

Appendix 7.1

Ornithology

Contents

A7.1	INTRODUCTION	1
	Latin Names	1
	Survey Methods	3
	Surveyors	3
	Survey Methodology	3
	Walkover Breeding Bird Survey	35
	Breeding Raptor Surveys	36
	Honey Buzzard Surveys	39
	Nightjar Surveys	39
	Survey Results	39
	Vantage Point Surveys	39
	Walkover Breeding Bird Survey	40
	Breeding Raptor Surveys	40
	Honey Buzzard Survey	42
	Nightjar Surveys	42
	Collision Risk Modelling Parameters	43
	Species Collision Risk	44
A7.2	CONFIDENTIAL APPENDIX (SEPARATE DOCUMENT)	47

List of Abbreviations

Abbreviation	Description
AIL	Abnormal Indivisible Loads
BBS	Breeding Bird Survey
BTO	British Trust for Ornithology
CRM	Collision Risk Model
ES	Environmental Statement
GIS	Geographic Information System
SNH	Scottish Natural Heritage: now NatureScot
VP	Vantage Point

A7.1 INTRODUCTION

- A7.1.1 This Appendix presents the following information in support of Chapter 7: Ornithology in Volume 1 of the Environmental Statement (ES) for Y Bryn Wind Farm (the proposed development):
- A list of Latin names of all bird species for which the English name is referred to in the main chapter;
 - Supplementary information regarding the survey methods employed by Natural Power to provide baseline information on the ornithological features present within the proposed development area;
 - Details of target and non-target species flights recorded during Vantage Point (VP) surveys undertaken between September 2019 and August 2021;
 - Details of target raptor flights recorded during breeding raptor surveys in 2020 and 2021;
 - Details of ornithological species recorded during Breeding Bird Surveys (BBS) undertaken in 2020 and 2021;
 - Details of nightjars observed during dedicated nightjar surveys in 2020 and 2021; and
 - Calculations of the theoretical collision risk to target species (where a sufficient number of flights was recorded) using the Band Model¹ as advocated by NatureScot (formerly Scottish Natural Heritage (SNH))².

Latin Names

- A7.1.2 Scientific (Latin) names of all species referred to in Chapter 7 and within this Appendix are given in Table A7.1.

Table A7.1: Latin names of species referred to in this chapter

Scientific Name	Common Name
<i>Branta bernicla bernicla</i>	Dark-bellied brent goose
<i>Branta canadensis</i>	Canada goose
<i>Anser anser</i>	Greylag goose
<i>Cygnus olor</i>	Mute swan
<i>Cygnus cygnus</i>	Whooper swan
<i>Tadorna tadorna</i>	Shelduck
<i>Spatula clypeata</i>	Shoveler
<i>Mareca strepera</i>	Gadwall
<i>Mareca penelope</i>	Wigeon
<i>Anas platyrhynchos</i>	Mallard
<i>Anas acuta</i>	Pintail
<i>Anas crecca</i>	Teal
<i>Aythya ferina</i>	Pochard
<i>Aythya fuligula</i>	Tufted duck

¹ SNH. (2007) Band, W., Madders, M. & Whitfield, D.P. Developing field and analytical methods to assess avian collision risk at wind farms. In de Lucas, M., Janss, G. & Ferrer, M. (eds.) Birds and Wind Power. Quercus, Madrid.

Scientific Name	Common Name
<i>Aythya marila</i>	Scaup
<i>Clangula hyemalis</i>	Long-tailed duck
<i>Bucephala clangula</i>	Goldeneye
<i>Mergus merganser</i>	Goosander
<i>Coturnix coturnix</i>	Quail
<i>Caprimulgus europaeus</i>	Nightjar
<i>Apus apus</i>	Swift
<i>Cuculus canorus</i>	Cuckoo
<i>Columba palumbus</i>	Woodpigeon
<i>Gallinula chloropus</i>	Moorhen
<i>Fulica atra</i>	Coot
<i>Tachybaptus ruficollis</i>	Little grebe
<i>Podiceps cristatus</i>	Great-crested grebe
<i>Podiceps nigricollis</i>	Black-necked grebe
<i>Haematopus ostralegus</i>	Oystercatcher
<i>Vanellus vanellus</i>	Lapwing
<i>Pluvialis apricaria</i>	Golden plover
<i>Pluvialis squatarola</i>	Grey plover
<i>Charadrius hiaticula</i>	Ringed plover
<i>Charadrius dubius</i>	Little ringed plover
<i>Charadrius morinellus</i>	Dotterel
<i>Numenius phaeopus</i>	Whimbrel
<i>Numenius arquata</i>	Curlew
<i>Limosa lapponica</i>	Bar-tailed godwit
<i>Calidris canutus</i>	Knot
<i>Calidris pugnax</i>	Ruff
<i>Calidris alpina</i>	Dunlin
<i>Scolopax rusticola</i>	Woodcock
<i>Actitis hypoleucos</i>	Common sandpiper
<i>Tringa ochropus</i>	Green sandpiper
<i>Tringa totanus</i>	Redshank
<i>Tringa nebularia</i>	Greenshank
<i>Chroicocephalus ridibundus</i>	Black-headed gull
<i>Hydrocoleus minutus</i>	Little gull
<i>Larus canus</i>	Common gull
<i>Larus marinus</i>	Great black-backed gull
<i>Larus argentatus</i>	Herring gull

² SNH. (2010) Use of Avoidance Rates in the SNH Wind Farm Collision Risk Model. SNH Avoidance Rate Information and Guidance Note. Scottish Natural Heritage. <http://www.snh.gov.uk/docs/B721137.pdf>

Scientific Name	Common Name
<i>Larus fuscus</i>	Lesser black-backed gull
<i>Chidonias niger</i>	Black tern
<i>Phalacrocorax carbo</i>	Cormorant
<i>Botaurus stellaris</i>	Bittern
<i>Ardea cinerea</i>	Grey heron
<i>Pandion haliaetus</i>	Osprey
<i>Pernis apivorus</i>	Honey buzzard
<i>Accipiter nisus</i>	Sparrowhawk
<i>Accipiter gentilis</i>	Goshawk
<i>Circus aeruginosus</i>	Marsh harrier
<i>Circus cyaneus</i>	Hen harrier
<i>Milvus milvus</i>	Red kite
<i>Buteo buteo</i>	Buzzard
<i>Tyto alba</i>	Barn owl
<i>Asio flammeus</i>	Short-eared owl
<i>Alcedo atthis</i>	Kingfisher
<i>Jynx torquilla</i>	Wryneck
<i>Dendrocopos major</i>	Great-spotted woodpecker
<i>Picus viridis</i>	Green woodpecker
<i>Falco tinnunculus</i>	Kestrel
<i>Falco columbarius</i>	Merlin
<i>Falco subbuteo</i>	Hobby
<i>Falco peregrinus</i>	Peregrine
<i>Garrulus glandarius</i>	Jay
<i>Pica pica</i>	Magpie
<i>Coloeus monedula</i>	Jackdaw
<i>Corvus corone</i>	Carrion crow
<i>Corvus corax</i>	Raven
<i>Periparus ater</i>	Coal tit
<i>Poecile palustris</i>	Marsh tit
<i>Poecile montanus</i>	Willow tit
<i>Cyanistes caeruleus</i>	Blue tit
<i>Parus major</i>	Great tit
<i>Lullula arborea</i>	Woodlark
<i>Alauda arvensis</i>	Skylark
<i>Hirundo rustica</i>	Swallow
<i>Delichon urbicum</i>	House martin
<i>Aegithalos caudatus</i>	Long-tailed tit
<i>Cettia cetti</i>	Cetti's warbler

Scientific Name	Common Name
<i>Phylloscopus sibilatrix</i>	Wood warbler
<i>Phylloscopus trochilus</i>	Willow warbler
<i>Phylloscopus collybita</i>	Chiffchaff
<i>Acrocephalus schoenobaenus</i>	Sedge warber
<i>Acrocephalus scirpaceus</i>	Reed warbler
<i>Locustella naevia</i>	Grasshopper warbler
<i>Sylvia atricapilla</i>	Blackcap
<i>Sylvia borin</i>	Garden warbler
<i>Curruca communis</i>	Whitethroat
<i>Curruca undata</i>	Dartford warbler
<i>Regulus ignicapilla</i>	Firecrest
<i>Regulus regulus</i>	Goldcrest
<i>Troglodytes troglodytes</i>	Wren
<i>Sitta europaea</i>	Nuthatch
<i>Certhia familiaris</i>	Treecreeper
<i>Sturnus vulgaris</i>	Starling
<i>Turdus philomelos</i>	Song thrush
<i>Turdus viscivorus</i>	Mistle thrush
<i>Turdus iliacus</i>	Redwing
<i>Turdus merula</i>	Blackbird
<i>Turdus pilaris</i>	Fieldfare
<i>Turdus torquatus</i>	Ring ouzel
<i>Muscicapa striata</i>	Spotted flycatcher
<i>Erithacus rubecula</i>	Robin
<i>Ficedula hypoleuca</i>	Pied flycatcher
<i>Phoenicurus ochruros</i>	Black redstart
<i>Phoenicurus phoenicurus</i>	Redstart
<i>Saxicola rubicola</i>	Stonechat
<i>Oenanthe oenanthe</i>	Wheatear
<i>Cinclus cinclus</i>	Dipper
<i>Passer domesticus</i>	House sparrow
<i>Prunella modularis</i>	Dunnock
<i>Motacilla cinerea</i>	Grey wagtail
<i>Motacilla alba yarrellii</i>	Pied wagtail
<i>Anthus pratensis</i>	Meadow pipit
<i>Anthus trivialis</i>	Tree pipit
<i>Fringilla coelebs</i>	Chaffinch
<i>Fringilla montifringilla</i>	Brambling
<i>Coccothraustes coccothraustes</i>	Hawfinch

Scientific Name	Common Name
<i>Pyrrhula pyrrhula</i>	Bullfinch
<i>Chloris chloris</i>	Greenfinch
<i>Linaria cannabina</i>	Linnet
<i>Acanthis cabaret</i>	Lesser redpoll
<i>Loxia curvirostra</i>	Common crossbill
<i>Carduelis carduelis</i>	Goldfinch
<i>Spinus spinus</i>	Siskin
<i>Plectrophenax nivalis</i>	Snow bunting
<i>Emberiza schoeniclus</i>	Reed bunting

Survey Methods

A7.1.3 The baseline ornithological surveys are described in Chapter 7. These comprised:

- VP flight activity surveys;
- Walkover BBS;
- Breeding raptor surveys;
- Honey buzzard surveys; and
- Nightjar surveys.

A7.1.4 Supplementary information regarding these surveys is provided the following paragraphs.

Surveyors

A7.1.5 All ornithology surveys were undertaken by experienced ornithological surveyors, which included (but not limited to):

Anthony Cross: Tony is a very experienced ornithologist and bird ringer. His expertise includes raptors and he contributed as an advisor to Hardey *et al.* (2006)³, which has become the standard guidance on monitoring raptors. Tony has monitored and studied nightjars in relation to wind farm developments for over 10 years. Tony undertook VP, raptor, honey buzzard and nightjar surveys.

Kate Davies: Kate is a knowledgeable ecologist with experience of undertaking a wide variety of ornithological monitoring and surveys for onshore wind farm projects as well as infrastructure and other development projects. Kate undertook VP, raptor, BBS and nightjar surveys.

David Rees: David is an experienced professional ecologist of over 15 years and has undertaken a variety of ornithological surveys on a large number of energy generation and infrastructure projects across Wales and the UK. David undertook VP, raptor and nightjar surveys.

Ciaran Rowett: Ciaran is an enthusiastic ecologist that has undertaken a variety of ornithological surveys on a range of onshore wind farm projects across Wales. Ciaran undertook VP surveys.

Heather Scott: Heather is a professional ecologist of nearly 20 years with a broad range of ecological expertise. Heather is an experienced ornithological surveyor and has undertaken surveys on a range of onshore wind farm projects across Wales. Heather undertook VP surveys.

Mike Shewring: Mike is an experienced ornithologist and chartered ecologist. with significant experience in ecological survey. He is trustee of the Welsh Ornithological Society. Mike has many years’ experience of undertaking ornithological surveys in relation to wind farm developments, including radio-tracking projects on nightjar. Mike undertook VP, BBS, raptor, honey buzzard and nightjar surveys.

Timothy Sykes: Tim has over 20 years’ experience as a professional ornithologist and has undertaken surveys on a large number of energy generation and infrastructure projects across the UK and internationally. Tim undertook BBS and raptor surveys.

Survey Methodology

A7.1.6 The survey methods are described in detail below.

Vantage Point Surveys (Flight Activity Survey)

A7.1.7 VP surveys were undertaken using the standard method published in NatureScot guidance⁴ as set out in Chapter 7. Eight VP locations were utilised.

A7.1.8 A summary of survey effort for each VP is shown in Table A7.2. Observers were: Dan Carrington (DC), Tony Cross (AC), Kate Davies (KD), Aurora Gonzalo-Tarodo (AG), Steven Parker (SP), David Rees (DR), Ciaran Rowett (CR), Heather Scott (HS), Mike Shewring (MS) and Sophie-Lee Williams (SW).

A7.1.9 The weather conditions during each survey were recorded every hour, full details of survey dates, times and weather conditions during all VP surveys are presented in Tables A7.3 – 7.6. In these tables, environmental conditions were recorded as follows: wind speed recorded using Beaufort Scale; precipitation (0=none, 1=drizzle, 2=light showers, 3=heavy showers, 4=persistent); cloud cover recorded in oktas; cloud height (0 = <150 m, 1 = 150-500 m, 2 = >500 m); visibility (0 = <1 km, 1 = 1-2 km, 2 = >2 km); frost (0=none, 1=ground, 2=all day) and snow (0=none, 1=on site, 2=high ground).

A7.1.10 Focal sampling was carried out for target species. The area in view was scanned until a target species was observed, at which point it was followed until it had ceased flying or had flown out of sight. The flight lines of target bird species observed were recorded onto 1:10,000 scale maps. Following NatureScot guidance⁴ the time and duration of the flight were recorded, and the altitude of the target bird(s) was recorded at the start of the observation and at 15 second intervals thereafter into height bands (as described in Chapter 7).

A7.1.11 A map showing the flight lines for each target species was compiled in a Geographic Information System (QGIS), with each flight line linked to its associated flight duration and height information held in an Excel spreadsheet.

³ Hardey, J., Crick, H.Q.P., Wernham, C.V., Riley, H.T., Etheridge, B. & Thompson, D.B.A. (2006) *Raptors: a field guide to survey and monitoring*. The Stationary Office, Edinburgh.

⁴ SNH. (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms. SNH, Battleby.

- A7.1.12 The information collected on key target species flying over the proposed development area and the adjacent airspace was used to estimate the number of individuals per species predicted to collide with the turbine rotors. The collision risk modelling (CRM) methods are described in Section 7.3 of Chapter 7, with full details of the parameters used in the CRM provided below, in Table A7.5 Collision Risk Modelling Parameters.
- A7.1.13 All secondary species were recorded using five-minute summaries. Each VP survey was sub-divided into five-minute periods. At the end of each five-minute period, the number and activity of

all secondary species observed was recorded. If a target species was being tracked during a five-minute period, then the activity summary for that period was abandoned and a new one started once observations of the target species had ended. Thus, observation of target species took priority over the recording of secondary species. The number of birds recorded in a five-minute period was the minimum number of individuals that could account for the activity observed.

Table A7.2: VP survey hours 2019-2021 breeding and non-breeding seasons

Year	Season	Month	Total Survey Hours							
			VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8
2019	Non-breeding	October	9	9	9	12	15	9	12	9
2019	Non-breeding	November	6	6	6	6	6	6	6	6
2019	Non-breeding	December	6	6	6	6	6	6	6	6
2020	Non-breeding	January	6	6	6	6	6	6	6	6
2020	Non-breeding	February	6	6	6	6	6	6	6	6
Sum of 2019-2020 Non-breeding Season			33	33	33	36	39	33	36	33
2020	Breeding	March	-	3	3	-	-	-	-	-
2020	Breeding	April	3	3	3	12	6	6	6	3
2020	Breeding	May	15	12	12	9	12	15	15	21
2020	Breeding	June	6	6	6	6	6	6	6	3
2020	Breeding	July	6	6	6	6	6	6	6	6
2020	Breeding	August	6	6	6	6	6	6	6	6
Sum of 2020 Breeding Season			36	36	36	39	36	39	39	39
2020	Non-breeding	September	6	6	6	6	6	6	6	6
2020	Non-breeding	October	6	6	6	6	6	6	6	3
2020	Non-breeding	November	6	6	6	6	6	6	6	9
2020	Non-breeding	December	6	6	6	6	6	6	6	6
2021	Non-breeding	January	6	6	6	6	6	6	6	6
2021	Non-breeding	February	6	6	6	6	6	6	6	6
Sum of 2020-2021 Non-breeding Season			36	36	36	36	36	36	36	36
2021	Breeding	March	6	6	6	6	6	6	6	6
2021	Breeding	April	6	6	6	6	6	6	6	6
2021	Breeding	May	6	6	6	6	6	6	6	6
2021	Breeding	June	6	6	6	6	6	6	6	6
2021	Breeding	July	6	6	6	6	6	6	6	6
2021	Breeding	August	6	6	6	6	6	6	6	6
Sum of 2021 Breeding Season			36	36	36	36	36	36	36	36

Source: Natural Power

Table A7.3: VP survey weather data during the non-breeding season (October 2019 to February 2020)

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
09/10/2019	CR	7	13:30:00	14:30:00	3	W	0	6	1	2	0	0	
09/10/2019	CR	7	14:30:00	15:30:00	4	W	0	7	1	2	0	0	
09/10/2019	CR	7	15:30:00	16:30:00	3	WSW	0	8	1	2	0	0	
09/10/2019	CR	7	10:00:00	11:00:00	3	WNW	0	5	1	2	0	0	
09/10/2019	CR	7	11:00:00	12:00:00	3	W	0	4	1	2	0	0	
09/10/2019	CR	7	12:00:00	13:00:00	3	W	0	7	1	2	0	0	
09/10/2019	AC	1	13:35:00	14:35:00	4	SW	2	7	1	2	0	0	
09/10/2019	AC	1	14:35:00	15:35:00	5	SW	2	6	2	2	0	0	
09/10/2019	AC	1	15:35:00	16:35:00	5	SW	2	7	1	2	0	0	
09/10/2019	AC	3	10:05:00	11:05:00	4	SW	0	6	2	2	0	0	
09/10/2019	AC	3	11:05:00	12:05:00	4	SW	0	7	1	2	0	0	
09/10/2019	AC	3	12:05:00	13:05:00	4	SW	0	5	2	2	0	0	
10/10/2019	CR	4	11:30:00	12:30:00	4	W	0	8	1	2	0	0	
10/10/2019	CR	4	12:30:00	13:30:00	4	WSW	3	8	1	1	0	0	
10/10/2019	CR	4	13:30:00	14:30:00	4	SW	2	8	1	2	0	0	
10/10/2019	CR	4	08:00:00	09:00:00	3	W	0	7	1	2	0	0	
10/10/2019	CR	4	09:00:00	10:00:00	3	W	2	8	1	2	0	0	
10/10/2019	CR	4	10:00:00	11:00:00	4	WSW	0	8	1	2	0	0	
11/10/2019	AC	2	12:00:00	13:00:00	6	SW	4	8	0	1	0	0	
11/10/2019	AC	2	13:00:00	14:00:00	5	SW	1	8	0	1	0	0	
11/10/2019	AC	2	14:00:00	15:00:00	4	SW	1	8	0	2	0	0	
11/10/2019	AC	8	15:30:00	16:30:00	6	SW	0	8	1	2	0	0	
11/10/2019	AC	8	16:30:00	17:30:00	6	SW	0	8	1	2	0	0	
11/10/2019	AC	8	17:30:00	18:30:00	4	SW	0	7	2	2	0	0	
11/10/2019	MS	5	13:50:00	14:50:00	3	W	0	8	1	2	0	0	
11/10/2019	MS	5	14:50:00	15:50:00	2	W	0	8	2	2	0	0	
11/10/2019	MS	5	15:50:00	16:50:00	2	NW	0	8	2	2	0	0	
11/10/2019	MS	5	10:00:00	11:00:00	3	SSW	4	8	0	0	0	0	
11/10/2019	MS	5	11:00:00	12:00:00	3	NW	4	8	0	0	0	0	
11/10/2019	MS	5	12:00:00	13:00:00	2	W	3	8	1	1	0	0	
13/10/2019	AC	1	09:30:00	10:30:00	2	SSE	0	8	2	2	0	0	
13/10/2019	AC	1	10:30:00	11:30:00	2	SSE	1	8	1	2	0	0	
13/10/2019	AC	1	11:30:00	12:30:00	2	SSE	2	8	0	1	0	0	
13/10/2019	AC	3	13:00:00	14:00:00	4	SW	0	8	2	2	0	0	
13/10/2019	AC	3	14:00:00	15:00:00	5	SW	0	8	2	2	0	0	
13/10/2019	AC	3	15:00:00	16:00:00	5	SW	0	6	1	2	0	0	
15/10/2019	AC	8	11:00:00	12:00:00	2	S	1	8	0	1	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
15/10/2019	AC	8	12:00:00	13:00:00	2	SW	1	8	0	1	0	0	
15/10/2019	AC	8	13:00:00	14:00:00	2	SW	1	8	0	2	0	0	
15/10/2019	AC	8	14:30:00	15:30:00	4	SSW	2	8	0	1	0	0	
15/10/2019	AC	8	15:30:00	16:30:00	4	SSW	0	8	1	2	0	0	
15/10/2019	AC	8	16:30:00	17:30:00	4	SW	0	6	1	2	0	0	
16/10/2019	MS	6	14:00:00	15:00:00	1	SW	0	1	2	2	0	0	
16/10/2019	MS	6	15:00:00	16:00:00	1	SW	0	2	2	2	0	0	
16/10/2019	MS	6	16:00:00	17:00:00	1	SW	0	2	2	2	0	0	
19/10/2019	AC	2	10:20:00	11:20:00	2	WNW	0	4	2	2	0	0	
19/10/2019	AC	2	11:20:00	12:20:00	2	WNW	0	3	2	2	0	0	
19/10/2019	AC	2	12:20:00	13:20:00	2	W	0	7	2	2	0	0	
19/10/2019	AC	3	14:00:00	15:00:00	2	W	0	6	1	2	0	0	
19/10/2019	AC	3	15:00:00	16:00:00	2	W	2	7	1	2	0	0	
19/10/2019	AC	3	16:00:00	17:00:00	1	W	2	7	1	2	0	0	
22/10/2019	MS	5	13:00:00	14:00:00	2	S	0	3	2	2	0	0	
22/10/2019	MS	5	14:00:00	15:00:00	1	S	0	4	2	2	0	0	
22/10/2019	MS	5	15:00:00	16:00:00	1	S	0	4	2	2	0	0	
23/10/2019	DC	7	14:00:00	15:00:00	2	SE	2	2	1	2	0	0	
23/10/2019	DC	7	15:00:00	16:00:00	2	SE	2	3	1	2	0	0	
23/10/2019	DC	7	16:00:00	17:00:00	2	SE	2	5	1	2	0	0	
23/10/2019	DC	7	10:00:00	11:00:00	2	SE	1	8	0	0	0	0	
23/10/2019	DC	7	11:00:00	12:00:00	2	SE	0	2	1	2	0	0	
23/10/2019	DC	7	12:00:00	13:00:00	2	SE	1	7	0	0	0	0	
23/10/2019	AC	1	11:00:00	12:00:00	1	SE	1	8	0	1	0	0	
23/10/2019	AC	1	12:00:00	13:00:00	1	SE	1	8	0	0	0	0	
23/10/2019	AC	1	13:00:00	14:00:00	1	SE	1	8	0	0	0	0	
23/10/2019	AC	2	14:30:00	15:30:00	3	SE	0	6	1	2	0	0	
23/10/2019	AC	2	15:30:00	16:30:00	3	SE	0	7	1	2	0	0	
23/10/2019	AC	2	16:30:00	17:30:00	3	SE	0	1	0	2	0	0	
24/10/2019	DC	4	11:30:00	12:30:00	1	WNW	0	7	0	2	0	0	
24/10/2019	DC	4	12:30:00	13:30:00	2	WNW	0	3	1	2	0	0	
24/10/2019	DC	4	13:30:00	14:30:00	2	WNW	0	6	1	2	0	0	
24/10/2019	DC	4	08:00:00	09:00:00	1	WNW	1	8	0	0	0	0	
24/10/2019	DC	4	09:00:00	10:00:00	1	WNW	1	8	0	1	0	0	
24/10/2019	DC	4	10:00:00	11:00:00	1	WNW	1	8	0	1	0	0	
30/10/2019	MS	6	09:24:00	10:24:00	3	W	2	8	2	2	0	0	
30/10/2019	MS	6	10:24:00	11:24:00	3	W	2	8	2	2	0	0	
30/10/2019	MS	6	11:24:00	12:24:00	4	W	2	8	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
30/10/2019	MS	5	14:06:00	15:06:00	4	W	2	8	2	2	0	0	
30/10/2019	MS	5	15:06:00	16:06:00	4	W	3	8	2	2	0	0	
30/10/2019	MS	5	16:06:00	17:06:00	4	W	4	8	2	2	0	0	
31/10/2019	MS	6	12:00:00	13:00:00	4	E	3	8	1	1	0	0	
31/10/2019	MS	6	13:00:00	14:00:00	4	E	4	8	1	0	0	0	
31/10/2019	MS	6	14:00:00	15:00:00	3	E	2	8	1	1	0	0	
31/10/2019	MS	5	08:30:00	09:30:00	3	NE	4	8	1	1	0	0	
31/10/2019	MS	5	09:30:00	10:30:00	2	NE	1	8	1	1	0	0	
31/10/2019	MS	5	10:30:00	11:30:00	2	NE	1	8	1	1	0	0	
13/11/2019	HS	4	12:15:00	13:15:00	1	SSE	2	8	2	2	0	0	
13/11/2019	HS	4	13:15:00	14:15:00	1	SSE	2	8	2	2	0	0	
13/11/2019	HS	4	14:15:00	15:15:00	1	SE	2	8	2	2	0	0	
13/11/2019	HS	4	08:45:00	09:45:00	0	na	0	8	2	2	0	0	
13/11/2019	HS	4	09:45:00	10:45:00	0	na	0	8	2	2	0	0	
13/11/2019	HS	4	10:45:00	11:45:00	1	SE	0	8	2	2	0	0	
15/11/2019	AC	3	09:00:00	10:00:00	3	NNE	1	8	0	2	0	0	
15/11/2019	AC	3	10:00:00	11:00:00	2	N	0	8	0	2	0	0	
15/11/2019	AC	3	11:00:00	12:00:00	2	N	0	8	0	2	0	0	
15/11/2019	AC	1	12:30:00	13:30:00	3	N	0	7	0	2	0	0	
15/11/2019	AC	1	13:30:00	14:30:00	3	N	1	6	0	2	0	0	Brief period of light drizzle in second half of survey hour.
15/11/2019	AC	1	14:30:00	15:30:00	3	N	0	7	0	2	0	0	
19/11/2019	AC	2	12:40:00	13:40:00	3	E	0	8	1	2	0	0	
19/11/2019	AC	2	13:40:00	14:40:00	3	E	0	8	1	2	0	0	
19/11/2019	AC	2	14:40:00	15:40:00	4	E	0	7	1	2	0	0	
19/11/2019	AC	8	09:10:00	10:10:00	3	E	0	8	1	2	0	0	
19/11/2019	AC	8	10:10:00	11:10:00	3	E	0	8	1	2	0	0	
19/11/2019	AC	8	11:10:00	12:10:00	2	E	0	8	2	2	0	0	
21/11/2019	MS	6	13:04:00	14:04:00	3	E	0	8	2	2	0	0	
21/11/2019	MS	6	14:04:00	15:04:00	3	E	0	8	2	2	0	0	
21/11/2019	MS	6	15:04:00	16:04:00	3	E	4	8	2	1	0	0	
21/11/2019	MS	5	09:34:00	10:34:00	3	E	0	8	2	2	0	0	
21/11/2019	MS	5	10:34:00	11:34:00	3	E	0	8	2	2	0	0	
21/11/2019	MS	5	11:34:00	12:34:00	2	E	0	8	2	2	0	0	
22/11/2019	MS	5	13:00:00	14:00:00	2	E	4	8	2	1	0	0	
22/11/2019	MS	5	14:00:00	15:00:00	2	E	4	8	2	1	0	0	
22/11/2019	MS	5	15:00:00	16:00:00	2	E	4	8	2	1	0	0	
27/11/2019	HS	7	13:00:00	14:00:00	0	n/a	0	6	2	2	0	0	
27/11/2019	HS	7	14:00:00	15:00:00	0	n/a	0	5	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
27/11/2019	HS	7	15:00:00	16:00:00	0	n/a	0	7	2	2	0	0	
27/11/2019	HS	7	09:30:00	10:30:00	1	NE	2	8	2	2	0	0	
27/11/2019	HS	7	10:30:00	11:30:00	1	NE	2	8	2	2	0	0	
27/11/2019	HS	7	11:30:00	12:30:00	0	n/a	0	7	2	2	0	0	
27/11/2019	AC	2	09:45:00	10:45:00	3	ENE	2	8	0	2	0	0	
27/11/2019	AC	2	10:45:00	11:45:00	2	ENE	4	8	0	2	0	0	Light but persistent rain.
27/11/2019	AC	2	11:45:00	12:45:00	2	WNW	0	8	0	2	0	0	
27/11/2019	AC	3	13:15:00	14:15:00	2	WNW	0	7	1	2	0	0	
27/11/2019	AC	3	14:15:00	15:15:00	2	WNW	0	6	1	2	0	0	
27/11/2019	AC	3	15:15:00	16:15:00	2	NW	2	8	0	2	0	0	
29/11/2019	MS	6	10:15:00	11:15:00	2	ENE	0	8	2	2	0	0	
29/11/2019	MS	6	11:15:00	12:15:00	2	ENE	0	8	2	2	0	0	
29/11/2019	MS	6	12:15:00	13:15:00	2	ENE	0	8	2	2	0	0	
30/11/2019	AC	1	08:30:00	09:30:00	4	E	0	8	1	2	0	0	
30/11/2019	AC	1	09:30:00	10:30:00	4	E	0	8	1	2	0	0	
30/11/2019	AC	1	10:30:00	11:30:00	4	E	0	8	1	2	0	0	
30/11/2019	AC	8	12:00:00	13:00:00	4	E	0	8	1	2	0	0	
30/11/2019	AC	8	13:00:00	14:00:00	4	E	0	8	2	2	0	0	
30/11/2019	AC	8	14:00:00	15:00:00	4	E	1	8	1	2	0	0	Light drizzle in last half hour.
02/12/2019	HS	7	13:00:00	14:00:00	0	n/a	0	7	2	2	0	0	
02/12/2019	HS	7	14:00:00	15:00:00	0	n/a	0	7	2	2	0	0	
02/12/2019	HS	7	15:00:00	16:00:00	0	n/a	0	7	2	2	0	0	
02/12/2019	HS	4	09:30:00	10:30:00	0	n/a	0	2	2	2	1	0	
02/12/2019	HS	4	10:30:00	11:30:00	0	n/a	0	4	2	2	1	0	
02/12/2019	HS	4	11:30:00	12:30:00	0	n/a	0	6	2	2	0	0	
03/12/2019	HS	4	13:00:00	14:00:00	1	SW	0	5	2	2	0	0	
03/12/2019	HS	4	14:00:00	15:00:00	1	SW	0	4	2	2	0	0	
03/12/2019	HS	4	15:00:00	16:00:00	0	n/a	0	6	2	2	0	0	
03/12/2019	HS	7	09:30:00	10:30:00	0	na	0	7	2	2	0	0	
03/12/2019	HS	7	10:30:00	11:30:00	1	WSW	0	5	2	2	0	0	
03/12/2019	HS	7	11:30:00	12:30:00	1	SW	0	5	2	2	0	0	
05/12/2019	AC	2	13:00:00	14:00:00	5	SW	0	8	1	2	0	0	
05/12/2019	AC	2	14:00:00	15:00:00	5	SW	0	8	0	2	0	0	Drizzle for last 15 mins.
05/12/2019	AC	2	15:00:00	16:00:00	5	SW	1	8	0	2	0	0	Drizzle. Visibility 1-2 km after 15:20.
05/12/2019	AC	3	09:30:00	10:30:00	3	SW	0	8	1	2	0	0	
05/12/2019	AC	3	10:30:00	11:30:00	3	SW	0	8	1	2	0	0	
05/12/2019	AC	3	11:30:00	12:30:00	3	SW	0	8	1	2	0	0	
12/12/2019	AC	1	07:45:00	08:45:00	3	SW	4	8	0	0	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
12/12/2019	AC	1	08:45:00	09:45:00	3	SW	4	8	0	0	0	0	
12/12/2019	AC	1	09:45:00	10:45:00	3	WSW	3	8	0	0	0	0	
12/12/2019	AC	8	12:00:00	13:00:00	3	SW	3	8	0	2	0	0	Patchy low cloud.
12/12/2019	AC	8	13:00:00	14:00:00	3	SW	1	8	0	2	0	0	Patchy low cloud.
12/12/2019	AC	8	14:00:00	15:00:00	3	SW	2	8	0	2	0	0	
13/12/2019	MS	5	13:02:00	14:02:00	3	NW	0	8	2	2	0	0	
13/12/2019	MS	5	14:02:00	15:02:00	3	NW	0	5	2	2	0	0	
13/12/2019	MS	5	15:02:00	16:02:00	4	NNW	0	4	2	2	0	0	
13/12/2019	MS	5	09:30:00	10:30:00	3	NW	0	5	2	2	0	0	
13/12/2019	MS	5	10:30:00	11:30:00	3	N	0	7	2	2	0	0	
13/12/2019	MS	5	11:30:00	12:30:00	3	NNW	0	7	2	2	0	0	
21/12/2019	AC	2	09:00:00	10:00:00	2	SW	2	8	0	2	0	0	
21/12/2019	AC	2	10:00:00	11:00:00	2	SW	2	8	0	2	0	0	
21/12/2019	AC	2	11:00:00	12:00:00	2	SW	0	8	0	2	0	0	
21/12/2019	AC	3	12:30:00	13:30:00	2	SSW	0	8	1	2	0	0	
21/12/2019	AC	3	13:30:00	14:30:00	3	S	0	8	0	2	0	0	
21/12/2019	AC	3	14:30:00	15:30:00	3	SE	2	8	0	2	0	0	
23/12/2019	MS	6	12:30:00	13:30:00	3	SW	0	6	2	2	0	0	
23/12/2019	MS	6	13:30:00	14:30:00	4	SW	0	6	2	2	0	0	
23/12/2019	MS	6	14:30:00	15:30:00	3	SW	2	7	2	2	0	0	
23/12/2019	AC	1	12:30:00	13:30:00	4	W	0	6	1	2	0	0	
23/12/2019	AC	1	13:30:00	14:30:00	4	W	0	8	1	2	0	0	
23/12/2019	AC	1	14:30:00	15:30:00	3	W	0	8	0	2	0	0	Showers from 14:52.
23/12/2019	AC	8	09:00:00	10:00:00	4	W	0	6	1	2	0	0	
23/12/2019	AC	8	10:00:00	11:00:00	4	W	0	4	2	2	0	0	
23/12/2019	AC	8	11:00:00	12:00:00	4	W	0	8	1	2	0	0	
28/12/2019	MS	6	10:24:00	11:24:00	2	SW	0	8	2	2	0	0	
28/12/2019	MS	6	11:24:00	12:24:00	2	SW	0	8	2	2	0	0	
28/12/2019	MS	6	12:24:00	13:24:00	2	W	0	8	2	2	0	0	
06/01/2020	MS	5	13:20:00	14:20:00	3	S	4	8	1	0	0	0	
06/01/2020	MS	5	14:20:00	15:20:00	3	S	2	8	0	0	0	0	
06/01/2020	MS	5	15:20:00	16:20:00	3	S	0	5	1	2	0	0	
06/01/2020	MS	6	09:50:00	10:50:00	4	S	0	8	2	2	0	0	
06/01/2020	MS	6	10:50:00	11:50:00	4	S	2	8	2	2	0	0	
06/01/2020	MS	6	11:50:00	12:50:00	3	S	4	8	1	1	0	0	
10/01/2020	MS	6	13:15:00	14:15:00	2	S	0	1	2	2	0	0	
10/01/2020	MS	6	14:15:00	15:15:00	2	S	0	1	2	2	0	0	
10/01/2020	MS	6	15:15:00	16:15:00	2	S	0	1	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
10/01/2020	AC	2	09:30:00	10:30:00	2	NW	0	3	1	2	0	0	
10/01/2020	AC	2	10:30:00	11:30:00	2	NW	0	2	2	2	0	0	
10/01/2020	AC	2	11:30:00	12:30:00	2	NW	0	2	2	2	0	0	
10/01/2020	AC	3	13:30:00	14:30:00	2	NW	0	1	2	2	0	0	
10/01/2020	AC	3	14:30:00	15:30:00	2	NW	0	1	2	2	0	0	
10/01/2020	AC	3	15:30:00	16:30:00	2	SW	0	5	1	2	0	0	
16/01/2020	CR	4	08:35:00	09:35:00	3	SE	0	8	1	2	0	0	
16/01/2020	CR	4	09:35:00	10:35:00	3	SE	3	8	1	2	0	0	
16/01/2020	CR	4	10:35:00	11:35:00	3	SE	4	8	1	1	0	0	
18/01/2020	AC	1	08:30:00	09:30:00	0	na	0	1	2	2	1	0	
18/01/2020	AC	1	09:30:00	10:30:00	0	na	0	1	2	2	1	0	
18/01/2020	AC	1	10:30:00	11:30:00	0	na	0	1	2	2	1	0	
18/01/2020	AC	8	12:30:00	13:30:00	1	NNW	0	1	2	2	0	0	
18/01/2020	AC	8	13:30:00	14:30:00	1	NNW	0	3	2	2	0	0	
18/01/2020	AC	8	14:30:00	15:30:00	1	NNW	0	2	2	2	0	0	
22/01/2020	HS	4	13:45:00	14:45:00	0	n/a	0	7	1	2	0	0	
22/01/2020	HS	4	14:45:00	15:45:00	1	S	0	7	1	2	0	0	
22/01/2020	HS	4	15:45:00	16:45:00	0	n/a	0	8	1	2	0	0	
23/01/2020	HS	7	12:15:00	13:15:00	1	ESE	0	8	1	2	0	0	
23/01/2020	HS	7	13:15:00	14:15:00	1	ESE	0	8	1	2	0	0	
23/01/2020	HS	7	14:15:00	15:15:00	1	SE	0	8	1	2	0	0	
23/01/2020	HS	7	08:45:00	09:45:00	1	E	0	8	1	2	0	0	
23/01/2020	HS	7	09:45:00	10:45:00	1	E	0	8	1	2	0	0	
23/01/2020	HS	7	10:45:00	11:45:00	1	E	0	8	1	2	0	0	
23/01/2020	AC	2	09:00:00	10:00:00	1	E	0	8	0	2	0	0	Patchy low cloud.
23/01/2020	AC	2	10:00:00	11:00:00	1	ESE	0	8	0	2	0	0	
23/01/2020	AC	2	11:00:00	12:00:00	1	ESE	0	8	0	2	0	0	Fog spilled over ridge for last 15 mins with visibility < 1km.
23/01/2020	AC	3	13:30:00	14:30:00	1	ENE	0	8	0	2	0	0	
23/01/2020	AC	3	14:30:00	15:30:00	1	ENE	0	8	0	2	0	0	
23/01/2020	AC	3	15:30:00	16:30:00	0	n/a	0	8	0	1	0	0	Patchy low cloud.
24/01/2020	MS	5	12:10:00	13:10:00	2	SW	1	8	0	1	0	0	
24/01/2020	MS	5	13:10:00	14:10:00	2	SW	1	8	0	0	0	0	
24/01/2020	MS	5	14:10:00	15:10:00	2	SW	1	8	0	1	0	0	
31/01/2020	AC	1	12:30:00	13:30:00	5	SW	4	8	0	1	0	0	Patchy low cloud
31/01/2020	AC	1	13:30:00	14:30:00	5	SW	3	8	0	0	0	0	Patchy low cloud
31/01/2020	AC	1	14:30:00	15:30:00	5	SW	3	8	0	0	0	0	Patchy low cloud
31/01/2020	AC	8	09:00:00	10:00:00	5	SW	2	8	0	1	0	0	Patchy low cloud.
06/02/2020	AC	2	10:00:00	11:00:00	3	SE	0	1	1	2	1	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
06/02/2020	AC	2	11:00:00	12:00:00	3	SE	0	7	1	2	0	0	
06/02/2020	AC	2	12:00:00	13:00:00	3	SE	0	6	1	2	0	0	
06/02/2020	AC	3	13:30:00	14:30:00	3	SE	0	0	n/a	2	0	0	
06/02/2020	AC	3	14:30:00	15:30:00	4	SE	0	0	n/a	2	0	0	
06/02/2020	AC	3	15:30:00	16:30:00	5	ESE	0	2	2	2	0	0	
07/02/2020	AC	1	09:30:00	10:30:00	3	ESE	0	7	1	2	0	0	
07/02/2020	AC	1	10:30:00	11:30:00	3	ESE	0	8	1	2	0	0	
07/02/2020	AC	1	11:30:00	12:30:00	3	SE	0	8	1	2	0	0	
07/02/2020	AC	8	13:00:00	14:00:00	5	SE	0	8	1	2	0	0	
07/02/2020	AC	8	14:00:00	15:00:00	5	SE	2	8	0	2	0	0	
07/02/2020	AC	8	15:00:00	16:00:00	5	SE	1	8	1	2	0	0	
13/02/2020	MS	5	09:30:00	10:30:00	3	SW	1	8	1	2	0	0	
13/02/2020	MS	5	10:30:00	11:30:00	3	SW	2	6	1	2	0	0	
13/02/2020	MS	5	11:30:00	12:30:00	5	SW	3	7	1	1	0	0	
14/02/2020	MS	4	08:30:00	09:30:00	3	SSW	0	8	2	2	0	0	
14/02/2020	MS	4	09:30:00	10:30:00	3	W	1	8	2	2	0	0	
14/02/2020	MS	4	10:30:00	11:30:00	3	W	1	8	2	2	0	0	
17/02/2020	MS	4	08:00:00	09:00:00	5	W	3	8	1	1	0	0	
17/02/2020	MS	4	09:00:00	10:00:00	4	W	2	8	1	2	0	0	
17/02/2020	MS	4	10:00:00	11:00:00	3	W	0	7	2	2	0	0	
18/02/2020	MS	5	14:30:00	15:30:00	3	SW	0	8	2	2	0	0	
18/02/2020	MS	5	15:30:00	16:30:00	3	SW	3	8	2	1	0	0	
18/02/2020	MS	5	16:30:00	17:30:00	2	SW	0	8	2	2	0	0	
18/02/2020	MS	6	11:00:00	12:00:00	4	SW	0	5	2	2	0	0	
18/02/2020	MS	6	12:00:00	13:00:00	4	SSW	0	8	2	2	0	0	
18/02/2020	MS	6	13:00:00	14:00:00	4	SW	0	8	2	2	0	0	
19/02/2020	MS	7	13:26:00	14:26:00	4	SW	4	8	1	0	0	0	
19/02/2020	MS	7	14:26:00	15:26:00	3	SW	1	8	1	0	0	0	
19/02/2020	MS	7	15:26:00	16:26:00	4	SW	1	8	1	0	0	0	
27/02/2020	MS	6	11:00:00	12:00:00	2	W	0	3	2	2	0	2	
27/02/2020	MS	6	12:00:00	13:00:00	3	WNW	0	2	2	2	0	2	
27/02/2020	MS	6	13:00:00	14:00:00	3	NW	0	2	2	2	0	2	
27/02/2020	MS	7	07:30:00	08:30:00	2	SW	0	1	2	2	1	1	
27/02/2020	MS	7	08:30:00	09:30:00	2	W	0	1	2	2	1	1	
27/02/2020	MS	7	09:30:00	10:30:00	2	WNW	0	3	2	2	0	1	
28/02/2020	AC	2	09:40:00	10:40:00	4	SE	4	8	0	1	0	0	
28/02/2020	AC	2	10:40:00	11:40:00	4	SE	4	8	0	1	0	0	
28/02/2020	AC	2	11:40:00	12:40:00	4	SE	4	8	0	1	0	0	Visibility poor at end of survey hour.

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
29/02/2020	AC	1	12:00:00	13:00:00	6	W	0	8	1	2	0	0	
29/02/2020	AC	1	13:00:00	14:00:00	6	SW	2	8	1	2	0	0	Wintery showers.
29/02/2020	AC	1	14:00:00	15:00:00	6	WSW	0	8	1	2	0	0	
29/02/2020	AC	3	15:30:00	16:30:00	6	WSW	2	8	1	2	0	0	Occasional wintry showers.
29/02/2020	AC	3	16:30:00	17:30:00	6	WSW	0	6	1	2	0	0	
29/02/2020	AC	3	17:30:00	18:30:00	6	WSW	2	8	1	2	0	0	
29/02/2020	AC	8	08:30:00	09:30:00	5	W	2	5	1	2	0	0	Light wintry showers.
29/02/2020	AC	8	09:30:00	10:30:00	5	W	2	4	1	2	0	0	
29/02/2020	AC	8	10:30:00	11:30:00	6	W	0	8	1	2	0	0	

Source: Natural Power

Table A7.4: VP survey weather data during the breeding season (March to August 2020)

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
06/03/2020	AC	3	09:30:00	10:30:00	1	W	0	3	2	2	0	0	
06/03/2020	AC	3	10:30:00	11:30:00	1	W	0	6	2	2	0	0	
06/03/2020	AC	3	11:30:00	12:30:00	1	NNW	0	5	2	2	0	0	
06/03/2020	AC	2	13:00:00	14:00:00	1	NW	0	8	1	2	0	0	
06/03/2020	AC	2	14:00:00	15:00:00	1	WNW	0	8	1	2	0	0	
06/03/2020	AC	2	15:00:00	16:00:00	1	WNW	2	7	1	2	0	0	
13/04/2020	MS	6	08:30:00	09:30:00	4	ENE	0	3	2	2	0	0	
13/04/2020	MS	6	09:30:00	10:30:00	4	NE	0	2	2	2	0	0	
13/04/2020	MS	6	10:30:00	11:30:00	2	NE	0	1	2	2	0	0	
13/04/2020	KD	5	12:05:00	13:05:00	3	ENE	0	1	2	2	0	0	
13/04/2020	KD	5	13:05:00	14:05:00	3	ENE	0	1	2	2	0	0	
13/04/2020	KD	5	14:05:00	15:05:00	3	ENE	0	1	2	2	0	0	
13/04/2020	KD	5	15:35:00	16:35:00	3	ENE	0	0	n/a	2	0	0	
13/04/2020	KD	5	16:35:00	17:35:00	3	ENE	0	0	n/a	2	0	0	
13/04/2020	KD	5	17:35:00	18:35:00	3	ENE	0	0	n/a	2	0	0	
15/04/2020	CR	4	13:00:00	14:00:00	3	ESE	0	2	2	2	0	0	
15/04/2020	CR	4	14:00:00	15:00:00	2	ESE	0	0	0	2	0	0	
15/04/2020	CR	4	15:00:00	16:00:00	2	ESE	0	0	0	2	0	0	
15/04/2020	CR	4	09:30:00	10:30:00	3	E	0	1	2	2	0	0	
15/04/2020	CR	4	10:30:00	11:30:00	3	ESE	0	1	2	2	0	0	
15/04/2020	CR	4	11:30:00	12:30:00	3	ESE	0	1	2	2	0	0	
29/04/2020	CR	7	12:00:00	13:00:00	4	WSW	0	5	1	2	0	0	
29/04/2020	CR	7	13:00:00	14:00:00	4	WSW	0	6	1	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
29/04/2020	CR	7	14:00:00	15:00:00	3	WSW	0	5	1	2	0	0	
29/04/2020	CR	7	08:30:00	09:30:00	2	WSW	4	8	0	1	0	0	
29/04/2020	CR	7	09:30:00	10:30:00	2	WSW	4	8	0	1	0	0	
29/04/2020	CR	7	10:30:00	11:30:00	2	WSW	4	8	0	1	0	0	
29/04/2020	MS	6	15:00:00	16:00:00	3	SW	0	6	2	2	0	0	
29/04/2020	MS	6	07:00:00	08:00:00	4	E	1	8	2	1	0	0	
29/04/2020	MS	6	08:00:00	09:00:00	4	E	1	8	1	1	0	0	
29/04/2020	AC	1	08:00:00	09:00:00	3	ESE	0	8	0	2	0	0	
29/04/2020	AC	1	09:00:00	10:00:00	3	ESE	4	8	0	1	0	0	
29/04/2020	AC	1	10:00:00	11:00:00	2	ESE	4	8	0	1	0	0	
29/04/2020	AC	8	12:00:00	13:00:00	5	WSW	0	8	0	2	0	0	
29/04/2020	AC	8	13:00:00	14:00:00	5	WSW	0	7	0	2	0	0	
29/04/2020	AC	8	14:00:00	15:00:00	5	WSW	0	7	0	2	0	0	
30/04/2020	CR	4	18:30:00	19:30:00	3	W	0	7	1	2	0	0	
30/04/2020	CR	4	19:30:00	20:30:00	3	W	0	6	1	2	0	0	
30/04/2020	CR	4	20:30:00	21:30:00	3	W	0	6	1	2	0	0	
30/04/2020	CR	4	15:05:00	16:05:00	3	W	0	7	1	2	0	0	
30/04/2020	CR	4	16:05:00	17:05:00	3	W	0	6	1	2	0	0	
30/04/2020	CR	4	17:05:00	18:05:00	3	W	0	7	1	2	0	0	
30/04/2020	AC	2	08:00:00	09:00:00	4	SSW	2	8	0	1	0	0	
30/04/2020	AC	2	09:00:00	10:00:00	3	SSW	1	8	0	1	0	0	
30/04/2020	AC	2	10:00:00	11:00:00	3	SSW	1	8	0	1	0	0	
30/04/2020	AC	3	11:30:00	12:30:00	3	SW	0	8	0	2	0	0	
30/04/2020	AC	3	12:30:00	13:30:00	3	WSW	2	8	0	2	0	0	
30/04/2020	AC	3	13:30:00	14:30:00	3	W	2	8	0	2	0	0	
01/05/2020	CR	8	08:30:00	09:30:00	2	W	0	5	1	2	0	0	
01/05/2020	CR	8	09:30:00	10:30:00	2	W	0	6	1	2	0	0	
01/05/2020	CR	8	10:30:00	11:30:00	2	W	0	7	1	2	0	0	
01/05/2020	CR	8	05:00:00	06:00:00	2	W	0	8	1	2	0	0	
01/05/2020	CR	8	06:00:00	07:00:00	2	W	0	8	1	2	0	0	
01/05/2020	CR	8	07:00:00	08:00:00	2	W	0	6	1	2	0	0	
02/05/2020	AC	1	12:15:00	13:15:00	3	NW	0	7	1	2	0	0	
02/05/2020	AC	1	13:15:00	14:15:00	2	WSW	0	7	1	2	0	0	
02/05/2020	AC	1	14:15:00	15:15:00	3	WSW	0	5	1	2	0	0	
02/05/2020	KD	6	13:50:00	14:50:00	2	SW	0	4	1	2	0	0	
02/05/2020	KD	6	14:50:00	15:50:00	3	SW	0	4	1	2	0	0	
02/05/2020	KD	6	15:50:00	16:50:00	2	SW	0	2	2	2	0	0	
02/05/2020	KD	6	17:20:00	18:20:00	3	SW	0	3	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
02/05/2020	KD	6	18:20:00	19:20:00	3	SW	0	4	2	2	0	0	
02/05/2020	KD	6	19:20:00	20:20:00	3	SW	0	4	2	2	0	0	
02/05/2020	AC	8	08:45:00	09:45:00	3	NW	0	4	1	2	0	0	
02/05/2020	AC	8	09:45:00	10:45:00	2	NW	0	1	2	2	0	0	
02/05/2020	AC	8	10:45:00	11:45:00	2	NW	0	5	2	2	0	0	
03/05/2020	KD	5	14:30:00	15:30:00	2	SE	1	8	1	2	0	0	
03/05/2020	KD	5	15:30:00	16:30:00	2	SE	1	8	1	2	0	0	
03/05/2020	KD	5	16:30:00	17:30:00	2	SE	0	8	1	2	0	0	
03/05/2020	KD	6	11:00:00	12:00:00	3	SE	1	8	1	2	0	0	
03/05/2020	KD	6	12:00:00	13:00:00	3	SE	0	8	1	2	0	0	
03/05/2020	KD	6	13:00:00	14:00:00	3	SE	1	8	1	2	0	0	
04/05/2020	CR	7	13:00:00	14:00:00	3	E	0	3	1	2	0	0	
04/05/2020	CR	7	14:00:00	15:00:00	3	E	0	4	1	2	0	0	
04/05/2020	CR	7	15:00:00	16:00:00	3	E	0	4	1	2	0	0	
04/05/2020	CR	7	09:30:00	10:30:00	3	E	0	1	1	2	0	0	
04/05/2020	CR	7	10:30:00	11:30:00	3	E	0	2	1	2	0	0	
04/05/2020	CR	7	11:30:00	12:30:00	3	E	0	4	1	2	0	0	
06/05/2020	AC	2	11:30:00	12:30:00	4	ESE	0	0	n/a	2	0	0	
06/05/2020	AC	2	12:30:00	13:30:00	4	ESE	0	0	n/a	2	0	0	
06/05/2020	AC	2	13:30:00	14:30:00	4	ESE	0	0	n/a	2	0	0	
06/05/2020	AC	3	07:30:00	08:30:00	3	E	0	0	n/a	2	0	0	
06/05/2020	AC	3	08:30:00	09:30:00	3	E	0	0	n/a	2	0	0	
06/05/2020	AC	3	09:30:00	10:30:00	3	ESE	0	0	n/a	2	0	0	
07/05/2020	AC	1	12:00:00	13:00:00	2	ESE	0	5	2	2	0	0	
07/05/2020	AC	1	13:00:00	14:00:00	2	ESE	0	2	2	2	0	0	
07/05/2020	AC	1	14:00:00	15:00:00	2	SE	0	3	2	2	0	0	
07/05/2020	AC	8	08:00:00	09:00:00	2	SE	0	7	2	2	0	0	
07/05/2020	AC	8	09:00:00	10:00:00	2	SE	0	7	2	2	0	0	
07/05/2020	AC	8	10:00:00	11:00:00	2	ESE	0	8	1	2	0	0	
13/05/2020	AC	2	09:00:00	10:00:00	4	ENE	0	7	1	2	0	0	
13/05/2020	AC	2	10:00:00	11:00:00	4	ENE	0	8	2	2	0	0	
13/05/2020	AC	2	11:00:00	12:00:00	4	ENE	0	8	2	2	0	0	
13/05/2020	AC	3	13:00:00	14:00:00	4	ENE	0	6	1	2	0	0	
13/05/2020	AC	3	14:00:00	15:00:00	4	ENE	0	8	1	2	0	0	
13/05/2020	AC	3	15:00:00	16:00:00	4	NE	0	8	1	2	0	0	
14/05/2020	MS	7	12:00:00	13:00:00	3	E	0	1	2	2	0	0	
14/05/2020	MS	7	13:00:00	14:00:00	2	E	0	1	2	2	0	0	
14/05/2020	MS	7	14:00:00	15:00:00	2	E	0	2	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
14/05/2020	MS	5	08:30:00	09:30:00	4	E	0	1	2	2	0	0	
14/05/2020	MS	5	09:30:00	10:30:00	3	E	0	1	2	2	0	0	
14/05/2020	MS	5	10:30:00	11:30:00	3	E	0	1	2	2	0	0	
15/05/2020	MS	5	11:45:00	12:45:00	3	SE	0	2	2	2	0	0	
15/05/2020	MS	5	12:45:00	13:45:00	3	SE	0	2	2	2	0	0	
15/05/2020	MS	5	13:45:00	14:45:00	3	SE	0	2	2	2	0	0	
15/05/2020	MS	4	08:15:00	09:15:00	2	E	0	1	2	2	0	0	
15/05/2020	MS	4	09:15:00	10:15:00	2	SE	0	1	2	2	0	0	
15/05/2020	MS	4	10:15:00	11:15:00	2	SE	0	1	2	2	0	0	
15/05/2020	AC	1	15:30:00	16:30:00	3	NW	0	1	2	2	0	0	
15/05/2020	AC	1	16:30:00	17:30:00	3	WNW	0	0	2	2	0	0	
15/05/2020	AC	1	17:30:00	18:30:00	4	NW	0	0	2	2	0	0	
15/05/2020	AC	8	12:00:00	13:00:00	3	NNW	0	3	2	2	0	0	
15/05/2020	AC	8	13:00:00	14:00:00	2	NNW	0	1	2	2	0	0	
15/05/2020	AC	8	14:00:00	15:00:00	3	NW	0	1	2	2	0	0	
17/05/2020	AC	2	11:00:00	12:00:00	3	WSW	0	8	1	2	0	0	
17/05/2020	AC	2	12:00:00	13:00:00	3	WSW	0	8	1	2	0	0	
17/05/2020	AC	2	13:00:00	14:00:00	4	WSW	0	7	1	2	0	0	
17/05/2020	AC	3	15:00:00	16:00:00	4	WSW	0	8	1	2	0	0	
17/05/2020	AC	3	16:00:00	17:00:00	5	WSW	0	8	1	2	0	0	
17/05/2020	AC	3	17:00:00	18:00:00	4	WSW	0	7	1	2	0	0	
19/05/2020	AC	1	13:00:00	14:00:00	2	W	0	8	1	2	0	0	
19/05/2020	AC	1	14:00:00	15:00:00	3	W	0	8	1	2	0	0	
19/05/2020	AC	1	15:00:00	16:00:00	3	W	0	8	1	2	0	0	
19/05/2020	AC	8	09:00:00	10:00:00	3	W	1	8	0	2	0	0	
19/05/2020	AC	8	10:00:00	11:00:00	3	W	1	8	0	2	0	0	
19/05/2020	AC	8	11:00:00	12:00:00	3	W	1	8	0	2	0	0	
21/05/2020	MS	6	09:00:00	10:00:00	2	SE	0	7	2	2	0	0	
21/05/2020	MS	6	10:00:00	11:00:00	2	S	0	7	2	2	0	0	
21/05/2020	MS	6	11:00:00	12:00:00	2	SSW	0	7	2	2	0	0	
22/05/2020	AC	2	16:00:00	17:00:00	6	SW	0	8	1	2	0	0	
22/05/2020	AC	2	17:00:00	18:00:00	6	SW	0	8	1	2	0	0	
22/05/2020	AC	2	18:00:00	19:00:00	6	SW	0	8	1	2	0	0	
22/05/2020	AC	3	10:30:00	11:30:00	6	SW	0	8	2	2	0	0	
22/05/2020	AC	3	11:30:00	12:30:00	6	SW	0	8	2	2	0	0	
22/05/2020	AC	3	12:30:00	13:30:00	6	SW	0	8	2	2	0	0	
25/05/2020	CR	7	15:20:00	16:20:00	2	W	0	1	2	2	0	0	
25/05/2020	CR	7	16:20:00	17:20:00	3	W	0	1	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
25/05/2020	CR	7	17:20:00	18:20:00	3	W	0	2	2	2	0	0	
25/05/2020	CR	7	11:50:00	12:50:00	2	SW	0	1	2	2	0	0	
25/05/2020	CR	7	12:50:00	13:50:00	2	W	0	1	2	2	0	0	
25/05/2020	CR	7	13:50:00	14:50:00	2	W	0	1	2	2	0	0	
25/05/2020	AC	1	09:00:00	10:00:00	1	n/a	0	0	n/a	2	0	0	
25/05/2020	AC	1	10:00:00	11:00:00	2	SSE	0	0	n/a	2	0	0	
25/05/2020	AC	1	11:00:00	12:00:00	2	S	0	0	n/a	2	0	0	
26/05/2020	CR	6	18:00:00	19:00:00	1	SW	0	1	2	2	0	0	
26/05/2020	CR	6	19:00:00	20:00:00	1	SW	0	1	2	2	0	0	
26/05/2020	CR	6	20:00:00	21:00:00	1	SW	0	1	2	2	0	0	
26/05/2020	CR	5	14:30:00	15:30:00	1	SW	0	4	1	2	0	0	
26/05/2020	CR	5	15:30:00	16:30:00	1	SW	0	5	1	2	0	0	
26/05/2020	CR	5	16:30:00	17:30:00	1	SW	0	3	1	2	0	0	
27/05/2020	CR	4	07:45:00	08:45:00	1	W	0	1	2	2	0	0	
27/05/2020	CR	4	08:45:00	09:45:00	1	W	0	0	0	2	0	0	
27/05/2020	CR	4	09:45:00	10:45:00	1	W	0	0	0	2	0	0	
27/05/2020	CR	4	04:15:00	05:15:00	1	W	0	0	0	2	0	0	
27/05/2020	CR	4	05:15:00	06:15:00	1	W	0	0	0	2	0	0	
27/05/2020	CR	4	06:15:00	07:15:00	1	W	0	0	0	2	0	0	
28/05/2020	AC	8	09:00:00	10:00:00	3	ESE	0	1	2	2	0	0	
28/05/2020	AC	8	10:00:00	11:00:00	3	ESE	0	0	2	2	0	0	
28/05/2020	AC	8	11:00:00	12:00:00	3	ESE	0	0	2	2	0	0	
04/06/2020	MS	6	09:30:00	10:30:00	1	SSW	0	7	2	2	0	0	
04/06/2020	MS	6	10:30:00	11:30:00	1	SSW	0	7	2	2	0	0	
04/06/2020	MS	6	11:30:00	12:30:00	1	SSW	0	7	2	2	0	0	
06/06/2020	AC	4	08:30:00	09:30:00	6	WNW	0	8	1	2	0	0	
06/06/2020	AC	4	09:30:00	10:30:00	6	WNW	2	8	1	2	0	0	
06/06/2020	AC	4	10:30:00	11:30:00	7	WNW	1	8	1	2	0	0	
06/06/2020	AC	7	12:00:00	13:00:00	6	WSW	1	8	1	2	0	0	
06/06/2020	AC	7	13:00:00	14:00:00	6	WSW	2	8	0	2	0	0	
06/06/2020	AC	7	14:00:00	15:00:00	6	WSW	2	8	0	2	0	0	Reduced visibility in last 20 minutes.
11/06/2020	MS	5	09:10:00	10:10:00	4	NE	0	4	2	2	0	0	
11/06/2020	MS	5	10:10:00	11:10:00	4	NE	0	5	2	2	0	0	
11/06/2020	MS	5	11:10:00	12:10:00	4	NE	0	6	2	2	0	0	
11/06/2020	MS	5	19:00:00	20:00:00	3	NE	0	5	2	2	0	0	
11/06/2020	MS	5	20:00:00	21:00:00	3	NE	0	5	2	2	0	0	
11/06/2020	MS	5	21:00:00	22:00:00	3	NE	0	5	2	2	0	0	
12/06/2020	CR	3	11:35:00	12:35:00	3	ENE	0	4	1	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
12/06/2020	CR	3	12:35:00	13:35:00	3	ENE	0	3	1	2	0	0	
12/06/2020	CR	3	13:35:00	14:35:00	3	ENE	0	6	1	2	0	0	
12/06/2020	CR	3	08:05:00	09:05:00	3	ENE	0	3	1	2	0	0	
12/06/2020	CR	3	09:05:00	10:05:00	3	ENE	0	2	1	2	0	0	
12/06/2020	CR	3	10:05:00	11:05:00	3	ENE	0	3	1	2	0	0	
19/06/2020	DR	1	15:00:00	16:00:00	5	SW	0	8	0	2	0	0	
19/06/2020	DR	1	16:00:00	17:00:00	5	SW	0	8	0	2	0	0	
19/06/2020	DR	1	17:00:00	18:00:00	5	SW	0	8	0	2	0	0	
19/06/2020	DR	1	11:30:00	12:30:00	5	SW	0	8	1	2	0	0	
19/06/2020	DR	1	12:30:00	13:30:00	5	SW	0	7	1	2	0	0	
19/06/2020	DR	1	13:30:00	14:30:00	5	SW	0	7	1	2	0	0	
22/06/2020	CR	2	13:35:00	14:35:00	2	SSW	0	7	1	2	0	0	
22/06/2020	CR	2	14:35:00	15:35:00	2	SSW	0	7	1	2	0	0	
22/06/2020	CR	2	15:35:00	16:35:00	2	SSW	0	5	1	2	0	0	
22/06/2020	CR	2	10:05:00	11:05:00	2	SSW	0	4	1	2	0	0	
22/06/2020	CR	2	11:05:00	12:05:00	2	SSW	0	5	1	2	0	0	
22/06/2020	CR	2	12:05:00	13:05:00	2	SSW	0	7	1	2	0	0	
28/06/2020	AC	4	18:00:00	19:00:00	6	WSW	0	8	0	2	0	0	
28/06/2020	AC	4	19:00:00	20:00:00	6	WSW	0	8	0	2	0	0	
28/06/2020	AC	4	20:00:00	21:00:00	6	WSW	2	8	0	2	0	0	
28/06/2020	AC	7	14:00:00	15:00:00	5	WSW	0	7	0	2	0	0	
28/06/2020	AC	7	15:00:00	16:00:00	5	WSW	0	8	1	2	0	0	
28/06/2020	AC	7	16:00:00	17:00:00	6	WSW	0	8	0	2	0	0	
30/06/2020	CR	8	09:15:00	10:15:00	2	S	1	8	1	2	0	0	
30/06/2020	CR	8	10:15:00	11:15:00	2	S	1	8	1	1	0	0	
30/06/2020	CR	8	11:15:00	12:15:00	1	S	1	8	0	0	0	0	
30/06/2020	DR	6	08:30:00	09:30:00	3	W	0	8	1	2	0	0	
30/06/2020	DR	6	09:30:00	10:30:00	3	W	1	8	0	2	0	0	
30/06/2020	DR	6	10:30:00	11:30:00	2	WSW	1	8	0	1	0	0	
14/07/2020	AC	2	16:00:00	17:00:00	3	NNW	0	8	1	2	0	0	
14/07/2020	AC	2	17:00:00	18:00:00	3	NNW	2	8	1	2	0	0	
14/07/2020	AC	2	18:00:00	19:00:00	3	NNW	0	8	1	2	0	0	
15/07/2020	MS	4	15:00:00	16:00:00	1	SW	0	8	2	2	0	0	
15/07/2020	MS	4	16:00:00	16:30:00	1	SW	0	8	2	2	0	0	
15/07/2020	MS	7	11:45:00	12:45:00	2	SSW	0	5	2	2	0	0	
15/07/2020	MS	7	12:45:00	13:45:00	2	SSW	0	7	2	2	0	0	
15/07/2020	MS	7	13:45:00	14:45:00	2	SSW	0	7	2	2	0	0	
15/07/2020	AC	3	06:00:00	07:00:00	0	n/a	0	8	n/a	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
15/07/2020	AC	3	07:00:00	08:00:00	0	n/a	0	8	n/a	2	0	0	
15/07/2020	AC	3	08:00:00	09:00:00	0	n/a	0	8	n/a	2	0	0	
16/07/2020	AC	8	11:00:00	12:00:00	2	SW	0	8	1	2	0	0	
16/07/2020	AC	8	12:00:00	13:00:00	2	SW	0	7	1	2	0	0	
16/07/2020	AC	8	13:00:00	14:00:00	3	SW	0	8	1	2	0	0	
17/07/2020	CR	5	14:00:00	15:00:00	2	WSW	0	8	0	2	0	0	
17/07/2020	CR	5	15:00:00	16:00:00	2	WSW	0	8	0	2	0	0	
17/07/2020	CR	5	16:00:00	17:00:00	2	WSW	0	8	0	2	0	0	
17/07/2020	CR	5	10:30:00	11:30:00	1	WSW	0	8	0	1	0	0	
17/07/2020	CR	5	11:30:00	12:30:00	1	WSW	0	8	0	2	0	0	
17/07/2020	CR	5	12:30:00	13:30:00	1	WSW	0	8	0	2	0	0	
19/07/2020	MS	4	19:15:00	20:15:00	1	SW	0	1	2	2	0	0	
19/07/2020	MS	4	20:15:00	21:15:00	1	SW	0	1	2	2	0	0	
22/07/2020	MS	6	13:51:00	14:51:00	1	SW	0	3	2	2	0	0	
22/07/2020	MS	6	14:51:00	15:51:00	1	SW	0	3	2	2	0	0	
23/07/2020	MS	6	19:30:00	20:30:00	2	SW	0	7	2	2	0	0	
23/07/2020	MS	6	20:30:00	21:30:00	2	SW	0	7	2	2	0	0	
24/07/2020	MS	7	13:33:00	14:33:00	2	SW	0	8	2	2	0	0	
24/07/2020	MS	4	10:45:00	11:45:00	1	W	1	8	1	0	0	0	
24/07/2020	MS	4	11:45:00	12:45:00	1	W	0	8	2	1	0	0	
24/07/2020	MS	4	12:45:00	13:15:00	1	W	0	8	2	1	0	0	
24/07/2020	MS	6	08:30:00	09:30:00	1	W	1	8	1	0	0	0	
24/07/2020	MS	6	09:30:00	10:30:00	1	W	1	8	1	0	0	0	
25/07/2020	MS	7	11:58:00	12:58:00	3	SW	0	8	2	2	0	0	
25/07/2020	MS	7	12:58:00	13:58:00	3	SW	2	8	2	2	0	0	
28/07/2020	AC	2	11:00:00	12:00:00	3	WNW	0	8	1	2	0	0	
28/07/2020	AC	2	12:00:00	13:00:00	3	WNW	0	6	1	2	0	0	
28/07/2020	AC	2	13:00:00	14:00:00	3	WNW	0	7	1	2	0	0	
29/07/2020	AC	3	10:00:00	11:00:00	2	WSW	0	8	2	2	0	0	
29/07/2020	AC	3	11:00:00	12:00:00	2	WSW	0	8	1	2	0	0	
29/07/2020	AC	3	12:00:00	13:00:00	2	SW	0	8	1	2	0	0	
29/07/2020	AC	8	06:00:00	07:00:00	0	n/a	0	0	n/a	2	0	0	
29/07/2020	AC	8	07:00:00	08:00:00	0	n/a	0	1	2	2	0	0	
29/07/2020	AC	8	08:00:00	09:00:00	0	n/a	0	7	2	2	0	0	
30/07/2020	CR	1	11:40:00	12:40:00	2	SE	0	1	1	2	0	0	
30/07/2020	CR	1	12:40:00	13:40:00	2	SSE	0	0	n/a	2	0	0	
30/07/2020	CR	1	13:40:00	14:40:00	2	SSE	0	1	1	2	0	0	
30/07/2020	CR	1	08:10:00	09:10:00	2	SE	0	3	1	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
30/07/2020	CR	1	09:10:00	10:10:00	2	SE	0	3	1	2	0	0	
30/07/2020	CR	1	10:10:00	11:10:00	2	SE	0	2	1	2	0	0	
04/08/2020	CR	5	10:15:00	11:15:00	2	SW	0	8	1	2	0	0	
04/08/2020	CR	5	11:15:00	12:15:00	2	SW	0	8	1	2	0	0	
04/08/2020	CR	5	12:45:00	13:45:00	2	SW	0	8	1	2	0	0	
04/08/2020	CR	5	13:45:00	14:45:00	2	SW	1	8	0	1	0	0	
04/08/2020	CR	5	14:45:00	15:45:00	2	SW	1	8	0	1	0	0	
06/08/2020	CR	7	13:00:00	14:00:00	1	SSE	2	8	0	1	0	0	
06/08/2020	CR	7	14:00:00	15:00:00	1	SSE	0	8	1	2	0	0	
06/08/2020	CR	7	15:00:00	16:00:00	1	SSE	0	8	1	2	0	0	
06/08/2020	CR	7	09:30:00	10:30:00	2	S	1	8	1	1	0	0	
06/08/2020	CR	7	10:30:00	11:30:00	1	S	1	8	1	1	0	0	
06/08/2020	CR	7	11:30:00	12:30:00	1	SSE	1	8	1	1	0	0	
12/08/2020	MS	6	15:00:00	16:00:00	2	SE	0	1	2	2	0	0	
12/08/2020	MS	6	16:00:00	17:00:00	2	E	0	2	2	2	0	0	
12/08/2020	MS	6	17:00:00	18:00:00	2	E	0	4	2	2	0	0	
12/08/2020	AC	2	12:30:00	13:30:00	2	ENE	0	2	2	2	0	0	Slight heat haze.
12/08/2020	AC	2	13:30:00	14:30:00	2	ENE	0	2	2	2	0	0	
12/08/2020	AC	2	14:30:00	15:30:00	3	SE	0	1	2	2	0	0	
12/08/2020	AC	8	16:30:00	17:30:00	1	SSE	0	5	2	2	0	0	
12/08/2020	AC	8	17:30:00	18:30:00	1	NNW	0	1	2	2	0	0	
12/08/2020	AC	8	18:30:00	19:30:00	1	NNW	0	1	2	2	0	0	
13/08/2020	MS	6	11:30:00	12:30:00	1	SE	0	7	2	2	0	0	
13/08/2020	MS	6	12:30:00	13:30:00	1	SE	0	7	2	2	0	0	
13/08/2020	MS	6	13:30:00	14:30:00	1	E	0	8	2	2	0	0	
14/08/2020	CR	3	10:25:00	11:25:00	1	NE	0	8	0	1	0	0	
14/08/2020	CR	3	11:25:00	12:25:00	1	ENE	0	8	0	1	0	0	
14/08/2020	CR	3	12:25:00	13:25:00	1	ENE	0	8	0	1	0	0	
21/08/2020	MS	4	09:11:00	10:11:00	6	SW	3	8	2	2	0	0	
21/08/2020	MS	4	10:11:00	11:11:00	6	SW	2	8	2	2	0	0	
21/08/2020	MS	4	11:11:00	12:11:00	6	SW	0	8	2	2	0	0	
21/08/2020	CR	1	11:40:00	12:40:00	5	SW	0	8	1	2	0	0	
21/08/2020	CR	1	12:40:00	13:40:00	5	SW	0	8	1	2	0	0	
21/08/2020	CR	1	13:40:00	14:40:00	5	SW	0	8	1	2	0	0	
21/08/2020	CR	1	08:20:00	09:20:00	4	SSW	3	8	1	2	0	0	
21/08/2020	CR	1	09:20:00	10:20:00	4	SW	3	8	1	2	0	0	
21/08/2020	CR	1	10:20:00	11:20:00	4	SW	0	8	1	2	0	0	
21/08/2020	CR	3	15:00:00	16:00:00	4	SW	0	8	1	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
21/08/2020	CR	3	16:00:00	17:00:00	4	SW	0	8	1	2	0	0	
21/08/2020	CR	3	17:00:00	18:00:00	4	SW	0	8	1	2	0	0	
21/08/2020	MS	4	13:00:00	14:00:00	5	SW	0	8	2	2	0	0	
21/08/2020	MS	4	14:00:00	15:00:00	5	SSW	2	8	2	1	0	0	
21/08/2020	MS	4	15:00:00	16:00:00	4	SW	0	8	2	2	0	0	
30/08/2020	AC	2	12:00:00	13:00:00	3	N	0	2	2	2	0	0	
30/08/2020	AC	2	13:00:00	14:00:00	3	NNE	0	2	2	2	0	0	
30/08/2020	AC	2	14:00:00	15:00:00	3	NNE	0	2	2	2	0	0	
30/08/2020	AC	8	15:30:00	16:30:00	2	NNE	0	7	2	2	0	0	
30/08/2020	AC	8	16:30:00	17:30:00	2	NNE	0	7	2	2	0	0	
30/08/2020	AC	8	17:30:00	18:30:00	1	NNE	0	6	2	2	0	0	

Source: Natural Power

Table A7.5: VP survey weather data during the non-breeding season (September 2020 to February 2021)

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
04/09/2020	CR	3	13:05:00	14:05:00	2	W	0	8	1	2	0	0	
04/09/2020	CR	3	14:05:00	15:05:00	2	W	0	8	1	2	0	0	
04/09/2020	CR	3	15:05:00	16:05:00	2	W	0	8	1	2	0	0	
04/09/2020	CR	3	09:35:00	10:35:00	2	W	0	8	1	2	0	0	
04/09/2020	CR	3	10:35:00	11:35:00	2	W	0	8	1	2	0	0	
04/09/2020	CR	3	11:35:00	12:35:00	2	W	0	7	1	2	0	0	
07/09/2020	CR	7	13:20:00	14:20:00	3	W	4	8	0	0	0	0	
07/09/2020	CR	7	14:20:00	15:20:00	3	W	2	8	1	1	0	0	
07/09/2020	CR	7	15:20:00	16:20:00	3	W	0	8	1	2	0	0	
07/09/2020	CR	7	09:50:00	10:50:00	3	W	0	8	1	2	0	0	
07/09/2020	CR	7	10:50:00	11:50:00	3	W	2	8	1	1	0	0	
07/09/2020	CR	7	11:50:00	12:50:00	3	W	4	8	0	0	0	0	
10/09/2020	CR	1	12:20:00	13:20:00	2	S	0	6	1	2	0	0	
10/09/2020	CR	1	13:20:00	14:20:00	1	S	0	6	1	2	0	0	
10/09/2020	CR	1	14:20:00	15:20:00	1	S	0	6	1	2	0	0	
10/09/2020	CR	1	08:50:00	09:50:00	1	ESE	0	8	1	2	0	0	
10/09/2020	CR	1	09:50:00	10:50:00	1	S	0	8	1	2	0	0	
10/09/2020	CR	1	10:50:00	11:50:00	1	S	0	7	1	2	0	0	
18/09/2020	CR	5	12:40:00	13:40:00	3	E	0	0	0	2	0	0	
18/09/2020	CR	5	13:40:00	14:40:00	3	E	0	0	0	2	0	0	
18/09/2020	CR	5	14:40:00	15:40:00	3	E	0	0	0	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
18/09/2020	CR	5	09:10:00	10:10:00	3	E	0	2	2	2	0	0	
18/09/2020	CR	5	10:10:00	11:10:00	3	E	0	0	0	2	0	0	
18/09/2020	CR	5	11:10:00	12:10:00	3	E	0	0	0	2	0	0	
23/09/2020	AC	2	13:00:00	14:00:00	3	SW	0	7	1	2	0	0	
23/09/2020	AC	2	14:00:00	15:00:00	4	W	0	8	1	2	0	0	
23/09/2020	AC	2	15:00:00	16:00:00	4	WNW	0	8	1	2	0	0	
23/09/2020	AC	8	16:30:00	17:30:00	3	NW	2	8	1	2	0	0	
23/09/2020	AC	8	17:30:00	18:30:00	3	NW	3	8	0	2	0	0	Heavy showers 18:10-18:30.
23/09/2020	AC	8	18:30:00	19:30:00	2	NW	2	8	0	1	0	0	Heavy showers 18:30-18:45.
28/09/2020	MS	4	12:30:00	13:30:00	1	S	0	8	1	1	0	0	
28/09/2020	MS	4	13:30:00	14:30:00	1	S	1	8	1	1	0	0	
28/09/2020	MS	4	14:30:00	15:30:00	1	S	1	8	1	1	0	0	
28/09/2020	MS	6	09:00:00	10:00:00	1	SW	1	8	1	1	0	0	
28/09/2020	MS	6	10:00:00	11:00:00	1	SW	0	8	1	1	0	0	
28/09/2020	MS	6	11:00:00	12:00:00	1	S	1	8	1	1	0	0	
29/09/2020	MS	6	09:10:00	10:10:00	1	NW	0	1	2	2	0	0	
29/09/2020	MS	6	10:10:00	11:10:00	1	W	0	1	2	2	0	0	
29/09/2020	MS	6	11:10:00	12:10:00	1	NW	0	1	2	2	0	0	
30/09/2020	MS	4	10:00:00	11:00:00	3	SW	3	8	1	1	0	0	
30/09/2020	MS	4	11:00:00	12:00:00	3	SW	4	8	1	1	0	0	
30/09/2020	MS	4	12:00:00	13:00:00	3	SW	3	8	1	0	0	0	
30/09/2020	AC	2	10:00:00	11:00:00	3	SW	4	8	0	1	0	0	
30/09/2020	AC	2	11:00:00	12:00:00	3	SW	4	8	0	1	0	0	
30/09/2020	AC	2	12:00:00	13:00:00	3	S	4	8	0	1	0	0	
30/09/2020	AC	8	14:00:00	15:00:00	5	SW	1	8	0	1	0	0	
30/09/2020	AC	8	15:00:00	16:00:00	6	WSW	1	8	0	1	0	0	
30/09/2020	AC	8	16:00:00	17:00:00	5	W	1	8	0	2	0	0	
06/10/2020	CR	6	12:30:00	13:30:00	4	W	2	8	1	2	0	0	
06/10/2020	CR	6	13:30:00	14:30:00	4	W	2	8	1	2	0	0	
06/10/2020	CR	6	14:30:00	15:30:00	4	W	3	8	1	2	0	0	
06/10/2020	CR	6	09:00:00	10:00:00	4	W	2	8	1	2	0	0	
06/10/2020	CR	6	10:00:00	11:00:00	4	W	2	7	1	2	0	0	
06/10/2020	CR	6	11:00:00	12:00:00	4	W	2	8	1	2	0	0	
07/10/2020	CR	2	08:45:00	09:45:00	2	WNW	0	6	1	2	0	0	
07/10/2020	CR	2	09:45:00	10:45:00	2	WNW	0	8	1	2	0	0	
07/10/2020	CR	2	10:45:00	11:45:00	2	WNW	0	5	1	2	0	0	
07/10/2020	CR	2	12:15:00	13:15:00	2	W	0	5	1	2	0	0	
07/10/2020	CR	2	13:15:00	14:15:00	2	WSW	2	8	1	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
07/10/2020	CR	2	14:15:00	15:15:00	2	WSW	3	8	1	2	0	0	Low cloud for final 15 minutes.
15/10/2020	AC	5	09:00:00	10:00:00	4	NE	0	1	0	2	0	0	
15/10/2020	AC	5	10:00:00	11:00:00	4	NE	0	1	0	2	0	0	
15/10/2020	AC	5	11:00:00	12:00:00	4	ENE	0	2	0	2	0	0	
15/10/2020	AC	7	12:30:00	13:30:00	5	ENE	0	2	1	2	0	0	
15/10/2020	AC	7	13:30:00	14:30:00	4	ENE	0	3	1	2	0	0	
15/10/2020	AC	7	14:30:00	15:30:00	3	ENE	0	3	1	2	0	0	
16/10/2020	AC	3	11:00:00	12:00:00	3	ENE	0	5	1	2	0	0	
16/10/2020	AC	3	12:00:00	13:00:00	3	ENE	0	8	1	2	0	0	
16/10/2020	AC	3	13:00:00	14:00:00	3	E	0	8	1	2	0	0	
16/10/2020	AC	3	14:30:00	15:30:00	3	E	0	8	1	2	0	0	
16/10/2020	AC	3	15:30:00	16:30:00	3	E	0	8	1	2	0	0	
16/10/2020	AC	3	16:30:00	17:30:00	3	E	0	7	1	2	0	0	
19/10/2020	CR	4	13:30:00	14:30:00	4	SE	0	8	1	2	0	0	
19/10/2020	CR	4	14:30:00	15:30:00	4	SE	0	8	1	2	0	0	
19/10/2020	CR	4	15:30:00	16:30:00	4	SSE	0	8	1	2	0	0	
19/10/2020	CR	4	10:00:00	11:00:00	3	SE	0	3	1	2	0	0	
19/10/2020	CR	4	11:00:00	12:00:00	3	SE	0	5	1	2	0	0	
19/10/2020	CR	4	12:00:00	13:00:00	3	SE	0	6	1	2	0	0	
24/10/2020	MS	1	12:30:00	13:30:00	2	SW	2	8	1	1	0	0	
24/10/2020	MS	1	13:00:00	14:00:00	2	SW	4	8	1	0	0	0	
24/10/2020	MS	1	14:00:00	15:00:00	2	SW	3	8	1	1	0	0	
24/10/2020	MS	5	09:00:00	10:00:00	1	SW	1	8	1	0	0	0	
24/10/2020	MS	5	10:00:00	11:00:00	1	SW	2	8	2	1	0	0	
24/10/2020	MS	5	11:00:00	12:00:00	1	SW	2	8	2	2	0	0	
28/10/2020	MS	7	07:03:00	08:03:00	2	SW	3	8	2	1	0	0	
28/10/2020	MS	7	08:03:00	09:03:00	2	SW	3	8	2	2	0	0	
28/10/2020	MS	7	09:03:00	10:03:00	3	SW	2	8	2	2	0	0	
28/10/2020	MS	1	12:30:00	13:30:00	2	SW	3	8	2	2	0	0	
28/10/2020	MS	1	13:30:00	14:30:00	2	SW	2	8	2	2	0	0	
28/10/2020	MS	1	14:30:00	15:30:00	2	SW	3	8	2	2	0	0	
31/10/2020	MS	8	09:00:00	10:00:00	5	WSW	4	8	2	1	0	0	
31/10/2020	MS	8	10:00:00	11:00:00	5	WSW	4	8	2	1	0	0	
31/10/2020	MS	8	11:00:00	12:00:00	5	WSW	3	8	2	2	0	0	
08/11/2020	AC	2	11:00:00	12:00:00	2	ESE	1	8	0	1	0	0	Patchy low cloud.
08/11/2020	AC	2	12:00:00	13:00:00	2	SE	1	8	0	1	0	0	Patchy low cloud.
08/11/2020	AC	2	13:00:00	14:00:00	2	SE	1	8	0	1	0	0	Patchy low cloud.
08/11/2020	AC	3	14:15:00	15:15:00	1	SE	1	8	0	1	0	0	Patchy low cloud.

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
08/11/2020	AC	3	15:15:00	16:15:00	1	SE	0	8	0	2	0	0	
08/11/2020	AC	3	16:15:00	17:15:00	1	SSE	1	7	0	2	0	0	Patchy low cloud.
12/11/2020	MS	5	11:30:00	12:30:00	2	W	0	5	2	2	0	0	
12/11/2020	MS	5	12:30:00	13:30:00	2	W	0	5	2	2	0	0	
12/11/2020	MS	5	13:30:00	14:30:00	2	W	0	5	2	2	0	0	
12/11/2020	MS	5	08:00:00	09:00:00	2	W	0	6	2	2	0	0	
12/11/2020	MS	5	09:00:00	10:00:00	3	W	0	6	2	2	0	0	
12/11/2020	MS	5	10:00:00	11:00:00	3	W	2	6	2	2	0	0	
13/11/2020	MS	8	08:00:00	09:00:00	2	W	0	4	2	2	0	0	
13/11/2020	MS	8	09:00:00	10:00:00	3	SW	3	7	2	1	0	0	
13/11/2020	MS	8	10:00:00	11:00:00	4	SW	0	7	2	2	0	0	
19/11/2020	MS	8	11:30:00	12:30:00	3	SW	2	5	2	2	0	0	
19/11/2020	MS	8	12:30:00	13:30:00	3	SW	0	5	2	2	0	0	
19/11/2020	MS	8	13:30:00	14:30:00	3	SSW	0	4	2	2	0	0	
19/11/2020	MS	8	08:00:00	09:00:00	5	SW	0	4	2	2	0	0	
19/11/2020	MS	8	09:00:00	10:00:00	5	SW	0	4	2	2	0	0	
19/11/2020	MS	8	10:00:00	11:00:00	5	SW	0	4	2	2	0	0	
20/11/2020	AC	1	09:30:00	10:30:00	5	WSW	1	8	0	2	0	0	
20/11/2020	AC	1	10:30:00	11:30:00	5	WSW	1	8	0	2	0	0	
20/11/2020	AC	1	11:30:00	12:30:00	5	WSW	1	8	0	1	0	0	
20/11/2020	AC	4	13:00:00	14:00:00	6	WSW	1	8	0	2	0	0	
20/11/2020	AC	4	14:00:00	14:30:00	5	WSW	1	8	0	0	0	0	
22/11/2020	AC	2	12:00:00	13:00:00	1	NW	0	7	2	2	0	0	
22/11/2020	AC	2	13:00:00	14:00:00	2	NW	0	6	2	2	0	0	
22/11/2020	AC	2	14:00:00	15:00:00	2	NW	0	5	2	2	0	0	
22/11/2020	AC	3	08:30:00	09:30:00	1	SW	0	7	2	2	0	0	
22/11/2020	AC	3	09:30:00	10:30:00	1	WNW	0	3	2	2	0	0	
22/11/2020	AC	3	10:30:00	11:30:00	1	NW	0	4	2	2	0	0	
22/11/2020	AC	4	15:15:00	16:15:00	1	NW	0	7	1	2	0	0	
22/11/2020	AC	4	16:15:00	16:45:00	1	NW	0	5	1	2	0	0	
26/11/2020	MS	7	12:30:00	13:30:00	1	SW	0	1	2	2	0	0	
26/11/2020	MS	7	13:30:00	14:30:00	1	W	0	2	2	2	0	0	
26/11/2020	MS	7	14:30:00	15:30:00	2	W	0	1	2	2	0	0	
26/11/2020	MS	7	09:00:00	10:00:00	1	SW	0	2	2	2	0	0	
26/11/2020	MS	7	10:00:00	11:00:00	1	SW	0	1	2	2	0	0	
26/11/2020	MS	7	11:00:00	12:00:00	1	SW	0	1	2	2	0	0	
28/11/2020	AC	1	13:30:00	14:30:00	3	E	0	8	0	1	0	0	
28/11/2020	AC	1	14:30:00	15:30:00	2	E	0	8	0	1	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
28/11/2020	AC	1	15:30:00	16:30:00	2	E	0	8	0	1	0	0	
28/11/2020	AC	4	10:00:00	11:00:00	4	E	0	8	0	1	0	0	Patchy low cloud.
28/11/2020	AC	4	11:00:00	12:00:00	4	E	0	8	0	1	0	0	Patchy low cloud.
28/11/2020	AC	4	12:00:00	13:00:00	4	E	0	8	0	1	0	0	Patchy low cloud.
28/11/2020	MS	6	13:00:00	14:00:00	2	W	1	8	1	1	0	0	
28/11/2020	MS	6	14:00:00	15:00:00	2	W	1	8	1	1	0	0	
28/11/2020	MS	6	15:00:00	16:00:00	2	W	0	8	1	1	0	0	
30/11/2020	MS	6	13:00:00	14:00:00	3	SW	0	8	1	1	0	0	
30/11/2020	MS	6	14:00:00	15:00:00	4	SSW	2	8	1	1	0	0	
30/11/2020	MS	6	15:00:00	16:00:00	4	SW	1	8	1	0	0	0	
07/12/2020	AC	1	09:00:00	10:00:00	0	n/a	0	8	1	2	0	0	
07/12/2020	AC	1	10:00:00	11:00:00	0	n/a	0	8	1	2	0	0	
07/12/2020	AC	1	11:00:00	12:00:00	0	n/a	0	8	1	2	0	0	
07/12/2020	AC	3	12:30:00	13:30:00	1	ENE	0	8	1	2	0	0	
07/12/2020	AC	3	13:30:00	14:30:00	1	ENE	0	8	1	2	0	0	
07/12/2020	AC	3	14:30:00	15:30:00	2	ENE	0	8	1	2	0	0	
08/12/2020	AC	5	09:30:00	10:30:00	2	WNW	0	4	0	2	0	0	
08/12/2020	AC	5	10:30:00	11:30:00	2	WNW	0	3	0	2	0	0	
08/12/2020	AC	5	11:30:00	12:30:00	3	WNW	0	1	0	2	0	0	
08/12/2020	AC	6	13:00:00	14:00:00	3	WNW	0	4	1	2	0	0	Sun glare until 13:45.
08/12/2020	AC	6	14:00:00	15:00:00	3	WNW	0	8	1	2	0	0	
08/12/2020	AC	6	15:00:00	16:00:00	5	NW	0	8	1	2	0	0	
11/12/2020	CR	4	08:50:00	09:50:00	2	WSW	2	8	0	1	0	0	
11/12/2020	CR	4	09:50:00	10:50:00	3	WSW	3	8	0	0	0	0	
11/12/2020	CR	4	10:50:00	11:50:00	2	W	0	8	0	1	0	0	
11/12/2020	CR	4	12:20:00	13:20:00	2	W	3	8	0	1	0	0	
11/12/2020	CR	4	13:20:00	14:20:00	2	W	0	6	0	2	0	0	
11/12/2020	CR	4	14:20:00	15:20:00	1	W	0	6	0	2	0	0	
18/12/2020	MS	8	08:30:00	09:30:00	4	SE	0	8	2	2	0	0	
18/12/2020	MS	8	09:30:00	10:30:00	5	SSW	0	8	2	2	0	0	
18/12/2020	MS	8	10:30:00	11:30:00	6	SSW	3	8	1	0	0	0	
18/12/2020	MS	8	12:00:00	13:00:00	6	SW	3	8	1	1	0	0	
18/12/2020	MS	8	13:00:00	14:00:00	6	SW	3	8	1	1	0	0	
18/12/2020	MS	8	14:00:00	15:00:00	6	SW	4	8	1	0	0	0	
23/12/2020	MS	2	12:45:00	13:45:00	4	E	4	8	2	1	0	0	
23/12/2020	MS	2	13:45:00	14:45:00	4	E	4	8	1	1	0	0	
23/12/2020	MS	2	14:45:00	15:45:00	4	SSW	4	8	2	2	0	0	
23/12/2020	MS	7	09:16:00	10:16:00	4	SE	2	8	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
23/12/2020	MS	7	10:16:00	11:16:00	5	E	3	8	1	1	0	0	
23/12/2020	MS	7	11:16:00	12:16:00	3	S	4	8	1	1	0	0	
24/12/2020	AC	1	12:10:00	13:10:00	3	NNW	0	3	2	2	0	0	
24/12/2020	AC	1	13:10:00	14:10:00	3	NNW	0	5	1	2	0	0	
24/12/2020	AC	1	14:10:00	15:10:00	3	N	0	1	1	2	0	0	
24/12/2020	AC	3	08:40:00	09:40:00	3	NW	0	2	2	2	0	0	
24/12/2020	AC	3	09:40:00	10:40:00	3	NNW	0	1	2	2	0	0	
24/12/2020	AC	3	10:40:00	11:40:00	3	NNW	0	3	2	2	0	0	
30/12/2020	MS	7	12:40:00	13:40:00	1	N	0	8	2	2	0	2	
30/12/2020	MS	7	13:40:00	14:40:00	1	N	0	8	2	2	0	2	
30/12/2020	MS	7	14:40:00	15:40:00	1	N	0	8	2	2	0	2	
31/12/2020	AC	5	12:30:00	13:30:00	2	NW	0	4	1	2	1	0	
31/12/2020	AC	5	13:30:00	14:30:00	2	NW	0	2	2	2	1	0	
31/12/2020	AC	5	14:30:00	15:30:00	2	NW	0	1	2	2	1	0	
31/12/2020	AC	6	09:00:00	10:00:00	1	NW	0	6	2	2	1	0	
31/12/2020	AC	6	10:00:00	11:00:00	1	NNW	0	3	1	2	1	0	
31/12/2020	AC	6	11:00:00	12:00:00	2	NNW	0	2	1	2	1	0	
31/12/2020	MS	2	09:30:00	10:30:00	1	N	0	2	2	2	0	2	
31/12/2020	MS	2	10:30:00	11:30:00	1	N	0	2	2	2	0	2	
31/12/2020	MS	2	11:30:00	12:30:00	1	NE	0	3	2	2	0	2	
05/01/2021	CR	2	12:50:00	13:50:00	2	NNE	0	0	0	2	0	0	
05/01/2021	CR	2	13:50:00	14:50:00	3	NE	0	1	1	2	0	0	
05/01/2021	CR	2	14:50:00	15:50:00	3	NE	0	3	1	2	0	0	
05/01/2021	CR	3	09:20:00	10:20:00	2	NNE	0	1	1	2	0	0	
05/01/2021	CR	3	10:20:00	11:20:00	3	NNE	0	3	1	2	0	0	
05/01/2021	CR	3	11:20:00	12:20:00	2	NNE	0	2	1	2	0	0	
07/01/2021	CR	2	09:30:00	10:30:00	0	n/a	0	0	0	2	1	0	
07/01/2021	CR	2	10:30:00	11:30:00	0	n/a	0	0	0	2	1	0	
07/01/2021	CR	2	11:30:00	12:30:00	1	NW	0	5	1	2	0	0	
07/01/2021	HS	4	12:50:00	13:50:00	1	W	0	7	2	2	0	0	
07/01/2021	HS	4	13:50:00	14:50:00	1	W	0	6	2	2	0	0	
07/01/2021	HS	4	14:50:00	15:50:00	0	n/a	0	4	2	2	0	0	
07/01/2021	HS	4	09:20:00	10:20:00	0	n/a	0	0	0	2	0	0	
07/01/2021	HS	4	10:20:00	11:20:00	0	n/a	0	0	0	2	0	0	
07/01/2021	HS	4	11:20:00	12:20:00	1	W	0	2	2	2	0	0	
07/01/2021	CR	1	13:00:00	14:00:00	1	NW	0	6	1	2	0	0	
07/01/2021	CR	1	14:00:00	15:00:00	1	NW	0	5	1	2	0	0	
07/01/2021	CR	1	15:00:00	16:00:00	1	NW	0	4	1	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
14/01/2021	AC	6	08:30:00	09:30:00	5	NW	0	8	0	2	0	0	
14/01/2021	AC	6	09:30:00	10:30:00	5	NW	0	8	0	2	0	0	
14/01/2021	AC	6	10:30:00	11:30:00	5	NW	0	8	0	2	0	0	
14/01/2021	AC	8	12:00:00	13:00:00	5	NW	1	8	0	2	0	0	
14/01/2021	AC	8	13:00:00	14:00:00	6	NW	1	8	0	2	0	0	
14/01/2021	AC	8	14:00:00	15:00:00	6	NW	0	8	0	2	0	0	
15/01/2021	CR	3	12:10:00	13:10:00	2	ESE	0	2	2	2	0	0	
15/01/2021	CR	3	13:10:00	14:10:00	2	SE	0	1	2	2	0	0	
15/01/2021	CR	3	14:10:00	15:10:00	2	SE	0	2	2	2	0	0	
15/01/2021	CR	1	08:40:00	09:40:00	1	ESE	0	8	2	2	0	0	
15/01/2021	CR	1	09:40:00	10:40:00	1	ESE	0	8	0	0	0	0	
15/01/2021	CR	1	10:40:00	11:40:00	2	ESE	0	4	1	1	0	0	
15/01/2021	MS	8	11:00:00	12:00:00	4	SE	0	8	1	1	0	0	
15/01/2021	MS	8	12:00:00	13:00:00	4	SE	0	8	1	1	0	0	
15/01/2021	MS	8	13:00:00	14:00:00	3	SE	0	8	2	2	0	0	
21/01/2021	HS	7	12:15:00	13:15:00	3	W	0	5	2	2	0	0	
21/01/2021	HS	7	13:15:00	14:15:00	3	W	0	4	2	2	0	0	
21/01/2021	HS	7	14:15:00	15:15:00	3	W	0	3	2	2	0	0	
21/01/2021	HS	7	08:45:00	09:45:00	2	WSW	2	6	2	2	0	1	
21/01/2021	HS	7	09:45:00	10:45:00	3	SW	0	6	2	2	0	1	
21/01/2021	HS	7	10:45:00	11:45:00	3	WSW	0	5	2	2	0	0	
27/01/2021	HS	5	12:00:00	13:00:00	1	W	0	8	1	2	0	0	
27/01/2021	HS	5	13:00:00	14:00:00	2	W	0	8	1	2	0	0	
27/01/2021	HS	5	14:00:00	15:00:00	2	W	0	8	1	2	0	0	
27/01/2021	HS	5	08:30:00	09:30:00	1	NW	0	8	1	2	0	0	
27/01/2021	HS	5	09:30:00	10:30:00	1	WNW	0	8	1	2	0	0	
27/01/2021	HS	5	10:30:00	11:30:00	1	W	0	8	1	2	0	0	
28/01/2021	MS	6	09:00:00	10:00:00	3	SW	1	8	1	0	0	0	
28/01/2021	MS	6	10:00:00	11:00:00	2	SW	0	8	1	0	0	0	
28/01/2021	MS	6	11:00:00	12:00:00	3	SSW	0	8	1	0	0	0	
04/02/2021	HS	7	08:30:00	09:30:00	1	E	0	8	1	2	0	0	
04/02/2021	HS	7	09:30:00	10:30:00	2	E	2	8	1	2	0	0	
04/02/2021	HS	7	10:30:00	11:30:00	2	SE	2	8	1	2	0	0	
04/02/2021	HS	7	12:00:00	13:00:00	2	ESE	2	8	1	2	0	0	
04/02/2021	HS	7	13:00:00	14:00:00	2	ESE	0	8	1	2	0	0	
04/02/2021	HS	7	14:00:00	15:00:00	2	ESE	2	8	1	2	0	0	
09/02/2021	HS	8	12:15:00	13:15:00	4	E	0	8	2	2	0	0	
09/02/2021	HS	8	13:15:00	14:15:00	4	ENE	0	8	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
09/02/2021	HS	8	14:15:00	15:15:00	3	ENE	0	6	2	2	0	0	
09/02/2021	HS	8	08:45:00	09:45:00	4	E	0	8	2	2	0	0	
09/02/2021	HS	8	09:45:00	10:45:00	3	E	0	7	2	2	0	0	
09/02/2021	HS	8	10:45:00	11:45:00	4	E	0	8	2	2	0	0	
10/02/2021	AC	1	08:30:00	09:30:00	2	NE	0	1	2	2	2	0	
10/02/2021	AC	1	09:30:00	10:30:00	3	ENE	0	7	2	2	2	0	
10/02/2021	AC	1	10:30:00	11:30:00	3	ENE	1	8	2	2	2	1	
10/02/2021	AC	2	12:00:00	13:00:00	3	ENE	0	6	2	2	1	0	
10/02/2021	AC	2	13:00:00	14:00:00	3	ENE	0	5	2	2	1	0	
10/02/2021	AC	2	14:00:00	15:00:00	4	ENE	0	7	2	2	1	0	
10/02/2021	CR	6	08:45:00	09:45:00	3	ENE	1	4	1	2	1	0	
10/02/2021	CR	6	09:45:00	10:45:00	3	ENE	1	4	1	2	1	0	
10/02/2021	CR	6	10:45:00	11:45:00	3	ENE	0	4	1	2	1	0	
10/02/2021	CR	6	12:15:00	13:15:00	3	ENE	0	4	1	2	0	0	
10/02/2021	CR	6	13:15:00	14:15:00	3	ENE	0	6	1	2	0	0	
10/02/2021	CR	6	14:15:00	15:15:00	3	ENE	0	6	1	2	0	0	
18/02/2021	AC	3	10:00:00	11:00:00	4	WSW	0	8	0	2	0	0	
18/02/2021	AC	3	11:00:00	12:00:00	4	WSW	0	4	0	2	0	0	Brief but heavy shower 11:21-11:28.
18/02/2021	AC	3	12:00:00	13:00:00	4	WSW	0	7	1	2	0	0	
21/02/2021	AC	1	13:00:00	14:00:00	2	SW	0	8	0	2	0	0	
21/02/2021	AC	1	14:00:00	15:00:00	1	SE	0	8	0	2	0	0	
21/02/2021	AC	1	15:00:00	16:00:00	1	SE	0	8	0	2	0	0	
21/02/2021	AC	2	09:30:00	10:30:00	3	SW	2	8	0	2	0	0	
21/02/2021	AC	2	10:30:00	11:30:00	2	SW	2	8	0	2	0	0	
21/02/2021	AC	2	11:30:00	12:30:00	2	SW	2	8	0	2	0	0	
21/02/2021	KD	5	13:30:00	14:30:00	1	SE	1	8	1	2	0	0	
21/02/2021	KD	5	14:30:00	15:30:00	1	SE	0	6	2	2	0	0	
21/02/2021	KD	5	15:30:00	16:30:00	1	SE	0	7	2	2	0	0	
21/02/2021	KD	5	10:00:00	11:00:00	2	SE	2	8	1	2	0	0	
21/02/2021	KD	5	11:00:00	12:00:00	1	SE	2	8	1	2	0	0	
21/02/2021	KD	5	12:00:00	13:00:00	1	SE	1	8	1	2	0	0	
22/02/2021	KD	4	11:30:00	12:30:00	2	SW	0	4	1	2	0	0	
22/02/2021	KD	4	12:30:00	13:30:00	2	SW	0	3	1	2	0	0	
22/02/2021	KD	4	13:30:00	14:30:00	2	SW	0	3	1	2	0	0	
22/02/2021	KD	4	15:00:00	16:00:00	2	SW	0	2	1	2	0	0	
22/02/2021	KD	4	16:00:00	17:00:00	2	SW	0	1	2	2	0	0	
22/02/2021	KD	4	17:00:00	18:00:00	2	SW	0	1	2	2	0	0	
26/02/2021	AC	3	13:45:00	14:45:00	2	W	0	7	0	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
26/02/2021	AC	3	14:45:00	15:45:00	2	W	0	8	0	2	0	0	
26/02/2021	AC	3	15:45:00	16:45:00	1	W	0	5	1	2	0	0	

Source: Natural Power

Table A7.6: VP survey weather data during the breeding season (March to August 2021)

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
04/03/2021	HS	6	12:00:00	13:00:00	1	NE	2	8	1	2	0	0	
04/03/2021	HS	6	13:00:00	14:00:00	1	NE	0	8	1	2	0	0	
04/03/2021	HS	6	14:00:00	15:00:00	1	NE	0	8	2	2	0	0	
04/03/2021	HS	6	08:30:00	09:30:00	1	NE	2	8	2	2	0	0	
04/03/2021	HS	6	09:30:00	10:30:00	1	NE	2	8	2	2	0	0	
04/03/2021	HS	6	10:30:00	11:30:00	1	NE	2	8	2	2	0	0	
12/03/2021	CR	5	13:00:00	14:00:00	4	W	0	8	1	2	0	0	
12/03/2021	CR	5	14:00:00	15:00:00	4	SW	0	7	1	2	0	0	
12/03/2021	CR	5	15:00:00	16:00:00	4	SW	0	8	1	2	0	0	
12/03/2021	CR	5	09:30:00	10:30:00	4	W	0	8	1	2	0	0	
12/03/2021	CR	5	10:30:00	11:30:00	4	W	0	8	1	2	0	0	
12/03/2021	CR	5	11:30:00	12:30:00	4	W	0	8	1	2	0	0	
14/03/2021	AC	2	11:00:00	12:00:00	4	WNW	0	8	1	2	0	0	
14/03/2021	AC	2	12:00:00	13:00:00	4	W	0	6	1	2	0	0	
14/03/2021	AC	2	13:00:00	14:00:00	5	W	0	8	1	2	0	0	
14/03/2021	AC	3	15:30:00	16:30:00	4	W	4	8	0	1	0	0	Light but persistent rain.
14/03/2021	AC	3	16:30:00	17:30:00	4	W	4	8	0	1	0	0	Light but persistent rain.
14/03/2021	AC	3	17:30:00	18:30:00	4	W	2	8	0	1	0	0	Patchy low cloud.
15/03/2021	CR	7	13:10:00	14:10:00	3	NW	0	6	1	2	0	0	
15/03/2021	CR	7	14:10:00	15:10:00	3	NW	0	5	1	2	0	0	
15/03/2021	CR	7	15:10:00	16:10:00	3	NW	0	6	1	2	0	0	
15/03/2021	CR	7	09:40:00	10:40:00	3	NW	0	8	0	2	0	0	
15/03/2021	CR	7	10:40:00	11:40:00	3	NW	0	8	0	2	0	0	
15/03/2021	CR	7	11:40:00	12:40:00	3	NW	0	8	0	2	0	0	
16/03/2021	AC	4	10:30:00	11:30:00	3	NW	0	8	0	2	0	0	
16/03/2021	AC	4	11:30:00	12:30:00	3	NW	0	8	0	2	0	0	
16/03/2021	AC	4	12:30:00	13:30:00	4	NNW	0	8	0	2	0	0	
18/03/2021	AC	1	10:00:00	11:00:00	2	NNW	0	4	2	2	0	0	
18/03/2021	AC	1	11:00:00	12:00:00	2	NNW	0	8	2	2	0	0	
18/03/2021	AC	1	12:00:00	13:00:00	2	N	0	6	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
24/03/2021	AC	2	13:00:00	14:00:00	4	W	0	4	1	2	0	0	
24/03/2021	AC	2	14:00:00	15:00:00	4	W	0	4	1	2	0	0	
24/03/2021	AC	2	15:00:00	16:00:00	4	WSW	0	5	1	2	0	0	
24/03/2021	AC	3	09:30:00	10:30:00	2	WNW	0	7	1	2	0	0	
24/03/2021	AC	3	10:30:00	11:30:00	2	NW	0	7	1	2	0	0	
24/03/2021	AC	3	11:30:00	12:30:00	3	W	0	6	1	2	0	0	
25/03/2021	HS	8	11:15:00	12:15:00	2	SW	0	8	2	2	0	0	
25/03/2021	HS	8	12:15:00	13:15:00	2	SW	0	7	2	2	0	0	
25/03/2021	HS	8	13:15:00	14:15:00	2	SW	0	7	2	2	0	0	
25/03/2021	HS	8	07:45:00	08:45:00	1	SW	1	8	1	2	0	0	
25/03/2021	HS	8	08:45:00	09:45:00	1	SW	0	8	1	2	0	0	
25/03/2021	HS	8	09:45:00	10:45:00	2	SW	0	8	1	2	0	0	
26/03/2021	AC	4	14:00:00	15:00:00	6	WSW	0	6	1	2	0	0	
26/03/2021	AC	4	15:00:00	16:00:00	7	WSW	0	7	1	2	0	0	
26/03/2021	AC	4	16:00:00	17:00:00	7	WSW	0	5	1	2	0	0	Brief wintry shower at 16:24.
30/03/2021	AC	1	14:00:00	15:00:00	3	SE	0	0	2	2	0	0	
30/03/2021	AC	1	15:00:00	16:00:00	2	SE	0	2	2	2	0	0	
30/03/2021	AC	1	16:00:00	17:00:00	2	SE	0	6	2	2	0	0	
01/04/2021	CR	4	12:30:00	13:30:00	3	ENE	0	8	2	2	0	0	
01/04/2021	CR	4	13:30:00	14:30:00	3	ENE	0	8	2	2	0	0	
01/04/2021	CR	4	14:30:00	15:30:00	3	ENE	0	8	2	2	0	0	
01/04/2021	CR	4	09:00:00	10:00:00	4	ENE	0	8	2	2	0	0	
01/04/2021	CR	4	10:00:00	11:00:00	4	ENE	0	8	2	2	0	0	
01/04/2021	CR	4	11:00:00	12:00:00	4	ENE	0	8	2	2	0	0	
08/04/2021	CR	7	09:25:00	10:25:00	2	W	0	8	0	2	0	0	
08/04/2021	CR	7	10:25:00	11:25:00	2	W	0	8	0	2	0	0	
08/04/2021	CR	7	11:25:00	12:25:00	2	W	0	8	0	2	0	0	
08/04/2021	CR	7	05:55:00	06:55:00	2	W	2	8	0	0	0	0	
08/04/2021	CR	7	06:55:00	07:55:00	2	W	0	8	0	2	0	0	
08/04/2021	CR	7	07:55:00	08:55:00	2	W	0	8	0	0	0	0	
10/04/2021	AC	2	11:40:00	12:40:00	3	NNE	0	6	2	2	0	0	
10/04/2021	AC	2	12:40:00	13:40:00	2	NNE	0	7	2	2	0	0	
10/04/2021	AC	2	13:40:00	14:40:00	2	NNE	0	7	2	2	0	0	Light rain started at 14:05.
10/04/2021	AC	3	15:10:00	16:10:00	3	NE	0	8	1	2	0	0	
10/04/2021	AC	3	16:10:00	17:10:00	3	E	2	8	1	2	0	0	Spitting with rain from 16:50.
10/04/2021	AC	3	17:10:00	18:10:00	3	NNW	1	8	0	2	0	0	Light rain and sleet showers 17:22 -17:48.
13/04/2021	DR	5	14:20:00	15:20:00	2	W	0	7	1	2	0	0	
13/04/2021	DR	5	15:20:00	16:20:00	3	W	0	8	1	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
13/04/2021	DR	5	16:20:00	17:20:00	2	W	1	8	1	1	0	0	
16/04/2021	DR	5	14:30:00	15:30:00	1	W	0	6	1	2	0	0	
16/04/2021	DR	5	15:30:00	16:30:00	1	W	0	7	1	2	0	0	
16/04/2021	DR	5	16:30:00	17:30:00	1	W	0	7	0	0	0	0	
16/04/2021	DR	6	11:00:00	12:00:00	1	W	0	1	1	2	0	0	
16/04/2021	DR	6	12:00:00	13:00:00	1	W	0	3	1	2	0	0	
16/04/2021	DR	6	13:00:00	14:00:00	1	W	0	4	1	2	0	0	
19/04/2021	AC	3	10:30:00	11:30:00	3	SE	0	0	2	2	0	0	
19/04/2021	AC	3	11:30:00	12:30:00	3	SSE	0	0	2	2	0	0	
19/04/2021	AC	3	12:30:00	13:30:00	3	SSE	0	0	2	2	0	0	
19/04/2021	SP	1	10:20:00	11:20:00	1	SE	0	0	2	2	0	0	
19/04/2021	SP	1	11:20:00	12:20:00	3	SE	0	0	2	2	0	0	
19/04/2021	SP	1	12:20:00	13:20:00	3	SE	0	0	2	2	0	0	
23/04/2021	DR	8	09:00:00	10:00:00	3	E	0	1	2	2	0	0	
23/04/2021	DR	8	10:00:00	11:00:00	4	E	0	2	2	2	0	0	
23/04/2021	DR	8	11:00:00	12:00:00	4	E	0	3	2	2	0	0	
25/04/2021	AC	1	14:30:00	15:30:00	4	E	0	0	n/a	2	0	0	
25/04/2021	AC	1	15:30:00	16:30:00	3	E	0	0	n/a	2	0	0	
25/04/2021	AC	1	16:30:00	17:30:00	3	E	0	0	n/a	2	0	0	
25/04/2021	AC	2	11:00:00	12:00:00	4	E	0	0	n/a	2	0	0	
25/04/2021	AC	2	12:00:00	13:00:00	4	E	0	0	n/a	2	0	0	
25/04/2021	AC	2	13:00:00	14:00:00	5	E	0	0	n/a	2	0	0	
27/04/2021	DR	6	13:30:00	14:30:00	1	E	0	0	n/a	2	0	0	
27/04/2021	DR	6	14:30:00	15:30:00	1	E	0	0	n/a	2	0	0	
27/04/2021	DR	6	15:30:00	16:30:00	1	E	0	0	n/a	2	0	0	
28/04/2021	DR	8	12:45:00	13:45:00	1	E	1	8	1	1	0	0	
28/04/2021	DR	8	13:45:00	14:45:00	1	E	4	8	1	1	0	0	
28/04/2021	DR	8	14:45:00	15:45:00	1	E	4	8	1	1	0	0	
10/05/2021	MS	5	12:00:00	13:00:00	2	SW	2	7	2	2	0	0	
10/05/2021	MS	5	13:00:00	14:00:00	2	SW	2	7	2	2	0	0	
10/05/2021	MS	5	14:00:00	15:00:00	4	S	3	7	2	2	0	0	
10/05/2021	MS	5	08:30:00	09:30:00	2	SSW	2	7	2	2	0	0	
10/05/2021	MS	5	09:30:00	10:30:00	2	SW	0	6	2	2	0	0	
10/05/2021	MS	5	10:30:00	11:30:00	2	SW	2	7	2	2	0	0	
12/05/2021	CR	7	14:15:00	15:15:00	2	SSW	0	8	1	2	0	0	
12/05/2021	CR	7	15:15:00	16:15:00	2	SSW	0	8	1	2	0	0	
12/05/2021	CR	7	16:15:00	17:15:00	2	SSW	0	8	1	2	0	0	
13/05/2021	CR	4	10:05:00	11:05:00	3	S	2	8	1	2	0	0	Rain for first 20 minutes.

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
13/05/2021	CR	4	11:05:00	12:05:00	3	S	2	8	1	2	0	0	
13/05/2021	CR	4	12:05:00	13:05:00	3	S	2	8	1	2	0	0	Rain for last 25 minutes.
14/05/2021	CR	4	12:55:00	13:55:00	2	SE	0	6	1	2	0	0	
14/05/2021	CR	4	13:55:00	14:55:00	2	SE	0	5	1	2	0	0	
14/05/2021	CR	4	14:55:00	15:55:00	2	SE	0	8	1	2	0	0	
14/05/2021	CR	7	09:25:00	10:25:00	2	SE	0	8	1	2	0	0	
14/05/2021	CR	7	10:25:00	11:25:00	2	SE	0	8	1	2	0	0	
14/05/2021	CR	7	11:25:00	12:25:00	2	SE	0	8	1	2	0	0	
22/05/2021	SP	1	08:30:00	09:30:00	3	NNW	2	8	1	2	0	0	
22/05/2021	SP	1	09:30:00	10:30:00	3	NW	2	6	1	2	0	0	
22/05/2021	SP	1	10:30:00	11:30:00	3	NW	0	7	1	2	0	0	
22/05/2021	AC	2	08:30:00	09:30:00	3	NNW	0	8	1	2	0	0	
22/05/2021	AC	2	09:30:00	10:30:00	3	NNW	0	7	1	2	0	0	
22/05/2021	AC	2	10:30:00	11:30:00	3	NW	0	7	1	2	0	0	
22/05/2021	AC	3	12:00:00	13:00:00	3	NW	0	7	1	2	0	0	
22/05/2021	AC	3	13:00:00	14:00:00	3	WNW	0	6	1	2	0	0	
22/05/2021	AC	3	14:00:00	15:00:00	3	WNW	0	8	1	2	0	0	
22/05/2021	SP	1	12:00:00	13:00:00	3	NW	0	7	1	2	0	0	
22/05/2021	SP	1	13:00:00	14:00:00	3	NW	0	4	1	2	0	0	
22/05/2021	SP	1	14:00:00	15:00:00	3	NW	0	5	1	2	0	0	
26/05/2021	DR	8	10:45:00	11:45:00	1	W	0	6	1	2	0	0	
26/05/2021	DR	8	11:45:00	12:45:00	1	W	2	7	1	2	0	0	
26/05/2021	DR	8	12:45:00	13:45:00	1	W	0	7	1	2	0	0	
26/05/2021	DR	6	14:00:00	15:00:00	1	W	0	7	1	2	0	0	
26/05/2021	DR	6	15:00:00	16:00:00	2	W	0	7	1	2	0	0	
26/05/2021	DR	6	16:00:00	17:00:00	2	W	0	7	1	2	0	0	
27/05/2021	AC	2	13:30:00	14:30:00	2	SW	0	1	2	2	0	0	
27/05/2021	AC	2	14:30:00	15:30:00	2	SW	0	7	2	2	0	0	
27/05/2021	AC	2	15:30:00	16:30:00	2	SW	0	4	2	2	0	0	
27/05/2021	AC	3	09:30:00	10:30:00	2	W	0	1	2	2	0	0	
27/05/2021	AC	3	10:30:00	11:30:00	2	W	0	1	2	2	0	0	
27/05/2021	AC	3	11:30:00	12:30:00	2	W	0	0	2	2	0	0	
27/05/2021	DR	6	09:30:00	10:30:00	4	SW	1	8	0	2	0	0	
27/05/2021	DR	6	10:30:00	11:30:00	4	SW	0	8	0	2	0	0	
27/05/2021	DR	6	11:30:00	12:30:00	4	SW	0	8	0	2	0	0	
27/05/2021	DR	8	13:00:00	14:00:00	1	SW	0	1	2	2	0	0	
27/05/2021	DR	8	14:00:00	15:00:00	2	SW	0	1	2	2	0	0	
27/05/2021	DR	8	15:00:00	16:00:00	2	SW	0	1	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
09/06/2021	MS	5	08:30:00	09:30:00	2	SSW	0	8	2	2	0	0	
09/06/2021	MS	5	09:30:00	10:30:00	2	SSW	1	8	2	1	0	0	
09/06/2021	MS	5	10:30:00	11:30:00	2	SSW	1	8	2	2	0	0	
10/06/2021	MS	5	12:30:00	13:30:00	1	SSW	1	8	1	0	0	0	
10/06/2021	MS	5	13:30:00	14:30:00	1	SW	1	8	1	0	0	0	
10/06/2021	MS	5	14:30:00	15:30:00	2	SSW	1	8	1	0	0	0	
12/06/2021	MS	8	17:00:00	18:00:00	2	SSW	0	0	0	2	0	0	
12/06/2021	MS	8	18:00:00	19:00:00	1	SW	0	0	0	2	0	0	
12/06/2021	MS	8	19:00:00	20:00:00	1	SW	0	0	0	2	0	0	
14/06/2021	MS	8	13:00:00	14:00:00	3	WNW	0	6	1	1	0	0	
14/06/2021	MS	8	14:00:00	15:00:00	3	W	0	5	2	1	0	0	
14/06/2021	MS	8	15:00:00	16:00:00	3	W	0	5	1	1	0	0	
17/06/2021	KD	6	16:00:00	17:00:00	2	NW	0	2	2	2	0	0	
17/06/2021	KD	6	17:00:00	18:00:00	2	NW	0	3	2	2	0	0	
17/06/2021	KD	6	18:00:00	19:00:00	2	NW	0	4	2	2	0	0	
17/06/2021	KD	6	12:30:00	13:30:00	2	NW	0	2	2	2	0	0	
17/06/2021	KD	6	13:30:00	14:30:00	2	NW	0	2	2	2	0	0	
17/06/2021	KD	6	14:30:00	15:30:00	2	NW	0	2	2	2	0	0	
18/06/2021	KD	4	15:50:00	16:50:00	2	NNE	0	8	2	0	0	0	
18/06/2021	KD	4	16:50:00	17:50:00	1	NNE	0	8	2	2	0	0	
18/06/2021	KD	4	17:50:00	18:50:00	1	NNE	0	8	2	2	0	0	
18/06/2021	KD	7	12:20:00	13:20:00	1	NNE	0	8	2	2	0	0	
18/06/2021	KD	7	13:20:00	14:20:00	1	NNE	0	8	2	2	0	0	
18/06/2021	KD	7	14:20:00	15:20:00	2	NNE	0	8	2	2	0	0	
21/06/2021	SW	3	15:00:00	16:00:00	2	NE	0	2	0	2	0	0	
21/06/2021	SW	3	16:00:00	17:00:00	1	NE	0	1	0	2	0	0	
21/06/2021	SW	3	17:00:00	18:00:00	1	NE	0	1	0	2	0	0	
23/06/2021	SW	3	11:00:00	12:00:00	2	NNW	0	5	0	2	0	0	
23/06/2021	SW	3	12:00:00	13:00:00	2	NNW	0	5	0	2	0	0	
23/06/2021	SW	3	13:00:00	14:00:00	2	NNW	0	4	0	2	0	0	
26/06/2021	SW	1	15:00:00	16:00:00	2	SW	0	1	0	2	0	0	
26/06/2021	SW	1	16:00:00	17:00:00	1	SW	0	1	0	2	0	0	
26/06/2021	SW	1	17:00:00	18:00:00	1	SW	0	1	0	2	0	0	
28/06/2021	MS	1	16:00:00	17:00:00	1	WNW	0	8	2	2	0	0	
28/06/2021	MS	1	17:00:00	18:00:00	1	WSW	0	8	2	2	0	0	
28/06/2021	MS	1	18:00:00	19:00:00	1	WSW	0	8	2	2	0	0	
29/06/2021	MS	2	13:30:00	14:30:00	2	SW	0	4	2	2	0	0	
29/06/2021	MS	2	14:30:00	15:30:00	2	SW	0	3	2	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
29/06/2021	MS	2	15:30:00	16:30:00	2	W	0	3	2	2	0	0	
29/06/2021	MS	2	10:00:00	11:00:00	2	S	0	6	2	2	0	0	
29/06/2021	MS	2	11:00:00	12:00:00	2	SW	0	6	2	2	0	0	
29/06/2021	MS	2	12:00:00	13:00:00	2	SW	0	6	2	2	0	0	
29/06/2021	KD	4	14:00:00	15:00:00	1	NW	0	7	2	2	0	0	
29/06/2021	KD	4	15:00:00	16:00:00	1	NW	0	5	2	2	0	0	
29/06/2021	KD	4	16:00:00	17:00:00	1	NW	0	4	2	2	0	0	
29/06/2021	KD	7	10:30:00	11:30:00	1	NW	0	8	2	2	0	0	
29/06/2021	KD	7	11:30:00	12:30:00	2	NW	0	8	2	2	0	0	
29/06/2021	KD	7	12:30:00	13:30:00	2	NW	2	8	2	2	0	0	
14/07/2021	KD	6	14:15:00	15:15:00	1	WNW	0	5	2	2	0	0	
14/07/2021	KD	6	15:45:00	16:45:00	1	WNW	0	4	2	2	0	0	
14/07/2021	KD	6	16:15:00	17:15:00	1	WNW	0	6	2	2	0	0	
14/07/2021	KD	6	10:45:00	11:45:00	1	WNW	0	4	2	2	0	0	
14/07/2021	KD	6	11:45:00	12:45:00	1	WNW	0	6	2	2	0	0	
14/07/2021	KD	6	12:45:00	13:45:00	1	WNW	0	7	2	2	0	0	
16/07/2021	KD	7	15:05:00	16:05:00	1	W	0	1	2	2	0	0	
16/07/2021	KD	7	16:05:00	17:05:00	2	W	0	2	2	2	0	0	
16/07/2021	KD	7	17:05:00	18:05:00	1	W	0	1	2	2	0	0	
16/07/2021	KD	7	11:35:00	12:35:00	2	W	0	1	2	2	0	0	
16/07/2021	KD	7	12:35:00	13:35:00	2	W	0	1	2	2	0	0	
16/07/2021	KD	7	13:35:00	14:35:00	2	W	0	1	2	2	0	0	
19/07/2021	KD	4	17:35:00	18:35:00	1	WNW	0	0	2	2	0	0	
19/07/2021	KD	4	18:35:00	19:35:00	1	WNW	0	0	2	2	0	0	
19/07/2021	KD	4	19:35:00	20:35:00	1	WNW	0	0	2	2	0	0	
22/07/2021	KD	5	13:50:00	14:50:00	1	SE	0	2	2	2	0	0	
22/07/2021	KD	5	14:50:00	15:50:00	1	SE	0	2	2	2	0	0	
22/07/2021	KD	5	15:50:00	16:50:00	1	SE	0	2	2	2	0	0	
27/07/2021	AG	8	10:30:00	11:30:00	0	S	1	8	1	1	0	0	
27/07/2021	AG	8	11:30:00	12:30:00	2	SSW	0	5	1	2	0	0	
27/07/2021	AG	8	12:30:00	13:30:00	1	SSW	0	3	2	2	0	0	
27/07/2021	AG	8	13:30:00	14:30:00	1	SSW	0	4	2	2	0	0	
27/07/2021	AG	8	14:30:00	15:30:00	3	SSW	0	3	2	2	0	0	
27/07/2021	AG	8	15:30:00	16:30:00	2	SSW	0	2	2	2	0	0	
28/07/2021	KD	2	15:10:00	16:10:00	1	WSW	2	6	2	2	0	0	
28/07/2021	KD	2	16:10:00	17:10:00	2	WSW	0	4	2	2	0	0	
28/07/2021	KD	2	17:10:00	18:10:00	2	WSW	0	4	2	2	0	0	
28/07/2021	KD	2	11:40:00	12:40:00	2	WSW	2	7	1	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
28/07/2021	KD	2	12:40:00	13:40:00	1	WSW	0	6	2	2	0	0	
28/07/2021	KD	2	13:40:00	14:40:00	1	WSW	2	8	1	2	0	0	
29/07/2021	AG	1	13:00:00	14:00:00	3	SW	0	7	1	2	0	0	
29/07/2021	AG	1	14:00:00	15:00:00	1	SSW	0	7	1	2	0	0	
29/07/2021	AG	1	15:00:00	16:00:00	1	SSW	0	7	1	2	0	0	
29/07/2021	AG	1	10:00:00	11:00:00	2	WSW	0	3	1	2	0	0	
29/07/2021	AG	1	11:00:00	12:00:00	2	WSW	0	6	2	2	0	0	
29/07/2021	AG	1	12:00:00	13:00:00	2	WSW	0	7	1	2	0	0	
29/07/2021	KD	5	14:20:00	15:20:00	2	WSW	0	8	2	2	0	0	
29/07/2021	KD	5	15:20:00	16:20:00	2	WSW	0	7	2	2	0	0	
29/07/2021	KD	5	16:20:00	17:20:00	2	WSW	0	8	2	2	0	0	Light rain started at 17:09.
30/07/2021	AG	3	13:00:00	14:00:00	4	WNW	1	8	0	1	0	0	
30/07/2021	AG	3	14:00:00	15:00:00	2	WNW	0	7	0	2	0	0	
30/07/2021	AG	3	15:00:00	16:00:00	1	WNW	0	6	1	2	0	0	
30/07/2021	AG	3	10:00:00	11:00:00	3	W	0	7	1	2	0	0	
30/07/2021	AG	3	11:00:00	12:00:00	2	W	0	6	0	2	0	0	
30/07/2021	AG	3	12:00:00	13:00:00	2	W	0	6	0	2	0	0	
30/07/2021	KD	4	12:30:00	13:30:00	2	WNW	2	8	1	2	0	0	
30/07/2021	KD	4	13:30:00	14:30:00	2	WNW	0	7	2	2	0	0	
30/07/2021	KD	4	14:30:00	15:30:00	2	WNW	0	8	2	2	0	0	
05/08/2021	CR	7	09:20:00	10:20:00	4	W	0	8	1	2	0	0	
05/08/2021	CR	7	10:20:00	11:20:00	4	W	0	7	1	2	0	0	
05/08/2021	CR	7	11:20:00	12:20:00	4	W	0	7	1	2	0	0	
10/08/2021	CR	4	17:20:00	18:20:00	3	W	0	2	1	2	0	0	
10/08/2021	CR	4	18:20:00	19:20:00	3	W	0	3	1	2	0	0	
10/08/2021	CR	4	19:20:00	20:20:00	3	W	0	5	1	2	0	0	
11/08/2021	CR	4	10:30:00	11:30:00	3	W	0	8	1	2	0	0	
11/08/2021	CR	4	11:30:00	12:30:00	2	SW	2	8	1	2	0	0	
11/08/2021	CR	4	12:30:00	13:30:00	2	W	2	8	1	2	0	0	
11/08/2021	CR	7	07:00:00	08:00:00	3	W	2	8	0	1	0	0	
11/08/2021	CR	7	08:00:00	09:00:00	3	W	2	8	0	1	0	0	
11/08/2021	CR	7	09:00:00	10:00:00	2	W	0	8	0	1	0	0	
17/08/2021	KD	5	12:35:00	13:35:00	2	WNW	0	7	1	2	0	0	
17/08/2021	KD	5	13:35:00	14:35:00	2	WNW	0	8	1	2	0	0	
17/08/2021	KD	5	14:35:00	15:35:00	2	WNW	0	7	1	2	0	0	
17/08/2021	KD	5	09:05:00	10:05:00	2	WNW	0	8	1	2	0	0	
17/08/2021	KD	5	10:05:00	11:05:00	3	WNW	0	8	1	2	0	0	
17/08/2021	KD	5	11:05:00	12:05:00	2	WNW	0	6	1	2	0	0	

Date	Observer	VP	Hour start	Hour end	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
17/08/2021	AC	1	09:45:00	10:45:00	4	WNW	0	8	1	2	0	0	
17/08/2021	AC	1	10:45:00	11:45:00	4	WNW	0	6	1	2	0	0	
17/08/2021	AC	1	11:45:00	12:45:00	4	WNW	0	6	1	2	0	0	
17/08/2021	AC	3	13:15:00	14:15:00	4	WNW	0	8	1	2	0	0	
17/08/2021	AC	3	14:15:00	15:15:00	4	WNW	0	8	1	2	0	0	
17/08/2021	AC	3	15:15:00	16:15:00	3	NW	0	8	0	2	0	0	
18/08/2021	KD	6	09:15:00	10:15:00	1	W	0	8	1	2	0	0	
18/08/2021	KD	6	10:15:00	11:15:00	1	W	0	8	1	2	0	0	
18/08/2021	KD	6	11:15:00	12:15:00	1	W	0	8	1	2	0	0	
18/08/2021	AC	1	12:30:00	13:30:00	3	NW	0	8	0	2	0	0	
18/08/2021	AC	1	13:30:00	14:30:00	3	W	0	8	0	2	0	0	
18/08/2021	AC	1	14:30:00	15:30:00	3	W	0	8	0	2	0	0	
18/08/2021	AC	2	09:00:00	10:00:00	3	WNW	1	8	0	1	0	0	
18/08/2021	AC	2	10:00:00	11:00:00	3	WNW	1	8	0	1	0	0	
18/08/2021	AC	2	11:00:00	12:00:00	2	WNW	1	8	0	1	0	0	
19/08/2021	KD	6	12:05:00	13:05:00	2	SW	2	8	1	2	0	0	
19/08/2021	KD	6	13:05:00	14:05:00	2	SW	0	8	1	2	0	0	
19/08/2021	KD	6	14:05:00	15:05:00	2	SW	0	8	1	2	0	0	
19/08/2021	AC	2	17:00:00	18:00:00	2	W	1	8	0	1	0	0	
19/08/2021	AC	2	18:00:00	19:00:00	2	WSW	0	8	0	2	0	0	
19/08/2021	AC	2	19:00:00	20:00:00	3	W	0/1	8	0	1	0	0	Brief spell of low cloud at 19:00.
19/08/2021	AC	3	10:30:00	11:30:00	2	SE	1	8	0	1	0	0	
19/08/2021	AC	3	11:30:00	12:30:00	2	SE	1	8	0	1	0	0	Patchy low cloud.
19/08/2021	AC	3	12:30:00	13:30:00	2	SE	1	8	0	2	0	0	
20/08/2021	KD	8	10:35:00	11:35:00	1	SW	0	7	1	2	0	0	
20/08/2021	KD	8	11:35:00	12:35:00	1	SW	0	7	2	2	0	0	
20/08/2021	KD	8	12:35:00	13:35:00	1	SW	0	7	2	2	0	0	
20/08/2021	KD	8	07:05:00	08:05:00	2	SW	0	8	1	1	0	0	
20/08/2021	KD	8	08:05:00	09:05:00	1	SW	0	8	1	2	0	0	
20/08/2021	KD	8	09:05:00	10:05:00	1	SW	0	8	1	2	0	0	

Source: Natural Power

Walkover Breeding Bird Survey

A7.1.14 Breeding bird surveys were undertaken in the breeding seasons of 2020 and 2021 as stated in Chapter 7. The site was surveyed using an adapted Brown and Shepherd (1993)⁵ survey method. This generic upland bird methodology, as advocated by NatureScot⁴, is used primarily to survey

breeding upland wading birds in open ground habitats, but the adapted method that was utilised recorded all bird species encountered, including passerines. Four survey visits were carried out between early May and July 2020, and another four survey visits between April and July 2021.

A7.1.15 In 2020 the survey covered open ground (non-forested habitats) within the wind farm areas and a 500 m surrounding buffer. Although the focus was open ground areas, birds within the woodland

⁵ Brown, A.F. & Shepherd, K.B. (1993) A Method for Censusing Upland Breeding Waders. *Bird Study* 40, 189-195.

edge were recorded. In 2021 the survey area covered all ground within the wind farm areas that lay within 750 m of proposed infrastructure; plus the proposed Abnormal Indivisible Loads (AIL) access areas and a 400 m buffer (of the layout proposed at that time). In 2021, forested and clear, felled areas were covered as well as open ground.

A7.1.16 In open ground areas, the location and behaviour of all birds encountered were recorded in the field on 1:25,000 scale maps. Standard British Trust for Ornithology (BTO) behaviour and species codes were used on field forms. In forested areas a species list was compiled for discrete areas of forest. A species list was also compiled for the AIL (north) area; whereas the AIL (south) area had territories mapped.

A7.1.17 Following completion of the four survey visits, territory analysis was carried out for the species recorded in open ground areas. Territories were identified using a cluster analysis method, based upon the approach outlined in Bibby *et al.*⁶. For resident bird species and summer migrants alike, a minimum of two registrations from two separate visits were required to generate a 'cluster'. This cluster was considered to represent a territory. Where a nest with eggs or young chicks was recorded, this record on its own constituted a cluster and hence a breeding territory.

A7.1.18 Species were considered to have shown evidence of breeding if any of the following behaviour was observed:

- Song, courtship or territorial display (if recorded on more than one visit);
- Territorial dispute;
- Nest building and nest-hole excavation;
- Agitated behaviour by adult bird(s) indicating the presence of a nearby nest or young (e.g. repetitive alarm calling, distraction display);
- Adult(s) carrying food; and
- Juveniles with parents in attendance.

A7.1.19 All surveys were carried out by experienced surveyors in suitable weather conditions.

A7.1.20 Table A7.7 lists the survey effort for the BBS undertaken in 2020 (no weather data available). Table A7.8 lists the survey details for the BBS undertaken in 2021.

Table A7.7: Breeding Bird Survey effort 2020 (wind farm areas)

Date	Observer	Start time	End time
05/05/2020	MS	08:00	15:00
24/05/2020	KD	10:00	13:00
26/05/2020	MS	07:00	14:00
29/05/2020	MS	08:00	15:00
04/06/2020	MS	06:00	09:00
07/06/2020	MS	06:00	10:00
11/06/2020	MS	06:00	09:00
13/06/2020	KD	10:30	13:30
10/07/2020	KD	11:15	15:15

⁶ Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S., (2000) *Bird census techniques*. Elsevier.

Date	Observer	Start time	End time
11/07/2020	KD	09:00	14:30
25/07/2020	KD	10:00	15:30

Table A7.8: Breeding Bird Survey effort 2021 (wind farm areas and AIL access areas)

Visit No.	Observer	Date	Start/End Time	Wind Speed	Precipitation
1	TS	13/04/21	0720/1600	1	0
1	TS	14/04/21	0750/1850	1	0
1	TS	15/04/21	0810/1320	0	2
1	TS	07/05/21	0740/1040	1	2
2	TS	09/05/21	0920/1650	1	2
2	TS	10/05/21	0830/1400	1	0
2	TS	11/05/21	0930/1530	1	0
2	TS	12/05/21	0810/1340	1	0
2	TS	30/05/21	0800/1220	1	0
3	TS	12/06/21	1000/1530	1	1
3	TS	13/06/21	0800/1340	0	0
3	TS	22/06/21	0715/1405	1	0
3	TS	23/06/21	0730/1405	0	0
3	TS	27/06/21	0745/1600	1	0
4	TS	05/07/21	0750/1220	2	0
4	TS	08/07/21	0950/1810	1	0
4	TS	14/07/21	0815/1820	1	0
4	TS	19/07/21	0720/1400	0	0

Wind speed is force, using Beaufort Scale. Precipitation: 0=none, 1=drizzle, 2=light showers, 3=heavy showers, 4=persistent.

Source: Natural Powe

Breeding Raptor Surveys

A7.1.21 Breeding raptor surveys were undertaken between May and July 2020, and February and July 2021. Methods were informed by Hardey et al. (2013)³ and are described in Chapter 7.

A7.1.22 A summary of survey effort and weather data for the breeding raptor surveys is shown in Table A7.9. All surveys were undertaken by suitably experienced surveyors in possession of a Schedule 1 Licence. Raptor surveys in 2020 were undertaken by MS and AC, plus KD and DR. Raptors surveys in 2021 were undertaken by TS. Note Table A7.8 includes data for all raptor surveys (including honey buzzard surveys).

A7.1.23 In the table, environmental conditions were recorded as follows: wind speed (force) recorded using Beaufort Scale; precipitation (0=none, 1=drizzle, 2=light showers, 3=heavy showers, 4=persistent);

cloud cover recorded in oktas; cloud height (0 = <150 m, 1 = 150-500 m, 2 = >500 m); visibility (0 = <1 km, 1 = 1-2 km, 2 = >2 km).

Table A7.9: Raptor survey weather data 2020 and 2021

Date	Start time	End time	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Notes
29/04/2020	No weather data available.								
30/04/2020	No weather data available.								
01/05/2020	No weather data available.								
14/05/2020	No weather data available.								
27/05/2020	09:00	17:00	1	W	0	1-3	2	2	
28/05/2020	09:00	15:00	1-2	SE	0	0	n/a	2	
03/06/2020	12:00	17:00	3	E	2	7	2	2	
06/06/2020	12:00	17:30	3		2			1	
07/06/2020	12:00	17:30	2		2			2	
09/06/2020	10:00	16:00	2-3	SSW	0	4-6	2	2	
21/06/2020	09:00	15:00	2-3	SW	2	8	2	2	
30/06/2020	07:10		1	W	2	8	1	1	
19/07/2020	11:00	17:15	2	N	0	5	0	2	
20/07/2020	05:30	13:00	2	N	0	1	2	2	
23/07/2020	10:15	15:15	2-4	W	0-3	8	2	1-2	
25/07/2020	14:00	20:00	2	SW	0	6	2	2	
28/07/2020	14:30	21:00	3	WSW	0	1-7	1-2	2	
29/07/2020	09:30	16:00	1	W	0	3-5	2	2	
30/07/2020	09:25	17:25	1	SW	0	0-1	2	2	
13/08/2020	08:30	17:00	1-2	SE	0-1	8	2	2	
16/08/2020	11:00	19:00	2-3	SE	0-2	8	1-2	2	
26/08/2020	07:30	14:30	3-4		0			2	
28/08/2020	09:05	12:05	3		0-2			2	

Date	Start time	End time	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Notes
31/08/2020	06:00	12:00	2	SE	0	4-8	1-2	2	
05/02/2021	13:00	16:00	2		0			2	
18/02/2021	11:00	16:30	3-5	SSW	0-2	2-7	1-2	2	
26/02/2021	10:00	13:20	2	W	0	4-6	1	2	
16/03/2021	13:40	17:00	3-4	WNW	0	0-5	1-2	2	
29/03/2021	08:00	15:00	3		2			1	
05/04/2021	11:30	20:10	2		0			2	
07/04/2021	08:20	19:40	2		0			2	
09/04/2021	14:30	18:10	1		0			2	
16/04/2021	13:40	19:00	1		0			2	
07/05/2021	15:00	19:45	1		0			2	
11/05/2021	15:30	19:50	2		1			2	
20/05/2021	09:15	16:15	5		3			2	
22/05/2021	13:40	20:00	2		0-2			2	
30/05/2021	12:20	20:50	1		0			2	
02/06/2021	07:00	14:30	4		0-2			2	
12/06/2021	16:30	21:30	1		0-2			2	
21/06/2021	16:30	20:45	1		0			2	
27/06/2021	16:00	20:40	1		0			2	
28/06/2021	10:45	19:40	1		0-3			2	
29/06/2021	06:30	13:30	2		0			2	
09/07/2021	14:10	18:40	0		0			2	
13/07/2021	15:00	20:10	1		0			2	
19/07/2021	13:00	20:00	3		0			2	

Date	Start time	End time	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Notes
20/07/2021	06:40	13:40	2		0			2	
30/07/2021	10:30	18:30	3		0			2	
31/07/2021	07:30	12:15	3		2			2	
01/08/2021	07:30	14:40	3		2			2	
20/08/2021	14:00	17:00	1		0			2	
25/08/2021	09:00	17:00	2		0			2	
28/08/2021	11:30	18:30	2		0			2	
29/08/2021	07:30	19:00	2		0			2	
31/08/2021	09:00	17:00	2		0			2	

Source: Natural Power

Honey Buzzard Surveys

- A7.1.24

In addition to the breeding raptor surveys, dedicated honey buzzard surveys were also undertaken. Surveys were undertaken following methods in Hardey *et al.* (2013)³ and more recent guidance regarding survey timings (e.g. from the Rare Breeding Birds Panel (2020)⁷). Surveys were undertaken by skilled surveyors (AC and MS) with experience of surveying honey buzzards in South Wales, and who hold a Schedule 1 Licence. Surveys were carried out in 2020 and 2021, between May and August, with most survey effort being focused in July and August in both years.
- A7.1.25

When considering honey buzzard survey the following issues were taken into account:
 - Identification – identification problems can occur with distant birds, particularly in areas with high numbers of common buzzards and goshawks. Therefore, experienced surveyors familiar with these species were used.
 - Behaviour – aerial activity is limited often to short periods at key times and months. Otherwise honey buzzards are very secretive and can fly long distances below the canopy. Survey effort was focussed at the times regarded as most likely to result in detection of breeding birds.
 - Weather - honey buzzard aerial activity can be more closely linked to fine weather than other raptors. Surveys were undertaken in favourable conditions.
- A7.1.26

Details of the honey-buzzard surveys are included in the raptor survey data presented in Table A7.8.

Nightjar Surveys

- A7.1.27

Dedicated nightjar surveys were undertaken in both breeding seasons and covered all suitable habitat within the north and south sections; as stated in Chapter 7. Methods followed standard

guidance as set out in Gilbert *et al.* (1998)⁸ and were undertaken in the hours around dusk. All nightjars seen or heard were recorded and mapped.

- A7.1.28

Surveys were undertaken by experienced surveyors (MS, AC, KD in both years, plus DR and SP in 2021) under a Schedule 1 Licence.
- A7.1.29

Two visits were made in each breeding season, in June and July. Dates of the visits in 2020 were: 2, 7 and 11 June; and 19, 23, 25 and 27 July. Visits in 2021 were: 12, 13 and 22 June and 19 July. Most visits were undertaken by two surveyors but the July 2021 visit was undertaken by five surveyors (full survey area covered in one evening).
- A7.1.30

Surveys were undertaken in suitable weather conditions, with light winds ($\leq$ force 3), no precipitation and good visibility.

Survey Results

- A7.1.31

A summary of the results of the ornithological baseline recording is presented in Chapter 7. Further data is provided below.

Vantage Point Surveys

- A7.1.32

Summaries of all target and secondary species recorded during the baseline VP (flight activity) surveys are presented in Chapter 7. Full details of all records can be provided upon request but the large number of records precludes them from being presented here.
- A7.1.33

Incidental observations of target species recorded during VP surveys are summarised in Table A7.10. These include birds that were not in flight, birds that were heard but not seen, and birds that were observed outside of the viewshed that was being monitored.

⁷ Available at: <https://rbbp.org.uk/honey-buzzard-2020/> [Accessed 13/12/2023]

⁸ Gilbert, G., Gibbons, D.W. & Evans, J. (1998). *Bird Monitoring Methods A Manual of Techniques for Key UK Species*. RSPB, Sandy.

Table A7.10: Incidental records of target species recorded during VP surveys 2019 - 2021

Year	Season	Species	No. Flights	No. Individuals
2019/2020	Non-breeding	Golden plover	1	28
2019/2020	Non-breeding	Herring gull	2	2
2019/2020	Non-breeding	Goshawk	2	2
2019/2020	Non-breeding	Merlin	1	1
2020	Breeding	Great-black backed gull	1	1
2020	Breeding	Herring gull	4	5
2020	Breeding	Lesser-black backed gull	1	1
2020	Breeding	Unidentified large gull	1	1
2020	Breeding	Goshawk	1	1
2020	Breeding	Red kite	2	2
2020/2021	Non-breeding	Golden plover	1	40
2020/2021	Non-breeding	Red kite	2	2
2020/2021	Non-breeding	Kestrel	1	1
2021	Breeding	Unidentified goose	1	1
2021	Breeding	Herring gull	1	1
2021	Breeding	Lesser-black backed gull	1	2
2021	Breeding	Red kite	3	3

Source: Natural Power

Walkover Breeding Bird Survey

A7.1.34 All species recorded during the BBS are listed within Chapter 7.

Breeding Raptor Surveys

A7.1.35 The main outcomes of the breeding raptor surveys are presented in Chapter 7. Details of all records of target species made during the baseline raptor surveys (2020 and 2021) are listed in Table A7.11. Grid references are not included in order to protect the locations of Schedule 1 species. The locations of the nesting records can be found in the Appendix 7.2: Ornithology Confidential Appendix and on confidential Figure 7.12. Note that kestrel is included in the 2021 data. In 2020 kestrel was recorded as a secondary species.

Table A7.11: Target species recorded during raptor surveys 2020 and 2021

Date	Flight or Point?	Species	Sex/ age	No. Individuals	Signs	Notes
30/04/20	Point	Goshawk		1	Nest/ individual	Female on nest. Probably incubating.
30/04/20	Point	Goshawk		1	Individual	With prey.

Date	Flight or Point?	Species	Sex/ age	No. Individuals	Signs	Notes
01/05/20	Point	Goshawk	Female	1	Individual	
01/05/20	Point	Merlin	Female	1	Individual	
14/05/20	Point	Goshawk		1	Individual	
27/05/20	Point	Peregrine?		-	Pluck	Remains of carrion crow; possible peregrine kill. Not recent.
28/05/20	Point	Goshawk	Female	1	Individual	
29/07/20	Point	Red kite	Adult	1	Individual	
29/03/21	Point	Goshawk	Adult	1	Individual calling	
31/03/21	Point	Goshawk		1	Nest	Probable nest; partly built. (Supplementary record.)
07/04/21	Flight	Goshawk		1	Individual	
09/04/21	Point	Goshawk	Male/ Adult	1	Individual	
09/04/21	Flight	Goshawk	Female/Adult	1	Individual	
09/04/21	Point	Goshawk	Adult	1	Heard only	Calling repeatedly.
16/04/21	Flight	Goshawk	Female	1	Individual	
16/04/21	Flight	Goshawk	Male	1	Individual	
07/05/21	Flight	Goshawk		1	Individual	
11/05/21	Flight	Peregrine		1	Individual	
11/05/21	Flight	Goshawk		1	Individual	
22/05/21	Flight	Goshawk		1	Individual	
22/05/21	Flight	Goshawk		1	Individual	
22/05/21	Flight	Kestrel	Female/Adult	1	Individual	Caught prey item then flew west towards presumed nest site outside site boundary.
12/06/21	Point	Goshawk		1	Nest with chicks	Two chicks present.
12/06/21	Point	Goshawk		1	Nest	
21/06/21	Flight	Peregrine		1	Individual	Hunting.
09/07/21	Point	Goshawk		1	Nest with chicks	Chicks present in and around nest until 19 July at least.

Source: Natural Power

A7.1.36 Secondary raptor species recorded during these surveys are shown in Table A7.12. Note that this includes kestrel during the 2020 breeding season.

Table A7.12: Secondary species recorded during raptor surveys 2020 - 2021

Date	Species	Sex/ age	No. Individuals	Notes
13/04/2020	Common buzzard			
30/04/2020	Common buzzard			
30/04/2020	Common buzzard			
14/05/2020	Kestrel			
14/05/2020	Kestrel			
14/05/2020	Kestrel			
06/06/2020	Common buzzard	Adult	1	
06/06/2020	Common buzzard	Adult	1	
07/06/2020	Common buzzard	Chick	1	Nest located. Minimum of one chick present.
07/06/2020	Sparrowhawk			Carrying prey.
09/06/2020	Sparrowhawk	Male	1	
09/06/2020	Common buzzard	Pair	2	
19/07/2020	Common buzzard			
20/07/2020	Common buzzard		1	
25/07/2020	Kestrel	Adult	1	
28/07/2020	Sparrowhawk		1	
28/07/2020	Common buzzard		2	
28/07/2020	Common buzzard		1	
28/07/2020	Common buzzard		2	
28/07/2020	Common buzzard		1	
28/07/2020	Common buzzard		1	
28/07/2020	Common buzzard		2	
28/07/2020	Raven		1	

Date	Species	Sex/ age	No. Individuals	Notes
28/07/2020	Common buzzard		1	
28/07/2020	Common buzzard		1	
13/08/2020	Common buzzard	Juvenile	1	
13/08/2020	Raven		1	
16/08/2020	Sparrowhawk		1	
16/08/2020	Common buzzard		1	
16/08/2020	Raven			
16/08/2020	Common buzzard		3	
16/08/2020	Common buzzard		1	
31/08/2020	Common buzzard		1	
31/08/2020	Sparrowhawk		1	
18/02/2021	Common buzzard		1	
18/02/2021	Raven			
18/02/2021	Common buzzard		1	
18/02/2021	Common buzzard		3	
26/02/2021	Common buzzard		1	
26/02/2021	Common buzzard		3	
26/02/2021	Raven		2	
16/03/2021	Sparrowhawk	Female	1	
16/03/2021	Common buzzard		1	
16/03/2021	Common buzzard		2	
16/03/2021	Common buzzard		1	
16/03/2021	Common buzzard		1	
05/04/2021	Sparrowhawk	Male/	1	

Date	Species	Sex/ age	No. Individuals	Notes
		Adult		
05/04/2021	Common buzzard		1	Apparent territory in south section.
07/04/2021	Sparrowhawk	Male	1	
07/04/2021	Common buzzard	Adult	1	Possible territory in north section.
16/04/2021	Common buzzard	Adult	1	Possible territory.
16/04/2021	Common buzzard	Adult	1	Apparent territory in south section.
07/05/2021	Common buzzard	Adult	1	Apparent territory in south section (as recorded in April).
11/05/2021	Common buzzard	Adult	1	Apparent territory in north section (as recorded in April).
22/05/2021	Common buzzard	Adult	1	Apparent territory in south section (new location).
27/06/2021	Common buzzard	Adult	1	Apparent territory (as previously recorded).
27/06/2021	Common buzzard		1	Fledged chicks at nest in south section.
28/06/2021	Common buzzard		1	Nest with 1+ calling juvenile(s) in south section.
13/07/2021	Common buzzard	Adult	1	Apparent territory in north section but no nest or juveniles located.

Honey Buzzard Survey

A7.1.37 No honey buzzards were recorded during the dedicated surveys in 2020 and 2021.

Nightjar Surveys

A7.1.38 Records from the nightjar surveys in 2020 and 2021 are presented in Table A7.13. Grid references are not included to protect the location of territories. The locations of nesting birds can be found in Confidential Appendix 7.2, Confidential Figure 7.13.

Table A7.13: Nightjar recorded during the 2020 and 2021 dedicated surveys

Date	Species	Sex/ age	Notes
02/06/2020	Nightjar	Adult male	Male churring/displaying.
02/06/2020	Nightjar	Adult male	Male churring/displaying.
02/06/2020	Nightjar	Adult male	Male churring/displaying.
02/06/2020	Nightjar	Adult male	Male churring/displaying.
02/06/2020	Nightjar	Adult female	Individual.
02/06/2020	Nightjar	Adult male	Male churring/displaying.

Date	Species	Sex/ age	Notes
02/06/2020	Nightjar	Adult female	Individual.
02/06/2020	Nightjar	Adult male	Male churring/displaying.
02/06/2020	Nightjar	Adult male	Individual.
02/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult male	Male churring/displaying.
07/06/2020	Nightjar	Adult female	Individual.
07/06/2020	Nightjar		Individual.
07/06/2020	Nightjar	Adult male	Individual.
07/06/2020	Nightjar	Adult male	Individual.
11/06/2020	Nightjar	Adult female	Individual.
19/07/2020	Nightjar	Adult male	Male churring/displaying.
19/07/2020	Nightjar		Nest.
19/07/2020	Nightjar		Nest.
19/07/2020	Nightjar	Adult male	Male churring/displaying.
19/07/2020	Nightjar	Male and Female	Pair.
19/07/2020	Nightjar	Adult male	Individual.
19/07/2020	Nightjar	Adult male	Male churring/displaying.
23/07/2020	Nightjar		Individual.
23/07/2020	Nightjar		Individual.
23/07/2020	Nightjar	Adult male	Male churring/displaying.
23/07/2020	Nightjar	Adult male	Male churring/displaying.
23/07/2020	Nightjar	Adult male	Male churring/displaying.
23/07/2020	Nightjar	Adult male	Male churring/displaying.
23/07/2020	Nightjar	Adult male	Male churring/displaying.
25/07/2020	Nightjar	Juvenile?	Individual.
25/07/2020	Nightjar	Adult male	Individual.

[illegible][illegible]

Source: Natural Power

Collision Risk Modelling Parameters

- A7.1.39 The CRM was carried out using the flight activity survey (VP) data collected between October 2019 and August 2021 inclusive from eight VPs. For each species, the risk of collision given to an individual that passes through the rotor swept volume is calculated by estimating the likelihood of collision based on the characteristics of the bird and of the proposed turbines. The results of CRM are presented in Chapter 7. The parameters that fed into the CRM are presented below.
- A7.1.40 Wind farm specifications used in the model are provided in Table A7.14. Where specifications were not available, representative values were used.

Table A7.14: Wind turbine specifications used in CRM

Attribute	Value
Number of turbines	18
Number of blades	3
Maximum chord length (metres)	4.2*
Pitch (degrees)	6*
Rotor diameter (metres)	172
Rotation period (seconds)	4.2*

* Representative value

Source: Natural Power

Species Collision Risk

A7.1.41 Species with sufficient data to run CRM during the breeding seasons are shown in Table A7.15. Table A7.16 shows species with sufficient data to run CRM during the non-breeding seasons. Bird parameters used in the model are provided in Table A7.17.

Table A7.15: Number of flights and individuals observed passing through the turbine area at collision risk height during the breeding season in 2020 and 2021

Species	No. flights	Flights at risk height	Individuals at risk height	CRM carried out
Great black-backed gull	8	3	3	Yes
Goosander	1	1	1	No
Goshawk	20	7	7	Yes
Greylag goose	1	0	0	No
Herring gull	254	47	64	Yes
Hobby	1	1	1	No
Honey buzzard	1	0	0	No
Kestrel	27*	9	9	Yes
Red kite	44	5	5	Yes
Lesser black-backed gull	72	14	20	Yes
Unidentified large gull species	20	2	2	No**
Merlin	2	1	1	No
Peregrine	2	1	1	Yes
Woodcock	1	0	0	No

*Includes flights recorded as targets and secondary species (see methods)
**These flights were incorporated into both herring gull and lesser black-backed gull estimates
Source: Natural Power

Table A7.16: Number of flights and individuals observed passing through the turbine area at collision risk height during the non-breeding season in 2019/20 and 2020/21

Species	No. flights	Flights at risk height	Individuals at risk height	CRM carried out
Black-headed gull	1	0	0	No

Table A7.18: Collision Risk Model for gull species in the 2020 and 2021 breeding seasons

Parameter	Unit	Formula	Great black-backed gull	Herring gull	Lesser black-backed gull
Total number of birds flying through wind farm polygon	birds	a	3	66**	22**
Mean survey effort	minutes	b	4410	4410	4410
Daylight during survey period, based on civil twilight	minutes	c	163140	163141	163140
Estimate of nocturnal activity as a proportion of daytime activity		d	0	0	0
Time of potential activity during survey period	minutes	e = c * (1+d)	163140	163141	163140

Species	No. flights	Flights at risk height	Individuals at risk height	CRM carried out
Goshawk	15	3	3	Yes
Golden plover	1	0	0	No
Herring gull	25	0	0	Yes
Kestrel	42	10	10	Yes
Red kite	17	2	2	No
Lesser black-backed gull	1	0	0	Yes
Peregrine	7	1	1	No
Woodcock	2	0	0	No

Source: Natural Power
Table A7.17: Bird specifications used in CRM

Attribute	Great black-backed gull	Goshawk	Herring gull	Kestrel	Red kite	Lesser black-backed gull
Bird length (metres)	0.71	0.55	0.60	0.34	0.66	0.58
Wingspan (metres)	1.58	1.50	1.44	0.76	1.95	1.43
Bird speed (metres/second)	13.7	11.3	12.8	8.3	12.0	13.1
Estimated nocturnal activity (as proportion of diurnal activity)	0	0	0	0	0	0
Calculated individual collision risk	0.078	0.082	0.077	0.089	0.085	0.074

Source: Natural Power

A7.1.42 Details of calculations used to produce estimates for collision risk models for each gull species eligible for CRM during the breeding season are shown in Table A7.18. Details of calculations used to produce estimates for collision risk models for each gull species eligible for CRM during the non-breeding season are shown in Table A7.19.

Parameter	Unit	Formula	Great black-backed gull	Herring gull	Lesser black-backed gull
Rate of birds recorded during survey period	birds per minute	$f = a/b$	0.0007	0.015	0.005
Estimate of number of birds during season	birds	$g = e * f$	110.98	2441.55	813.85
Risk window length	metres	h	4859.89	3847.10	2903.33
Turbine blade length	metres	i	86	86	86
Number of turbines		j	18	18	18
Risk window	square metres	$k = h * i * 2$	835901	661702	499372
Rotor-swept area	square metres	$l = \pi * i^2 * j$	418234	418234	418234
Proportion of risk area that is rotor-swept		$m = l/k$	0.5	0.632	0.838
Estimate of number of birds flying through rotor-swept area during season	birds	$n = g * m$	55.5	1543.2	681.6
Probability of collision for a bird flying through rotors (estimated using NatureScot spreadsheet)		o	0.078	0.076	0.074
Predicted mortality with no avoidance - turbines operational 85% of the time	collisions per season	$p = n * o * 0.85$	3.69	100.22	42.85

* Figures have been rounded for presentation purposes. Following the calculations using the rounded figures may yield slightly different results.

**Includes two flights recorded as unidentified large gull species

Source: Natural Power

Table A7.19: Collision Risk Model for gull species in the 2019/20 and 2020/21 non-breeding seasons

Parameter	Unit	Formula	Great black-backed gull	Herring gull	Lesser black-backed gull
Total number of birds flying through wind farm polygon	birds	a	0	0	0
Mean survey effort	minutes	b	4230	4230	4230
Daylight during survey period, based on civil twilight	minutes	c	105714	105714	105714
Estimate of nocturnal activity as a proportion of daytime activity		d	0	0	0
Time of potential activity during survey period	minutes	$e = c * (1+d)$	105714	105714	105714
Rate of birds recorded during survey period	birds per minute	$f = a/b$	0.0000	0	0.000
Estimate of number of birds during season	birds	$g = e * f$	0.00	0	0.00
Risk window length	metres	h	4859.89	3847.10	2903.33
Turbine blade length	metres	i	86	86	86
Number of turbines		j	18	18	18
Risk window	square metres	$k = h * i * 2$	835901	661702	499372
Rotor-swept area	square metres	$l = \pi * i^2 * j$	418234	418234	418234
Proportion of risk area that is rotor-swept		$m = l/k$	0.5	0.632	0.838
Estimate of number of birds flying through rotor-swept area during season	birds	$n = g * m$	0.0	0	0.0
Probability of collision for a bird flying through rotors (estimated using NatureScot spreadsheet)		o	0.078	0.076	0.074
Predicted mortality with no avoidance - turbines operational 85% of the time	collisions per season	$p = n * o * 0.85$	0.00	0	0.00

* Figures have been rounded for presentation purposes. Following the calculations using the rounded figures may yield slightly different results.

Source: Natural Power

A7.1.43 Details of calculations used to produce estimates for collision risk models for each raptor species eligible for CRM during the breeding season are shown in Table A7.20. Details of calculations used to produce estimates for collision risk models for each raptor species eligible for CRM during the non-breeding season are shown in Table A7.21.

Table A7.20: Collision Risk Model for raptor species in the 2020 and 2021 breeding seasons

Parameter	Unit	Formula	Goshawk	Kestrel	Red kite
Occupancy of risk volume	seconds	a	165	9	279
Survey effort	hectare-minutes	b	3061836	3061836	3061836
Observed occupancy rate for site	seconds per hectare-minute	$c = a / b$	0.00005	0	0.00009
Daylight minutes	minutes	d	163140	163140	163140
Potentially active period	minutes	$e = d * 1$	163140	163140	163140
Area of the wind farm polygon	hectares	f	423.1	423.1	423.1
Total occupancy of risk volume during period of interest	seconds	$g = c * e * f$	3714	205	6283
Rotor diameter	metres	h	172	172	172
Risk volume	cubic metres	$i = f * h * 10,000$	727733510	727733510	727733510
Number of turbines	turbines	j	18	18	18
Rotor blade width	metres	k	4.2	4.2	4.2
Length of bird of interest	metres	l	0.55	0.34	0.66
Rotor-swept volume	cubic metres	$m = j * \pi * (h/2)^2 * (k + l)$	1986611	1898782	2032617
Bird occupancy of rotor-swept volume	seconds	$n = g * m / i$	10.1	0.5	17.6
Bird flight speed	metres per second	o	11.3	8.3	12
Time taken for bird to transit rotor	seconds	$p = (k + l) / o$	0.42	0.55	0.41
Number of rotor transits	rotor transits	$q = n / p$	24	1	43
Probability of collision for a bird flying through rotors (estimated using NatureScot spreadsheet)		r	0.082	0.089	0.085
Predicted mortality with no avoidance - turbines operational 85% of the time	collisions per season	$y = q * r * 0.85$	1.68	0.07	3.14

* Figures have been rounded for presentation purposes. Following the calculations using the rounded figures may yield slightly different results.

Source: Natural Power

Table A7.21: Collision Risk Model for raptor species in the 2019/20 and 2020/21 non-breeding seasons

Parameter	Unit	Formula	Goshawk	Kestrel	Red kite
Occupancy of risk volume	seconds	a	88	8	49
Survey effort	hectare-minutes	b	2959188	2959188	2959188
Observed occupancy rate for site	seconds per hectare-minute	$c = a / b$	0.00003	0	0.00002
Daylight minutes	minutes	d	105714	105714	105714
Potentially active period	minutes	$e = d * 1$	105714	105714	105714
Area of the wind farm polygon	hectares	f	423.1	423.1	423.1
Total occupancy of risk volume during period of interest	seconds	$g = c * e * f$	1328	114	739
Rotor diameter	metres	h	172	172	172
Risk volume	cubic metres	$i = f * h * 10,000$	727733510	727733510	727733510
Number of turbines	turbines	j	18	18	18
Rotor blade width	metres	k	4.2	4.2	4.2
Length of bird of interest	metres	l	0.55	0.34	0.66
Rotor-swept volume	cubic metres	$m = j * \pi * (h/2)^2 * (k + l)$	1986611	1898782	2032617
Bird occupancy of rotor-swept volume	seconds	$n = g * m / i$	3.6	0.3	2.1

Parameter	Unit	Formula	Goshawk	Kestrel	Red kite
Bird flight speed	metres per second	o	11.3	8.3	12
Time taken for bird to transit rotor	seconds	$p = (k + l) / o$	0.42	0.55	0.41
Number of rotor transits	rotor transits	$q = n / p$	9	1	5
Probability of collision for a bird flying through rotors (estimated using NatureScot spreadsheet)		r	0.082	0.089	0.085
Predicted mortality with no avoidance - turbines operational 85% of the time	collisions per season	$y = q * r * 0.85$	0.60	0.04	0.37

** Figures have been rounded for presentation purposes. Following the calculations using the rounded figures may yield slightly different results.*

Source: Natural Power

A7.2 CONFIDENTIAL APPENDIX (SEPARATE DOCUMENT)