Carn Fearna Wind Farm

Technical Appendix 9.1: Ornithology Methodology and Results

avianecology

CONTENTS

ANNEXES

1 INTRODUCTION

1.1.1 This Technical Appendix has been prepared to accompany **Chapter 9: Ornithology**, in **Volume 2**, of the Environmental Impact Assessment (EIA) Report for Carn Fearna Wind Farm (the Proposed Development).

1.1.2 It presents details of data gathering methodologies and results, gathered from ornithological desk studies and field surveys, in order to inform the design and assessment of the Proposed Development**.**

1.1.3 It should be read with reference to the following figures, which are included within **Volume 3a** of the EIA Report:

- **Figure 9.1**: Ornithological Statutory Designated Sites for Nature Conservation.
- **Figure 9.2**: Vantage Point Flight Activity Survey Plan.
- **Figure 9.3**: Breeding Bird Survey Plan.
- **Figure 9.4a**: Target Species Flight Activity – Waders (Year 1).
- **Figure 9.4b**: Target Species Flight Activity – Raptors and Owls (Year 1).
- **Figure 9.4c**: Target Species Flight Activity – Other Species (Year 1).
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- **Figure 9.6a**: Moorland Breeding Bird Survey Results (Year 1).
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- **Confidential Figure 9.8a**: Breeding Annex 1/Schedule 1 Raptor and Owl (Year 1).
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- **Confidential Figure 9.9a**: Breeding Black Grouse Leks (Year 1).
- **Confidential Figure 9.9b**: Breeding Black Grouse Leks (Year 2).
- **Confidential Figure 9.9c**: Breeding Black Grouse Leks (Years 1 and 2 Combined).

1.1.4 Information considered sensitive, principally concerning nesting location information of Schedule 1 species and the location of black grouse leks, is provided separately in **Technical Appendix 9.2: Confidential Ornithology**, with accompanying **Confidential Figures 9.7a** to **9.9c**, as listed above. Furthermore, **Technical Appendix 9.4: GET Model** is also considered confidential. This sensitive/confidential information will not be made publicly available, but will be provided to the Scottish Government, NatureScot, The Highland Council (THC) and the Royal Society for the Protection of Birds (RSPB).

1.1.5 Only common bird species names are referred to within the main body of this Technical Appendix. **Annex 1** provides a summary of all bird species referred to herein and within **Chapter 9**, and all other associated appendices and figures. Both common and scientific species names together with a summary of their conservation status, as relevant, is provided.

1.2 Site Overview

1.2.1 The land identified for the Proposed Development ('the site') is located on the land at Carn Fearna, near Garve, in Ross-shire, Highlands.

1.2.2 The site is upland in nature and comprises a mosaic of boggy, rough pasture, moorland with some heather, some early-stage woodland regeneration and some limited semi-mature forestry plantation. Mixed livestock grazing within the site has resulted in a mixture of sward lengths.

1.2.3 The site is located within Natural Heritage Zone (NHZ) 7: Northern Highlands.

1.3 Key Guidance

1.3.1 Ornithology survey methodologies and subsequent interpretation of results has made reference to the following key industry standard guidance, including that produced by NatureScot (formerly Scottish Natural Heritage (SNH)):

- SNH (2016). *Assessing connectivity with Special Protection Areas (SPAs).* Guidance. Version 3 – June 2016.
- SNH (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Version 2. March 2017.
- SNH (2018). *Assessing significance of impacts from onshore wind farm outwith designated areas*. Guidance. Version 2 – February 2018.
- Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022). *Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species*. NatureScot Research Report 1283.
- 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: 723-747.
- Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013). *Raptors: a field guide to survey and monitoring.* Third Edition. The Stationary Office, Edinburgh.
- Gilbert, G., Gibbons, D.W. and Evans, J. (1998). *Bird monitoring methods.* A manual of techniques for key UK species. RSPB, Sandy, Bedfordshire.
- Brown, A.F. and Shepherd, K.B. (1993). A method for censusing upland breeding waders. *Bird Study* 40, 189-195.

1.4 Target Species

1.4.1 In accordance with NatureScot guidance (SNH, 2017), the surveys focused on 'target' species. These were identified as being those species which are afforded a higher level of legislative protection and are potentially most sensitive to wind farm developments, and were based on the following lists:

- Annex I of the EC Birds Directive (2009/147/EC);
- Schedule 1 of the Wildlife & Countryside Act 1981;
- Red-listed Birds of Conservation Concern (Stanbury, *et al*. (2021)); and
- Other species which may be at risk to wind farm developments, such as some ducks and herons, are also included as target species.

1.4.2 This has ensured inclusion of qualifying interests of designated sites for nature conservation (see **Table 2.2**) and "*Priority bird species for assessment when considering the development of onshore wind farms in Scotland*" as per NatureScot guidance (SNH, 2018). For each specific survey type, the target species considered are also confirmed in **Section 2**.

1.4.3 The target species likely most relevant for the Proposed Development (and in some cases which were considered for the requirement of targeted species-specific surveys) were identified through desk study and an initial reconnaissance visit (carried out in early September 2019), on the basis of known species distributions or likely presence in the vicinity of the site, and the likely sensitivity of such species to the Proposed Development. The scope of surveys (and target species to consider) was confirmed with NatureScot through informal consultation in September 2019 (see **Chapter 9** for further details).

2 METHODOLOGY

2.1 Desk Study

2.1.1 In accordance with NatureScot guidance (SNH, 2017), a desk study was undertaken with the aim of obtaining relevant supplementary information, to provide context to the field survey data and to inform the EIA Report.

2.1.2 The desk study comprised a review of sources summarised in **Table 2.1**.

Table 2.1: Desk study sources.

Key Source	Information Sought	Search Area
NatureScot Sitelink[1]	Statutory designated sites for nature conservation with qualifying ornithological interests.	Within 10 km of the site, extended to 20 km for internationally designated sites with migratory pink-footed geese and greylag geese as a qualifying interest (see **Figure 9.1**).
Mitchell, C. (2012) report on distribution of geese in Scotland.	Identification of regularly utilised foraging areas by wintering geese in the vicinity of the site.	The site and immediately surrounding area.
RSPB	Existing ornithological records of all species.	Within 6 km of the central grid reference (NH 41691 62618) for all species, extended to 10 km for eagle species.

[1] Available from: https://sitelink.nature.scot/map (Accessed 16/01/2025).

Key Source	Information Sought	Search Area
Highland Biological Recording Group (HBRG)	Existing ornithological records and non-statutory designated sites.	Existing ornithological records and non-statutory designated sites, within 2 km of the site, extended to 10 km for Annex 1/ Schedule 1 raptors.
Highland Raptor Study Group (HRSG)	Existing records of scarce breeding and roosting raptors and owls.	Within 2 km of the central grid reference (NH 41691 62618) for species, extended to 6 km for eagle species.
Publicly available wind farm application data	The documentation which supported the previous Carn Gorm Wind Farm application (Ref: 13/04791/FUL; 5th September 2014), which was within the site.	Relevant ornithological records within the site.

2.2 Field Surveys

2.2.1 Detailed knowledge of bird populations, distributions and flight activity has been derived from field surveys undertaken between 2019 and 2021, in order to predict the potential effects of the Proposed Development upon ornithological features.

2.2.2 The identification of target species and scope of surveys undertaken was informed through consultation with NatureScot (in September 2019), proximity to designated sites and existing knowledge of sensitive species as derived from desk study (all consultation is summarised in **Table 9.1** of **Chapter 9**).

2.2.3 Field surveyor knowledge and experience of bird - habitat associations further informed and guided survey effort over the course of surveys.

2.2.4 All survey visits were undertaken in weather conditions conducive to survey. Details of weather conditions were regularly recorded during field surveys and this information is summarised in **Annex 2**.

2.2.5 Field surveys undertaken for the Proposed Development comprise coverage of survey areas required in accordance with NatureScot guidance (SNH, 2017), and the surrounding wider area where appropriate. Details of each survey area are presented in the corresponding survey methodologies and shown on **Figures 9.2** and **9.3**.

2.2.6 Design evolution of the Proposed Development meant that the boundary of the site has modestly altered. Ornithology surveys and survey areas were based on the original boundary of the site (as shown in **Figure 9.3**). Further discussion with this regard is provided in **Section 2.3**.

Field Survey Personnel

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

Methodologies

2.2.8 The following field surveys were completed between 2019 and 2021:

- Vantage Point (VP) flight activity surveys;
- Moorland Breeding Bird Survey (MBBS);
- Breeding Annex 1 and Schedule 1 raptor and owl searches;
- Breeding black grouse searches; and
- Breeding diver searches.

2.2.9 Surveys were undertaken in accordance with recommendations outlined within NatureScot guidance (SNH, 2017).

VP Flight Activity Surveys

2.2.10 VP flight activity surveys were undertaken between September 2019 and August 2021, in accordance with NatureScot guidance (SNH, 2017). The surveys covered two non-breeding seasons (taken to be approximately the period September to March, in 2019/2020 and 2020/2021) and two breeding seasons (taken to be approximately the period April to August, in 2020 and 2021).

VP Locations and Viewsheds

2.2.11 Appropriate VP locations were set up to provide the best possible visual coverage of the indicative turbine layout (at the time of survey commencement) and 500 m surrounding buffer; whilst adopting the minimum number of VPs in order to obtain this coverage (in accordance with NatureScot guidance (SNH, 2017)). Note, overlap between the VP viewsheds was minimal, and VPs with any notable degree of overlap were not surveyed simultaneously. As such, overlap between the VP viewsheds is included within **Table 2.2**.

2.2.12 A total of three VP locations were used to provide maximum visual coverage, as summarised within **Table 2.2** and illustrated in **Figure 9.2**. Visible areas for each viewshed were calculated using a Digital Elevation Model (DEM), based on an observer height of 1 m and a 20 m ground offset, and were subsequently ground-truthed in the field. All three VP viewsheds adopted a 2 km radius.

Table 2.2: VP locations during Year 1 and 2 surveys.

VP	Grid reference	Visible area (ha)[2]	Orientation
1	NH 43987 61589	144.15	West
2	NH 42982 62942	196.92	West
3	NH 41163 61165	13.73	North north-east

Survey Effort

2.2.13 NatureScot guidance (SNH, 2017) recommends 36 hours of survey effort per VP per season (breeding and non-breeding). The total survey effort (hours) completed during the two years of baseline surveys is presented in **Table 2.3**.

2.2.14 In anticipation of golden eagle presence, additional survey effort was weighted towards February-April and September-October to capture the main adult eagle display and juvenile eagle dispersal

[2] Note, this is the visible area within 300 m of the final turbine layout, and which is used in collision risk mortality modelling, see **Technical Appendix 9.3**.

periods, respectively. Because of the additional survey effort, more than the recommended minimum was completed. Survey times were dispersed throughout the day and were also completed in a range of weather conditions, but always conductive to survey and safe access.

2.2.15 Each VP survey session was no more than three hours in duration, with at least a 30-minute break taken between consecutive surveys.

2.2.16 **Table 2.3** shows that in each season the minimum of 36 hours per VP was consistently exceeded.

Table 2.3: VP survey effort.

VP	2019/20							Total Hrs	2020					Total Hrs
	Non-breeding Season								Breeding Season					
	Sep	Oct	Nov	Dec	Jan	Feb	Mar		Apr	May	Jun	Jul	Aug	
VP1	12	12	6	6	6	3	12	57	12	6	9	9	6	42
VP2	12	12	6	6	6	12	12	66	12	6	9	9	6	42
VP3	12	12	6	6	6	3	12	57	12	6	9	9	6	42
VP	2020/21							Total Hrs	2021					Total Hrs
	Non-breeding Season								Breeding Season					
	Sep	Oct	Nov	Dec	Jan	Feb	Mar		Apr	May	Jun	Jul	Aug	
VP1	12	12	6	6	3	12	15	66	12	6	6	12	6	42
VP2	12	12	6	6	6	12	12	66	12	6	6	12	6	42
VP3	12	12	6	6	6	12	12	66	12	6	6	12	6	42

2.2.17 Note, the modest difference in hours between some of the VPs was due to adverse weather conditions, for example in February 2020 which reduced hours surveyed at VPs 1 and 3 during the non-breeding season in Year 1. Nonetheless, seasonal VP effort completed at all locations well exceeded the minimum requirements recommended in applicable NatureScot guidance (SNH, 2017).

2.2.18 Flight lines were mapped for all target species passing through the VP survey area (previous turbine locations plus 500 m). Details of species, number of birds, flight height in bands (see below), duration and direction were noted on standardised recording forms and field plans.

2.2.19 The following height bands were used in the field, to assign target species flight activity at, below or above collision risk height, based on the preferred candidate turbine specification at the time of surveys:

- Height Band 1 = < 10 m;
- Height Band 2 = 10–25 m;
- Height Band 3 = 25-150 m;
- Height Band 4 = 150-180m; and
- Height Band 5 = > 180 m.

Target Species

2.2.20 Target species during VP flight activity surveys for recording included all Annex 1/ Schedule 1raptors, waders, divers, black grouse, owls, swans, geese and ducks (excluding mallard and feral waterfowl species) as observed.

2.2.21 Target species included greylag goose. Greylag geese in Scotland comprise three populations:

- the Icelandic migratory population present between October and April, predominantly in Scotland and northern England;

- the north-west Scotland remnant population, which predominantly occur within western Scotland and in mainland northern Scotland; and

- the re-established (naturalised) introduced population, which is widespread throughout Britain and Ireland (Mitchell & Hearn, 2004).

2.2.22 The local passage and non-breeding populations between October and April are considered to potentially comprise part of the Icelandic migratory population.

Secondary Species

2.2.23 Secondary species were also noted in approximately five-minute summary intervals, with the number of birds present and general behaviour recorded in order to build an overall picture of activity. Note, target species activity, however, took priority during survey.

2.2.24 Secondary species are defined here as more common raptors (e.g. buzzard, kestrel and sparrowhawk), all gulls, feral species and mallard, along with any large concentrations of Schedule 1 or Red-listed passerines as recorded during survey.

Collision Risk Mortality

2.2.25 For species for which there is sufficient (considered ≥3 flights, or greater than 20 birds if less than three flights, within any one survey year) "at collision risk" flight activity data, collision risk mortality as a result of birds colliding with rotor blades was considered for assessment using Collision Risk Model (CRM) Analysis as detailed in Band *et al*. (2007).

2.2.26 CRM Analysis has accordingly been undertaken for golden eagle and red kite with explanation and results presented in **Technical Appendix 9.3**, in **Volume 4**, of the EIA Report.

Moorland Breeding Bird Survey (MBBS)

2.2.27 Moorland Breeding Bird Survey (MBBS), following an adapted Brown and Shepherd (1993) methodology but updated to include four survey visits as recommended by Calladine *et al.* (2009), was undertaken in the breeding seasons of 2020 and 2021, in accordance with NatureScot guidance (SNH, 2017).

2.2.28 The survey was carried out across open ground habitats within the original boundary of the site, and out to 500 m (where access permissions allowed), as shown on **Figure 9.3**. The geography of the site meant that the 500 m buffer was readily visible by regular scanning from within the site boundary, for those areas for which access was not possible. See **Section 2.3** with regards to the alteration to the site boundary since surveys.

2.2.29 Target species for the MBBS included breeding moorland and open country non-passerine species, typically waders, waterfowl (included mallard, but excluded feral species), grouse and gulls, in accordance with NatureScot guidance (SNH, 2017). Any other species of note (such as raptors and owls) encountered during the course of the surveys were also recorded. During surveys all observations of target species (seen or heard) were recorded onto a base map, with any evidence of breeding activity also noted (e.g. displaying, alarming, juvenile birds).

2.2.30 A series of staggered visits were completed during each survey year, between April and July. During each survey visit a pre-determined route was walked through the survey area, with all birds seen or heard, and their behaviours (e.g. displaying, carrying food etc.) mapped in the field, using standard British Trust for Ornithology (BTO) notation. The methodology followed Gilbert *et al.* (1998). Territory

mapping was then carried out on completion of all surveys to determine the number of breeding pairs of each target species within the survey area.

2.2.31 All surveys were undertaken during daylight hours and in fine conditions conducive to survey. Surveys were undertaken by a team of ornithologists (for most of 2021 surveys) or over two days. Survey effort is summarised in **Table 2.4**. Full details of all survey times, field surveyors used, and weather conditions are presented in **Annex 2.**

Table 2.4: MBBS effort.

Survey Visit	2020			2021		
	Date	Start Time (24hrs)	End Time (24hrs)	Date	Start Time (24hrs)	End Time (24hrs)
1	22/04/2020	08:30	14:40	15/04/2021	08:30	15:00
	23/04/2020	08:00	13:35			
2	06/05/2020	07:30	13:30	17/05/2021	08:45	14:45
	07/05/2020	07:30	13:20			
3	09/06/2020	08:30	14:30	22/06/2021	08:30	16:15
	11/06/2020	09:15	15:15			
4	08/07/2020	09:25	17:00	20/07/2021	07:40	14:50
	09/07/2020	08:45	16:00	21/07/2021	07:50	12:40

Annex 1 and Schedule 1 Breeding Raptor and Owl Searches

2.2.32 Dedicated searches for breeding Schedule 1 and Annex 1 raptors and owls were conducted in both survey years (2020 and 2021), adopting species-specific survey advice from Hardey *et al*. (2013), in accordance with NatureScot guidance (SNH, 2017).

2.2.33 The survey area comprised the original boundary of the site and a surrounding buffer of at least 2 km, extended to 6 km for eagle species (where access permissions allowed), in accordance with NatureScot guidance (SNH, 2017). Presence, and most especially any breeding evidence, was recorded for all Schedule 1 and Annex 1 raptor and owl species, where observed. The survey areas are shown on **Figure 9.3**. See **Section 2.3** with regards to the alteration to the site boundary since surveys.

2.2.34 Surveys consisted of a combination of walkovers and short vantage point watches over suitable habitat features, to determine occupancy and any evidence of breeding behaviour. The surrounding buffer was surveyed by scanning from within the site and by using public highways. This included drive around surveys using public roads to cover the 6 km buffer, where available.

2.2.35 Survey effort is summarised in **Table 2.5**. In 2020, the surveys were undertaken between April and August, and in 2021 the surveys were undertaken between February and July. All survey visits were undertaken in weather conditions conducive to survey.

Table 2.5: Breeding Annex 1/ Schedule 1 raptor and owl search survey effort.

2020			2021		
Date	Start time (24hrs)	End time (24hrs)	Date	Start time (24hrs)	End time (24hrs)
21/04/2020	08:20	17:30	21/02/2021	09:35	15:50

2020			2021		
Date	**Start time (24hrs)**	**End time (24hrs)**	**Date**	**Start time (24hrs)**	**End time (24hrs)**
29/04/2020	12:30	15:30	26/02/2021	07:30	13:30
12/05/2020	09:40	12:35	18/03/2021	15:00	18:10
14/05/2020	15:15	18:50	19/03/2021	08:30	11:30
19/05/2020	10:30	16:30	31/03/2021	13:35	16:45
20/05/2020	08:40	14:40	21/04/2021	10:00	16:00
25/06/2020	16:45	19:35	17/05/2021	12:25	18:50
30/06/2020	08:20	14:20	01/06/2021	08:35	14:35
20/07/2020	12:15	15:15	28/06/2021	11:30	18:00
23/07/2020	11:05	17:05	27/07/2021	10:00	16:00
28/07/2020	13:30	19:30	29/07/2021	09:00	15:00
12/08/2020	10:15	16:30	05/08/2021	08:30	14:35

Breeding Black Grouse Searches

2.2.36 Searches for black grouse leks were undertaken in 2020 and 2021, with reference to the species-specific methodologies outlined in Gilbert *et al*. (1998), as per NatureScot guidance (SNH, 2017).

2.2.37 The survey area comprised suitable habitats within the original site boundary, and out to 1.5 km (where access allowed), as shown in **Figure 9.3**. Areas off-site were typically surveyed by scanning from within the site boundary or from public highways. See **Section 2.3** with regards to the alteration to the site boundary since surveys.

2.2.38 A reconnaissance visit carried out on 4th September 2019, where a habitat appraisal of the areas of suitable habitat (e.g. open moorland, woodland edges and tracks) for black grouse was identified.

2.2.39 Visits were undertaken from mid-March to late April to locate and count any black grouse lekking within the survey area. The aim of the survey was to locate any lek sites and provide an estimate of the number of displaying males and attending females. Other evidence of black grouse (such as solo females) was also recorded if encountered. Lek sites more than 200 m apart from each other were treated as separate leks.

2.2.40 Survey effort is summarised in **Table 2.6.**

Table 2.6: Breeding black grouse search survey effort.

2020				2021			
Date	**Start time (24hrs)**	**End time (24hrs)**	**Sunrise (24hrs)**	**Date**	**Start time (24hrs)**	**End time (24hrs)**	**Sunrise (24hrs)**
18/03/2020	05:25	08:25	06:17	19/03/2021	05:30	08:30	06:15
19/03/2020	05:20	08:20	06:14	01/04/2021	05:45	08:05	06:44
23/04/2020	05:00	08:00	05:52	02/04/2021	05:45	08:45	06:41
25/04/2020	04:35	07:35	05:48	-	-	-	

Breeding Diver Searches

2.2.41 Searches for breeding divers were undertaken in 2020 and 2021, with reference to the species-specific methodologies outlined in Gilbert *et al*. (1998), as per NatureScot guidance (SNH, 2017).

2.2.42 This involved searches of lochs/lochans within the original boundary of the site and a surrounding buffer of 1 km for the presence of divers between April and June. Searches were carried out initially by long-range observation, followed by walks around shore margins for the presence of any nests. Note, lochs were also surveyed during other surveys described above (particularly MBBS and Annex 1/ Schedule 1 raptor and owl searches), so the diver search survey effort summarised in **Table 2.7** is only for those dedicated surveys specifically targeting divers (and in reality, the surveys in which divers could be recorded was greater). The survey area (and those waterbodies checked) for the breeding diver searches is shown in **Figure 9.3**.

2.2.43 See **Section 2.3** with regards to the alteration to the site boundary since surveys.

2.2.44 Survey effort is summarised in **Table 2.7**.

Table 2.7: Breeding diver searches survey effort.

2020			**2021**		
Date	**Start time (24hrs)**	**End time (24hrs)**	**Date**	**Start time (24hrs)**	**End time (24hrs)**
28/04/2020	08:30	14:00	23/04/2021	08:30	11:30
07/05/2020	14:30	17:30	01/06/2021	08:35	14:35
12/05/2020	13:20	16:20	-	-	-
21/05/2020	04:15	07:15	-	-	-

Breeding Diver Focal Loch Watches

2.2.45 If breeding diver occupancy was confirmed, focal watches overlooking occupied breeding lochs/lochans were undertaken to record incoming and outgoing flights of provisioning adult divers during the incubation and chick-rearing periods (July to August) in accordance with NatureScot guidance (SNH, 2017).

Additional Surveys

2.2.46 The site is not located in area of known importance for foraging migratory greylag or pink-footed geese (e.g. as per Mitchell, 2012). The broad habitats within the site are also considered to be unsuitable for wintering and migrant foraging waterfowl. Feeding distribution surveys for geese and swans have therefore not been undertaken. Year 1 and 2 VP flight activity surveys did also not record large frequent movements of migratory waterfowl.

2.2.47 Surveys of woodland passerines, particularly in sites supporting commercial plantation woodland are not required in accordance with NatureScot guidance (SNH, 2017) and have not been undertaken. Observations of any notable species (incl. Schedule 1 species) would however be noted during the MBBS and/or other ornithological surveys where observed.

2.3 Limitations

2.3.1 The natural topography of the site resulted in some steep hollows missing from coverage, however survey coverage is considered appropriate, and in accordance with NatureScot guidance (SNH, 2017).

DEM and ground-truthing were used to ensure maximum visual coverage of the required VP survey area has been achieved using the minimum number of VPs, in accordance with the NatureScot guidance (SNH, 2017). The final turbine layout is appropriately covered by VP viewsheds, as shown in **Figure 9.2**.

2.3.2 NatureScot guidance (SNH, 2017) recommends that VPs be sited outside the turbine area of the Proposed Development to prevent the presence of the surveyor from potentially altering flight behaviour and artificially reducing the level of activity during the course of the survey. Although VP 3 and 4 is located outside the turbine envelope, VPs 1 and 2 are located within the turbine envelope (within 500 m, albeit both are several hundred metres from the nearest turbine). At all VPs, surveyors were positioned off the peaks and instead positioned on slopes (below the skyline) and wore muted clothes to be as inconspicuous as possible, while maximising visibility of the survey area. The recorded flight activity indicates no evidence of bird activity being influenced by the presence of surveyors. Given VP2 is on the edge of the viewshed of VP1, these VPs were not undertaken simultaneously.

2.3.3 During the Annex 1/Schedule 1 breeding raptor and owl searches, MBBS and breeding black grouse searches, direct access to land outside the site for survey was restricted. Suitable habitat features were however scanned from appropriate vantage points within the site and from public rights of ways (PRoWs) to detect activity and likely breeding locations of key species. In conjunction with the desk study data, it is considered unlikely that any breeding target species were overlooked.

2.3.4 The site boundary has evolved since the baseline surveys were completed, with the boundary reduced in the north and south, and extended slightly in the west and east (see **Figure 9.3**). The surrounding buffers that were based on the original site boundary, and which comprised the survey areas covered during the baseline surveys, have meant that the western and eastern areas of the new site boundary have been largely covered. The extreme east of the new site boundary has, however, not been covered during MBBS, but this is not considered a substantive constraint given the area is limited in extent, typically on the periphery of the Proposed Development, and the characteristic breeding bird assemblage, and ornithological importance, of the site (and the surrounding area) has been established over a two-year period.

2.3.5 No substantive limitations have been identified during the baseline data gathering.

3 RESULTS

3.1 Desk Study

Statutory Designated Sites for Nature Conservation

3.1.1 This section should be read with reference to **Figure 9.1**.

3.1.2 **Table 3.1** summarises the statutory designated sites with ornithological features of interest located within 10 km of the site, extended to 20 km for international statutory sites with migratory geese as a qualifying feature.

3.1.3 Only ornithological listed features are detailed in **Table 3.1**. Additionally, where a designated area lies more than 10 km from the site and has been identified due to its migratory goose interest, only the specific goose interest is listed, as the other ornithological designated features are considered unlikely to have connectivity with the site; with reference to core ranges stated in NatureScot guidance (SNH, 2016).

3.1.4 The results show that the site does not form part of any statutory designated site for nature conservation with qualifying ornithological interests. The nearest such site is Ben Wyvis Special

Protection Area (SPA) and Site of Special Scientific Interest (SSSI), which is 1.1 km from the site and is designated for its breeding population of dotterel.

Table 3.1: Designated sites for nature conservation with ornithological interests.

SPA: Special Protection Area; SSSI: Site of Special Scientific Interest; Ramsar Site: Wetland or International Importance; NNR: National Nature Reserve.

Designated Site	Distance / Orientation	Qualifying Ornithological Interest
International Sites		
Ben Wyvis SPA	1.1 km, north-east	Breeding dotterel.
Glen Affric to Strathconon SPA	3.1 km, south-west	Breeding golden eagle.
Cromarty Firth SPA and Ramsar Site	10.6 km, east	Wintering greylag goose. *Also, breeding osprey, common tern and other overwintering wetland species.*
Inner Moray Firth SPA and Ramsar	16.4 km, south-east	Wintering greylag goose. *Also, breeding osprey, common tern and other overwintering wetland species.*
Nationally Designated Sites		
Ben Wyvis SSSI	1.1 km, north-east	Breeding dotterel.
Ben Wyvis NNR	1.1 km, north-east	No specific qualifying species, but golden eagle, ptarmigan, dotterel and snow bunting are listed as possible birds to see.

3.1.5 The Glen Affric to Strathconon SPA and Cromarty Firth SPA and Ramsar site are respectively within the documented core foraging ranges of the qualifying species golden eagle and greylag goose, as per NatureScot guidance (SNH, 2016).

3.1.6 Regarding the greylag geese associated with the Inner Moray Firth SPA and Ramsar Site, as well as the greylag geese associated with the Cromarty Firth SPA and Ramsar Site, Mitchell (2012) showed that the large majority of foraging areas were found on low-lying ground adjacent to the coast. Habitats within the site comprise upland moorland on sloping ground, which is unsuitable foraging habitat for wintering geese.

Non-statutory Designated Sites for Nature Conservation

3.1.7 The data request submitted to the HBRG identifies that the site does not form part of any non-statutory designated sites for nature conservation with ornithological interests.

3.1.8 In further review of non-statutory designated sites, the site is also not located within 2 km of any such site with ornithological interests.

Existing Ornithological Records

3.1.9 This section provides a summary of existing ornithological records identified through desk study sources. Only records of 'priority species for assessment when considering the development of onshore wind farms in Scotland' and 'Species with restricted ranges' as listed in NatureScot guidance (SNH, 2018) are considered in detail.

3.1.10 The consideration of existing records is also limited to those reported since 2010, to ensure that the most contemporary records are considered.

RSPB

3.1.11 Records of short-eared owl (two records in 2010), hen harrier (one record in 2010), white-tailed eagle (two records in 2010), red kite (12 records from 2010-15) and black grouse (17 records from 2010-11) were returned from the RSPB, with all records considered sensitive.

3.1.12 Records are discussed further in **Technical Appendix 9.2: Confidential Ornithology** and the accompanying **Confidential Figure 9.7a**.

HBRG

3.1.13 One record (red kite in 2014) was returned from the HBRG. This record is discussed further in **Technical Appendix 9.2: Confidential Ornithology** and the accompanying **Confidential Figure 9.7a**.

HRSG

3.1.14 Information from two known golden eagle pairs (with nest sites) was returned by the HRSG from 2019-23. A record from 2019 of a breeding pair of red kites was also provided. Records are discussed further in **Technical Appendix 9.2: Confidential Ornithology** and the accompanying **Confidential Figure 9.7b**.

Information from the Carn Gorm Wind Farm application (Ref: 13/04791/FUL

3.1.15 VP flight activity surveys between March 2010 and March 2012 recorded 320 flights of 15 target species, with red kite and golden eagle two of the most regularly recorded target species.

3.1.16 Information from the other ornithological surveys carried out, comprising breeding bird surveys (moorland birds and raptor searches) and winter walkover surveys is not publicly available. However, targeted golden eagle nest site checks are regarded, so potential for breeding evidence of this target species is at least considered at the locality.

3.2 Field Surveys

VP Flight Activity Surveys

Target Species

3.2.1 Target species flight activity recorded during the VP survey period (September 2019 to August 2021) from all three VPs combined is summarised in **Table 3.2**. Note, that for completeness all records are presented in **Table 3.2**, including flights which would not be at collision risk (i.e. flights below rotor swept height or that lie outside the rotor swept area of the proposed turbines). For a summary of 'at collision risk' flights see **Table 3.3.** Note, also that the number of birds presented is simply the sum of the number of individuals recorded for each flight, but in some cases, this may refer to the same bird seen more than once.

3.2.2 Full details of these records are presented in **Annex 3**.

3.2.3 Flight activity of target species is presented in **Figures 9.4a** to **9.5c**.

Table 3.2: Target species flight activity summary.

Species	Total No. of Flights	Total No. of Birds	Total Flight Time (s)[3]
Year 1 (September 2019 to August 2020)			
Golden eagle	13	14	2,697
Goosander	1	1	38
Greylag goose	5	54	10,504
Greenshank	3	3	22
Golden plover	3	45	6,527
Red kite	13	14	2,438
Merlin	1	1	17
Osprey	1	1	459
Peregrine	2	5	702
Red-throated diver	1	1	247
Teal	2	4	66
White-tailed eagle	2	2	274
Whooper swan	4	37	2,421
Year 2 (September 2020 to August 2021)			
Black grouse	1	1	20
Golden eagle	35	36	6,555
Goshawk	1	1	447
Greylag goose	3	8	488
Greenshank	4	6	135
Golden plover	1	11	1,023
Grey heron	1	1	401
Hen harrier	4	4	471
Red kite	33	35	7,408
Merlin	3	4	276
Osprey	1	1	184
Peregrine	3	4	358
Pink-footed goose	8	833	64,598
Red-throated diver	1	2	178

3.2.4 The purpose of the flight activity surveys is to determine potential collision risk of target species. Target species flights recorded outside the collision risk zone (greater than 300 m from the outermost turbines) and/or not recorded at potential collision height (thus not at a height of 18 m to 180 + m) can be considered as not being at risk from collision and are excluded from the assessment. The identification of collision risk flights, including further information into how 'at collision risk' flights

[3] Duration of each flight is multiplied by the number of individual birds and summed for each species.

have been defined in the assessment, is presented in **Technical Appendix 9.3**, in **Volume 4**, of the EIA Report.

3.2.5 Those target flights regarded as being at collision risk are summarised in **Table 3.3**. Those species recorded with sufficient flight activity to meet the threshold for undertaking CRM (**Technical Appendix 9.3**, in **Volume 4**, of the EIA Report) are highlighted in bold **Table 3.3**.

Table 3.3: Target species at collision risk flight activity summary.

Species	Total No. of Flights	Total No. of Birds	Total Flight Time at Collision Risk (s)[4]
Year 1 (September 2019 to August 2020)			
Golden eagle	**6**	**7**	**1,486**
Greylag goose	2	17	1,606
Golden plover	1	11	5,687
Red kite	**9**	**9**	**1,520**
Red-throated diver	1	1	232
Teal	1	2	42
White-tailed eagle	1	1	198
Whooper swan	2	27	1,710
Year 2 (September 2020 to August 2021)			
Golden eagle	**17**	**17**	**3,711**
Greylag goose	1	2	70
Greenshank	2	3	75
Golden plover	1	11	825
Grey heron	1	1	195
Hen harrier	1	1	366
Red kite	**14**	**14**	**3,067**
Merlin	2	3	170
Osprey	1	1	184
Peregrine	2	2	240
Pink-footed goose	3	160	33,644
Red-throated diver	1	2	178

Secondary Species

3.2.6 Low levels of activity of the following secondary species were also recorded:

- Sparrowhawk.

[4] Duration of each flight spent at collision risk height (note, this includes those flights >180 m as a precaution, although in reality these flights are likely to be above collision risk height, especially for traversing migratory waterfowl) and within 300 m of the turbine envelope is multiplied by the number of individual birds and summed for each species.

- Buzzard.
- Kestrel.
- Raven.
- Mallard.

Moorland Breeding Bird Surveys

3.2.7 The MBBS undertaken in 2020 and 2021 recorded a relatively limited range of open moorland breeding species, which is considered largely a typical breeding assemblage for the habitat types within the site.

3.2.8 The MBBS and subsequent territory analysis produced estimates for the number of territories present within the MBBS survey area. These estimates are summarised in **Table 3.4**.

3.2.9 The indicative locations of these territories are illustrated on **Figure 9.6a** for Year 1 (2020) and **Figure 9.6b** for Year 2 (2021).

Table 3.4: MBBS results.

Species	**No. of Territories**	
	Year 1 (2020)	**Year 2 (2021)**
Mallard	2	-
Teal	1	-
Snipe	5	5
Curlew	1	1
Greenshank	1	-
Golden plover	1	1
Oystercatcher	-	1
Ptarmigan	1	1
Common crossbill	2	1
Red grouse	-	4

Annex 1 and Schedule 1 Breeding Raptor and Owl Searches

3.2.10 The dedicated Annex 1 and Schedule 1 raptor and owl searches, in conjunction with the other baseline surveys, produced the following results.

<u>Red Kite</u>

3.2.11 Although red kite was frequently recorded during baseline surveys, most records were of birds foraging and/or traversing, rather than of birds displaying behaviour indicative of breeding. Red kites breed in mature deciduous and coniferous woodland. Small pockets of semi-mature coniferous plantation exist within the site, but this is not considered suitable nesting habitat for red kites. Red kites have a core foraging range of 4 km, and a maximum foraging range of 6 km, according to NatureScot guidance (SNH, 2016), and there are areas of suitable habitat (blocks of mature woodland) within this distance from the site. The regularity with which red kites were recorded during surveys

suggests that there may be breeding territories within this wider area. Supporting this, the desk study revealed evidence (in previous years) of breeding red kite in the wider area (see **Technical Appendix 9.2: Confidential Ornithology**).

Osprey

3.2.12 Osprey (maximum of two pairs) was confirmed as breeding (through the presence of nest sites) greater than 2 km from the site in Year 1 and Year 2. Details of the nest locations can be found in **Technical Appendix 9.2: Confidential Ornithology**, and **Confidential Figures 9.8a** and **9.8b**. Osprey prefer to breed in tall living or dead trees often near the edge of a waterbody. The site does not support suitable nesting habitat for osprey.

Peregrine

3.2.13 In Year 1, a peregrine pair was confirmed as breeding greater than 2 km from the Site. Details of the nest location can be found in **Technical Appendix 9.2: Confidential Ornithology**, and **Confidential Figure 9.8a**.

Golden eagle

3.2.14 Moderate golden eagle activity was recorded during baseline surveys. A suspected golden eagle nest site was recorded within 6 km of the site in Year 1, however, there was no sign of golden eagle using a nest site at the same locality in Year 2. In Year 2, a suspected golden eagle breeding territory was identified within the 6 km survey buffer from the site (see **Confidential Figures 9.8a** and **9.8b**). Given a nest site was not recorded during field surveys (in either year), activity recorded during surveys may relate to known nesting golden eagle pairs from the wider area identified from desk study gathering, (as presented in **Confidential Figure 9.7b**), ranging into the survey areas. Further details are provided in **Technical Appendix 9.2: Confidential Ornithology**.

Barn Owl

3.2.15 A suspected barn owl breeding territory was recorded within the site, in Year 1, with the location provided in **Confidential Figure 9.8a**, and further details in **Technical Appendix 9.2: Confidential Ornithology**. This breeding territory was not identified however during Year 2 surveys.

Goshawk

3.2.16 A suspected breeding goshawk territory/range was identified during Year 2 surveys in forestry within 2 km of the Site. The location is provided within **Confidential Figure 9.8b**, and with further details in **Technical Appendix 9.2: Confidential Ornithology**. This breeding territory/range was not identified however during Year 1 surveys.

Other Species

3.2.17 Other raptor species recorded during baseline surveys was very low levels of white-tailed eagle activity (including one bird in flight north of the site during a MBBS in May 2020, Year 1), with no evidence of breeding in the survey areas, in 2020 (Year 1) or 2021 (Year 2).

3.2.18 In April 2021 (Year 2), an adult merlin female was recorded in flight in the north of the site (north of Beinn a Ghuilbein). In July 2021 (Year 2), a short-eared owl was recorded hunting and sat on a fencepost in the north of the site (in a similar locality to the merlin recorded earlier in the breeding season). There was no evidence of either of these breeding in either survey year, however.

3.2.19 Activity of common raptors, buzzard, sparrowhawk and kestrel was recorded during baseline surveys in both survey years, with evidence of all three species potentially breeding in the surrounding habitats around the site.

Breeding Black Grouse Searches

3.2.20 Four black grouse leks were identified combining the results from surveys in Year 1 and Year 2 (three leks during each survey year, with two lek locations used in both years), and a maximum of two lek sites located within the site. The leks only consisted of small numbers of black grouse (maximum of three males), however black grouse were recorded lekking to the north of the site (within 1.5 km survey buffer), and in the south of the site, during both survey years, suggesting these are established leks. Details of all the identified lek sites can be found in **Technical Appendix 9.2: Confidential Ornithology**, with lek locations provided in **Confidential Figures 9.9a, 9.9b** and **9.9c**.

Breeding Diver Searches

3.2.21 No breeding divers were recorded using any of the seven lochs/lochans within the survey area in Year 1 or Year 2.

3.2.22 During surveys, two red-throated diver flights were recorded during the VP flight activity surveys (see **Table 3.2**), with one individual in flight recorded in Year 1, and one flight of a pair of red-throated divers in Year 2. The pair in Year 2 was recorded in July 2021, in flight and landed on Loch na Geàrra within the site (at NH 42789 62388). There was no evidence that the pair was using the loch to breed, and habitats at the locality were appraised as being suboptimal to support breeding diver due to largely unsuitable margins of the loch.

3.2.23 During a MBBS in June 2020, in Year 1, a red-throated diver pair was recorded at Loch na Geàrra, but with no signs of breeding. During a raptor and owl search in June 2020, in Year 1, a red-throated diver was recorded foraging at Loch Achilty at NH 43245 56649, south of the site, but with no signs of breeding.

3.2.24 No further evidence of divers using Loch na Geàrra or Loch Achilty, or any of the other surveyed waterbodies was identified, during the two years of survey (2020-21).

3.2.25 Given no breeding evidence of any divers was recorded during the surveys, breeding diver focal loch watches were not carried out in either survey year.

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ANNEX 1 – BIRD SPECIES SUMMARY

Table A1-1 provides a list of bird species referred to within **Chapter 9: Ornithology** and/or the associated Technical Appendices. Both common and scientific names are presented along with a summary of each species' conservation status using the following abbreviations:

- Ann1 - species listed on Annex I of the Birds Directive (2009/147/EC);
- Schedule 1.1, 1.1A, A1, 1.2 (Sch1.1/Sch1A/SchA1/Sch1.2) - species listed on Schedule 1, Schedule 1A or Schedule A1, or Schedule 1 part 2, of the Wildlife and Countryside Act (1981, as amended);
- Red (high concern), Amber (medium concern) or Green (least concern) as listed on the Birds of Conservation Concern (BoCC) (Stanbury *et al*., 2021);
- SBL - species listed on the Scottish Biodiversity List; and
- RBBP – listed as a species which the UK Rare Breeding Bird Panel reports on.

Table A1.1: Summary of bird species.

Common name	Scientific Name	Conservation Status
Greylag goose	*Anser anser*	Amber; Sch1.2[5]
Pink-footed goose	*Anser brachyrhynchus*	Amber; RBBP
Whooper swan	*Cygnus cygnus*	Amber; Sch1.1; SBL; Ann1; RBBP
Mallard	*Anas platyrhynchos*	Amber
Teal	*Anas crecca*	Amber
Goosander	*Mergus merganser*	Green
Red grouse	*Lagopus scotica*	Amber; SBL
Ptarmigan	*Lagopus muta*	Red
Black grouse	*Lyrurus tetrix*	Red; SBL
Oystercatcher	*Haematopus ostralegus*	NT; Amber
Golden plover	*Pluvialis apricaria*	Green; SBL; Ann1
Dotterel	*Charadrius morinellus*	Red; Sch1.1; SBL; Ann1; RBBP
Curlew	*Numenius arquata*	NT; Red; SBL
Snipe	*Gallinago gallinago*	Amber
Greenshank	*Tringa nebularia*	Amber; Sch1.1; RBBP
Common tern	*Sterna hirundo*	Amber; SBL; Ann1
Red-throated diver	*Gavia stellata*	Green; Sch1.1; SBL; Ann1; RBBP
Grey heron	*Ardea cinerea*	Green
Osprey	*Pandion haliaetus*	Amber; Sch1.1; SBL; Ann1; RBBP
Golden eagle	*Aquila chrysaetos*	Green; Sch1.1/1A/A1; SBL; Ann1; RBBP
Sparrowhawk	*Accipiter nisus*	Amber
Goshawk	*Astur gentilis*	Green; Sch1.1; RBBP
Hen harrier	*Circus cyaneus*	Red; Sch1.1 & 1A; SBL; Ann1; RBBP

[5] Outer Hebrides, Caithness, Sutherland & Wester Ross only.

Common name	Scientific Name	Conservation Status
Red kite	*Milvus milvus*	Green; Sch1.1 & 1A; SBL; Ann1
White-tailed eagle	*Haliaeetus albicilla*	Amber; Sch1.1, 1A & A1; SBL; Ann1; RBBP
Buzzard	*Buteo buteo*	Green
Barn owl	*Tyto alba*	Green; Sch1.1; SBL
Short-eared owl	*Asio flammeus*	Amber; SBL; Ann1; RBBP
Kestrel	*Falco tinnunculus*	Amber; SBL
Merlin	*Falco columbarius*	Red; Sch1.1; SBL; Ann1; RBBP
Peregrine	*Falco peregrinus*	Green; Sch1.1; SBL; Ann1; RBBP
Raven	*Corvus corax*	Green
Crossbill	*Loxia curvirostra*	Green; Sch1.1
Snow bunting	*Plectrophenax nivalis*	Amber; Sch1.1; SBL; RBBP

ANNEX 2 – ORNITHOLOGY FIELD SURVEY EFFORT

The following codes were used to record weather conditions during surveys and are used in **Tables A2.1** to **A2.9**:

Wind Speed		**Rain**		**Cloud Cover**	
Calm	0	None	0	Out of 8 (oktas)	
Light air	1	Drizzle/mist	1		
Light breeze	2	Light showers	2	**Frost**	
Gentle breeze	3	Heavy showers	3	None	0
Moderate breeze	4	Heavy rain	4	Ground	1
Fresh breeze	5			All day	2
Strong breeze	6	**Visibility**			
Moderate gale	7	Poor	0	**Snow**	
Fresh gale	8	<1km	1	None	0
Strong gale	9	>1km	2	On site	1
Whole gale	10			High ground	2
Storm	11	**Cloud Height**			
		<150m	0		
Wind Direction		150-500m	1		
16 point compass		>500m	2		

Field surveys were undertaken by the following named surveyors:

E. McLachlan (EM), M. Wood (MW), P. Carroll (PC), C. Griffin (CG), A. MacNab (AJM), A. Little (AL), K. Little (KL), N. Voaden (NV), A. Russell (AR), G. Dunbar (GD), J. Sykes (JS), V. Hastie (VH) and S. MacDonald (SM).

Table A2.1: Flight activity survey effort (September 2019 to August 2021).

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
19/09/2019	1	EM	16:30	19:30	3	3/3/3	W/W/W	0/0/0	4/3/3	2/2/2	2/2/2	0/0/0	0/0/0
19/09/2019	1	EM	17:00	20:00	3	3/3/3	W/W/W	0/0/0	2/1/1	2/2/2	2/2/2	0/0/0	0/0/0
25/09/2019	1	AL	13:10	16:10	3	3/3/2	ESE/E/ESE	2/0/0	6/7/6	2/2/2	2/2/2	0/0/0	0/0/0
25/09/2019	1	AL	16:40	19:40	3	2/3/3	ESE/SE/SE	0/0/2	5/7/7	2/2/2	2/2/2	0/0/0	0/0/0
20/09/2019	2	PC	09:30	12:30	3	2/2/3	ESE/ESE/ESE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
20/09/2019	2	PC	13:00	16:00	3	3/3/2	ESE/ESE/ESE	0/0/0	0/0/0	N/A	2/2/2	0/0/0	0/0/0
26/09/2019	2	KL	06:40	09:40	3	3/3/1	ESE/ESE/ESE	3/2/0/	8/7/7	1/1/2	2/2/2	0/0/0	0/0/0
26/09/2019	2	KL	10:10	13:10	3	2/3/3	WNW/WSW/WNW	0/0/0	3/3/5	2/2/2	2/2/2	0/0/0	0/0/0
19/09/2019	3	PC	13:15	16:15	3	3/3/3	W/W/W	0/0/0	7/4/4	2/2/2	2/2/2	0/0/0	0/0/0
19/09/2019	3	PC	16:45	19:45	3	3/2/2	WNW/WNW/WNW	0/0/0	2/2/1	2/2/2	2/2/2	0/0/0	0/0/0
25/09/2019	3	KL	13:05	16:05	3	4/4/3	E/ESE/ESE	3/0/0	7/7/6	2/2/2	2/2/2	0/0/0	0/0/0
25/09/2019	3	KL	16:35	19:35	3	3/4/3	SE/SE/SE	0/0/0	4/7/6	2/2/2	2/2/2	0/0/0	0/0/0
28/10/2019	1	MW	14:20	17:20	3	1/1/2	W/WNW/NW	2/0/0	5/4/4	2/2/2	2/2/2	0/0/0	0/0/0
28/10/2019	1	MW	10:50	13:50	3	2/2/2	W/W/W	0/0/2	3/4/6	2/2/2	2/2/2	0/0/0	0/0/0
25/10/2019	1	AL	11:15	14:15	3	4/4/4	W/W/W	0/0/0	1/0/0	2/-/-	2/2/2	0/0/0	2/2/2
25/10/2019	1	AL	07:45	10:45	3	5/3/4	W/W/SW	0/0/0	3/1/2	2/2/2	2/2/2	1/0/0	1/1/2
24/10/2019	2	KL	11:50	14:50	3	4/4/4	WNW/WNW/W	2/0/0	4/4/3	1/2/2	2/2/2	0/0/0	0/0/0
24/10/2019	2	KL	15:20	18:20	3	4/3/2	WNW/WNW/NW	0/0/0	3/3/5	2/2/2	2/2/2	0/0/0	0/0/0
29/10/2019	2	PC	09:00	12:00	3	1/2/0	N/NW/-	0/0/0	2/5/7	2/2/2	2/2/2	0/0/0	0/0/0
29/10/2019	2	PC	12:30	15:30	3	0/2/1	-/SSW/SSW	0/0/0	6/7/7	2/2/2	2/2/2	0/0/0	0/0/0
25/10/2019	3	KL	11:15	14:15	3	5/5/5	WSW/WSW/WSW	0/0/0	1/0/0	2/-/-	2/2/2	0/0/0	2/2/2
25/10/2019	3	KL	07:45	10:45	3	5/3/4	WSW/WSW/SW	0/0/0	2/1/2	2/2/2	2/2/2	0/0/0	1/2/2
28/10/2019	3	PC	14:05	17:05	3	2/2/3	WNW/NW/NW	2/0/0	4/4/5	2/2/2	2/2/2	0/0/0	0/0/0
28/10/2019	3	PC	10:35	13:35	3	2/3/3	WNW/WNW/WNW	0/2/2	4/6/5	2/2/2	2/2/2	0/0/0	0/0/0
28/11/2019	1	MW	09:00	12:00	3	3/3/2	N/N/NW	0/0/0	7/5/6	2/2/2	2/2/2	0/0/0	0/0/0
28/11/2019	1	MW	12:30	15:30	3	3/3/3	NW/N/N	1/0/1	7/3/4	2/2/2	2/2/2	0/0/0	0/0/0
19/11/2019	2	PC	08:55	11:55	3	2/2/2	ENE/ENE/ENE	0/0/0	7/7/6	2/2/2	2/2/2	1/1/1	2/2/2

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
19/11/2013	2	PC	12:35	15:35	3	2/2/3	E/E/E	0/0/0	7/8/8	2/2/2	2/2/2	1/1/1	2/2/2
28/11/2019	3	PC	09:05	12:05	3	3/2/1	NE/NE/NNE	0/0/0	7/7/6	2/2/2	2/2/2	0/0/0	2/2/2
28/11/2019	3	PC	12:35	15:35	3	2/2/2	N/N/N	2/0/2	6/5/6	2/2/2	2/2/2	0/0/0	2/2/2
17/12/2019	1	MW	09:05	12:05	3	0/1/2	-/NW/NW	0/0/0	8/8/4	2/2/2	2/2/2	2/2/2	1/1/1
17/12/2019	1	MW	12:35	15:35	3	1/0/0	NW/-/-	0/0/0	3/6/7	2/2/2	2/2/2	2/2/2	1/1/1
06/12/2019	2	MW	09:00	12:00	3	2/3/3	W/W/W	0/1/0	7/6/5	1/2/2	2/2/2	0/0/0	0/0/0
06/12/2019	2	MW	12:30	15:30	3	3/3/3	W/W/W	1/0/0	5/5/7	1/2/1	2/2/2	0/0/0	0/0/0
16/12/2019	3	MW	09:05	12:05	3	1/1/2	SE/SE/SE	0/0/0	2/3/5	2/2/2	2/2/2	2/2/2	2/2/2
16/12/2019	3	MW	12:35	15:35	3	2/3/3	SE/SE/SE	0/1/1	7/8/8	2/1/1	2/2/2	2/2/2	2/1/1
10/01/2020	2	MW	08:35	11:35	3	0/1/1	SE/SE/SE	0/0/0	6/6/7	2/2/2	2/2/2	2/2/2	2/2/2
10/01/2020	2	MW	12:05	15:05	3	2/3/3	SE/S/S	0/0/0	8/8/8	2/2/2	2/2/2	2/2/2	2/2/2
28/01/2020	3	PC	09:55	12:55	3	2/2/2	E/ENE/ENE	0/0/0	3/5/6	2/2/2	2/2/2	0/0/0	1/1/1
28/01/2020	1	MW	09:55	12:55	3	1/0/0	NE/-/-	0/0/0	4/5/4	2/2/2	2/2/2	2/2/2	1/1/1
28/01/2020	3	PC	13:25	16:25	3	1/1/1	ENE/NNE/SW	0/0/0	3/7/7	2/2/2	2/2/2	0/0/0	1/1/1
28/01/2020	1	MW	13:25	16:25	3	1/0/1	N/-/NW	0/0/0	5/8/7	2/2/2	2/2/2	2/2/2	1/1/1
26/02/2020	1	AL	12:15	15:15	3	3/2/2	WSW/W/WSW	0/2/3	3/3/5	2/2/1	2/2/1	0/0/0	1/1/1
20/02/2020	2	AJM	08:40	11:40	3	3/4/4	WSW/WSW/WSW	0/0/0	5/4/5	2/2/2	2/2/2	0/0/0	1/1/1
20/02/2020	2	AJM	12:10	15:10	3	5/5/5	WSW/WSW/WSW	0/0/0	5/5/6	2/2/2	2/2/2	0/0/0	1/1/1
28/02/2020	2	KL	08:30	11:30	3	4/3/4	SSE/ESE/ESE	0/0/0	7/8/8	2/2/2	2/2/2	0/0/0	1/1/1
28/02/2020	2	KL	12:00	15:00	3	4/4/4	ESE/ESE/ESE	0/2/3	8/8/8	2/2/1	2/2/1	0/0/0	1/1/1
26/02/2020	3	KL	12:30	15:30	3	4/4/4	WNW/WNW/WNW	2/0/2	3/3/3	2/2/2	2/2/2	0/0/0	1/1/1
13/03/2020	1	SM	07:35	10:35	3	1/1/2	NE/ENE/E	0/0/0	2/1/1	2/2/2	2/2/2	1/1/0	1/1/1
13/03/2020	1	SM	11:05	14:05	3	2/2/2	ESE/SSE/ESE	0/0/0	6/5/4	2/2/2	2/2/2	0/0/0	1/1/1
18/03/2020	1	SM	09:30	12:30	3	3/3/3	WSW/WSW/WSW	3/2/0	7/6/5	1/2/2	2/2/2	0/0/0	1/1/1
18/03/2020	1	SM	13:00	16:00	3	4/4/3	WSW/W/W	2/0/0	5/5/4	2/2/2	2/2/2	0/0/0	1/2/2
12/03/2020	2	PC	11:50	14:50	3	2/2/2	NNE/NNE/NNE	2/2/1	7/8/8	1/2/1	2/2/2	0/0/0	1/1/1
12/03/2020	2	PC	15:20	18:20	3	2/2/3	NW/NW/NW	1/1/0	8/7/4	1/2/2	1/2/2	0/0/0	1/1/1
20/03/2020	2	SM	07:15	10:15	3	1/1/2	E/ESE/ESE	0/0/0	0/0/1	2/2/2	2/2/2	1/1/0	2/2/2

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
20/03/2020	2	SM	10:45	13:45	3	2/2/2	SSE/ESE/E	0/0/0	4/6/4	2/2/2	2/2/2	0/0/0	2/2/2
13/03/2020	3	PC	07:15	10:15	3	2/2/2	NE/ESE/ESE	0/0/0	4/4/2	2/2/2	2/2/2	1/0/0	1/1/1
13/03/2020	3	PC	10:45	13:45	3	3/3/3	ESE/ESE/ESE	0/0/0	4/6/4	2/2/2	2/2/2	0/0/0	1/1/1
19/03/2020	3	SM	08:50	11:50	3	2/2/2	W/NW/WNW	0/3/0	5/7/7	2/2/2	2/2/2	0/0/0	2/2/2
19/03/2020	3	SM	12:20	15:20	3	3/2/2	W/W/W	0/0/0	6/4/4	2/2/2	2/2/2	0/0/0	2/2/2
24/04/2020	1	MW	18:30	21:30	3	0/0/0	/-/-/-/	0/0/0	0/0/0	/-/-/-/	2/2/2	0/0/0	0/0/0
25/04/2020	1	MW	07:35	10:35	3	1/1/2	SW/SW/SW	0/0/0	0/0/0	/-/-/-/	2/2/2	0/0/0	0/0/0
25/04/2020	1	MW	11:05	14:05	3	2/2/2	SW/SW/SW	0/0/0	0/0/0	/-/-/-/	2/2/2	0/0/0	0/0/0
30/04/2020	1	MW	11:50	14:50	3	3/3/2	SE/SE/SE	0/2/0	7/8/7	2/2/2	2/2/2	0/0/0	0/0/0
24/04/2020	2	MW	08:00	11:00	3	1/1/2	S/S/S	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
24/04/2020	2	MW	11:30	14:30	3	2/2/2	S/S/S	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
30/04/2020	2	MW	08:20	11:20	3	3/3/3	SE/SE/SE	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
30/04/2020	2	MW	15:20	18:20	3	2/2/2	SE/SE/SE	2/1/0	7/8/8	2/2/2	2/2/2	0/0/0	0/0/0
27/04/2020	3	MW	11:15	14:15	3	2/2/2	SW/SW/SW	0/0/0	5/6/6	2/2/2	2/2/2	0/0/0	0/0/0
27/04/2020	3	MW	14:45	17:45	3	2/1/1	SW/SW/SW	0/0/0	5/4/3	2/2/2	2/2/2	0/0/0	0/0/0
28/04/2020	3	MW	15:00	18:00	3	1/1/1	S/S/S	0/0/0	4/4/5	2/2/2	2/2/2	0/0/0	0/0/0
28/04/2020	3	MW	18:30	21:30	3	1/1/0	S/S/-	0/0/0	3/3/2	2/2/2	2/2/2	0/0/0	0/0/0
11/05/2020	1	MW	14:50	17:50	3	3/3/3	NW/NW/NW	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
11/05/2020	1	MW	18:20	21:20	3	3/3/2	NW/NW/NW	0/0/0	5/6/5	2/2/2	2/2/2	0/0/0	0/0/0
05/05/2020	2	MW	09:50	12:50	3	1/1/0	SE/SE/-	0/0/0	1/1/0	2/2/-	2/2/2	0/0/0	0/0/0
05/05/2020	2	MW	13:20	16:20	3	0/1/1	-/SE/SE	0/0/0	0/2/1	-/2/2	2/2/2	0/0/0	0/0/0
14/05/2020	3	MW	08:30	11:30	3	3/3/3	NW/NW/NW	0/0/1	7/8/8	2/2/1	2/2/2	0/0/0	0/0/0
14/05/2020	3	MW	12:00	15:00	3	3/3/3	NW/NW/NW	0/1/0	6/7/8	2/2/2	2/2/2	0/0/0	0/0/0
23/06/2020	1	SM	12:15	15:15	3	2/3/3	SSW/SSW/SW	0/0/0	7/4/7	2/2/2	2/2/2	0/0/0	0/0/0
23/06/2020	1	SM	15:45	18:45	3	3/2/2	SSW/SW/SSW	0/0/0	7/8/8	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
30/06/2020	1	SM	14:50	17:50	3	1/1/1	W/NW/W	3/3/1	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
10/06/2020	2	SM	09:55	12:55	3	1/1/2	E/E/ESE	1/0/0	8/8/8	1/2/2	1/2/2	0/0/0	0/0/0
10/06/2020	2	SM	13:25	16:25	3	2/2/2	ESE/E/ENE	1/3/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
11/06/2020	2	SM	19:50	22:50	3	2/1/2	E/E/E	0/0/0	4/2/1	2/2/2	2/2/2	0/0/0	0/0/0
16/06/2020	3	SM	12:15	15:15	3	1/2/2	NW/NW/WNW	0/0/0	8/8/8	1/1/1	2/2/2	0/0/0	0/0/0
16/06/2020	3	SM	15:45	18:45	3	2/2/2	WNW/WNW/W	0/0/0	8/7/7	2/2/2	2/2/2	0/0/0	0/0/0
23/06/2020	3	SM	06:40	09:40	3	1/2/2	S/S/S	0/0/0	7/8/8	2/2/2	2/2/2	0/0/0	0/0/0
22/07/2020	1	SM	09:45	12:45	3	3/3/3	E/ESE/SE	0/0/0	6/7/8	2/2/2	2/2/2	0/0/0	0/0/0
22/07/2020	1	SM	13:15	16:15	3	3/2/2	SE/SSE/S	0/0/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
29/07/2020	1	AL	07:00	10:00	3	2/2/3	WNW/WNW/WNW	2/2/2	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
07/07/2020	2	SM	10:25	13:25	3	2/2/2	W/WNW/NW	1/2/2	8/8/8	1/2/2	1/2/2	0/0/0	0/0/0
07/07/2020	2	SM	13:55	16:55	3	3/2/3	NW/NW/NNW	0/0/0	7/7/6	2/2/2	2/2/2	0/0/0	0/0/0
28/07/2020	2	KL	10:00	13:00	3	5/5/5	NW/NW/NW	1/0/2	6/6/8	2/2/2	2/2/2	0/0/0	0/0/0
15/07/2020	3	SM	10:20	13:20	3	3/3/4	W/W/W	0/2/2	8/7/7	2/2/2	2/2/2	0/0/0	0/0/0
15/07/2020	3	SM	13:50	16:50	3	4/4/3	W/W/W	2/0/2	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
20/07/2020	3	SM	16:05	19:05	3	3/3/3	NW/WNW/WNW	0/0/0	8/8/7	2/2/2	2/2/2	0/0/0	0/0/0
19/08/2020	1	SM	13:55	16:55	3	3/3/2	E/E/E	0/0/0	8/5/6	1/2/2	2/2/2	0/0/0	0/0/0
20/08/2020	1	SM	16:35	19:35	3	4/4/4	SE/SE/SE	3/2/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
21/08/2020	2	SM	06:05	09:05	3	4/4/3	E/E/ESE	2/2/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
21/08/2020	2	SM	09:35	12:35	3	3/3/2	ESE/SE/SSE	0/0/0	8/5/7	2/2/2	2/2/2	0/0/0	0/0/0
18/08/2020	3	SM	11:20	14:20	3	2/2/3	SSE/SE/ESE	0/0/2	6/4/7	2/2/2	2/2/2	0/0/0	0/0/0
18/08/2020	3	SM	14:50	17:50	3	3/3/3	E/ESE/SE	2/3/0	7/8/6	2/2/2	2/2/2	0/0/0	0/0/0
03/09/2020	1	SM	09:55	12:55	3	5/4/4	W/WSW/WSW	2/0/2	6/5/7	2/2/2	2/2/2	0/0/0	0/0/0
03/09/2020	1	SM	13:25	16:25	3	4/5/4	SW/SW/WSW	2/0/3	8/5/8	2/2/2	2/2/2	0/0/0	0/0/0
22/09/2020	1	AL	09:15	12:15	3	2/1/2	SSE/SE/SSE	1/2/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
22/09/2020	1	AL	12:45	15:45	3	3/3/3	SSE/SW/SW	2/2/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
01/09/2020	2	SM	12:40	15:40	3	2/2/3	S/SSW/SSW	0/0/0	7/5/7	2/2/2	2/2/2	0/0/0	0/0/0
01/09/2020	2	SM	16:10	19:10	3	4/3/3	SE/S/SE	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
10/09/2020	2	SM	06:40	09:40	3	2/2/2	W/W/WNW	0/0/0	8/8/7	2/2/2	2/2/2	0/0/0	0/0/0
10/09/2020	2	SM	10:10	13:10	3	3/1/2	WSW/W/WSW	0/2/2	7/8/8	2/2/2	2/2/2	0/0/0	0/0/0
02/09/2020	3	SM	10:55	13:55	3	4/4/4	SE/S/SE	0/0/2	8/8/7	2/2/2	2/2/2	0/0/0	0/0/0
02/09/2020	3	SM	14:25	17:25	3	4/3/3	SSE/SW/S	0/0/0	6/6/7	2/2/2	2/2/2	0/0/0	0/0/0
22/09/2020	3	KL	09:00	12:00	3	2/2/2	E/SE/SE	0/2/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
22/09/2020	3	KL	12:30	15:30	3	2/3/3	SSE/SSW/SSW	2/2/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
06/10/2020	1	SM	10:10	13:10	3	1/2/2	WNW/W/W	0/0/0	8/6/7	1/2/2	2/2/2	0/0/0	0/0/0
06/10/2020	1	SM	13:40	16:40	3	2/3/2	W/WNW/NW	0/3/0	6/8/8	2/2/2	2/2/2	0/0/0	0/0/0
28/10/2020	1	AL	10:00	13:00	3	2/2/1	SE/SE/S	0/0/0	6/8/8	2/2/2	2/2/2	0/0/0	0/0/0
28/10/2020	1	AL	13:30	16:30	3	2/3/3	SSW/SSW/SW	0/0/0	8/7/7	2/2/2	2/2/2	0/0/0	0/0/0
02/10/2020	2	SM	08:05	11:05	3	3/3/3	E/ENE/E	0/0/0	8/8/8	1/1/2	1/2/2	0/0/0	0/0/0
02/10/2020	2	SM	11:35	14:35	3	3/2/2	ESE/ESE/SE	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
09/10/2020	2	MW	07:40	10:40	3	2/2/2	W/W/W	0/2/2	6/7/8	2/1/1	2/2/2	0/0/0	0/0/0
09/10/2020	2	MW	11:10	14:10	3	2/3/3	W/W/NW	2/2/2	8/8/8	1/1/1	2/2/2	0/0/0	0/0/0
08/10/2020	3	MW	11:55	14:55	3	2/3/2	W/W/W	2/3/0	6/6/4	2/2/2	2/2/2	0/0/0	0/0/0
08/10/2020	3	MW	15:25	18:25	3	2/2/2	W/W/W	0/0/1	4/3/5	2/2/2	2/2/2	0/0/0	0/0/0
28/10/2020	3	KL	09:40	12:40	3	1/1/1	SE/SSE/SSE	0/0/0	5/7/8	2/2/2	2/2/2	0/0/0	0/0/0
28/10/2020	3	KL	13:10	16:10	3	2/2/2	WSW/SW/SW	0/0/0	8/7/7	2/2/2	2/2/2	0/0/0	0/0/0
24/11/2020	1	SM	07:55	10:55	3	1/2/3	SSW/WSW/W	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	2/2/2
24/11/2020	1	SM	11:25	14:25	3	2/1/1	W/WSW/WNW	2/2/1	8/8/8	2/2/2	2/2/2	0/0/0	2/2/2
03/11/2020	2	SM	10:25	13:25	3	3/3/3	WNW/W/W	2/2/2	7/6/7	2/2/2	2/2/2	0/0/0	2/2/2
03/11/2020	2	SM	13:55	16:55	3	3/3/3	WNW/WNW/NW	3/0/0	8/6/5	1/2/2	2/2/2	0/0/0	2/2/2
13/11/2020	3	SM	07:30	10:30	3	2/3/3	W/SW/WSW	0/2/2	8/7/6	2/2/2	2/2/2	0/0/0	0/0/0
13/11/2020	3	SM	11:00	14:00	3	3/2/3	WSW/WSW/SW	3/2/0	7/7/5	2/2/2	2/2/2	0/0/0	0/0/0
18/12/2020	1	SM	08:30	11:30	3	3/3/3	NE/ENE/E	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	2/2/2
18/12/2020	1	SM	12:00	15:00	3	3/3/2	ESE/SSE/S	0/0/3	7/8/8	2/2/2	2/2/2	0/0/0	2/2/2
11/12/2020	2	SM	08:20	11:20	3	4/4/3	ENE/ESE/NNE	2/0/0	4/5/4	2/2/2	2/2/2	0/0/0	2/2/2
11/12/2020	2	SM	11:50	14:50	3	3/3/3	NE/ENE/E	0/0/0	4/6/7	2/2/2	2/2/2	0/0/0	2/2/2

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
19/12/2020	3	SM	08:40	11:40	3	3/3/3	SE/ESE/ESE	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	2/2/2
19/12/2020	3	SM	12:10	15:10	3	3/3/3	SE/SSE/SSE	0/0/0	6/5/7	2/2/2	2/2/2	0/0/0	2/2/2
28/01/2021	1	SM	09:15	12:15	3	5/4/4	ENE/ENE/E	0/0/3	8/8/8	2/2/1	2/2/2	0/0/0	1/1/1
27/01/2021	2	SM	09:50	12:50	3	2/1/3	ENE/NE/NE	0/0/0	8/8/8	2/1/2	2/1/2	0/0/0	1/1/1
27/01/2021	2	SM	13:20	16:20	3	2/2/2	NE/NNE/ENE	0/0/0	7/8/8	2/2/2	2/2/2	0/0/0	1/1/1
07/01/2021	3	MW	09:30	12:30	3	1/2/1	NNW/NNW/NNW	0/0/0	7/6/6	2/2/2	2/2/2	2/2/2	1/1/1
07/01/2021	3	MW	13:00	16:00	3	1/2/1	NNW/NNW/NNW	0/1/1	7/8/8	2/1/1	2/2/2	2/2/2	1/1/1
23/02/2021	1	AL	10:15	13:15	3	5/5/5	ESE/SSE/SE	2/2/3	8/8/7	2/2/1	2/2/2	0/0/0	1/1/1
23/02/2021	1	AL	13:45	16:45	3	5/5/4	SSE/SSE/SW	3/3/0	8/8/5	1/1/2	1/1/2	0/0/0	1/1/1
25/02/2021	1	AL	10:00	13:00	3	5/6/6	SW/W/W	2/0/0	4/5/3	2/2/2	2/2/2	0/0/0	1/1/1
25/02/2021	1	AL	13:30	16:30	3	6/6/6	W/W/W	2/1/0	8/8/6	2/1/2	2/2/2	0/0/0	1/1/1
24/02/2021	2	KL	09:30	12:30	3	4/4/4	SW/SW/SW	0/0/0	5/4/3	2/2/2	2/2/2	0/0/0	1/1/1
24/02/2021	2	KL	13:00	16:00	3	5/5/5	WSW/WSW/WSW	0/0/0	3/2/3	2/2/2	2/2/2	0/0/0	1/1/1
26/02/2021	2	KL	07:45	10:45	3	2/2/2	NW/NW/WNW	0/0/0	7/6/7	2/2/2	2/2/2	0/0/0	1/1/1
26/02/2021	2	KL	11:15	14:15	3	2/2/2	WNW/WNW/WNW	0/0/0	8/6/6	2/2/2	2/2/2	0/0/0	1/1/1
23/02/2021	3	KL	09:45	12:45	3	4/4/4	SE/ESE/SSE	2/2/3	7/7/7	2/2/2	2/2/2	0/0/0	1/1/1
23/02/2021	3	KL	13:15	16:15	3	3/2/4	SSE/SW/SW	2/2/0	8/7/5	2/2/2	2/2/2	0/0/0	1/1/1
25/02/2021	3	KL	09:45	12:45	3	4/4/4	W/W/W	2/2/0	3/3/3	2/2/2	2/2/2	0/0/0	1/1/1
25/02/2021	3	KL	13:15	16:15	3	4/4/4	WNW/W/W	2/2/0	7/5/5	2/2/2	2/2/2	0/0/0	1/1/1
08/03/2021	1	SM	12:50	15:50	3	2/2/2	W/W/WNW	0/0/0	5/5/7	2/2/2	2/2/2	0/0/0	2/2/2
11/03/2021	1	PC	11:05	14:05	3	4/4/4	W/W/W	3/3/3	6/6/6	2/2/2	2/2/2	0/0/0	1/1/1
11/03/2021	1	PC	14:35	17:35	3	4/5/5	W/W/W	3/3/3	6/5/6	2/2/2	2/2/2	0/0/0	1/1/1
18/03/2021	1	GD	08:30	11:30	3	3/4/4	NW/NW/NW	0/0/0	8/7/8	1/1/1	2/2/2	0/0/0	2/2/2
18/03/2021	1	GD	12:00	15:00	3	4/5/5	NW/NW/NW	0/0/0	8/8/8	1/2/2	2/2/2	0/0/0	2/2/2
17/03/2021	2	MW	12:30	15:30	3	3/3/3	NW/NW/NW	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
17/03/2021	2	MW	16:00	19:00	3	3/3/3	NW/NW/NW	0/0/0	5/7/7	2/2/1	2/2/2	0/0/0	0/0/0
29/03/2021	2	SM	11:50	14:50	3	2/2/2	W/W/W	0/0/2	8/8/8	2/2/1	2/2/2	0/0/0	0/0/0
30/03/2021	2	SM	12:35	15:35	3	2/3/4	SW/WSW/W	0/1/3	8/8/8	2/1/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
11/03/2021	3	GD	11:00	14:00	3	4/5/5	WNW/W/W	2/2/3	8/7/7	2/2/2	2/2/2	0/0/0	1/1/1
11/03/2021	3	GD	14:30	17:30	3	4/5/5	W/WNW/W	3/1/2	8/7/8	2/2/2	2/2/2	0/0/0	1/1/1
18/03/2021	3	MW	08:40	11:40	3	3/3/3	WNW/WNW/WNW	0/0/0	6/7/7	2/2/2	2/2/2	0/0/0	0/0/0
18/03/2021	3	MW	12:10	15:10	3	3/4/4	WNW/WNW/WNW	0/0/0	7/3/3	2/2/2	2/2/2	0/0/0	0/0/0
16/04/2021	1	CG	06:00	09:00	3	1/1/2	SE/SE/SE	0/0/0	0/0/0	0/0/0	2/2/2	1/0/0	2/2/2
16/04/2021	1	CG	09:30	12:30	3	1/2/2	SE/SE/SE	0/0/0	1/2/3	2/2/2	2/2/2	0/0/0	2/2/2
22/04/2021	1	AL	09:45	12:45	3	3/2/2	WNW/W/SW	0/0/0	0/1/4	0/2/2	2/2/2	0/0/0	0/0/0
22/04/2021	1	AL	13:15	16:15	3	3/4/3	W/SW/W	0/0/0	5/6/5	2/2/2	2/2/2	0/0/0	0/0/0
14/04/2021	2	MW	08:05	11:05	3	0/1/1	-/NW/NW	0/0/0	0/1/3	-/2/2	2/2/2	1/1/0	1/1/1
14/04/2021	2	MW	11:35	14:35	3	2/2/2	NW/NW/NW	0/0/0	5/4/4	2/2/2	2/2/2	0/0/0	0/0/0
20/04/2021	2	KL	11:00	14:00	3	4/3/4	NW/NNW/NW	0/0/0	8/7/7	2/2/2	2/2/2	0/0/0	1/1/1
20/04/2021	2	KL	14:30	17:30	3	4/4/5	WNW/NW/NW	0/0/2	7/7/7	2/2/2	2/2/2	0/0/0	1/1/1
02/04/2021	3	SM	08:55	11:55	3	1/1/1	NNW/NW/NW	1/0/0	8/8/8	1/2/2	2/2/2	0/0/0	2/2/2
02/04/2021	3	SM	12:25	15:25	3	1/2/1	WNW/WNW/WNW	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	2/2/2
22/04/2021	3	KL	09:15	12:15	3	3/2/2	WNW/WNW/SSW	0/0/0	0/1/2	-/2/2	2/2/2	0/0/0	1/1/1
22/04/2021	3	KL	12:45	15:45	3	2/2/3	NW/WNW/WNW	0/0/0	3/7/6	2/2/2	2/2/2	0/0/0	1/1/1
31/05/2021	1	GD	13:40	16:40	3	3/3/3	SE/SE/SE	0/0/0	2/3/4	2/2/2	2/2/2	0/0/0	0/0/0
31/05/2021	1	GD	17:10	20:10	3	3/3/2	SE/SE/SE	0/0/0	5/5/5	2/2/2	2/2/2	0/0/0	0/0/0
13/05/2021	2	KL	09:30	12:30	3	3/3/3	E/ENE/E	0/0/0	7/7/7	2/2/2	1/2/2	0/0/0	0/0/0
13/05/2021	2	KL	13:00	16:00	3	3/2/2	E/ESE/E	2/2/2	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
31/05/2021	3	PC	13:25	16:35	3	3/3/3	SSE/SSE/SSE	0/0/0	2/3/5	2/2/2	2/2/2	0/0/0	0/0/0
31/05/2021	3	PC	17:05	20:05	3	3/3/2	SSE/SSE/SSE	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
21/06/2021	1	NV	12:00	15:00	3	4/4/4	WNW/WNW/WNW	0/2/0	7/8/7	2/2/2	2/2/2	0/0/0	0/0/0
21/06/2021	1	NV	15:30	18:30	3	4/4/3	WNW/WNW/WNW	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
09/06/2021	2	GD	13:45	16:45	3	2/2/2	SW/SW/SW	2/2/2	8/8/8	2/1/2	2/1/2	0/0/0	0/0/0
09/06/2021	2	GD	17:15	20:15	3	1/2/2	SW/SW/SW	0/0/0	8/8/8	2/2/1	2/2/1	0/0/0	0/0/0
21/06/2021	3	AJM	11:50	14:50	3	4/4/3	WNW/WNW/WNW	0/2/0	4/5/5	2/2/2	2/2/2	0/0/0	0/0/0
21/06/2021	3	AJM	15:20	18:20	3	3/3/4	WNW/WNW/WNW	0/0/0	6/7/6	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
27/07/2021	1	AR	10:50	13:50	3	4/4/4	E/ENE/ENE	0/0/0	8/6/6	1/2/2	2/2/2	0/0/0	0/0/0
27/07/2021	1	AR	14:20	17:20	3	4/4/4	ENE/NE/NE	0/0/2	6/7/8	2/2/1	2/2/2	0/0/0	0/0/0
29/07/2021	1	AR	09:50	12:50	3	4/4/5	NW/NW/WNW	1/0/0	8/8/8	1/1/2	2/2/2	0/0/0	0/0/0
29/07/2021	1	AR	13:20	16:20	3	4/4/4	NW/NW/N	1/0/2	8/7/8	2/2/2	2/2/2	0/0/0	0/0/0
19/07/2021	2	MW	16:00	19:00	3	1/1/1	NW/NW/NW	0/0/0	3/3/3	2/2/2	2/2/2	0/0/0	0/0/0
19/07/2021	2	MW	19:30	22:30	3	1/0/0	NW/-/-	0/0/0	2/-/-	2/-/-	2/2/2	0/0/0	0/0/0
26/07/2021	2	SM	13:10	16:10	3	2/2/2	ESE/SE/SE	0/0/0	7/8/7	2/2/2	2/2/2	0/0/0	0/0/0
26/07/2021	2	SM	16:40	19:40	3	1/2/2	SSW/WNW/NW	0/0/2	7/8/8	2/2/2	2/2/2	0/0/0	0/0/0
27/07/2021	3	JS	10:45	13:45	3	2/2/2	ENE/ENE/E	0/0/0	8/8/6	2/2/2	2/2/2	0/0/0	0/0/0
27/07/2021	3	JS	14:15	17:15	3	3/3/3	E/E/E	0/0/3	5/6/8	2/2/2	2/2/2	0/0/0	0/0/0
29/07/2021	3	JS	09:05	12:05	3	2/3/3	NW/NW/NW	0/1/0	8/8/8	1/1/2	2/2/2	0/0/0	0/0/0
29/07/2021	3	JS	12:35	15:35	3	3/3/3	NW/NW/NW	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
19/08/2021	1	GD	07:45	10:45	3	0/0/0	-/-/-	0/2/1	8/8/8	1/2/2	1/1/2	0/0/0	0/0/0
19/08/2021	1	GD	11:15	14:15	3	0/1/1	-/SW/E	1/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
25/08/2021	2	AJM	10:20	13:20	3	0/0/0	NW/SSW/SE	0/0/0	6/5/5	1/2/2	2/2/2	0/0/0	0/0/0
25/08/2021	2	AJM	13:50	16:50	3	2/2/2	E/E/E	0/0/0	4/3/3	2/2/2	2/2/2	0/0/0	0/0/0
19/08/2021	3	SM	07:45	10:45	3	1/1/1	SW/ENE/ESE	0/0/0	8/8/8	1/1/2	1/2/2	0/0/0	0/0/0
19/08/2021	3	SM	11:15	14:15	3	1/2/2	SE/ESE/ESE	2/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0

Table A2.2: MBBS effort – Year 1 (2020). *Note, 'Visibility' was '2' for all MBBS.*

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Frost	Snow
22/04/2020	MW	08:30	14:40	2/2/2/3/3/3	SE/SE/SE/SE/SE/SE	0/0/0/0/0/0	0/0/0/0/0/0	/-/-/-/-/-/-	0	0
23/04/2020	MW	08:00	13:35	0/0/0/1/1/1	-/-/-/SE/SE/SE	0/0/0/0/0/0	0/0/0/0/0/0	/-/-/-/-/-/-	0	0
06/05/2020	MW	07:30	13:30	1/1/2/2/2/2	SW/SW/SW/SW/SW/SW	0/0/0/0/0/0	0/0/0/1/1/1	/-/-/-/2/2/2/	0	0
07/05/2020	MW	07:30	13:20	2/2/2/2/3/3/	SW/SW/SW/SW/SW/SW	0/0/0/0/0/0	0/0/0/1/2/3	/-/-/-/2/2/2/	0	0
09/06/2020	SM	08:30	14:30	1/1/1/2/2/1	WSW/W/W/W/W/WSW	0/0/0/0/0/1	8/8/8/8/8/8	2	0	0
11/06/2020	SM	09:15	15:15	3/2/2/2/2/2	ENE/ENE/ENE/ENE/E/E	0/0/0/0/0/0	7/7/8/8/8/5	2	0	0

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Frost	Snow
08/07/2020	SM	09:25	17:00	1/2/2/2/2/1/1	W/SSW/SW/SW/W/SW/SW	0/0/0/0/0/0/0	3/4/6/7/7/8/8	2	0	0
09/07/2020	SM	08:45	16:00	2/2/2/2/2/2/2	NW/NNW/NW/W/W/NNW/NW	0/0/0/0/0/0/0	7/5/6/7/5/7/8	2	0	0

Table A2.3: MBBS effort – Year 2 (2021). *Note, 'Visibility' was '2' for all MBBS.*

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Frost	Snow
15/04/2021	CG	08:30	14:30	1/1/1/1/1/1	N/N/N/N/NE/NE	0	2/2/2/2/2/2	2	1/1/0/0/0/0	2/2/2/2/2/2
15/04/2021	MW	08:40	15:00	0/1/1/1/1/1	NA/S/S/S/S/S	0	-/-/2/2/2/2	2	1/0/0/0/0/0	1/1/1/1/1/1
17/05/2021	AL & KL	08:45	14:45	1/1/2/2/2/1	NNE/SSE/NW/NW/SE/SSW	0	2/2/2/2/2/2	2	0	0
22/06/2021	NV	08:30	14:30	1/3/2/2/3/3	SW/SWWSW/WSW/WSW/WSW	0	2/2/2/2/2/2	2	0	0
22/06/2021	AJM	08:35	16:15	1/3/2/2/2/3	SW/SW/WSW/WSW/WSW/WSW	0	2/2/2/2/2/2	2	0	0
20/07/2021	MW	07:40	14:50	0/0/1/1/1/1/1	-/-/W/W/W/W/W	0	-/-/-/-/1/2/2	2	0	0
21/07/2021	MW	07:50	12:40	1/1/1/1/1	W/W/W/W/W	0	2/2/-/-/-	2	0	0

Table A2.4: Annex 1 & Schedule 1 breeding raptor and owl survey effort – Year 1 (2020). *Note, 'Visibility' was '2' for all surveys.*

Date	Surveyor	Start Time	Finish Time	Wind Speed	Rain	Cloud Cover	Cloud Height	Frost	Snow
21/04/2020	MW	08:20	17:30	2/2/3/3/4/4/4/3/2	0/0/0/0/0/0/0/0/0	0	-	0	2
29/04/2020	MW	12:30	15:30	2/2/2	0/0/0	4/4/4	2/2/2	0	0
12/05/2020	MW	09:40	12:35	3/3/3	0/1/2	6/8/8	1/1/1	0	2
14/05/2020	MW	15:15	18:50	3/3/4/3	0/1/2/0	7/8/8/7	2/2/2/2	0	2
19/05/2020	MW	10:30	16:30	2/2/2/2/2/2	0/0/0/0/0/0	3/3/4/5/5/4	2/2/2/2/2/2	0	0
20/05/2020	MW	08:40	14:40	2/2/2/3/3/3	0/0/0/0/0/0	0/0/0/1/1/1	-/-/-/2/2/2	0	0
25/06/2020	SM	16:35	19:35	1/1/1	0/0/0	1/1/1	2/2/2	0	0
30/06/2020	SM	08:20	14:20	1/1/1/1/1/1	1/0/2/2/0/2	8/8/8/8/8/8	1/1/2/2/2/2	0	0
20/07/2020	SM	12:15	15:15	3/2/2	0/0/0	4/6/8	2/2/2	0	0
23/07/2020	SM	11:05	17:05	2/2/3/4/3/2	0/0/0/0/0/0	8/8/7/6/6/4	2/2/2/2/2/2	0	0
28/07/2020	AL & KL	13:30	19:30	3/2/2/2/3/2	2/2/0/2/0/0	4/8/5/6/4/4	2/2/2/2/2/2	0	0

Date	Surveyor	Start Time	Finish Time	Wind Speed	Rain	Cloud Cover	Cloud Height	Frost	Snow
12/08/2020	SM	10:15	16:30	1/2/1/1/2/1	0/0/0/0/0/0	8/8/7/4/1/2	1/2/2/2/2/2	0	0

Table A2.5: Annex 1 & Schedule 1 breeding raptor and owl survey effort – Year 1 (2020). *Note, 'Visibility' was '2' for all surveys.*

Date	Surveyor	Start Time	Finish Time	Wind Speed	Rain	Cloud Cover	Cloud Height	Frost	Snow
21/02/2021	SM	09:35	15:50	3/4/5/5/4/3	0/0/0/0/0/0	6/7/5/6/4/2	2/2/2/2/2/2	0	1
26/02/2021	AL	07:30	13:30	1/1/1/1/1/1	0/0/0/0/0/0	5/6/7/6/5/4	2/2/2/2/2/2	0	0
18/03/2021	MW	15:10	18:10	3/3/2	0/0/0	3/3/3	2/2/2	0	0
18/03/2021	GD	15:00	18:00	4/3/2	0/0/0	8/7/5	1/2/2	0	2
19/03/2021	MW	08:30	11:30	1/2/3	0/0/0	3/3/3	2/2/2	0	0
31/03/2021	SM	13:35	16:35	3/3/4	0/0/1	8/8/8	2/2/2	0	0
21/04/2021	AL & KL	10:00	16:00	0/1/1/2/2/1	0/0/0/0/0/0	0/0/0/0/0/0	-	0	0
17/05/2021	AJM	12:25	18:50	2/2/3/4/4/3	0/0/0/0/0/0	6/6/5/5/6/7	2/2/2/2/2/2	0	0
01/06/2021	PC	08:35	14:35	3/4/4/4/3/3	0/0/0/0/0/0	8/8/8/8/8/7	2/2/2/2/2/2	0	0
28/06/2021	AJM	11:30	17:55	1/1/2/2/2/2	0/0/0/0/0/0	1/1/1/1/1/1	2/2/2/2/2/2	0	0
28/06/2021	MW	12:00	18:00	2/2/3/3/3/3	0/0/0/0/0/1	2/2/0/0/0/1	2/2/-/-/-/2	0	0
27/07/2021	PC	10:00	16:00	3/3/3/3/3/4	0/0/0/0/0/0	7/8/7/7/7/7	2/2/2/2/2/2	0	0
29/07/2021	PC	09:00	15:00	4/4/3/3/3/3	2/1/0/0/0/0	8/8/8/8/8/8	2/2/2/2/2/2	0	0
05/08/2021	GD	08:30	14:30	2/2/2/2/2/2	0/0/0/0/0/0	6/6/6/7/5/6	2/2/2/2/2/2	0	0
05/08/2021	VH	08:35	14:35	2/3/3/3/3/4	0/0/0/0/0/0	7/7/7/6/7/7	2/2/2/2/2/2	0	0

Table A2:6: Black grouse survey effort – Year 1 (2020).

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
18/03/2020	SM	05:25	08:25	1/2/2	W/W/W	3/2/2	8/8/8	1/1/2	2/2/2	1/1/1	1/1/1
19/03/2020	SM	05:20	08:20	1/2/2	WSW/WSW/W	0/0/0	2/1/3	2/2/2	2/2/2	1/1/1	2/2/2
23/04/2020	MW	05:00	08:00	0/0/0	-/-/-	0/0/0	0/0/0	-/-/-	2/2/2	1/1/0	0/0/0
25/04/2020	MW	04:35	07:35	0/0/0	-/-/SW	0/0/0	0/0/0	-/-/-	2/2/2	1/1/0	0/0/0

Table A2:7: Black grouse survey effort – Year 2 (2021).

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
19/03/2021	MW	05:30	08:30	1/1/1	NW/NW/NW	0/0/0	4/5/4	2/2/2	2/2/2	0/0/0	0/0/0
19/03/2021	GD	05:30	08:30	0/1/1	-/N/N	0/0/0	8/8/8	2/2/1	2/2/2	0/0/0	2/2/2
01/04/2021	SM	05:45	08:05	2/2/2	E/E/E	0/0/0	0/0/0	NA	2/2/2	1/1/1	2/2/2
02/04/2021	SM	05:45	08:45	1/1/1	WNW/N/NNW	0/0/0	8/8/8	2/2/2	2/2/2	1/1/0	2/2/2

Table A2:8: Diver searches survey effort – Year 1 (2020).

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
28/04/2020	MW	O8:30	14:00	1/1/1/1/1/1	S/S/S/S/S/S	0/0/0/0/0/0	3/3/3/2/4/4	2	2/2/2/2/2	0	0
07/05/2020	MW	14:30	17:30	2/2/2	SW/SW/SW	0/0/0	2/2/3	2	0/0/0	0	0
12/05/2020	MW	13:20	16:20	3/3/3	NW/NW/NW	0/0/0	6/6/5	2	0/0/0	0	0
21/05/2020	MW	04:15	07:15	0/0/0	/-/-/-/	0/0/0	6/6/5	2	0/0/0	0	0

Table A2:9: Diver searches survey effort – Year 2 (2021).

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
23/04/2021	AL & KL	08:30	11:30	0/1/1	-/W/W	0	1/1/1	2	2	0	0
01/06/2021	GD	08:35	14:35	2/1/1/2/2/2	SW	0	8/8/8/6/6/8	2	2	0	0

ANNEX 3 – VP FLIGHT ACTIVITY SURVEYS: TARGET SPECIES FLIGHTS

Tables A3.1 and **A3.2** presents details of target species flight lines recorded during VP surveys undertaken between September 2019 and August 2021.

The species, number of birds, total flight time (in seconds) and duration spent at each height band (HT) is presented. Note that the flights presented refer to all target species flights recorded, and not just those flights which are identified as being 'at collision risk' from the Proposed Development.

British Trust for Ornithology (BTO) codes[6] used are: ***GJ*** *– Greylag goose,* ***PG*** *– Pink-footed goose,* ***WS*** *– Whooper swan,* ***RH*** *– Red-throated diver,* ***GD*** *– Goosander,* ***T.*** *– Teal,* ***GP*** *– Golden plover,* ***GK*** *– Greenshank, SN – Snipe,* ***EA*** *– Golden eagle,* ***WE*** *– White-tailed eagle,* ***OP*** *– Osprey,* ***GI*** *– Goshawk,* ***HH*** *– Hen harrier,* ***KT*** *– Red kite,* ***ML*** *– Merlin,* ***BK*** *– Black grouse, and* ***PE*** *– Peregrine.*

Table A3:1: Target species flight activity – Year 1 (September 2019 to August 2020).

Date	VP	Species	No. of Birds	Start Time	Total Flight Time (s)	HT1	HT2	HT3	HT4	HT5	Notes
19/09/2019	3	EA	1	15:36	49	4	45	0	0	0	Juvenile.
19/09/2019	3	WE	1	15:28	76	0	0	15	30	31	Adult.
20/09/2019	2	EA	1	09:30	185	0	20	15	15	135	Adult female hunting.
20/09/2019	2	EA	1	10:56	176	0	26	0	15	135	Same adult female hunting.
20/09/2019	2	EA	1	12:20	140	0	30	20	45	45	Same adult female hunting.
24/10/2019	1	KT	1	13:51	45	0	0	45	0	0	-
24/10/2019	2	WS	21	16:22	60	0	0	0	0	60	-
24/10/2019	2	WS	6	16:36	75	0	0	0	0	75	-
25/10/2019	1	GP	22	12:28	30	0	0	30	0	0	-
25/10/2019	1	KT	1	12:35	60	0	45	15	0	0	-
25/10/2019	1	WS	7	08:57	90	0	0	60	30	0	-
25/10/2019	3	KT	1	09:16	45	0	30	15	0	0	-
25/10/2019	3	PE	2	10:43	30	0	15	15	0	0	Two males interacting.
28/10/2019	1	KT	1	13:29	48	0	0	48	0	0	-

[6] 'BTO Species Codes' Available at: https://www.bto.org/sites/default/files/u16/downloads/forms_instructions/bto_bird_species_codes.pdf (Accessed 16/01/2025).

Date	VP	Species	No. of Birds	Start Time	Total Flight Time (s)	HT1	HT2	HT3	HT4	HT5	Notes
29/10/2019	2	GP	12	10:15	15	15	0	0	0	0	-
28/11/2019	3	GJ	15	11:31	94	0	0	0	0	94	-
28/11/2019	3	GJ	15	13:04	110	0	0	0	0	110	-
10/01/2020	2	WE	1	13:12	198	0	120	60	18	0	1st winter bird.
20/02/2020	2	EA	1	13:00	250	0	0	150	15	85	Probably male, 3rd calendar year.
13/03/2020	1	WS	3	08:06	27	0	0	27	0	0	-
18/03/2020	1	KT	1	13:55	71	0	71	0	0	0	Direct flight.
24/04/2020	1	T.	2	20:43	21	0	15	6	0	0	-
24/04/2020	2	GK	1	10:48	4	4	0	0	0	0	-
24/04/2020	2	GK	1	13:37	6	6	0	0	0	0	Calling, around loch on the site.
25/04/2020	1	EA	2	09:53	320	0	0	320	0	0	Pair.
25/04/2020	1	EA	1	13:56	267	0	240	27	0	0	Female.
25/04/2020	1	GJ	2	13:16	98	0	0	0	98	0	-
25/04/2020	1	ML	1	11:26	17	17	0	0	0	0	Male.
27/04/2020	3	GJ	5	16:17	42	0	0	0	42	0	-
28/04/2020	3	GD	1	19:51	38	0	0	38	0	0	Male.
30/04/2020	1	KT	1	13:11	72	0	27	45	0	0	-
30/04/2020	2	GK	1	08:53	12	12	0	0	0	0	-
05/05/2020	2	EA	1	12:34	66	0	0	0	15	51	Adult female.
05/05/2020	2	EA	1	12:35	34	0	0	34	0	0	Male.
05/05/2020	2	EA	1	14:07	78	0	0	0	33	45	Adult female.
05/05/2020	2	T.	2	15:11	12	12	0	0	0	0	Male and female.
14/05/2020	3	EA	1	12:47	166	0	0	120	46	0	Male.
14/05/2020	3	EA	1	13:35	23	0	0	23	0	0	Male.
11/06/2020	2	RH	1	21:39	247	15	15	217	0	0	Flew from Loch na Geàrra.
16/06/2020	3	GJ	17	14:51	414	0	0	150	264	0	-
16/06/2020	3	KT	2	14:43	339	0	9	330	0	0	-

Date	VP	Species	No. of Birds	Start Time	Total Flight Time (s)	HT1	HT2	HT3	HT4	HT5	Notes
16/06/2020	3	OP	1	16:17	459	0	39	285	135	0	Displaying, carrying a stick.
07/07/2020	2	EA	1	14:14	623	0	0	0	323	300	Adult, being mobbed by ravens.
07/07/2020	2	KT	1	11:47	154	15	15	124	0	0	Hunting.
07/07/2020	2	KT	1	12:12	48	0	48	0	0	0	-
07/07/2020	2	KT	1	12:15	372	72	225	75	0	0	Hunting.
07/07/2020	2	KT	1	13:59	475	0	0	195	210	70	-
15/07/2020	3	PE	3	13:12	214	15	49	150	0	0	One adult and two juveniles.
22/07/2020	1	KT	1	11:48	58	0	0	58	0	0	-
19/08/2020	1	KT	1	14:54	312	0	105	207	0	0	Hunting.
21/08/2020	2	GP	11	10:42	517	0	0	52	285	180	-

Table A3:2: Target species flight activity – Year 2 (September 2020 to August 2021).

Date	VP	Species	No. of Birds	Start Time	Total Flight Time (s)	HT1	HT2	HT3	HT4	HT5	Notes
01/09/2020	2	EA	1	14:04	427	0	0	0	0	427	-
01/09/2020	2	EA	1	17:12	502	30	7	465	0	0	Hunting, male (probable) adult.
01/09/2020	2	EA	1	17:18	25	0	0	0	25	0	-
01/09/2020	2	EA	1	18:03	193	0	43	105	45	0	Adult female hunting.
01/09/2020	2	PE	1	13:24	145	30	85	30	0	0	Juvenile hunting, unsuccessful hunting attempt.
02/09/2020	3	KT	1	11:37	71	0	0	71	0	0	-
02/09/2020	3	KT	1	12:51	155	0	15	140	0	0	Soared.
02/09/2020	3	PE	2	13:01	44	0	14	30	0	0	Swooping at each other.
03/09/2020	1	EA	1	10:15	69	0	0	9	30	30	-
03/09/2020	1	EA	1	12:02	264	0	0	129	90	45	Hunting.
03/09/2020	1	EA	1	15:03	184	0	0	94	45	45	Hunting.

Date	VP	Species	No. of Birds	Start Time	Total Flight Time (s)	HT1	HT2	HT3	HT4	HT5	Notes
03/09/2020	1	EA	1	15:18	332	0	0	285	47	0	Adult hunting.
10/09/2020	2	PG	79	07:18	264	0	0	0	195	69	-
10/09/2020	2	PG	11	08:24	208	0	0	0	0	208	-
10/09/2020	2	EA	1	10:34	63	0	0	0	0	63	-
10/09/2020	2	KT	1	10:16	205	0	25	180	0	0	-
10/09/2020	2	KT	1	10:47	431	0	75	120	236	0	Hunting.
10/09/2020	2	KT	1	11:01	236	0	131	105	0	0	Hunting.
08/10/2020	3	EA	1	12:01	53	23	15	15	0	0	Adult female.
08/10/2020	3	EA	1	12:06	170	0	60	45	45	20	Adult male.
08/10/2020	3	EA	1	14:52	54	0	0	0	0	54	Adult male.
08/10/2020	3	GI	1	14:47	447	0	0	240	90	117	Male.
28/10/2020	1	GJ	2	14:21	35	0	0	35	0	0	-
28/10/2020	1	KT	1	10:19	45	30	15	0	0	0	-
28/10/2020	1	KT	2	14:25	360	165	195	0	0	0	Pair.
28/10/2020	1	KT	1	14:27	780	405	375	0	0	0	Hunting and soaring.
03/11/2020	2	EA	1	14:21	158	0	45	113	0	0	Juvenile.
03/11/2020	2	EA	1	14:27	20	0	20	0	0	0	Hunting, could not age.
13/11/2020	3	BK	1	10:05	20	5	15	0	0	0	Male.
13/11/2020	3	EA	1	09:21	481	0	0	61	90	330	Adult, flew off to join a second bird out of viewshed.
13/11/2020	3	HH	1	10:01	34	0	34	0	0	0	Ringtail.
13/11/2020	3	HH	1	10:21	47	0	2	45	0	0	-
13/11/2020	3	KT	1	08:44	20	0	0	20	0	0	Went behind Carn Fearna.
11/12/2020	2	PE	1	12:39	125	0	20	105	0	0	Adult male travelling.
19/12/2020	3	KT	1	10:21	552	0	0	480	72	0	Hunting.
19/12/2020	3	KT	1	10:23	217	0	0	120	75	22	-
19/12/2020	3	KT	1	10:55	109	0	0	109	0	0	Hunting.
19/12/2020	3	KT	1	13:23	69	0	15	54	0	0	Travelling, dipped behind hill.

Date	VP	Species	No. of Birds	Start Time	Total Flight Time (s)	HT1	HT2	HT3	HT4	HT5	Notes
28/01/2021	1	EA	1	10:11	221	0	71	150	0	0	Juvenile, steadily moving.
23/02/2021	3	KT	1	10:11	195	0	30	165	0	0	Hunting.
24/02/2021	2	KT	1	10:29	225	0	0	0	225	0	Long glide.
24/02/2021	2	KT	1	13:49	60	0	0	60	0	0	Adult.
25/02/2021	1	KT	1	12:34	30	0	30	0	0	0	Over ridgeline.
25/02/2021	3	KT	1	11:19	75	0	0	75	0	0	-
08/03/2021	1	EA	1	13:12	466	0	0	466	0	0	Adult, lost to view behind ridge.
08/03/2021	1	EA	1	13:19	193	0	0	30	133	30	Adult – displaying.
08/03/2021	1	EA	1	13:36	378	0	30	105	60	183	Adult, likely same bird as above.
08/03/2021	1	EA	1	14:40	84	0	54	15	15	0	Adult hunting.
08/03/2021	1	KT	1	14:33	142	0	60	82	0	0	Hunting.
17/03/2021	2	EA	1	16:31	163	0	0	0	60	103	-
17/03/2021	2	KT	1	17:20	205	0	0	15	15	175	-
18/03/2021	1	EA	1	12:29	24	0	24	0	0	0	-
18/03/2021	3	EA	1	11:11	103	0	0	0	30	73	-
18/03/2021	3	EA	1	12:31	235	30	85	120	0	0	Female.
18/03/2021	3	EA	1	14:41	10	0	10	0	0	0	-
18/03/2021	3	KT	1	09:59	186	15	45	126	0	0	-
18/03/2021	3	KT	1	10:33	189	30	54	105	0	0	-
18/03/2021	3	KT	1	12:15	148	30	15	30	15	58	-
29/03/2021	2	KT	1	12:32	267	60	207	0	0	0	-
02/04/2021	3	HH	1	13:22	366	0	0	180	105	81	Circled up then headed east. Not sexed, silhouetted throughout.
02/04/2021	3	GJ	2	14:01	119	0	0	119	0	0	-
02/04/2021	3	EA	1	15:25	208	0	0	208	0	0	Adult. Seen as survey ended. Came from and went back over Carn Gorm.
14/04/2021	2	ML	2	09:06	70	0	0	45	0	25	Adult male and female calling.
14/04/2021	2	EA	1	10:35	17	0	17	0	0	0	Adult.
14/04/2021	2	KT	1	10:39	122	0	30	92	0	0	-

Date	VP	Species	No. of Birds	Start Time	Total Flight Time (s)	HT1	HT2	HT3	HT4	HT5	Notes
14/04/2021	2	KT	1	13:14	78	0	78	0	0	0	-
16/04/2021	1	EA	1	10:16	273	0	0	135	45	93	Adult male.
16/04/2021	1	HH	1	07:32	24	24	0	0	0	0	Female.
16/04/2021	1	PG	30	08:40	64	0	0	64	0	0	Migrating flock.
16/04/2021	1	PG	48	08:43	58	0	0	58	0	0	Migrating flock.
16/04/2021	1	PG	500	09:53	36	0	0	36	0	0	-
20/04/2021	2	GK	1	11:36	15	15	0	0	0	0	Landed on shore of Loch A Bhealaich.
20/04/2021	2	GK	1	11:40	30	15	15	0	0	0	Flew over Carn Loch an Tuirc.
20/04/2021	2	GK	2	12:44	15	15	0	0	0	0	Landed on shore of Loch A Bhealaich.
20/04/2021	2	GK	2	13:02	30	0	15	15	0	0	Flew over Carn Loch An Tuirc.
22/04/2021	1	PG	70	12:03	75	0	0	0	0	75	Single skein flying north (very high).
22/04/2021	3	PG	70	12:03	150	0	0	0	0	150	V. high. Flew north. Same flight as above passing through the viewsheds.
22/04/2021	3	KT	1	12:53	75	0	0	0	30	45	High glide west.
22/04/2021	3	PG	25	13:15	120	0	0	0	0	120	High. Flew north.
13/05/2021	2	EA	1	13:42	45	0	0	0	0	45	Soaring over Carn Fearna then direct glide south-west. Adult.
31/05/2021	3	KT	1	14:11	461	56	60	195	90	60	Appeared to be carrying a small fish.
31/05/2021	3	KT	1	18:07	305	0	15	15	45	230	Hunting.
31/05/2021	3	KT	1	18:40	250	30	60	100	60	0	Hunting.
21/06/2021	1	EA	1	13:59	216	0	0	216	0	0	Adult hunting.
21/06/2021	3	EA	1	14:02	75	0	12	60	0	0	Adult. Probably female.
21/06/2021	3	KT	2	12:02	175	0	15	160	0	0	-
19/07/2021	2	EA	1	17:14	173	0	0	0	120	53	Adult male.
27/07/2021	1	EA	1	11:22	176	0	26	105	45	0	Female, lost behind hill with male, hunting.
27/07/2021	1	EA	1	11:22	260	35	75	120	30	0	Male, flying together with female.
27/07/2021	1	OP	1	13:27	184	0	19	105	45	15	Lost behind hill calling over VP1.
27/07/2021	1	GP	11	15:13	93	18	45	30	0	0	Flying across moor, calling.
27/07/2021	1	RH	2	11:19	89	0	29	60	0	0	Landed on loch, calling.

Date	VP	Species	No. of Birds	Start Time	Total Flight Time (s)	HT1	HT2	HT3	HT4	HT5	Notes
27/07/2021	3	EA	2	12:09	120	0	0	30	30	60	Pair circling around together.
29/07/2021	1	H.	1	10:07	401	206	195	0	0	0	Struggling to fly over hills.
29/07/2021	1	ML	1	14:54	49	19	15	15	0	0	Hunting.
29/07/2021	1	ML	1	15:25	87	27	45	15	0	0	Hunting.
29/07/2021	3	GJ	4	09:12	45	0	0	45	0	0	-
25/08/2021	2	KT	1	11:12	350	45	165	140	0	0	-
25/08/2021	2	KT	1	13:07	85	0	0	85	0	0	-