

Appendix 7-1 – Bird Survey Methods



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A7.1.1 INTRODUCTION

This appendix includes full details of the bird survey methods and coverage for all the bird surveys carried out for the Cloghercor Wind Farm project, apart from the Golden Eagle surveys. Details of the latter are included in Appendices 7.4 and 7.5.

A7.1.2 VANTAGE POINT SURVEYS

Objectives

The objectives of the vantage point survey were to achieve thorough coverage of the potential collision height zone across the wind farm site, and to complete at least 36 hours of vantage point survey at each vantage point in each six month summer and winter season over a two year period. An additional objective, where appropriate, was to carry out additional surveys to complete 36 hours of vantage point survey during shorter seasonal periods that were relevant to particular species of conservation concern. The two year survey period was completed between the 2019/20 winter period and the 2021 summer period for the eastern section of the site, where the wind farm development is located. Vantage point surveys were also completed at selected vantage points in two further seasons (the 2021/22 winter period and the 2022 summer period).

Vantage point locations and viewshed coverage

The vantage point locations were identified by a combination of GIS analysis and ground-truthing. The viewshed mapping was carried out using ArcGIS 10.3 for Desktop, Version 10.3.0.4322 with the Viewshed geoprocessing part of Spatial Analyst extension. The analyses used an observer height of 1.5 m, and show the area visible at 25 m above ground level from each vantage point. The viewsheds were initially mapped using ground-level altitude data (derived from a Digital Terrain Model) and then modified by ground-truthing to take account of vegetation impeding views. In November 2021, the viewshed mapping was updated using a Digital Surface Model, which incorporates the effects of vegetation and structures. The Digital Surface Model that was used was supplied by Bluesky, based on imagery acquired on 20/09/2019 and 13/04/2020. This viewshed mapping was used for the remainder of the surveys, and is the mapping shown in this report.

A total of 10 vantage point locations were used for the vantage point surveys across the five seasons, although not all of these vantage points were surveyed in each season. The vantage point locations are shown in Figure A.7.1.1 and the viewshed coverage for each vantage point is shown in Figure A.7.1.2.

Apart from VP3, the vantage point locations were all around the perimeter of the wind farm site and were all at least 500 m from the nearest turbine location. The VP1-VP6 viewsheds covered all the turbine locations.

The position of VP5 was adjusted over the first year of the survey to improve the viewshed coverage. The three positions used are shown in Figure A.7.1.1. VP5.1 was used for from October 2019 to March 2020. VP5.2 was used in June and July 2020. VP5.3 was used in April and May 2020 and from August 2020 for the remainder of the survey work at VP5.



Overall vantage point survey effort

For the purposes of managing the vantage point surveys, the surveys were divided into summer (April-September) and winter (October-March) seasons. The survey target was to complete at least six hours of vantage point survey per vantage point in each month.

Six vantage points were used in the first season (2019/20) covering the initial wind farm site (VP1-VP6). Another four vantage points were added in the second season (summer 2020) to cover some high ground in the south-east corner of the initial wind farm site (VP7), and to cover an extension of the wind farm site to the west (VP8-VP10). All ten vantage points were then surveyed until the end of the fourth season (summer 2021). By the end of the fourth season, two full years of vantage point survey had been completed for the vantage points whose viewsheds covered the turbine locations (VP1-VP6). Therefore, in the fifth season, the vantage point survey effort was scaled back to focus on the vantage points that covered the majority of the turbine locations (VP1, VP2 and VP4) and the vantage points covering the western section of the wind farm site where there was a high level of Golden Eagle activity (VPs 8-10). VP1, VP2 and VP4 cover 15 of the 19 turbine locations. The other four turbine locations are within 200 m of the boundaries of the viewsheds for these vantage points, so the flight activity recorded at these vantage points is likely to be representative of the flight activity at those turbine locations.

The overall vantage point survey effort at each vantage point in each season is shown in Table A.7.1.1. The vantage points covering the turbine locations (VP1-VP6) received at least 36 hours of vantage point surveys in each of the first four seasons, apart from VP4 in the 2019/20 winter where only 35 hours of coverage was achieved. VP7-VP10 were not surveyed in the first season. Surveys at VP8-VP10 began in May 2020 resulting in only 30 hours of vantage point survey in the 2020 summer period.

Only selected vantage points were surveyed in the 2021/22 winter period (VP1, VP2, VP4 and VP8-10). In March and April 2022, vantage point surveys were suspended at some vantage points on the advice of the Golden Eagle surveyor to avoid disturbance to potential eyrie sites. This resulted in only 30 hours of vantage point survey at VP1 and VP9 in the 2021/22 winter period, although additional vantage point surveys were carried out at VP10 (which has a viewshed with a large overlap with the VP9 viewshed).

Table A.7.1.1 Total vantage point survey hours at each vantage point location in each season

Season	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10
2019/20 winter	36	36	36	35	39	36	0	0	0	0
2020 summer	36	36	36	48	46	36	48	30	30	30
2020/21 winter	36	36	36	36	36	36	36	36	36	36
2021 summer	36	36	36	48	48	36	48	36	36	36
2021/22 winter	30	36	0	36	0	0	0	36	30	42
2022 summer	36	36	0	0	0	0	0	36	0	72

Species-specific vantage point survey effort

Assessments for Irish wind farm projects typically use six month seasons to assess the adequacy of the vantage point survey effort. However, based on the SNH guidance, assessments of the adequacy of the vantage point survey effort should use species-specific seasonal periods relating to species of conservation interest that are relevant to the wind farm project. For the



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Cloghercor Wind Farm project, the key species were Whooper Swan, Golden Eagle and Golden Plover.

The general occurrence period of wintering Whooper Swan populations in Ireland is from October to March. The vantage points covering the turbine locations (VP1-VP6) received at least 36 hours of vantage point surveys in the 2019/20 and 2020/21 Whooper Swan wintering seasons, apart from VP4 in the 2019/20 winter where only 35 hours of coverage was achieved (Table A.7.1.2).

Table A.7.1.2 Total vantage point survey hours at each vantage point location in the seasonal occurrence period of Whooper Swan wintering populations (October – March).

Season	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10
2019/20 winter	36	36	36	35	39	36	0	0	0	0
2020/21 winter	36	36	36	36	36	36	36	36	36	36
2021/22 winter	30	36	0	36	0	0	0	36	30	42

Whooper Swan seasonal occurrence period defined as October – March based on general occurrence patterns of Whooper Swan in Ireland.

The Golden Eagle breeding season is defined as April to August in the SNH guidance. The vantage points covering the turbine locations (VP1-VP6) received at least 42 hours of vantage point surveys in the 2020 and 2021 Golden Eagle breeding seasons (Table A.7.1.3).

Table A.7.1.3 Total vantage point survey hours at each vantage point location in the Golden Eagle breeding season (February – August).

Season	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10
2020 breeding season	42	42	42	51	52	42	42	24	24	24
2021 breeding season	42	42	42	54	54	42	54	42	42	42

Golden Eagle breeding season defined as February – August based on Table A.7.1.2 in SNH (2017).

The Golden Plover breeding season is defined as April to July by Douse (2014). As the standard six hours per month vantage point survey effort would not be sufficient to generate 36 hours of vantage point survey effort within this season, additional vantage point surveys were carried out to make up the extra hours. The additional surveys were started in May 2020, following the discovery of a displaying Golden Plover pair in the south-east corner of the wind farm site in late April 2020. The additional vantage point survey effort was focused on the vantage points whose viewsheds covered the location of the breeding Golden Plover pair and potential commuting routes that could be used by the pair (VP4, VP5 and VP7). Totals of 34-36 hours of vantage point surveys were completed at these vantage points in the 2020 Golden Plover breeding season, and 36 hours in the 2021 Golden Plover breeding season (Table A.7.1.4).

Table A.7.1.4 Total vantage point survey hours at each vantage point location in the Golden Plover breeding season (April – July).

Season	VP4	VP5	VP7
2020 breeding season	36	34	36
2021 breeding season	36	36	36

Golden Plover breeding season defined as April – July based on Douse (2014).



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Vantage point survey methods

Observations of all waterbird and raptor species, and any other species of potential conservation concern, during the vantage point surveys were recorded using the methodology for focal bird sampling in the SNH guidelines. Flight activity was recorded separately in five height bands: 0-25 m, 25-50 m, 50-160 m, 160-220 m and > 220 m. The durations of all flight in each height band were recorded. Apart from in the first season, and for some surveys in the second and third seasons, these durations were only recorded for flight activity within the mapped viewsheds, as it is only flight activity within the mapped viewsheds that is relevant for collision risk modelling. Details of the adjustments that were made to flight durations recorded in the first season are described in the collision risk modelling report (Appendix 6). All flightlines were mapped as accurately as possible.

Survey coverage

Details of the dates, timings and weather conditions of all the vantage point watches are shown in Table A.7.1.5.

Table A.7.1.5 Dates, timings and weather conditions of the vantage point watches.

Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
24/10/2019	2	1	12:45	15:45	NW5	0	4	4	JS
24/10/2019	2	2	16:31	18:30	NE5	0	4	4	JS
25/10/2019	1	1	07:50	10:50	S2	0	8	4	JS
25/10/2019	1	2	11:20	14:20	S0	0	8	4	JS
25/10/2019	4	1	07:50	10:50	SW4	0	7	4	SC
25/10/2019	4	2	11:20	14:20	SW4	3	6	4	SC
29/10/2019	2	1	13:30	14:45	E4	0	3	4	SC
29/10/2019	6	1	11:00	14:00	S2	0	2	4	JS
29/10/2019	6	2	14:30	17:30	SE2	0	2	4	JS
30/10/2019	3	1	10:30	13:30	E1	0	6	4	JS
30/10/2019	5	1	07:00	10:00	NE3	0	4	4	SC
30/10/2019	5	2	10:34	13:34	NE4	0	4	4	SC
31/10/2019	5	1	10:34	13:34	NE4	0	4	4	SC
18/11/2019	3	1	11:00	14:00	W1	0	8	4	SC
18/11/2019	3	2	14:30	17:30	W1	0	8	4	SC
18/11/2019	5	1	10:55	13:55	SW1	0	7	4	JS
18/11/2019	5	2	14:25	17:25	SE1	0	7	4	JS
19/11/2019	1	1	10:20	13:20	W3	0-3	8	4	SC
19/11/2019	1	2	13:54	16:54	W0-2	0	4	4	SC
19/11/2019	4	1	10:24	13:24	SE4	4	8	3	JS
19/11/2019	4	2	13:56	16:56	SE3	0	3	4	JS
20/11/2019	2	1	07:15	10:15	SE3	0	1	4	JS
20/11/2019	2	2	10:45	13:45	SE4	0	5	4	JS
20/11/2019	6	1	07:15	10:15	W1	0	6	4	SC



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Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
20/11/2019	6	2	10:45	13:45	W1	0	6	4	SC
30/11/2019	3	1	07:00	10:00	E1	0	5	4	JS
09/12/2019	1	1	07:40	10:40	NW4	0	2	4	JS
09/12/2019	1	2	11:10	14:10	W2	0	4	4	JS
09/12/2019	4	1	07:45	10:45	NW4	0	8	4	SC
09/12/2019	4	2	11:15	14:15	W4	0	5	4	SC
11/12/2019	3	1	07:46	10:46	SW3	0	2	4	JS
11/12/2019	3	2	11:15	14:15	W2	2	4	4	JS
11/12/2019	5	1	07:45	10:45	NW4	4	4	4	SC
11/12/2019	5	2	11:15	14:15	NW3	4	4	4	SC
12/12/2019	2	1	10:00	13:00	SW4	0	4	4	SC
12/12/2019	2	2	13:30	16:40	W4	4	6	4	SC
12/12/2019	6	1	10:05	13:05	W1	1	7	4	JS
12/12/2019	6	2	13:35	16:35	W1	0	2	4	JS
20/01/2020	3	1	14:40	17:40	W3	2	7	3	SC
20/01/2020	5	1	14:45	17:45	W2	0	7	4	JS
21/01/2020	3	1	08:50	11:50	W0-3	0-2	8	3	SC
21/01/2020	5	1	09:00	12:00	W1	2	8	3	JS
23/01/2020	1	1	10:35	13:35	W4	0-2	7	3	SC
23/01/2020	1	2	14:05	17:05	W4	0-2	7	3	SC
23/01/2020	4	1	12:00	14:20	SW3	2	8	2	JS
23/01/2020	4	2	14:20	17:20	SW3	1	8	3	JS
24/01/2020	2	1	08:05	11:05	SW2	2	8	2	JS
24/01/2020	2	2	11:35	14:35	SW2	2	8	2	JS
24/01/2020	6	1	07:45	10:45	SW1	0-2	8	3	SC
24/01/2020	6	2	11:30	14:30	SW1	0-2	8	3	SC
17/02/2020	5	1	11:50	14:50	W3	2	7	3	JS
18/02/2020	3	1	15:15	18:15	W4	2	7	3	JS
18/02/2020	5	1	07:20	10:30	SW2	2	7	2	JS
20/02/2020	1	1	11:26	14:26	W7	0	6	4	SC
20/02/2020	1	2	14:55	18:00	W7	0	6	4	SC
20/02/2020	4	1	11:45	14:45	W6	0	3	4	JS
20/02/2020	4	2	15:15	18:15	NW6	0	4	4	JS
21/02/2020	3	1	10:00	13:00	W6	3	8	3	SC
22/02/2020	2	1	07:15	10:15	W7	0	6	4	SC
22/02/2020	2	2	10:45	13:45	W7	0	6	4	SC
22/02/2020	6	1	07:10	10:10	W5	3	8	3	SC
22/02/2020	6	2	10:40	13:40	W6	3	7	3	JS



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Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
09/03/2020	3	1	14:02	17:02	W4	3	8	2	SC
09/03/2020	5	1	12:25	15:25	W3	5	8	1	JS
09/03/2020	5	2	15:55	18:55	W4	4	8	3	JS
10/03/2020	3	1	06:30	09:30	W4	3	7	3	JS
11/03/2020	1	1	06:25	09:25	W6	3	7	3	JS
11/03/2020	1	2	09:55	12:55	W3	3	6	4	JS
11/03/2020	4	1	06:17	09:17	W5	1	4	4	SC
11/03/2020	4	2	09:47	12:47	W5	1	4	4	SC
12/03/2020	2	1	12:30	15:30	NW4	4	8	3	JS
12/03/2020	2	2	16:00	19:00	W3	2	5	4	JS
12/03/2020	6	1	11:45	14:45	W4	0	7	4	SC
12/03/2020	6	2	16:00	19:00	W3	0	4	4	SC
27/04/2020	1	1	16:30	19:30		1	7	4	JS
27/04/2020	4	1	16:30	19:30	SE3	3	8	4	SC
28/04/2020	1	1	12:00	15:00	SE0-3	0	4	4	SC
28/04/2020	4	1	12:00	15:00	E1	0	6	4	JS
28/04/2020	6	1	07:43	10:43		0	4	4	SC
28/04/2020	6	2	15:50	18:50	SW3	0	6	4	SC
28/04/2020	7	1	07:40	10:40	E3	0	6	4	JS
28/04/2020	7	2	15:50	18:50	E4	3	7	4	JS
29/04/2020	3	1	08:15	11:15	E3	0	7	4	JS
29/04/2020	3	2	17:14	20:14	SW1	0	6	4	SC
30/04/2020	2	1	08:20	11:20	SW1	2	4	4	SC
30/04/2020	2	2	13:40	16:40	NW4	3	4	4	SC
30/04/2020	5	1	08:20	11:20	E2	0	2	4	JS
30/04/2020	5	2	13:37	16:37	NW3	0	7	4	JS
11/05/2020	3	1	15:25	18:25	NE3	0	3	4	JS
12/05/2020	1	1	11:05	14:05	SW5	1	6	4	SC
12/05/2020	1	2	16:15	19:15	SE5	1	6	4	SC
12/05/2020	4	1	11:05	14:05	NE4	0	6	4	JS
12/05/2020	4	2	16:10	19:10	NE4	0	6	4	JS
13/05/2020	2	1	12:15	15:15	NE3	0	7	4	JS, JG
13/05/2020	2	2	17:10	20:10	NE4	0	0	4	JS, JG
13/05/2020	3	1	07:25	10:25	E1	1	6	4	SC
13/05/2020	6	1	12:15	15:15	NE2	0	6	4	SC
13/05/2020	6	2	17:15	20:15	NE4	0	1	4	SC
14/05/2020	5	1	11:00	14:00	NE3	0	4	4	JS, JG
14/05/2020	5	2	16:10	19:10	NE2	0	8	4	JS, JG



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Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
14/05/2020	5	3	19:10	20:10	NE2	0	8	4	JS, JG
14/05/2020	7	1	11:08	14:08	N2	0	0	4	SC
14/05/2020	7	2	16:15	19:15	N3	0	6	4	SC
15/05/2020	4	1	06:45	10:45	N1	2	8	1	SC
15/05/2020	5	1	10:55	13:55	NE3	0	6	4	JG
15/05/2020	7	1	06:45	09:45	N3	0	8	3	JS
15/05/2020	7	2	09:45	10:45	N3	0	7	4	JS
18/05/2020	8	1	07:00	10:00	SW2	1	8	4	JB
18/05/2020	10	1	10:30	13:30	SSW2	1	8	4	JB
26/05/2020	8	1	08:15	11:15	W2	0	6	3	JB
26/05/2020	10	1	11:45	14:45					JB
29/05/2020	9	1	11:00	17:00	SE3	0	6	4	ND
08/06/2020	3	1	15:50	18:50	W3	0	6	4	SC
09/06/2020	4	1	06:45	09:45	SW1	0	8	4	SC
09/06/2020	7	1	11:35	15:35	SW3	0	8	4	JS, JG
10/06/2020	2	1	06:55	09:55	W1	0	8	4	SC
10/06/2020	2	2	11:25	14:25	W3	1	6	4	SC
10/06/2020	6	1	07:00	10:00	N1	0	7	4	JG
10/06/2020	6	2	12:00	15:00	N1	0	7	4	JG
10/06/2020	7	1	06:35	09:35	NW2	0	7	4	JS
10/06/2020	7	2	10:45	13:45	NW3	2	8	4	JS
11/06/2020	1	1	12:30	15:30	NE4	0	2	4	JS
11/06/2020	1	2	16:45	19:45	NE4	0	6	4	JS
11/06/2020	4	1	11:35	13:35	NE4	0	4	4	SC, JG
11/06/2020	4	2	17:45	19:45	NE4	0	4	4	SC, JG
11/06/2020	8	1	07:35	10:35	E4	0	4	4	JB
11/06/2020	10	1	11:00	14:00	E3	0	3	4	JB
12/06/2020	3	1	10:50	13:50	S3	1	6	4	SC
12/06/2020	4	1	06:55	09:55	NE4	1	7	4	JS
14/06/2020	5	1	11:00	17:00	SE2	0	1	4	ND
23/06/2020	5	1	10:30	13:30					JB
23/06/2020	5	2	14:00	17:00					JB
25/06/2020	8	1	07:45	10:45	NE2	0	6	4	JB
25/06/2020	10	1	11:15	14:15	NE2	0	5	4	JB
06/07/2020	4	1	13:35	17:35	NW5	0	4	4	SC
07/07/2020	2	1	12:40	15:40	S2	0	8	4	JS, JG
07/07/2020	2	2	17:00	20:00	E3	0	8	4	JS, JG
07/07/2020	6	1	12:05	15:05	NW2	0	8	4	SC



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Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
07/07/2020	6	2	17:30	20:30	NW2	0	8	4	SC
08/07/2020	3	1	07:40	10:40	NE1	0	6	4	JS
08/07/2020	3	2	12:00	15:00		0	8	4	JS
08/07/2020	7	1	08:15	11:15	SE4	0	3	4	SC, JG
08/07/2020	7	2	12:23	15:23	SE3	0	7	4	SC, JG
08/07/2020	9	1	15:00	18:00	SW2	2	8	4	ND
09/07/2020	1	1	08:05	11:05	NE4	0	4	4	SC
09/07/2020	1	2	12:25	15:25	NE5	0	5	4	SC
09/07/2020	4	1	08:00	11:00	NE3	0	4	4	JS, JG
09/07/2020	4	2	12:50	15:50	NE3	0	7	4	JS, JG
10/07/2020	7	1	07:15	11:15	NW3	1	4	4	JS, SC
12/07/2020	5	1	11:45	14:45	SSW3	0	8	4	JB
12/07/2020	5	2	15:15	17:15	SSE3	1	7	4	JB
12/07/2020	9	1	10:00	13:00	SW3	0	6	4	ND
17/07/2020	8	1	17:40	20:40	SW2	0	7	4	JB
17/07/2020	10	1	10:40	13:40	W2	1	8	4	JB
17/07/2020	10	2	14:10	17:10	WSW3	0	5	4	JB
18/07/2020	8	1	17:00	20:00	W3	0	7	4	JB
20/07/2020	5	1	10:30	11:30	SW3	0	7	4	JB
26/07/2020	9	1	12:00	18:00	SW3	0	6	4	ND
10/08/2020	5	1	18:00	21:00	E1	0	8	4	JS
10/08/2020	7	1	10:45	13:45	N1	0	7	4	SC
10/08/2020	7	2	14:15	17:15	NW0	0	7	4	SC
11/08/2020	1	1	08:30	11:30	N0-1	0	0	4	SC
11/08/2020	1	2	12:00	15:00	W2	0	2	4	SC
11/08/2020	4	1	08:25	11:25		0	2	4	JS
11/08/2020	4	2	11:55	14:55	N1	0	1	4	JS
12/08/2020	2	1	07:30	10:30	E2	0	3	4	JS
12/08/2020	2	2	11:15	14:15	SE2	0	2	4	JS
12/08/2020	6	1	07:45	10:45	NE0	0	1	4	SC
12/08/2020	6	2	11:30	14:30	NE1	0	1	4	SC
13/08/2020	3	1	14:40	17:40	NE1	0	3	4	JS
13/08/2020	3	2	18:10	21:10	NE1	0	4	4	JS
13/08/2020	5	1	10:00	13:00	NE2	0	8	4	SC
27/08/2020	8	1	10:45	13:45	SE2	0	8	4	JB
27/08/2020	8	2	14:15	17:15	SE2	1	8	4	JB
28/08/2020	10	1	10:30	13:30	NE3	0	8	4	JB
28/08/2020	10	2	14:00	17:00	N3	0	8	4	JB



Appendix 7.1 – Bird Survey Methods

Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
30/08/2020	9	1	12:00	18:00	W2	2	7	4	ND
07/09/2020	5	1	14:00	17:00	W2	2	8	2	JS
08/09/2020	3	1	07:40	10:40	SW1	1	8	4	SC
08/09/2020	3	2	11:10	14:10	SW1	0	8	4	SC
08/09/2020	5	1	07:30	10:30	W2	2	8	3	JS
08/09/2020	6	1	11:20	14:20	W2	1	8	3	JS
08/09/2020	6	2	16:25	19:25	SW1	1	8	4	SC
09/09/2020	2	1	08:10	11:10	W5	1	8	4	SC
09/09/2020	2	2	11:40	14:40	W6	0	8	4	SC
09/09/2020	7	1	08:05	11:05	W3	0	7	3	JS
09/09/2020	7	2	11:35	14:35	W3	1	8	4	JS
10/09/2020	1	1	13:00	16:00	W3	1	8	4	JS
10/09/2020	1	2	16:30	19:30	W3	1	8	4	JS
10/09/2020	4	1	13:00	16:00	SW6	1	8	4	SC
10/09/2020	4	2	16:30	19:30	SW6	1	8	4	SC
17/09/2020	8	1	15:00	18:00	S2	0	1	4	JB
17/09/2020	10	1	11:30	14:30	S3	0	1	4	JB
20/09/2020	9	1	12:00	18:30	NW2	0	8	4	ND
21/09/2020	8	1	09:40	12:40	SW2	0	8	4	JB
21/09/2020	10	1	13:10	16:10	SW3	0		4	JB
05/10/2020	3	1	16:50	19:50	W1	0	7	4	JS
05/10/2020	5	1	16:45	19:45	NW3	0	6	4	JG
06/10/2020	3	1	09:45	12:45	NW1	0	7	4	JS
06/10/2020	5	1	09:45	12:45	N2	0	6	4	JG
06/10/2020	6	1	13:25	16:25	N1	3	7	2	JG
06/10/2020	6	2	16:25	19:25	NW2	2	8	3	JS
07/10/2020	2	1	07:25	10:25	NW2	0	6	4	JS
07/10/2020	2	2	10:55	13:55	NW2	0	8	4	JS
07/10/2020	7	1	07:25	10:25	NW2	0	5	4	JG
07/10/2020	7	2	10:55	13:55	NW2	0	7	4	JG
08/10/2020	1	1	07:30	10:30	N2	0	7	4	JS
08/10/2020	1	2	11:00	14:00	N4	0	5	4	JS
08/10/2020	4	1	07:30	10:30	NW1	1	8	4	JG
08/10/2020	4	2	11:00	14:00	NW3	1	3	4	JG
26/10/2020	9	1	12:00	15:00	NW6	3	4	4	ND
30/10/2020	10	1	10:00	13:00	SW2	1	4	4	JB
30/10/2020	10	2	13:30	16:30	sw3	0	6	4	JB
04/11/2020	8	1	08:45	11:45					JB



Appendix 7.1 – Bird Survey Methods

Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
04/11/2020	8	2	12:15	15:15					JB
07/11/2020	9	1	10:30	13:30	SE1	0	2	4	ND
09/11/2020	3	1	13:37	16:37	SE3	0	6	4	JS
09/11/2020	5	1	13:40	16:40	S4	0	3	4	SC
10/11/2020	2	1	10:30	13:30	SW4	0	8	4	SC
10/11/2020	2	2	14:00	17:00	SW4	0	6	4	SC
10/11/2020	7	1	12:10	13:40	S4	0	7	4	JS
10/11/2020	7	2	14:10	17:10	S4	0	7	4	JS
11/11/2020	6	1	07:30	10:30	SW4	4	8	2	SC
11/11/2020	6	2	10:50	13:50	S3	1	8	4	JS
12/11/2020	1	1	10:10	13:10	SW6	0	7	4	SC
12/11/2020	1	2	13:40	16:40	SW6	0	7	4	SC
12/11/2020	4	1	10:30	13:30	S5	0	7	4	JS
12/11/2020	4	2	14:00	17:00	S6	0	7	4	JS
12/11/2020	7	1	08:50	10:20	S5	0	7	4	JS
13/11/2020	3	1	07:30	10:30	SW4	1	7	3	SC
13/11/2020	5	1	07:30	10:30	SW5	1	7	4	JS
26/11/2020	9	1	10:50	13:50	SW5	0	8	1	CR
26/11/2020	9	2	14:20	17:20	SW5	0	8	1	CR
30/11/2020	8	1	09:45	12:45	W4-5	1	8	3	MH
30/11/2020	8	2	13:20	16:20	W2-3	1	8	3	MH
30/11/2020	10	1	11:15	14:15	W4	2	2	4	JW
30/11/2020	10	2	14:15	17:15	W4	2	2	4	JW
07/12/2020	3	1	13:30	16:30	NA0	0	1	4	SC
07/12/2020	5	1	13:15	16:15	W1	0	0	4	JS
08/12/2020	2	1	09:05	12:05	N4	1	7	4	JS
08/12/2020	2	2	12:35	15:35	N4	1	6	4	JS
08/12/2020	7	1	09:15	12:15	N4	1	5	4	SC
08/12/2020	7	2	12:45	15:45	N5	1	5	4	SC
09/12/2020	3	1	08:15	11:15	N2	1	8	4	JS
09/12/2020	5	1	08:20	11:20	SE4	1	8	4	SC
09/12/2020	6	1	13:40	16:40	NW2	3	8	3	JS
10/12/2020	1	1	08:40	11:40	S2	0	8	3	JS
10/12/2020	4	1	08:30	09:30	SW3	2	8	2	SC
10/12/2020	4	2	09:30	11:30	SW4	0	6	4	SC
10/12/2020	4	3	12:00	14:00	SW5	0	6	4	SC
10/12/2020	4	4	14:00	15:00	SW5	5	8	2	SC
11/12/2020	1	1	12:10	15:10	S4	0	7	4	JS



Appendix 7.1 – Bird Survey Methods

Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
11/12/2020	6	1	08:15	11:15	SSW1	0	4	4	SC
12/12/2020	8	1	07:30	10:30	W1-2	2	3	4	MH
12/12/2020	8	2	11:20	14:20	SW1-2	2	4	4	MH
16/12/2020	10	1	11:00	14:00	W4	1	8	4	JW
16/12/2020	10	2	14:00	17:00	W4	3	8	2	JW
31/12/2020	9	1	10:40	16:40	N6	3	4-8	1-4	CR
11/01/2021	3	1	13:00	15:00	W4	1	8	2	SC
11/01/2021	3	2	15:00	16:00	W4	3	8	1	SC
11/01/2021	5	1	12:10	15:10	W2	1	8	3	JS
12/01/2021	2	1	08:50	11:50	SE3	0	3	4	JS
12/01/2021	2	2	12:15	15:15	SE2	0	8	4	JS
12/01/2021	7	1	08:45	09:45	E3	0	2	4	SC
12/01/2021	7	2	09:45	10:45	E4	0	3	4	SC
12/01/2021	7	3	10:45	11:45	E4	0	4	4	SC
12/01/2021	7	4	12:15	15:15	E4	0	7	4	SC
13/01/2021	6	1	08:30	11:30	SE2	3	8	3	JS
13/01/2021	6	2	12:25	13:25	SW3	1	8	4	SC
13/01/2021	6	3	13:25	14:25	SW3	2	8	3	SC
13/01/2021	6	4	14:25	15:25	SW3	1	8	4	SC
14/01/2021	1	1	09:46	12:46	NE4	4	4	4	SC
14/01/2021	1	2	13:15	16:15	NE4	4	6	3	SC
14/01/2021	4	1	09:50	12:50	NW2	1	7	4	JS
14/01/2021	4	2	13:20	16:20	NW2	0	4	4	JS
15/01/2021	3	1	08:45	11:45	SE3	0	8	4	JS
15/01/2021	5	1	08:50	09:50	SW1	0	2	4	SC
15/01/2021	5	2	09:50	11:50	SW4	0	8	4	SC
20/01/2021	10	1	09:45	12:45	0	0	0	2	JW
20/01/2021	10	2	12:45	15:45	SW1	0	2	4	JW
28/01/2021	8	1	07:40	10:40	SW4-5	0	8	4	MH
28/01/2021	8	2	14:35	17:35	S4-5	3	8	4	MH
30/01/2021	9	1	09:00	12:00	E7	0	1-2	4	CR
30/01/2021	9	2	12:30	15:30	E7	0	1-2	4	CR
15/02/2021	3	1	13:30	16:30	SW3	1	6	4	SC
15/02/2021	5	1	13:30	16:30	W2	0	6	4	JS
16/02/2021	2	1	10:50	13:50	SSW5	1	5	4	SC
16/02/2021	2	2	14:20	17:20	SSW5	1	5	4	SC
16/02/2021	7	1	10:50	13:50	SW3	0	6	4	JS
16/02/2021	7	2	14:20	17:20	SW3	1	6	4	JS



Appendix 7.1 – Bird Survey Methods

Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
17/02/2021	1	1	07:50	10:50	SW3	1	4	4	JS
17/02/2021	1	2	11:20	14:20	SW3	1	5	4	JS
17/02/2021	4	1	07:50	10:50	SSW7	1	4	3	SC
17/02/2021	4	2	11:20	14:20	SSW7	1	4	3	SC
18/02/2021	6	1	09:00	10:00	SW1	1	2	4	SC
18/02/2021	6	2	10:00	11:00	SW3	1	4	4	SC
18/02/2021	6	3	11:00	12:00	SW4	1	6	4	SC
18/02/2021	6	4	14:45	17:45	SW1	0	7	4	JS
19/02/2021	3	1	08:25	11:25	SSW3	1	8	4	JS
19/02/2021	5	1	08:20	09:20	SSW2	1	6	4	SC
19/02/2021	5	2	09:20	10:20	SSW3	1	6	4	SC
19/02/2021	5	3	10:20	11:20	SSW4	3	8	3	SC
25/02/2021	10	1	09:52	12:52	W5	0	2	4	JW
25/02/2021	10	2	13:52	16:52	W5	0	2	4	JW
26/02/2021	8	1	08:30	11:30	S4	0	6	4	MH
26/02/2021	8	2	12:00	15:00	S5-6	0	2	4	MH
26/02/2021	9	1	08:00	11:00	SW3	0	4	4	CR
26/02/2021	9	2	11:15	14:15	SW3	0	4	4	CR
08/03/2021	3	1	13:42	16:42	SW3	1	8	4	SC
08/03/2021	5	1	14:30	17:30	SW2	1	8	4	JS
09/03/2021	2	1	07:25	10:25	S2	0	8	4	JS
09/03/2021	2	2	10:55	13:55	S3	3	8	3	JS
09/03/2021	7	1	07:20	08:20	SW4	0	8	4	SC
09/03/2021	7	2	08:20	09:20	SW5	1	8	2	SC
09/03/2021	7	3	09:20	10:20	SW5	2	8	2	SC
09/03/2021	7	4	10:50	11:50	SW6	3	8	4	SC
09/03/2021	7	5	11:50	12:50	SW6	4	8	4	SC
09/03/2021	7	6	12:50	13:50	SW7	4	8	4	SC
10/03/2021	6	1	07:10	10:10	SW4	3	8	3	SC
10/03/2021	6	2	11:45	14:45	SW3	3	8	3	JS
11/03/2021	3	1	06:55	09:55	W3	3	8	3	JS
11/03/2021	5	1	06:55	09:55	SW5	4	8	3	SC
15/03/2021	1	1	15:20	16:20	W1	0	8	2	JS
15/03/2021	4	1	15:23	16:23	SW5	0	8	1	SC
16/03/2021	1	1	06:50	09:50	N5	0	4	4	SC
16/03/2021	1	2	09:20	11:20	NW6	0	2	4	SC
16/03/2021	4	1	06:50	08:50	NE2	0	4	4	JS
16/03/2021	4	2	09:20	12:20	NE2	0	6	4	JS



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Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
21/03/2021	8	1	16:30	19:30	SW2	0	7	4	MH
22/03/2021	8	1	06:10	09:10	S4	0	8	4	MH
30/03/2021	9	1	17:50	20:50	SW4-5	1	8	3-4	CR
31/03/2021	9	1	07:00	10:00	NE4	1	8	3-4	CR
31/03/2021	10	1	08:00	11:00	NW5	5	8	4	JW
31/03/2021	10	2	11:30	14:30	NW5	0	7	4	JW
26/04/2021	3	1	12:15	15:15	W2	0	8	4	SC
26/04/2021	3	2	15:45	17:45	W2	1	8	3	SC
26/04/2021	5	1	11:30	14:30	W3	0	6	4	JS
26/04/2021	5	2	15:00	18:00	NW2	0	8	4	JS
27/04/2021	2	1	11:30	14:30	N3	1	8	4	JS, JG
27/04/2021	2	2	15:45	18:45	N5	0	6	4	JS, JG
27/04/2021	7	1	11:10	14:10	N3	1	4	4	SC
27/04/2021	7	2	15:44	18:44	N3	0	4	4	SC
27/04/2021	8	1	13:40	16:40	NE4	0	5	4	MH
27/04/2021	8	2	16:40	19:40	NE4-5	0	4	4	MH
27/04/2021	9	1	14:00	17:00	NE5	2	2	4	CR
27/04/2021	9	2	17:30	20:30	NE5	2	2	4	CR
28/04/2021	4	1	14:45	17:45	N3	0	6	4	JS
28/04/2021	5	3	10:30	13:30	NE2	0	4	4	SC
28/04/2021	6	1	06:25	09:25	NE1	0	3	4	JG
28/04/2021	6	2	17:40	20:40	NE1	0	3	4	SC
28/04/2021	7	1	10:15	13:15	NE2	0	6	4	JS
29/04/2021	1	1	08:50	11:50	NE2	1	5	4	SC
29/04/2021	1	2	12:40	15:40	NE3	1	6	4	SC
29/04/2021	3	1	16:55	17:55	NE1	1	2	4	SC
30/04/2021	4	2	08:55	11:55	N1	1	6	4	JS
30/04/2021	4	3	12:55	15:55	NE3	1	7	4	JS, JG
30/04/2021	10	1	07:30	10:30	W2	0	2	5	JW
30/04/2021	10	2	11:00	14:00	W2	0	2	5	JW
15/05/2021	5	1	12:50	15:50	E4-5	0	8	4	MH
15/05/2021	5	2	16:10	19:10	E5-6	0	6	4	MH
16/05/2021	8	1	09:00	12:00	NE3-4	0	6	4	MH
16/05/2021	8	2	12:30	15:30	N3	0	5	4	MH
17/05/2021	4	1	17:40	20:40	W3	1	4	4	SC
17/05/2021	5	1	06:25	09:25	W2	3	7	4	MH
17/05/2021	7	1	17:35	20:35	W3	0	6	4	JS
17/05/2021	9	1	17:30	20:30	W4	0	3	4	CR



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Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
18/05/2021	1	1	08:50	11:50	SW3	1	4	4	SC
18/05/2021	1	2	12:41	15:41	W3	0	2	4	SC
18/05/2021	4	2	09:00	12:00	W3	0	6	4	JS, JG
18/05/2021	4	3	13:20	16:20	NW3	0	2	4	JS, JG
18/05/2021	9	2	09:00	12:00	SW4	2	5	3	CR
19/05/2021	2	1	08:40	11:40	W4	1	6	4	JS, SC
19/05/2021	2	2	12:45	15:45	W4	0	4	4	JS, SC
19/05/2021	7	2	08:45	11:45	W4	1	6	4	JG
19/05/2021	7	3	12:50	15:50	W4	0	4	4	JG
20/05/2021	3	1	09:00	12:00	E4	2	8	4	SC
20/05/2021	3	2	12:30	15:30	E4	3	8	4	SC
20/05/2021	6	1	05:31	08:31	SW2	0	8	4	JG
20/05/2021	6	2	15:50	18:50	E5	4	8	4	JS
20/05/2021	10	1	14:30	17:30	NE6	3	8	5	JW
20/05/2021	10	2	18:00	21:00	NE6	3	8	5	JW
14/06/2021	4	1	17:50	20:50	W5	0	6	4	JC
14/06/2021	7	1	17:52	20:52	W1	0	7	4	JS
15/06/2021	3	1	06:50	09:50	SE1	0	8	4	JS
15/06/2021	6	1	10:45	13:45	S2	2	7	4	JG
15/06/2021	6	2	13:50	16:50	W3	3	8	3	JC
16/06/2021	1	1	15:15	18:15	W2	0	5	4	JS
16/06/2021	1	2	19:00	22:00	W2	0	7	4	JS
16/06/2021	4	1	14:30	17:30	W5	0	4	3	JC, JS
16/06/2021	4	2	19:00	22:00	W5	1	7	3	JC, JS
17/06/2021	2	1	14:25	17:25	W5	0	6	4	JC, JS
17/06/2021	2	2	18:40	21:40	W5	0	7	4	JC, JS
17/06/2021	7	2	14:25	17:25	SW3	0	6	4	JG
17/06/2021	7	3	18:30	21:30	SW2	0	5	4	JG
18/06/2021	3	1	08:55	11:55	0	0	6	4	JS
19/06/2021	5	1	13:30	16:30	SE4	0	4	4	MH
19/06/2021	5	2	16:45	19:45	SE4-5	0	8	4	MH
20/06/2021	5	1	11:50	14:50	S4-5	2	4	4	MH
21/06/2021	8	1	06:55	09:55	N4	0	3	4	MH
21/06/2021	8	2	10:30	13:30	N4	0	4	4	MH
22/06/2021	9	1	14:30	17:30	SW4	2	8	4	CR
23/06/2021	9	2	07:40	10:40	SW4	2	8	1	CR
30/06/2021	10	1	14:00	17:00	N4	0	8	5	JW
30/06/2021	10	2	18:00	21:00	N4	0	8	5	JW



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Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
14/07/2021	9	1	16:00	19:15	SW3	1	6	2	CR
15/07/2021	9	1	09:00	12:00	SW2	1	8	4	CR
16/07/2021	5	1	10:20	13:20	SW3	0	0	4	MH
17/07/2021	5	1	07:20	10:20	W1	0	0	4	MH
17/07/2021	5	2	11:00	14:00	W4	0	0	4	MH
18/07/2021	8	1	07:35	10:35	NW2	1	8	3	MH
18/07/2021	8	2	11:10	14:10	NW2	0	8	4	MH
19/07/2021	4	1	18:45	21:45	W1	0	1	4	JS
19/07/2021	7	1	18:45	21:45	W1	0	1	4	JC
20/07/2021	1	1	09:05	12:05	0	0	1	4	JG
20/07/2021	1	2	12:35	15:35	NW1	0	1	4	JG
20/07/2021	4	2	08:25	11:25	SE2	0	0	4	JC, JS
20/07/2021	4	3	12:55	15:55	SE1	0	1	4	JC, JS
21/07/2021	2	1	13:40	16:40	W1	0	3	4	JC, JS
21/07/2021	2	2	17:40	20:40	W1	0	1	4	JC, JS
21/07/2021	7	2	13:45	16:45	W1	0	1	4	JG
21/07/2021	7	3	17:40	20:40	W1	0	1	4	JG
22/07/2021	3	1	16:00	19:00	W1	0	6	4	JS
22/07/2021	3	2	19:00	22:00	W0	0	1	4	JC
22/07/2021	6	1	09:00	12:00	0	0	3	4	JG
22/07/2021	6	2	12:30	15:30	0	0	3	4	JG
29/07/2021	10	1	08:00	11:00	N4	0	8	4	JW
29/07/2021	10	2	14:00	17:00	N4	0	8	4	JW
09/08/2021	3	1	18:05	21:05	NE2	0	6	4	JS
09/08/2021	5	1	18:03	21:03	N1	0	6	4	JC
10/08/2021	2	1	08:05	11:05	SW1	0	8	3	JC
10/08/2021	2	2	11:35	14:35	SW1	0	8	3	JC
10/08/2021	7	1	08:05	11:05	0	0	7	4	JS
10/08/2021	7	2	11:35	14:35	W1	0	7	4	JS
11/08/2021	1	1	14:06	17:06	W5	0	3	4	JC
11/08/2021	1	2	17:36	20:36	W4	0	2	4	JC
11/08/2021	4	1	14:20	17:20	W4	0	4	4	JS
11/08/2021	4	2	17:50	20:50	W1	0	4	4	JS
12/08/2021	3	2	11:35	14:35	SW4	1	7	4	JS
12/08/2021	5	2	11:40	14:40	S6	0	5	3	JC
12/08/2021	6	1	08:10	11:10	SE4	0	5	3	JC
12/08/2021	6	2	15:10	18:10	SW4	1	7	4	JS
17/08/2021	8	1	12:35	15:35	SW3-4	1	8		MH



Appendix 7.1 – Bird Survey Methods

Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
17/08/2021	8	2	16:00	19:00	SW4	1	8	3	MH
20/08/2021	10	1	08:00	11:00	SE6	3	8	2	JW
20/08/2021	10	2	11:30	14:30	SE6	3	8	2	JW
23/08/2021	9	1	10:55	13:55	N1-2	0	4	4	MH
23/08/2021	9	2	14:10	17:10	N3	0	5	4	MH
06/09/2021	5	1	17:10	20:10	W2	1	8	2	JC
07/09/2021	2	1	13:30	16:30	SW2	0	1	4	JS
07/09/2021	2	2	17:00	20:00	SW2	0	2	4	JS
07/09/2021	7	1	13:30	16:30	S2	0	3	4	JC
07/09/2021	7	2	17:00	20:00	SW2	0	5	4	JC
08/09/2021	1	1	06:50	09:50	S1	1	8	4	JS
08/09/2021	1	2	10:20	13:20	E1	0	8	4	JS
08/09/2021	4	1	06:50	09:50	SE2	0	8	4	JC
08/09/2021	4	2	10:20	13:20	SE2	0	7	4	JC
09/09/2021	3	1	10:30	13:30	W2	0	6	4	JC
09/09/2021	5	2	10:30	13:30	E1	1	8	4	JS
09/09/2021	6	1	06:55	09:55	S1	1	8	3	JS
09/09/2021	6	2	14:30	17:30	W1	0	8	3	JC
10/09/2021	3	2	07:05	10:05	N0	0	8	3	JS
10/09/2021	10	1	08:00	11:00	NE2	1	8	1	JW
10/09/2021	10	2	12:00	15:00	NE2	1	8	2	JW
16/09/2021	8	1	08:25	11:25	S4	0	6	4	MH
16/09/2021	8	2	12:00	15:00	S4	0	6	4	MH
29/09/2021	9	1	09:00	12:00	W6	3	5	4	CR
29/09/2021	9	2	12:30	15:30	NW6	3	5	4	CR
15/10/2021	2	1	10:00	13:00	W2	0	4	4	JW
15/10/2021	2	2	14:00	17:00	W2	0	4	4	JW
21/10/2021	4	1	08:30	11:30	N5-6	2	6	4	MH
21/10/2021	4	2	11:45	14:45	N6	2	5	4	MH
28/10/2021	8	1	08:20	14:50	S2	0	4	4	DMo
29/10/2021	1	1	08:30	11:30	SW4	0	5	4	CR
29/10/2021	1	2	12:00	15:00	SW5	1	6	4	CR
29/10/2021	10	1	09:10	15:40	S3	0	7	4	DMo
30/10/2021	9	1	08:45	15:15	SW2	2	8	3	DMo
22/11/2021	1	1	09:05	12:05	NW2	0	8	4	MH
22/11/2021	1	2	12:05	15:05	NW2	0	8	4	MH
23/11/2021	4	1	09:10	12:10	W3-4	1	8	2	MH
23/11/2021	4	2	12:10	15:10	W5	0	8	4	MH



Appendix 7.1 – Bird Survey Methods

Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
24/11/2021	8	1	07:25	10:25	W1-2	2	7	4	MH
24/11/2021	8	2	11:30	14:30	W3	3	6	4	MH
24/11/2021	10	1	11:00	14:00	NW6	3	4	3	JW
24/11/2021	10	1	14:30	17:30	NW6	3	4	3	JW
25/11/2021	2	1	09:00	12:00	NW6	3	8	4	JW
25/11/2021	2	2	12:00	15:00	NW6	3	8	4	JW
25/11/2021	9	1	06:10	09:10	N5	3	3	4	MH
25/11/2021	9	2	09:10	12:10	N6	3	5	4	MH
13/12/2021	4	1	08:30	11:30	SW5	2	4	3	JW
13/12/2021	4	2	12:00	15:00	SW5	2	4	3	JW
13/12/2021	8	1	14:10	17:10	SW3-4	0	4	4	MH
14/12/2021	2	1	09:05	12:05	SW5-6	0	8	4	MH
14/12/2021	2	2	12:15	15:15	SW5-6	0	8	4	MH
15/12/2021	8	1	07:45	10:45	SW4	1	8	3	MH
23/12/2021	9	1	10:00	13:00	S5	1	6	4	CR
23/12/2021	9	2	13:30	16:30	S5	0	3	4	CR
28/12/2021	10	1	08:00	11:00	S0	0	5	4	JW
28/12/2021	10	2	11:30	14:30	SW0	0	5	4	JW
30/12/2021	1	1	10:30	13:30	SW4	1	8	3	CR
30/12/2021	1	2	14:00	17:00	SW5	1	8	3	CR
11/01/2022	8	1	14:30	17:30	SW3	2	6	4	MH
12/01/2022	1	1	10:00	16:00	SW3-4	0	6	4	MH
13/01/2022	8	1	07:50	10:50	SW2-3	0	8	4	MH
19/01/2022	10	1	11:00	14:00	NW6	0	2	4	JW
19/01/2022	10	2	14:30	17:30	NW6	0	2	4	JW
20/01/2022	4	1	09:00	12:00	NW3	0	7	4	JW
20/01/2022	4	2	12:30	15:30	NW3	0	7	4	JW
27/01/2022	9	1	11:30	14:30	NW5	0	6	4	CR
27/01/2022	9	2	15:00	18:00	NW2	0	6	4	CR
28/01/2022	2	1	09:00	12:00	SW4	2	8	3	CR
28/01/2022	2	2	12:30	15:30	SW5	0	8	4	CR
02/02/2022	10	1	15:00	18:00	SW5	2	8	3	JW
03/02/2022	10	2	08:00	11:00	SW6	0	7	4	JW
20/02/2022	8	1	15:10	18:10	W6	3	6	4	MH
21/02/2022	4	1	08:20	11:20	W6	2	7	4	MH
21/02/2022	4	2	11:30	14:30	W6	2	8	4	MH
22/02/2022	1	1	08:00	11:00	W6	3	8	3	MH
22/02/2022	1	2	11:20	14:20	W6	3	6	4	MH



Appendix 7.1 – Bird Survey Methods

Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
22/02/2022	2	1	12:30	15:30	W7	3	5	4	JW
22/02/2022	2	2	15:30	18:30	W7	3	5	4	JW
23/02/2022	8	2	06:50	09:50	W6	0	6	4	MH
01/03/2022	9	1	08:00	11:00	SE2	0	2	4	CR
01/03/2022	9	1	11:30	14:30	SE4	0	4	4	CR
22/03/2022	2	1	12:40	15:40	SE4-5	0	2	4	MH
22/03/2022	2	2	16:00	19:00	SE4-5	0	4	4	MH
23/03/2022	4	1	08:10	11:10	SE3-4	0	0	4	MH
23/03/2022	4	2	11:30	14:30	SE5	0	0	4	MH
24/03/2022	8	1	08:00	11:00	SW1-2	0	6	4	MH
24/03/2022	8	2	16:00	19:00	SW1-2	0	9	4	MH
25/03/2022	10	1	07:05	10:05	SW1-2	0	1	4	MH
25/03/2022	10	2	10:45	13:45	SW1-2	0	3	4	MH
29/03/2022	10	1	14:30	17:30	NW2	0	3	4	CR
29/03/2022	10	2	18:00	21:00	NW2	0	3	4	CR
10/04/2022	8	1	17:55	20:55	SE6	0	8	4	MH
11/04/2022	8	2	06:45	09:45	SE4-5	0	5	4	MH
11/04/2022	10	1	10:10	13:10	E6	0	8	4	MH
12/04/2022	10	2	06:40	09:40	SE3-4	0	7	4	MH
23/04/2022	10	1	15:00	18:00	NNE4	0	2	4	DMi
23/04/2022	10	2	18:30	21:30	NNE4	0	1	4	DMi
01/05/2022	4	1	13:40	16:40	W2	0	8	4	DMi
01/05/2022	4	2	17:10	20:10	W1	1	7	4	DMi
02/05/2022	2	1	14:10	17:10	NE1-2	0	8	4	MH
02/05/2022	2	2	17:30	20:30	N2	0	8	4	MH
03/05/2022	1	1	05:45	08:45	NW2	0	7	4	MH
03/05/2022	1	2	10:55	13:55	NW3	1	8	4	MH
12/05/2022	10	1	10:00	13:00	W3	2	8	4	DMi
12/05/2022	10	2	13:30	16:30	W4	3	8	4	DMi
22/05/2022	2	1	15:00	18:00	SW4-5	2	7-8	4	MH
22/05/2022	2	2	18:10	21:10	SW4-5	2	8	4	MH
23/05/2022	1	1	07:10	10:10	W4-5	2	4-6	4	MH
23/05/2022	1	2	10:30	13:30	W4	0	6	4	MH
23/05/2022	4	1	12:00	15:00	W3	2	7	4	DMi
23/05/2022	4	2	15:30	18:30	W3	2	7	4	DMi
24/05/2022	8	1	18:00	21:00	W3-4	0	5-8	4	MH
24/05/2022	10	1	09:20	12:20	W4	2	5-8	4	MH
24/05/2022	10	2	14:25	17:25	W4	0	3-8	4	MH



Appendix 7.1 – Bird Survey Methods

Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
25/05/2022	8	2	09:00	12:00	W4-5	0	8	4	MH
19/06/2022	10	1	12:15	15:15	N3-4	2	8	4	MH
19/06/2022	10	2	15:45	19:10	N3-4	0	8	4	MH
20/06/2022	2	1	09:35	12:35	SW3-4	0	1	4	MH
20/06/2022	2	2	13:00	16:00	SW4	0	0-8	4	MH
21/06/2022	1	1	11:55	14:55	W2	1	8	3	MH
21/06/2022	1	2	15:15	18:15	W2-3	1	8	3	MH
22/06/2022	8	1	05:50	08:50	NW2	2	8	3	MH
22/06/2022	8	2	09:20	12:20	W2	2	8	3	MH
29/06/2022	4	1	15:30	18:30	W3	0	7	4	DMi
29/06/2022	4	2	19:00	22:00	NW3	0	6	4	DMi
30/06/2022	10	1	06:30	09:30	SW1	0	6	4	DMi
30/06/2022	10	2	10:00	13:00	SW1	2	8	4	DMi
11/07/2022	2	1	11:00	14:00	S4-5	0	8	4	MH
11/07/2022	2	2	14:20	17:20	S4-5	0	8	4	MH
12/07/2022	1	1	11:25	14:25	W4-5	0	4	4	MH
12/07/2022	1	2	14:45	17:45	W4-5	0	8	4	MH
13/07/2022	10	1	06:30	09:30	W3-4	0	1	4	MH
13/07/2022	10	2	15:55	18:55	W3	0	8	4	MH
14/07/2022	8	1	05:50	08:50	NW3	1	8	4	MH
14/07/2022	8	2	09:25	12:25	W3	0	6	4	MH
21/07/2022	4	1	14:45	17:45	N2	0	7	4	DMi
21/07/2022	4	2	18:15	21:15	N1	0	5	4	DMi
22/07/2022	10	1	06:15	09:15	S1	0	7	4	DMi
22/07/2022	10	2	09:45	12:45	S0	0	4	4	DMi
14/08/2022	10	1	14:30	17:30	NW1	0	8	4	DMi
14/08/2022	10	2	18:00	21:00	NW1	0	8	4	DMi
18/08/2022	8	1	17:50	20:50	SW3-4	0	8	4	MH
19/08/2022	2	1	09:30	12:30	SW4-5	2	5-7	4	MH
19/08/2022	2	2	12:45	15:45	SW4-5	0	4-6	4	MH
19/08/2022	8	2	17:05	20:05	SW3-4	0	6	4	MH
20/08/2022	1	1	08:10	11:10	SW5-6	0	3-5	4	MH
20/08/2022	1	2	11:30	14:30	SW5-6	0	6	4	MH
27/08/2022	4	1	08:15	11:15	S3	1	8	3	DMi
27/08/2022	4	2	11:45	14:45	S1	1	8	4	DMi
27/08/2022	10	1	07:25	10:25	SE0-3	4	8		MH



Appendix 7.1 – Bird Survey Methods

Date	VP	Watch	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
27/08/2022	10	2	10:45	13:45	SE3-4	0	8	4	MH

Wind = compass direction and Beaufort scale. Rain: 0 = none; 1 = drizzle; 2 = light showers; 3 = heavy showers; 4 = heavy rain. Cloud = cloud cover in eighths. Visibility: 0 = no visibility; 1 = limited (< 500 m); 2 = poor (< 1 km); 3 = moderate (1-2 km); 4 = good (> 2 km). Surveyors: CR = Conor Ryan; DMi = David Miley; DMo = Daniel Moloney; JB = Jamie Bliss; JC = Jason Cahill; Jack Glennon; JS = John Sherry; JW = Jamie Woods; MH = Mick Hogan; ND = Nicholas Duff; SC = Sophia Couchman.

A7.1.3 MOORLAND BREEDING BIRD SURVEY

Survey methods

Moorland breeding bird surveys were carried out in the 2020 and 2021 breeding seasons. These targeted Red Grouse and breeding waders. However, all the open moorland habitat within 500 m of the turbine locations was covered with the exception of some areas of cutover bog in the outer part of the buffers around T18 and T19.

The survey methodology and timings were based on the adapted Brown and Sheppard method recommended by the SNH guidelines. This comprised monthly surveys between April and July.

The surveys were carried out by walking transects approximately 200 m apart. This differs from the grid square approach of Brown and Sheppard (1993), but was considered to be a more effective method for the Cloghercor Wind Farm site due to the fragmented nature of the moorland habitat, and the access issues. In any case, it achieved the same spatial coverage, and exceeded the duration intensity of the Brown and Sheppard requirements (20-25 minutes per 25 ha).

Survey coverage

Details of the dates, timings and weather conditions of the moorland breeding bird surveys are shown in Table A.7.1.6. The areas covered on each survey are either described in the table, or are shown in Figure A.7.1.3.

Table A.7.1.6 Dates, timings and weather conditions of the moorland breeding bird surveys.

Date	Survey area	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
28/04/2020	Area 7	10:57	11:50					JS
30/04/2020	Area 2	11:20	13:40	SE-NE3	3	6	4	SC
30/04/2020	Area 5	11:30	13:15	SE3	4	8	3	JS
01/05/2020	S of VP5	08:30						JS
12/05/2020	between VP4 and VP2	14:10	16:00	NE4	0	5	4	JS
13/05/2020	south of VP2	15:20	17:05	NE4	0	2	4	JG
13/05/2020	around VP2 (upper/south)	15:20	16:30	NE3	0	1	4	JS
14/05/2020	around VP7	14:08	16:12	N3	0	4	4	SC
15/05/2020	SE of VP5	14:15	16:12	NE3	1	6	4	JS
29/05/2020	around VP9	08:00	11:00	SE2	0	4	4	ND
29/05/2020	not specified	17:00	19:30	SE2	0	4	4	
09/06/2020	W of VP7	15:40	17:40	SW3	4	8	4	JG



Appendix 7.1 – Bird Survey Methods

Date	Survey area	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
10/06/2020	N of VP7	09:35	11:45	NE3	2	7	4	JS
10/06/2020	around VP2	09:50	11:20	W3	1	6	4	SC
11/06/2020	S of VP1	15:30	16:45	NE4	0	7	4	JS
11/06/2020	SE of VP4	15:40	17:30	NE4	0	4	4	SC
11/06/2020	NE of VP4	15:40	17:30	NE4	0	5	4	JG
13/06/2020	hill/plateau on south side of estuary to south of VP8	07:55	14:45	E2	0	8	4	JB
23/06/2020	around VP5	07:25	10:20	SW2	0	7	4	JB
03/07/2020	S of Cleengort Hill	15:15	20:40	W1-2	1	8	3-4	JB
04/07/2020	N of Cleengort Hill	09:40	15:55	SW1-2	1	0	4	JB
07/07/2020	SW of VP2	15:40	17:00	E2	0	7	4	JG
07/07/2020	SE of VP2	15:40	17:00	E2	0	6	4	JS
08/07/2020	N of VP7	11:20	12:20	SE3	0	3	4	SC
09/07/2020	N of VP4	11:00	12:50	NE3	0	4	4	JG
09/07/2020	peaks to E of VP4	11:00	12:50	NE3	0	6	4	JS
09/07/2020	not specified	11:10	12:20	NE4	0	4	4	SC
18/07/2020	hill/plateau on south side of estuary to south of VP8	10:30	11:30	W3	0	6	4	JB
19/07/2020	around VP9, VP10 and Loughs Doo and Smuttan	09:15	15:15	W3-4	0	5	4	JB
20/07/2020	around VP5	11:35	14:40	SW3	0	7	4	JB
27/04/2021	Area 5	14:10	15:44	N3	0	4	4	SC
27/04/2021	Area 2	14:13	15:45	NE4	0	7	4	JG
27/04/2021	Area 3	14:30	15:45	N3	0	7	4	JS
28/04/2021	Area 4	13:15	14:40	N2	1	7	4	JS
28/04/2021	Area 9	13:30	15:00	NE2	0	5	4	SC
28/04/2021	around VP9	08:20	15:05	NE4	0	4	4	MH
28/04/2021	around VP9	08:20	15:05	NE4	0	4	4	CR
29/04/2021	Area 1	11:50	12:40	NNE3	1	6	4	SC
30/04/2021	Area 5	11:55	13:00	NE3	3	6	4	JG
30/04/2021	Area 7	11:55	12:55	NE3	1	7	4	JS
17/05/2021	around VP9	12:15	17:30	W4-5	0	6	4	MH
17/05/2021	around VP9	12:15	17:30	W4-5	0	6	4	CR
18/05/2021	Area 7	12:00	13:15	NW4	0	3	4	JG
18/05/2021	Area 6	12:00	13:15	W3	0	2	4	JS
18/05/2021	Area 1	12:00	12:40	SW3	0	4	4	SC



Appendix 7.1 – Bird Survey Methods

Date	Survey area	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
19/05/2021	Area 2	11:40	12:45	W4	0	3	4	JS
16/06/2021	Area 6	17:30	19:00	W5	0	6	4	JC
17/06/2021	Area 3	17:25	18:50	W3	0	7	4	JC
17/06/2021	Area 2	17:25	18:40	W3	0	7	4	JS
20/06/2021	around VP5	05:30	11:30	NE1	0	4	4	MH
22/06/2021	hill/plateau on south side of estuary to south of VP8	20:00	22:00	SW5	2	8	3	CR
22/06/2021	around VP9	09:25	14:30	SW3	0	8	4	MH
22/06/2021	around VP9	09:25	14:30	SW3	0	8	4	CR
14/07/2021	hill/plateau on south side of estuary to south of VP8	20:00	22:00	SW4	2	8	3	CR
15/07/2021	around VP9	12:45	17:30	SW3	0	8	4	MH
15/07/2021	around VP9	12:45	17:30	SW3	0	8	4	CR
16/07/2021	around VP5	07:00	15:00	SW3	0	6	4	MH
17/07/2021	hill/plateau on south side of estuary to south of VP8	08:30	10:30	W4	0	0	4	CR
20/07/2021	Area 5	11:20	12:55	SE1	0	1	4	JS
20/07/2021	Area 6	11:20	12:55	SW1	0	1	4	JC
21/07/2021	Area 3	16:40	17:35	W1	0	3	4	JC
21/07/2021	Area 2	16:40	17:35	W1	0	3	4	JS

Survey area: numbered areas are shown on Wind = compass direction and Beaufort scale. Rain: 0 = none; 1 = drizzle; 2 = light showers; 3 = heavy showers; 4 = heavy rain. Cloud = cloud cover in eighths. Visibility: 0 = no visibility; 1 = limited (< 500 m); 2 = poor (< 1 km); 3 = moderate (1-2 km); 4 = good (> 2 km). Surveyors: CR = Conor Ryan; JB = Jamie Bliss; JC = Jason Cahill; JG = Jack Glennon; JS = John Sherry; JW = Jamie Woods; MH = Mick Hogan; ND = Nicholas Duff; SC = Sophia Couchman.

A7.1.4 WINTER WATERBIRD SURVEYS

Survey methods

In 2019/20, a winter walkover survey was carried out between October and March to assess possible usage of the site by Greenland White-fronted Goose and Golden Plover. Open areas of bog or heath habitat are favoured by these species therefore these areas were targeted. Due to restricted access at this time, only open bog/heath areas within the south and west of the site boundary were surveyed. This survey was not repeated in the winter of 2020/21 as it was considered that the vantage point surveys provided sufficient coverage to assess any usage of the site by Greenland White-fronted Goose and Golden Plover.

Waterbird surveys of the Gweebarra Estuary were carried out in the winters of 2019/20 and 2020/21. High and low tide counts were carried out in October 2019 and monthly between October 2020 and March 2021. These covered the sections of the estuary upstream of



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Lettermacaward Bridge, which includes all the estuary within a 2 km buffer of the site boundary. The surveys were carried out from a number of vantage points along both sides of the estuary.

Between November 2019 and March 2020, a waterbird vantage point survey was carried out monthly to assess connectivity and usage of the river as a commuting corridor. This used two vantage point locations, on the upstream and downstream sides of Lettermacaward Bridge. A single three hour watch was carried out each month during / near high tide.

In the 2020/21 winter, Whooper Swan and Greenland White-fronted Goose dusk roost surveys were carried out. These covered lakes within 1 km of the site boundary, where access was feasible. The surveys were conducted once per month between October 2020 and March 2021.

Survey coverage

Details of the dates, timings and weather conditions of the winter walkover surveys are shown in Table A.7.1.7.

Table A.7.1.7 Dates, timings and weather conditions of the winter walkover surveys.

Date	Location	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
21/11/2019	West of site	10:20	13:32	SE2	1	7	3	JS
21/11/2019	Upper transect	10:16	13:16	SE3	0	8	4	SC
13/12/2019	Lower transect	09:15	12:00	NW4	4	4	4	SC
13/12/2019	South of site	09:30	11:30	SW1	2	8	3	JS
22/01/2020	Lower transect	12:00	13:25	SW2		8	1	JS
22/01/2020	Upper transect	12:10	15:15	na0	0	8	0	SC
19/02/2020	Upper transect	09:00	11:00	W4	2	7	3	JS
19/02/2020	Lower transect	08:00	10:30	SW3	2	8	4	SC
13/03/2020	Lower transect	09:30	13:00	W2	0	3	4	JS
13/03/2020	Upper transect	09:30	12:30	W3	0	2	4	SC

Wind = compass direction and Beaufort scale. Rain: 0 = none; 1 = drizzle; 2 = light showers; 3 = heavy showers; 4 = heavy rain. Cloud = cloud cover in eighths. Visibility: 0 = no visibility; 1 = limited (< 500 m); 2 = poor (< 1 km); 3 = moderate (1-2 km); 4 = good (> 2 km). Surveyors: JS = John Sherry; SC = Sophia Couchman.

Details of the dates, timings and weather conditions of the waterbird counts of the Gweebarra Estuary are shown in Table A.7.1.8.



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Table A.7.1.8 Summary of the waterbird counts of the Gweebarra Estuary.

Date	Tide	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
31/10/2019	LT	12:15	16:15	SE1	0	8	4	SC
07/10/2020	LT	15:55	17:00	NW2	0	8	4	JS, JG
09/10/2020	HT	11:30	13:00	W1	0	6	4	JS, JG
11/11/2020	HT	08:30	09:37	S4	2	8	3	JS
11/11/2020	LT	14:00	15:30	SW4	4	8	2	SC
09/12/2020	HT	13:12	14:30	SW4	1	8	2	SC
11/12/2020	LT	09:05	10:30	S1	0	7	4	JS
11/01/2021	HT	15:16	16:30	SE2	1	8	4	JS
13/01/2021	LT	11:20	12:20	SW1	1	6	4	SC
18/02/2021	LT	15:00	16:15	SW4	1	4	4	SC
18/02/2021	HT	09:15	10:10	0	0	3	4	JS
10/03/2021	HT	15:50	16:54	SW5	1	6	4	SC
10/03/2021	LT	10:00	11:15	S1	1	8	4	JS

Tide: LT = low tide; HT = high tide. Wind = compass direction and Beaufort scale. Rain: 0 = none; 1 = drizzle; 2 = light showers; 3 = heavy showers; 4 = heavy rain. Cloud = cloud cover in eighths. Visibility: 0 = no visibility; 1 = limited (< 500 m); 2 = poor (< 1 km); 3 = moderate (1-2 km); 4 = good (> 2 km). Surveyors: JC = Jason Cahill; JG = Jack Glennon; JS = John Sherry; SC = Sophia Couchman.

Details of the dates, timings and weather conditions of the vantage point watches of the Gweebarra Estuary are shown in Table A.7.1.9.

Table A.7.1.9 Summary of the waterbird vantage point watches of the Gweebarra Estuary.

Date	Vantage Point	Start	Finish	Wind	Rain	Cloud	Visibility	Surveyor
21/11/2019	Downstream VP	10:00	13:00	NE5	1	8	4	SC
22/11/2019	Upstream VP	10:00	13:00	SE2	1	8	4	JS
10/12/2019	Downstream VP	13:10	16:10	W5	5	8	3	JS
10/12/2019	Upstream VP	13:15	16:15	NW5	0-4	8	4	SC
21/01/2020	Downstream VP	12:30	15:30	W1	0	8	4	JS
21/01/2020	Upstream VP	12:30	15:30	SW0-2	0-2	8	3	SC
19/02/2020	Downstream VP	12:10	15:15	N4	4	8	3	SC
19/02/2020	Upstream VP	12:15	15:15	W2	4	8	3	JS
10/03/2020	Downstream VP	15:15	18:15	W5	1	6	4	JS
10/03/2020	Upstream VP	15:15	18:15	SW4	3	6	4	SC

Wind = compass direction and Beaufort scale. Rain: 0 = none; 1 = drizzle; 2 = light showers; 3 = heavy showers; 4 = heavy rain. Cloud = cloud cover in eighths. Visibility: 0 = no visibility; 1 = limited (< 500 m); 2 = poor (< 1 km); 3 = moderate (1-2 km); 4 = good (> 2 km). Surveyors: JS = John Sherry; SC = Sophia Couchman.



A7.1.5 BREEDING RED-THROATED DIVER SURVEY

Survey methods

Breeding Red-throated Diver surveys were carried out in the 2020 and 2021 breeding seasons. These focused on surveying lakes within 1 km of the wind farm site, while some additional lakes within 2 km of the site were also covered (Figure A.7.1.4). The buffer distance for Red-throated Diver surveys recommended by the SNH guidelines is 1 km. The survey effort of the lakes within 1 km of the wind farm turbines and other infrastructure is summarised in Table A.7.1.10. The survey visits for these lakes were carried out between 8th June and 9th July.

Table A.7.1.10 Summary of Red-throated Diver survey effort of lakes within 1 km of the wind farm turbines and other infrastructure.

Lakes	Survey visits		Other survey effort
	2020	2021	
Lough Aneane Beg	2	1	Also checked during moorland surveys in 2021
Lough Aneane More	2	1	Also checked during moorland surveys in 2021
Lough Sallagh	0	0	Visible from VP2 and VP4
Pond 1	0	1	
Pond 2	0	1	

The survey methods followed Gilbert *et al.* (1998). At each lake a suitable vantage point was selected that provided the best coverage of the lake. The surveyor scanned the water and the lake shore for Red-throated Divers. When the surveyor was confident that no divers were present, and if access allowed, the surveyor walked the perimeter of the lake, scanning any islands, to search for signs of Red-throated Diver presence, such as empty nest scrapes, broken eggshells or dead chicks.

Survey coverage

Details of the dates, timings and weather conditions of the Red-throated Diver surveys are shown in Table A.7.1.5.

Table A.7.1.11 Dates, timings and weather conditions of the Red-throated Diver and breeding gull surveys.

Date	Lakes	Start	Finish	Wind	Rain	Cloud	Surveyor
11/05/2020	Lough Mor, Lough Machugh, Lough Smuttan			NE3	0	3	SC
08/06/2020	Lough Smuttan, Lough Errig, Lough Mor, Lough Beg						JS
09/06/2020	Lough Mor, Lough Beg	10:44	12:05	W1	0	8	SC
09/06/2020	Lough Nabrack, Lough Namurleog	15:40	17:40	SW3	4	8	JS
10/06/2020	Lough Machugh	10:15	11:45	N1	0	7	JG
06/07/2020	Lough Mor, Lough Beg, Lough Machugh, Lough Smuttan, Lough	14:30	17:30	W3	0	5	JS



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Date	Lakes	Start	Finish	Wind	Rain	Cloud	Surveyor
	Doo, Lough Namurleog, Lough Nabrack, Lough Errig						
08/07/2020	Lough Aneane More, Lough Aneane Beg	10:40	12:00	E1	0	7	JS
09/07/2020	Lough Nacroagh	12:20	12:30	NE3	0	6	JS
18/06/2021	Lough Aneane More, Lough Aneane Beg	13:55	15:04	0	0	4	JS, JG
18/06/2021	Derkmore Lough, Pond 1, Pond 2	12:12	15:03	W1	0	3	JC
19/07/2021	All lakes within study area	11:00	16:00	W1	0	1	JG

Wind = compass direction and Beaufort scale. Rain: 0 = none; 1 = drizzle; 2 = light showers; 3 = heavy showers; 4 = heavy rain. Cloud = cloud cover in eighths. Visibility: 0 = no visibility; 1 = limited (< 500 m); 2 = poor (< 1 km); 3 = moderate (1-2 km); 4 = good (> 2 km). Surveyors: JC = Jason Cahill; JG = Jack Glennon; JS = John Sherry; SC = Sophia Couchman.

A7.1.6 BREEDING GOLDEN PLOVER SURVEY

Survey methods

The moorland breeding bird surveys collected data on breeding Golden Plover in 2020 and 2021. Following consultation with NPWS, a targeted Golden Plovers survey was carried out in the 2022 breeding season. The objective of this survey was to collect data on Golden Plover commuting routes between the breeding area and potential grassland foraging habitat. There is no standard design for this type of survey. Therefore, the survey design was based on a literature review of information about Golden Plover breeding ecology.

Breeding Golden Plover in Britain typically commute from moorland nesting areas to grassland feeding areas. This commuting behaviour mainly occurs during the incubation period. Male Golden Plovers usually incubate during the day and females at night, with most changeovers occurring early in the morning and late in the evening. Once the young have hatched, the adults usually remain with the chicks in the moorland habitat.

The survey started in mid-April before the likely start of the incubation period and finished when observations indicate the end of the incubation period: i.e., both birds of the pair are active in the nesting area at the same time. Surveys were out at weekly intervals during this period. The watches started at dawn, or finished at dusk, when changeovers of incubating birds are most likely to occur. The surveyor watched for the arrival of the non-incubating bird. Based on the behaviour described in the literature, the non-incubating bird was expected to be visible for a period of time, displaying and/or standing on watch, before the changeover occurs. When the changeover occurred, the observer tracked the flight path of the departing bird for as long as possible.

The survey took measures avoid causing undue disturbance to the breeding Golden Plovers and other species of conservation importance. This included using observation positions in the nesting area that did not cause persistent agitation by the plovers, and liaising with the Golden Eagle survey team to avoid disturbance to any eagle nests.



Survey coverage

Details of the dates, timings and weather conditions of all the Golden Plover surveys are shown in Table A.7.1.5. All the surveys were carried out in the open moorland habitat in the eastern corner of the wind farm site. All the surveys were carried out by David Miley.

Table A.7.1.12 Dates, timings and weather conditions of the Golden Plover surveys.

Date	Start	Finish	Wind	Rain	Cloud	Visibility	Type
24/04/2022	06:15	09:15	NW4	0	5	3	VP
24/04/2022	09:15	11:00					B&S
02/05/2022	06:00	11:30	W2	0	7	4	mixed
11/05/2022	16:00	21:30	W5	1	8	4	mixed
17/05/2022	16:30	22:00	SE3.5	1	8	4	mixed
23/05/2022	18:40	22:00	W3	0	7	4	mixed
01/06/2022	14:00	19:00	W1	0	7	4	mixed

Wind = compass direction and Beaufort scale. Rain: 0 = none; 1 = drizzle; 2 = light showers; 3 = heavy showers; 4 = heavy rain. Cloud = cloud cover in eighths. Visibility: 0 = no visibility; 1 = limited (< 500 m); 2 = poor (< 1 km); 3 = moderate (1-2 km); 4 = good (> 2 km). Type: B&S = Brown and Sheppard survey; VP = vantage point watch; mixed = mix of the two survey methods.

A7.1.7 BREEDING GULL SURVEY

Survey methods

The objective of the breeding gull survey was to identify gull colonies on any lakes in the vicinity of the wind farm site. The survey was carried out at the same time as the breeding Red-throated Diver survey and focussed on lakes within 2 km of the wind farm site (Figure A.7.1.4). The buffer distance for breeding gull surveys recommended by the SNH guidelines is 2 km. The survey effort of the lakes within 2 km of the wind farm turbines and other infrastructure is summarised in Table A.7.1.10. The survey visits for these lakes were carried out between 11th May and 9th July. Each lake was checked for the presence of breeding gulls by scanning from a vantage point and / or walking the shoreline. If occupied gull nests had been present at any of the lakes, the population size would have been surveyed using the appropriate method from Gilbert *et al.* (1998). However, no occupied gull nests were present at any of the lakes surveyed, although evidence of probable breeding was recorded at one lake.

Table A.7.1.13 Summary of gull survey effort of lakes within 2 km of the wind farm turbines and other infrastructure.

Lakes	Survey visits		Other survey effort
	2020	2021	
Lough Aneane Beg	2	1	Also checked during moorland surveys in 2021
Lough Aneane More	2	1	Also checked during moorland surveys in 2021
Lough Doo	1	-	Covered by gull survey, or checked during moorland / VP surveys in 2021
Lough Machugh	3	1	Covered by gull survey, or checked during moorland / VP surveys in 2021



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Lakes	Survey visits		Other survey effort
	2020	2021	
Lough Nacroagh	1	1	Covered by gull survey, or checked during moorland / VP surveys in 2021
Lough Nacroaghy	0	0	Checked during access to / from VP9 in 2021
Lough Nabrack	2	1	Covered by gull survey, or checked during moorland / VP surveys in 2021
Lough Namurleog	2	1	Covered by gull survey, or checked during moorland / VP surveys in 2021
Lough Sallagh	0	0	Visible from VP2 and VP4
Lough Smuttan	3	1	Covered by gull survey, or checked during moorland / VP surveys in 2021
Pond 1	0	1	
Pond 2	0	1	

Survey coverage

Details of the dates, timings and weather conditions of all the breeding gull surveys are shown in Table A.7.1.10.

A7.1.8 BREEDING MERLIN SURVEY

Survey methods

The SNH guidelines recommends that Merlin surveys cover a 2 km buffer distance around the wind farm site. However, this is not practicable in landscapes like the one around the Cloghercor Wind Farm site, where most of the 2 km buffer is potentially suitable Merlin habitat. An intensive Merlin survey of ten sample 3 x 3 km squares by Lusby *et al.* (2011) involved 845 hours of survey work, which amounts to around nine hours per km². This would translate to around 750 hours of survey work to cover the 2 km buffer around the Cloghercor Wind Farm site, while access issues would also have been a major constraint. Instead, as the main sensitivity was considered to be potential disturbance to Merlin nesting close to the wind farm site, the Merlin survey effort focussed on areas within a 500 m buffer around the wind farm site.

The Merlin surveys in 2020 and 2021 were based on the methods used by Lusby *et al.* (2011) and. This involved searching for Merlin signs and then carrying out targeted vantage point surveys in areas of potential Merlin activity were identified from the sign searching. The searches for Merlin signs were incorporated with the moorland surveys and involved checking prominent features, such as boulders, fence posts, peat hummocks, etc., for signs such as plucking remains, moth wings, white wash, pellets, moulted feathers, etc. As the moorland surveys involved walking transects around 200 m apart, the survey coverage exceeded the levels recommended by Hardey *et al.* (2013), and that used by Lusby *et al.* (2011). The intention was that, when areas of potential Merlin activity had been identified from the sign searching, targeted vantage point surveys of potential nesting habitat would be carried out. However, as no areas of potential Merlin activity were identified from the sign searching, there was no requirement for targeted vantage point surveys.



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In 2022, a dedicated Merlin survey was carried out. This comprised 84.5 hours of survey work by an experienced Merlin surveyor between 28th March and 10th August. The survey covered all areas of the wind farm site, as well as the 500 m buffer around the site. The surveys consisted of walking accessible forestry edges and some of the tracks and rides, and all the open ground with suitable nesting habitat, to check for evidence of Merlin. Vantage point watches were used to look for displaying, calling, hunting, juveniles, etc., over forestry blocks, into inaccessible areas, rides and over areas of open ground for hunting Merlin. Vantage point watches were also used from the public road to cover areas where there were obvious land access issues.

Survey coverage

Details of the dates, timings and weather conditions of the 2022 Merlin surveys are shown in Table A.7.1.14. The survey routes covered on each date are shown in Figure A.7.1.5. All the surveys were carried out by Jamie Bliss.

Table A.7.1.14 Dates, timings and weather conditions of the Merlin surveys.

Date	Start	Finish	Wind	Rain	Cloud	Visibility
28/03/2022	08:45	17:50	SW-NW2-3	0	1	4
29/03/2022	10:30	13:45	NW2	0	0	4
25/04/2022	07:25	13:25	E2	0	1	4
26/04/2022	10:50	15:10	SE3	0	4	4
07/05/2022	09:40	19:00	W2	0	3	4
08/05/2022	07:45	16:40	S3	0	5	4
14/05/2022	08:50	14:50	SW2	0	7	4
22/06/2022	11:15	17:30	W1	1	8	4
27/06/2022	10:45	17:15	W1	1	8	3
12/07/2022	10:45	18:15	W3	0	8	4
19/07/2022	10:00	15:30	NW2-3	0-3	8	3-4
10/08/2022	09:05	13:35	W3	0	8	4

Wind = compass direction and Beaufort scale. Rain: 0 = none; 1 = drizzle; 2 = light showers; 3 = heavy showers; 4 = heavy rain. Cloud = cloud cover in eighths. Visibility: 0 = no visibility; 1 = limited (< 500 m); 2 = poor (< 1 km); 3 = moderate (1-2 km); 4 = good (> 2 km). Type: B&S = Brown and Sheppard survey; VP = vantage point watch; mixed = mix of the two survey methods.

A7.1.9 REFERENCES

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Appendix 7.1 – Bird Survey Methods

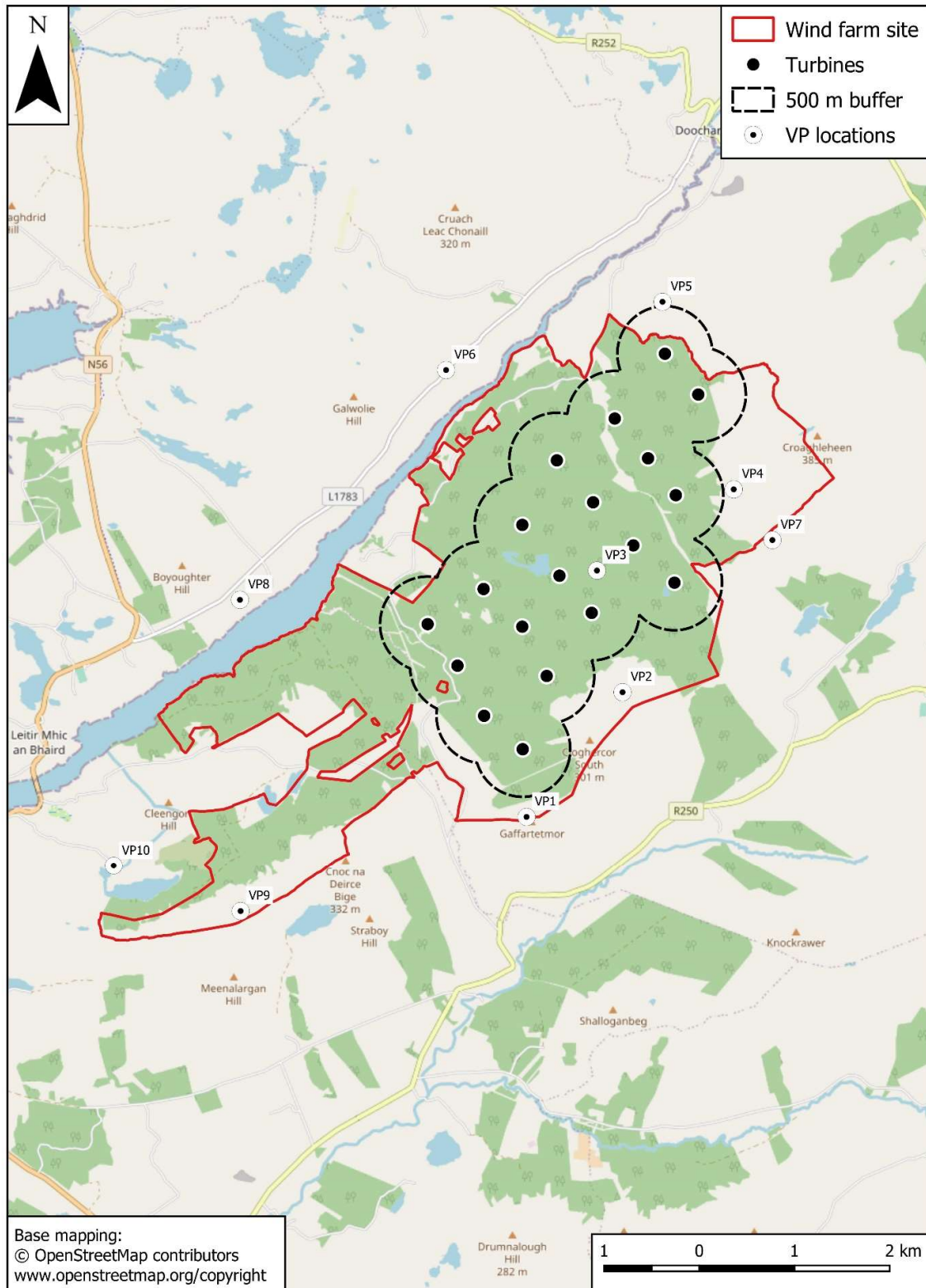


Figure A.7.1.1 - Vantage point locations.



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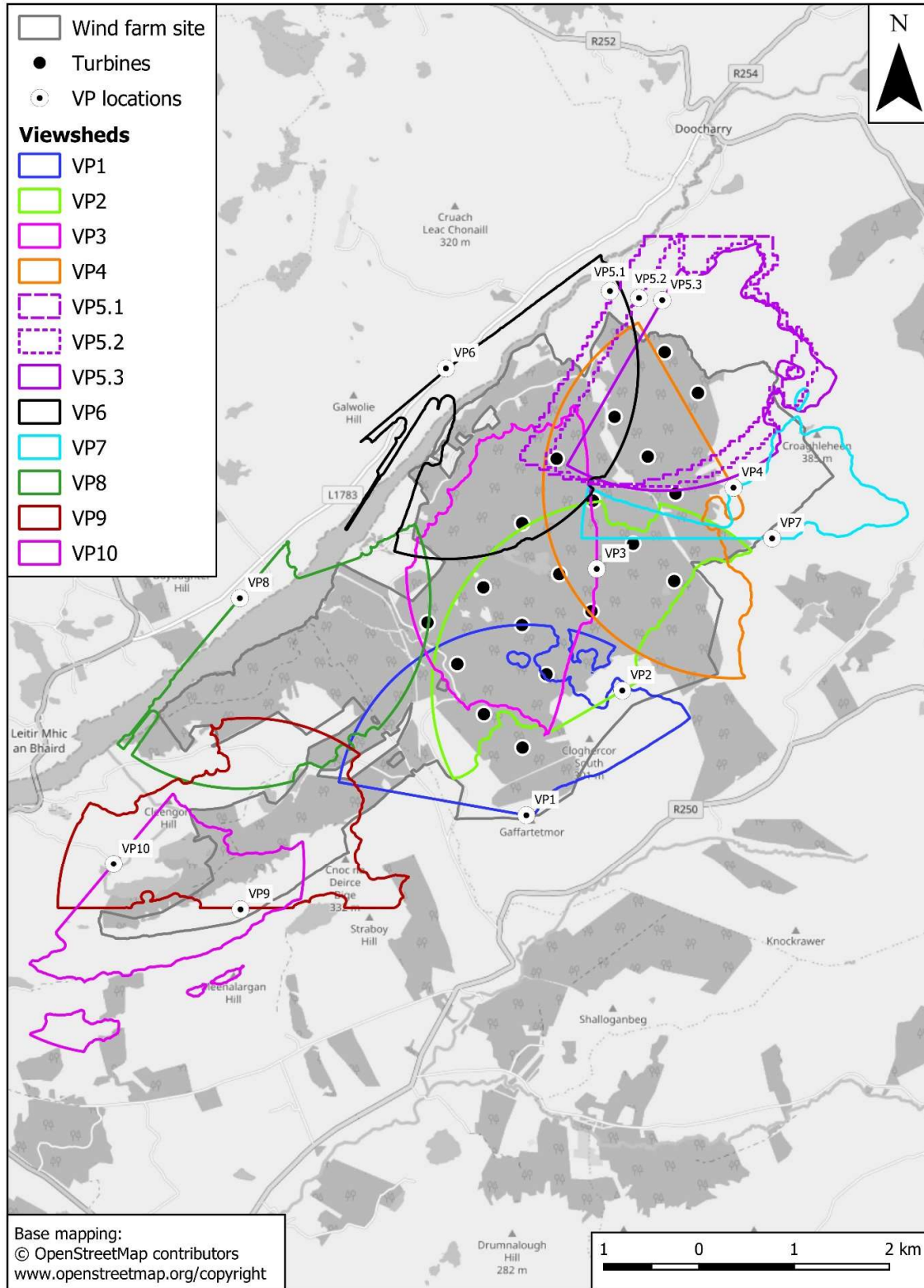


Figure A.7.1.2 - Viewshed coverage for each vantage point.



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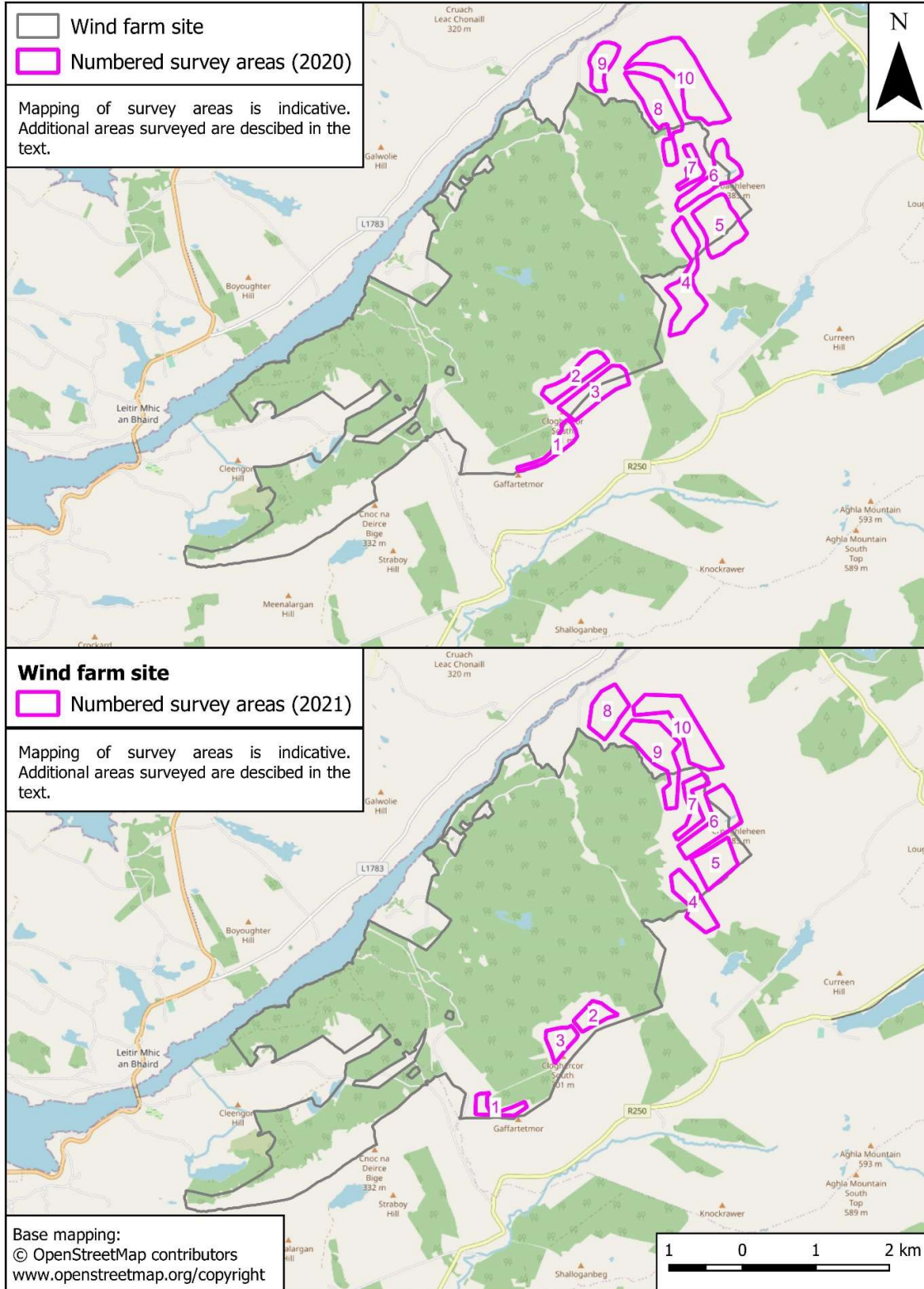


Figure A.7.1.3 - Numbered moorland breeding bird survey areas.



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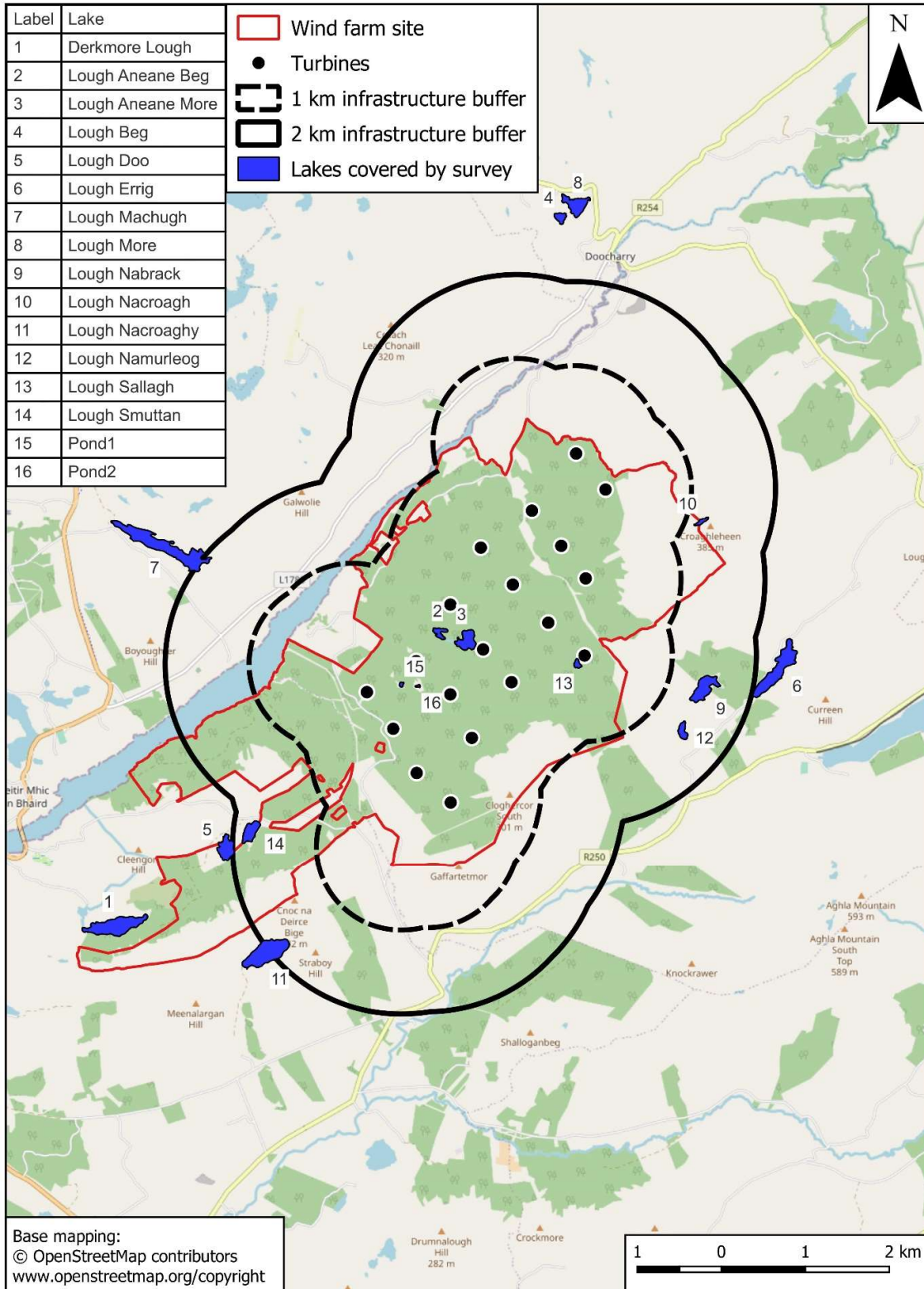


Figure A.7.1.4 - Lakes covered by the breeding Red-throated Diver / gull surveys.



Appendix 7.1 – Bird Survey Methods

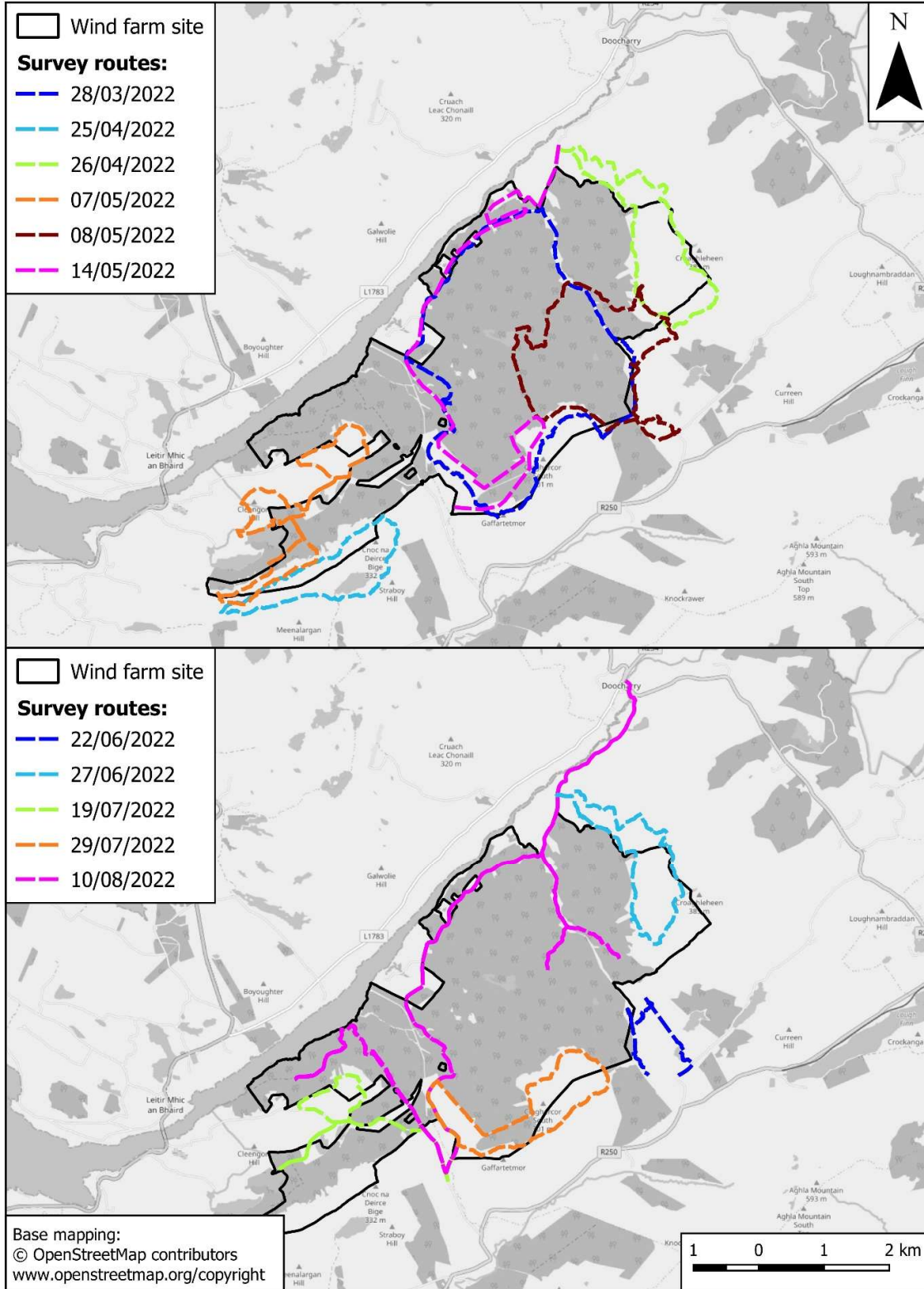


Figure A.7.1.5 - Merlin survey routes.

