3	0.998	0.072	0.090
Red kite	0.66	1.95	12	0.99	0.097	0.128

Table E-3 Visible Area within the CRAA per Vantage Point

VP	Area (ha)
1	43.535
2	461.564
3	323.361
4	487.264
5	88.730
8	331.168
9	466.941
10	124.047

Birds are assumed to be active during all the daylight hours and this is estimated by calculating the number of hours per day between sunrise and sunset (adjusting for correct latitude) for the survey seasons as defined in **Table E-4** below.

Table E-4 Season Definitions per Species/Species Group

Species	Breeding season			Non-breeding season		
	Start date	End date	Hours presumed present	Start date	End date	Hours presumed present
Curlew[3]	08th March	02nd August	2292.062	03rd August	07th March	2203.701
Greylag goose	15th May	31st August	1793.795	01st September	14th May	2701.969
Herring gull	15th May	31st August	2646.545	01st September	14th March	1849.218
Lapwing[4]	01st April	31st July	1970.438	27th July	31st March	2525.326
Pink-footed goose	15th May	31st August	1793.795	01st September	14th May	2701.969
Red kite	15th March	31st August	2646.545	01st September	14th March	1849.218

Outputs for the CRM for each species listed in **Table E-4** are presented in the tables below.

[1] Delaunay triangulation is a form of mathematical/computational geometry where a given set of points (in this case the turbine locations) are all joined to create discrete triangles. Further information is available here: https://uk.mathworks.com/help/matlab/math/delaunay-triangulation.html

[2] This was adjusted where appropriate depending on the spatial location of the turbines in relation to other turbines.

[3] Based on species occupancy recorded within the survey area.

[4] Based on the start of observations of post-breeding flocks recorded during surveys in July.

E.2 Curlew

Non-Breeding Season 2022/2023

Table E-5 Curlew flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	1545.490	0
2	0	14077.713	0
3	0	9700.816	0
4	0	12912.495	0
5	0	2661.910	0
8	0	0	0
9	0	0	0
10	0	0	0

Table E-6 Curlew mortality estimates

Mean activity in wind farm at rotor height	0	hr^{-1}
Total Combined rotor swept volume	614374.526	m^3
Bird occupancy	0	hrs/season
Bird occupancy of rotor swept volume	0	bird-sec
No. of transits through rotors	0	per season
Estimated collisions	0	per season
Estimated collisions after correction for operation	0	per season
Estimated collisions after avoidance factor	0	per season
Equivalent to 1 bird every	-	seasons

Breeding Season 2023

Table E-7 Curlew flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	21.767	0
2	0	16385.535	0
3	0	1940.163	0
4	43.083	4629.008	0.000000234
5	0	532.382	0
8	22.917	9935.031	0.000000124
9	491.773	14008.233	0.00000267
10	63.960	3721.398	0.000000347

Table E-8 Curlew mortality estimates

Mean activity in wind farm at rotor height	0.004	hr^{-1}
Total Combined rotor swept volume	614374.526	m^3
Bird occupancy	8.882	hrs/season
Bird occupancy of rotor swept volume	11.038	bird-sec
No. of transits through rotors	96.956	per season
Estimated collisions	8.194	per season
Estimated collisions after correction for operation	6.965	per season
Estimated collisions after avoidance factor	0.139	per season
Equivalent to 1 bird every	7.179	seasons

E.3 Greylag goose

Non-Breeding Season 2022/2023

Table E-9 Greylag goose flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	1567.258	0
2	116.093	24924.476	0.000000427
3	0	11640.979	0
4	0	17541.503	0
5	0	3194.292	0
8	0	5961.019	0
9	137.500	8404.940	0.000000506
10	0	2232.839	0

Table E-10 Greylag goose mortality estimates

Mean activity in wind farm at rotor height	0.001	hr^{-1}
Total Combined rotor swept volume	707777.021	m^3
Bird occupancy	2.896	hrs/season
Bird occupancy of rotor swept volume	4.146	bird-sec
No. of transits through rotors	41.581	per season
Estimated collisions	3.351	per season
Estimated collisions after correction for operation	2.848	per season
Estimated collisions after avoidance factor	0.006	per season
Equivalent to 1 bird every	175.564	seasons

Breeding Season 2023

Table E-11 Greylag goose flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	0	0
2	0	8308.1587	0
3	0	0	0
4	0	0	0
5	0	0	0
8	0	5961.0185	0
9	0	8404.9399	0
10	0	2232.8389	0

Table E-12 Greylag goose mortality estimates

Mean activity in wind farm at rotor height	0	hr^{-1}
Total Combined rotor swept volume	707777.021	m^3
Bird occupancy	0	hrs/season
Bird occupancy of rotor swept volume	0	bird-sec
No. of transits through rotors	0	per season
Estimated collisions	0	per season
Estimated collisions after correction for operation	0	per season
Estimated collisions after avoidance factor	0	per season
Equivalent to 1 bird every	0	seasons

E.4 Herring gull

Non-Breeding Season 2022/2023

Table E-13 Herring gull flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	1545.490	0
2	0	14077.713	0
3	0	9700.816	0
4	0	17541.503	0
5	0	3194.292	0
8	0	0	0
9	0	0	0
10	0	0	0

Table E-14 Herring gull mortality estimates

Mean activity in wind farm at rotor height	0	hr^{-1}
Total Combined rotor swept volume	630979.414	m^3
Bird occupancy	0	hrs/season
Bird occupancy of rotor swept volume	0	bird-sec
No. of transits through rotors	0	per season
Estimated collisions	0	per season
Estimated collisions after correction for operation	0	per season
Estimated collisions after avoidance factor	0	per season
Equivalent to 1 bird every	0	seasons

Breeding Season 2023

Table E-15 Herring gull flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	21.767	0
2	0	19154.921	0
3	0	1940.163	0
4	0	0	0
5	0	0	0
8	61.290	11922.037	0.000000313
9	0	16809.880	0
10	0	4465.678	0

Table E-16 Herring gull mortality estimates

Mean activity in wind farm at rotor height	0.000360	hr^{-1}
Total Combined rotor swept volume	630979.414	m^3
Bird occupancy	0.953	hrs/season
Bird occupancy of rotor swept volume	1.216	bird-sec
No. of transits through rotors	10.238	per season
Estimated collisions	0.914	per season
Estimated collisions after correction for operation	0.777	per season
Estimated collisions after avoidance factor	0.016	per season
Equivalent to 1 bird every	64.358	seasons

E.5 Lapwing

Non-Breeding Season 2022/2023

Table E-17 Lapwing flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	1567.258	0
2	0	19385.704	0
3	0	11640.979	0
4	132.347	17541.503	0.000000625
5	0	3194.292	0
8	0	1987.006	0
9	0	2801.647	0
10	0	744.280	0

Table E-18 Lapwing mortality estimates

Mean activity in wind farm at rotor height	0.001	hr^{-1}
Total Combined rotor swept volume	493989.088	m^3
Bird occupancy	1.811	hrs/season
Bird occupancy of rotor swept volume	1.810	bird-sec
No. of transits through rotors	18.096	per season
Estimated collisions	1.243	per season
Estimated collisions after correction for operation	1.056	per season
Estimated collisions after avoidance factor	0.021	per season
Equivalent to 1 bird every	47.342	seasons

Breeding Season 2023

Table E-19 Lapwing flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	0	0
2	14278.883	11077.545	0.000133712
3	0	0	0
4	0	0	0
5	0	0	0
8	0	7948.025	0
9	0	8404.940	0
10	35.750	2232.839	0.000000335

Table E-20 Lapwing mortality estimates

Mean activity in wind farm at rotor height	0.154	hr^{-1}
Total Combined rotor swept volume	493989.088	m^3
Bird occupancy	303.286	hrs/season
Bird occupancy of rotor swept volume	303.046	bird-sec
No. of transits through rotors	3030.498	per season
Estimated collisions	208.085	per season
Estimated collisions after correction for operation	176.872	per season
Estimated collisions after avoidance factor	3.537	per season
Equivalent to 1 bird every	0.283	seasons

E.6 Pink-footed goose

Non-Breeding Season 2022/2023

Table E-21 Pink-footed goose flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	1567.258	0
2	2150.079	24924.476	0.00000791
3	0	11640.979	0
4	3204.146	17541.503	0.00001179
5	0	3194.292	0
8	0	5961.019	0
9	0	8404.940	0
10	0	2232.839	0

Table E-22 Pink-footed goose mortality estimates

Mean activity in wind farm at rotor height	0.0226	hr^{-1}
Total Combined rotor swept volume	645508.691	m^3
Bird occupancy	61.143	hrs/season
Bird occupancy of rotor swept volume	79.834	bird-sec
No. of transits through rotors	888.195	per season
Estimated collisions	63.801	per season
Estimated collisions after correction for operation	54.231	per season
Estimated collisions after avoidance factor	0.108	per season
Equivalent to 1 bird every	9.220	seasons

Breeding Season 2023

Table E-23 Pink-footed goose flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	0	0
2	0	8308.159	0
3	0	0	0
4	0	0	0
5	0	0	0
8	0	5961.019	0
9	0	8404.940	0
10	0	2232.839	0

Table E-24 Pink-footed goose mortality estimates

Mean activity in wind farm at rotor height	0	hr^{-1}
Total Combined rotor swept volume	645508.691	m^3
Bird occupancy	0	hrs/season
Bird occupancy of rotor swept volume	0	bird-sec
No. of transits through rotors	0	per season
Estimated collisions	0	per season
Estimated collisions after correction for operation	0	per season
Estimated collisions after avoidance factor	0	per season
Equivalent to 1 bird every	0	seasons

E.7 Red kite

Non-Breeding Season 2022/2023

Table E-25 Red kite flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0.000	1545.490	0
2	46.065	14077.713	0.000000278
3	0.000	9700.816	0
4	230.575	17541.503	0.000001391
5	167.973	3194.292	0.000001013
8	0	0	0
9	0	0	0
10	0	0	0

Table E-26 Red kite mortality estimates

Mean activity in wind farm at rotor height	0.00308	hr^{-1}
Total Combined rotor swept volume	639281.858	m^3
Bird occupancy	5.693	hrs/season
Bird occupancy of rotor swept volume	7.362	bird-sec
No. of transits through rotors	57.368	per season
Estimated collisions	5.553	per season
Estimated collisions after correction for operation	4.720	per season
Estimated collisions after avoidance factor	0.047	per season
Equivalent to 1 bird every	21.188	seasons

Breeding Season 2023

Table E-27 Red kite flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0	21.767	0
2	67.308	19154.921	0.000000344
3	0	1940.163	0
4	0	0	0
5	0	0	0
8	0	11922.037	0
9	0	16809.880	0
10	379.745	4465.678	0.000001942

Table E-28 Red kite mortality estimates

Mean activity in wind farm at rotor height	0.003	hr^{-1}
Total Combined rotor swept volume	639281.858	m^3
Bird occupancy	6.948	hrs/season
Bird occupancy of rotor swept volume	8.984	bird-sec
No. of transits through rotors	70.008	per season
Estimated collisions	6.776	per season
Estimated collisions after correction for operation	5.760	per season
Estimated collisions after avoidance factor	0.058	per season
Equivalent to 1 bird every	17.362	seasons

Technical Appendix 7.2: Ornithology
Confidential

Technical Appendix 7.3: Ornithology, including:

Document Quality Record

Version	Status	Person Responsible	Date
0.1	Draft	Nicole Robinson	16/07/2024
0.2	Reviewed	S. Sanders	16/07/2024
0.3	Updated	Nicole Robinson	17/07/2024
1	Internal Approval	Nicole Robinson	14/08/2024

M74 West Renewable Energy Park

Ornithology Assessment Methodology and Cumulative Baseline

Appendix 7.3

Date: 14/08/2024

Tel: 0141 342 5404

Web: www.macarthurgreen.com

Address: 93 South Woodside Road | Glasgow | G20 6NT

CONTENTS

1 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA 2

1.1 Feature Sensitivity 2

1.2 Effect Magnitude 2

1.3 Significance Criteria 3

2 CUMULATIVE ASSESSMENT AND BASELINE 3

1 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

The assessment of potentially significant effects upon ornithological features presented in **Chapter 7: Ornithology** of the Environmental Impact Assessment (EIA) Report **(EIAR Volume 2)** has been undertaken following the principles of CIEEM guidance (2018[i]) and has included the following stages:

- Identification of potential impacts associated with the Proposed Development and the likelihood of occurrence of effects on an ornithological feature.
- Establishing the sensitivity of an ornithological feature to potential impacts based on the features Nature Conservation Importance (NCI) and conservation status.
- Characterisation of effect magnitude (both spatially and temporally).
- Determination of effect significance, and whether or not the consequent effect is significant with respect to the EIA Regulations.
- Outline of mitigation measures to avoid and reduce any potentially significant effects.
- Determination the significance of any residual effects after such measures.
- Identification of appropriate compensation measures to offset any significant residual effects.

1.1 Feature Sensitivity

The sensitivity of ornithological features on or near to the Proposed Development is assessed in line with best practice guidance, legislation, statutory designations and/or professional judgement.

Determination of the overall level of sensitivity of an ornithological feature, adopted for the purposes of assessment, is based on a combination of the feature's NCI and conservation status.

There are three levels of NCI as detailed in **Table 7-3-1.** Important Ornithological Features ('IOFs', as per CIEEM, 2022[i]) for the purposes of assessment, are taken to be those species of 'high' or 'medium' NCI.

Table 7-3-1 Ornithological Feature Sensitivity Criteria.

Sensitivity	Description
High	Populations receiving protection by an SPA, proposed SPA, Ramsar Site, SSSI or which would otherwise qualify under selection guidelines. Species present in nationally important numbers (>1 % national breeding or wintering population).
Medium	The presence of breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981. The presence of species listed in Annex I of the Birds Directive (but population does not meet the designation criteria under selection guidelines). The presence of rare, Red-listed breeding species noted on the latest Birds of Conservation Concern ('BoCC') Red list (Stanbury *et al.*, 2021[ii]). Regularly occurring migratory species, which are either rare or vulnerable, or warrant special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the proposed development. Species present in regionally important numbers (>1 % regional breeding population).
Low	All other species' populations not covered by the above categories.

As defined by NatureScot (SNH, 2018a[iii]), the conservation status of a species is "*the sum of the influences acting on it which may affect its long-term distribution and abundance, within the geographical area of interest*". Conservation status is considered by NatureScot (SNH, 2018a[iii]) to be 'favourable' under the following circumstances:

- "*population dynamics indicate that the species is maintaining itself on a long-term basis as a viable component of its habitats;*
- *the natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future; and*
- *there is (and probably will continue to be) a sufficiently large habitat to maintain its population on a long-term basis.*"

NatureScot (SNH, 2018a[iii]) recommends that "*the concept of favourable conservation status of a species should be applied at the level of its Scottish population, to determine whether an impact is sufficiently significant to be of concern. An adverse impact on a species at a regional scale (within Scotland) may adversely affect its national conservation status*". Thus, "*An impact should therefore be judged as of concern where it would adversely affect the existing favourable conservation status of a species or prevent a species from recovering to favourable conservation status, in Scotland.*"

In the case of non-designated sites in Scotland, the relevant regional context for many breeding species is considered to be the appropriate Natural Heritage Zone (NHZ) (SNH, 2018a[iii]) within which a development is located. In the case of the Proposed Development, this is NHZ 19 'Western Southern Uplands and Inner Solway".

For wintering or migratory species, the national UK population or flyway population is considered to be the relevant scale for determining effects on the conservation status.

1.2 Effect Magnitude

An effect is defined as a change of a particular magnitude to the abundance and/or distribution of a population as a result of the Proposed Development. effects can be adverse, neutral, or beneficial.

In determining the magnitude of effects, the resilience of a population to recover from temporary adverse conditions is considered in respect of each potentially affected population.

The sensitivity of individual species to anthropogenic activities is considered when determining spatial and temporal magnitude of an effect and is assessed using guidance described by Goodship & Furness (2022[iv]).

Effects are judged in terms of magnitude in space and time. There are five levels of spatial and temporal effect magnitude as detailed in **Table 7-3-2** and **Table 7-3-3** respectively.

Table 7-3-2 Spatial Magnitude of Effect.

Spatial Magnitude	Description
Very high	Total/near total loss of a bird population due to mortality or displacement. Total/near total loss of productivity in a bird population due to disturbance. Guide: >80 % of population lost or increase in additive mortality.

Spatial Magnitude	Description
High	Major reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 21-80 % of population lost or increase in additive mortality.
Medium	Partial reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 6-20 % of population lost or increase in additive mortality.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 1-5 % of population lost or increase in additive mortality.
Negligible	Very slight (or no discernible) reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Reduction barely discernible, approximating to the "no change" situation. Guide: <1 % of population lost or increase in additive mortality.

Table 7-3-3 Temporal Magnitude of Effect.

Temporal Magnitude	Description
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken as approximately 25-30 years), except where there is likely to be substantial improvement after this period. Where this is the case, long-term may be more appropriate.
Long-term	Approximately 15-25 years or longer (see above).
Medium-term	Approximately 5-15 years.
Short-term	Up to approximately 5 years.
Negligible	<12 months.

1.3 Significance Criteria

The potential significance of effect was determined through a standard method of assessment based on professional judgement, considering both feature sensitivity and magnitude of effect as detailed in **Table 7-3-4**.

Major and moderate effects are considered 'significant' in the context of the EIA Regulations.

Table 7-3-4 Significance Criteria.

Significance of Effect	Description
Major	The impact is likely to result in a long-term significant effect on the integrity of a feature.
Moderate	The impact is likely to result in a medium term, potentially significant effect on the integrity of a feature.
Minor	The impact is likely to affect a feature at an insignificant level by virtue of its limitations in terms of duration or extent, but there will probably be no effect on its integrity.
Negligible	No material effect.

2 CUMULATIVE ASSESSMENT AND BASELINE

The potential for significant cumulative effects is assessed for the Proposed Development in-combination with:

- Existing wind farm developments, either operational or under construction;
- Consented wind farm developments, awaiting implementation; and,
- Wind farm applications awaiting determination within the planning process with design information in the public domain.

Proposed wind farms that are going through Planning are included (where information is available), but it should be noted that such projects may be subject to design changes prior to consent.

Projects that are at the pre-Planning stage (i.e. Scoping) are not included as the impact assessment is yet to be carried out for such projects and so any meaningful information to inform the assessment is not available.

Those developments which have been withdrawn and/or refused are not considered unless an appeal is currently in progress and information is available.

Small wind farm developments, including those with three turbines or less, have also been scoped out of consideration for potentially significant cumulative effects as applications for such developments do not generally consider the potential for impacts upon ornithological features in sufficient detail.

With regards to the spatial extent of the cumulative assessment, NatureScot guidance (SNH, 2018a[iii]) recommends that cumulative effects should typically be assessed at the relevant regional NHZ scale. The potential for significant cumulative effects is therefore assessed at the NHZ 19 geographical scale, within which the Proposed Development is located.

Table 7-3-5 provides a summary of those other wind farm developments in NHZ 19 which have been considered within the cumulative assessment. No additional relevant developments were outlined by consultees for inclusion within the cumulative assessment for the Proposed Development (see **Technical Appendix 1.1: Consultation Register** of **Chapter 1: Introduction, EIAR Volume 4**).

Table 7-3-5 Relevant Cumulative Wind Farm Developments in NHZ 19.

Development	Development Stage	No. of Turbines	Relevant Information Available
Afton	Operational	27	ES (variation), Non-technical summary (NTS)
Airies	Operational	14	ES chapter
Andershaw	Operational	11	ES chapter
Arecleoch	Operational	60	ES chapter
Arecleoch Extension	Operational	13	EIA Chapter
Artfield Fell	Operational	15	No information available
Balmurrie Fell (Artfield Fell Extension)	Operational	7	NTS
Bankend Rig	Operational	11	No information available
Blackcraig Hill	Operational	23	NTS
Carscreugh	Operational	18	ES chapter
Clyde	Operational	152	ES chapter
Dalswinton (Pennyland Moor)	Operational	15	ES chapter
Dersalloch	Operational	23	ES chapter, 2006 and 2012 addendum
Dungavel	Operational	13	ES chapter
Galawhistle	Operational	22	ES chapter
Glen App	Operational	11	ES chapter
Glenchamber	Operational	11	No information available
Hare Hill Phase 1	Operational	20	No information available
Hare Hill Phase 2	Operational	35	No information available
Harestanes	Operational	68	ES chapter
Harting Rig / Kype Muir Extension	Operational	18	ES chapter
Kennoxhead	Operational	19	ES chapter
Kilgallioch (Arecleoch Phase 2)	Operational	96	ES chapter and addendum
Kype Muir	Operational	26	ES chapter
Mark Hill	Operational	28	Non-technical Summary

Development	Development Stage	No. of Turbines	Relevant Information Available
Middle Muir	Operational	15	ES chapter
Minnygap	Operational	10	Operational monitoring report
Nutberry	Operational	6	ES chapter
Sanquhar Community Windfarm	Operational	9	SEI chapter
South Kyle	Operational	50	ES chapter
Twentyshilling Hill	Operational	9	ES chapter
Wether Hill	Operational	14	ES Technical Appendix and subsequent monitoring reports
Whiteside Hill	Operational	10	NTS
Windy Rig	Operational	12	SEI chapter
Windy Standard - Phase 1	Operational	36	No information available
Windy Standard - Phase 2	Operational	30	No information available
Benbrack	Construction	18	ES chapter
Cumberhead	Construction	11	ES chapter
Enoch Hill	Construction	16	ES chapter
Hagshaw Hill Repowering	Construction	14	EIA Chapter
North Kyle	Construction	54	ES Chapter
Stranoch 2	Construction	20	ES chapter
Chirmorie	Consented	21	ES chapter
Cornharrow	Consented	7	EIA Chapter
Crookedstane	Consented	4	ES chapter
Fell Wind Farm	Consented	9	EIA Chapter
Gass	Consented	9	ES chapter
Glenmuckloch	Consented	8	ES chapter
Hare Craig	Consented	8	EIA chapter
Kilgallioch Extension	Consented	11	EIA Chapter
Knockman Hill	Consented	5	Environmental Report
Lethans	Consented	22	ES chapter
Lion Hill (Crookedstane 2)	Consented	4	ES chapter
Lorg	Consented	9	ES chapter
Margree	Consented	9	EIA Chapter
Mochrum Fell	Consented	8	ES chapter
Over Hill	Consented	10	ES chapter
Pencloe	Consented	19	ES chapter
Polquhairn	Consented	9	ES chapter
Sandy Knowe	Consented	24	ES chapter
Sanquhar 2	Consented	50	ES Chapter
Sanquhar Six	Consented	6	ES chapter
Troston Loch	Consented	14	EIA Chapter
Windy Standard - Phase 3	Consented	20	ES
Shepherds' Rig	Consented	17	ES chapter
Bodinglee	Application	37	EIA Chapter
Carrick	Application	13	EIA Chapter
Cloud Hill	Application	11	EIA Chapter
Daer	Application	17	EIA Chapter
Euchanhead	Application	21	EIA Chapter
Harestanes South Extension	Application	8	EIA Chapter
Knockkippen	Application	12	EIA Chapter
Lorg	Application	12	EIA Chapter
Magheuchan Rig	Application	12	No information available
Mid Moile	Application	15	EIA Chapter
Sclenteuch	Application	9	EIA Chapter
The Drum	Application	8	EIA Chapter

[i] Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (version 1.2). Chartered Institute of Ecology and Environmental Management, Winchester: Chartered Institute of Ecology and Environmental Management (CIEEM): September 2018, updated April 2022.

[ii] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds*, **114**, pp. 723-747

[iii] Scottish Natural Heritage (2018a). Assessing significance of impacts from onshore windfarms on birds out with designated areas. Version 2.

[iv] Goodship, N.M. and Furness, R.W. (MacArthur Green) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.