

## APPENDIX 8.1: ORNITHOLOGY FIELD SURVEY METHODOLOGY

### 8.1 Flight Activity (Vantage Point) Surveys

8.1.1 Vantage Point (VP) watches were undertaken from May to September 2018 and March to April 2019 to collect data on flight activity for target species. The surveys followed standard guidance for onshore wind farms<sup>1</sup>. The method focuses on identifying flight-paths and flight heights of target species, such as wildfowl and raptors, and allows any regular patterns of flightlines to be identified, allowing the OHL to be designed to minimise collision risk to birds.

8.1.2 Following consultation and desk study, the following target species were identified:

- all wild goose, swan and duck species, with the exception of Canada goose and mallard;
- all raptors and owls listed on Annex I of the Birds Directive<sup>2</sup> or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)<sup>3</sup>;
- all wader species;
- all skua species; and
- all diver species.

8.1.3 Initially, seven VP locations were established to monitor the Proposed Development. The entire length of the Proposed Development is not covered by VP viewsheds, instead targeted VP surveys were undertaken to cover areas that provide suitable habitat for the qualifying interest species of the nearby SPAs and lie within connectivity distance for those species. Current guidance on assessment of impacts from power lines suggests a survey corridor width of 500 m either side of a proposed route is appropriate for moorland sites or in areas with suitable habitat for qualifying species of protected sites<sup>4</sup>. Six hours of watches were completed at each VP location per month. Following the results of surveys undertaken in May and June 2018, an additional VP location was added to monitor the use of the Study Area by red-throated divers for the remainder of the 2018 breeding season. Six hours of watches were completed in July and August 2018 at this additional location (Diver VP).

8.1.4 VP locations are shown in **Figure 8.2**. The Ordnance Survey (OSGB) coordinates of each VP are listed below:

- VP 1: NC 52458 26459;
- VP 2: NC 52051 25752
- VP 2B: NC 50110 23331;
- VP 3: NC 59086 16094;
- VP 4: NC 58667 13609;
- VP 5: NC 58644 12123;
- VP 6: NC 58768 10423; and
- Diver VP: NC 52497 23960.

8.1.5 The VPs were selected through GIS analysis and field trials, maximising ground visibility within the flight activity Study Area. The height bands used to record flight activity were: Band 1 = <20 m; Band 2 = 20 – 40 m; Band 3 = 40 – 100 m; and Band 4 = 100 - 150 m; Band 5: = > 150 m.

<sup>1</sup> Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment onshore wind farms (Version 2). SNH Guidance. SNH, Battleby

<sup>2</sup> Bird species listed on Annex I of the EC Directive of the Conservation of Wild Birds (Birds Directive) – [http://ec.europa.eu/environment/nature/conservation/wildbirds/threatened/index\\_en.htm](http://ec.europa.eu/environment/nature/conservation/wildbirds/threatened/index_en.htm)

<sup>3</sup> Bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) - <https://www.legislation.gov.uk/ukpga/1981/69/schedule/1>

<sup>4</sup> SNH (2016) Assessment and mitigation of impacts of power lines and guyed meteorological masts on birds. (Version 1). SNH

- 8.1.6 Flights activity of secondary species was also summarised during each VP survey. In addition, all incidental records of target species (i.e. birds that were not in flight, birds that were heard but not seen, birds that were observed well beyond the viewshed and records outside of the formal VP survey hours) were recorded.
- 8.1.7 In line with SNH guidance, viewsheds extended to 2 km from each VP location in a 180 degree arc and covered as much of the area within the Study Area as possible, allowing for topographical constraints. Full details of target species flights are provided in **Appendix 8.2**. Weather records recorded during surveys are provided in **Appendix 8.3**.

## 8.2 Upland Breeding Bird Survey

- 8.2.1 Two breeding bird survey (BBS) visits using a version of the Brown and Shepherd<sup>5</sup> method were carried out in June and July 2018, the breeding bird survey area is displayed in **Figure 8.1**.
- 8.2.2 The modified Brown and Shepherd Moorland Breeding Bird survey is the standard survey technique for moorland / upland breeding birds (Gilbert *et al.* 1998)<sup>6</sup>, and is described in the SNH online guidance (SNH 2014, revised 2017)<sup>7</sup>. The Brown and Shepherd methodology is based on a constant search method involving spending 25 minutes in each 500 m x 500 m quadrant within the breeding bird survey area. Each quadrant was walked to ensure that all parts were approached within 100 m.
- 8.2.3 The survey involved a single surveyor walking the areas of open ground, recording the location and behaviour of all birds seen and heard. At regular intervals, the surveyor paused, scanned the area for species and listened out for calls and songs. All registrations were marked on a 1:10,000 scale map using British Trust for Ornithology (BTO) symbols with a note of the species activity. These surveys were undertaken on the following dates:
- 26<sup>th</sup> and 27<sup>th</sup> June; and
  - 12<sup>th</sup> and 13<sup>th</sup> July.
- 8.2.4 All surveys were carried out between the hours of 08:00 and 17:00 British Summer Time (BST). Surveys were conducted by experienced ornithologists in suitable weather conditions. Details of survey timings and weather conditions during the surveys are provided in **Appendix 8.3**.
- 8.2.5 Population estimates of birds in the breeding bird survey area were derived by comparing the summary maps for each of the main seasonal survey periods. When compiling figures of breeding birds, the approximate central location of all registrations recorded from different visits is used to identify a notional territory centre. Birds displaying breeding behaviour within a territory during more than one visit were assessed as breeding. For species which can be under-recorded such as snipe, birds displaying breeding behaviour, or recorded within suitable breeding habitat during any visit were assessed as breeding.

## 8.3 Breeding Raptor Survey

- 8.3.1 Breeding raptor and owl surveys were carried out between April and August 2018 within the breeding raptor and owl survey area, as shown in **Figure 8.1**. Hen harrier, osprey, short-eared owl, goshawk and merlin were identified as the target raptor species most likely to be breeding within the survey area. However, whilst surveys were designed to target these species in particular, all raptors encountered (including secondary species) were recorded.

<sup>5</sup> Brown, A.F. & Shepherd, K.B. (1993) A method for censusing upland breeding waders. *Bird Study*, **40**: 198 – 195.

<sup>6</sup> Gilbert, G., Gibbons, D. and Evans, L. (1998) *Bird Monitoring Methods*. RSPB, Sandy

<sup>7</sup> Scottish Natural Heritage (2014, revised 2017) Recommended Bird Survey methods to Inform Assessment of Onshore Wind Farms. SNH, Battleby.

- 8.3.2 Where suitable habitat for target raptor and owl species was present within 2 km of the Proposed Development, specific surveys for these target species were carried out using a combination of walkover surveys combined with miniature VPs in accordance with methods described in Hardey *et al.*, 2013<sup>8</sup>. Fixed point watches were carried out with the aim of identifying courtship displays and territorial behaviour of target raptor and owl species. In addition, any raptor flight data from the Vantage Point (VP) surveys that was indicative of breeding was used to help target the walkover surveys. Four breeding raptor and owl surveys were undertaken between May and July 2018 on the following dates: 27<sup>th</sup> May, 30<sup>th</sup> June, 8<sup>th</sup> July and 23<sup>rd</sup> July.
- 8.3.3 Surveys were carried out by suitably experienced surveyors under a Schedule 1 Licence in suitable weather conditions. Details of all target species flights (including height, duration and number of birds) were recorded, with flightlines recorded on 1:10,000 scale field maps. Results from breeding raptor and owl surveys are contained in Confidential **Appendix 8.5**, with details of survey dates, times and weather conditions provided in **Appendix 8.3**.

#### 8.4 Breeding Diver Surveys

- 8.4.1 Breeding diver surveys were undertaken for black and red-throated divers using the species-specific methodology described in Gilbert *et al.*, (1998)<sup>9</sup>. Licensed surveyors visited and checked all potentially suitable nesting waterbodies within 2 km of the Proposed Development which identified 11 potentially suitable waterbodies. These lochs are shown in **Figure 8.1**. Potentially suitable waterbodies were surveyed at least twice during the breeding season (as per guidance). In practice, these lochs were checked on numerous occasions during walkover surveys. If there was evidence of breeding, surveyors would collect targeted nesting diver flight-lines during the breeding season.
- 8.4.2 Diver surveys were carried out at suitable lochs and lochans on the following dates: 25<sup>th</sup> June; 9<sup>th</sup> and 23<sup>rd</sup> July and 6<sup>th</sup> August. Results from breeding diver surveys are contained in Confidential **Appendix 8.5**, with details of survey dates, times and weather conditions provided in **Appendix 8.3**.

#### 8.5 Black Grouse Surveys

- 8.5.1 The standard survey methodology for black grouse as outlined in Gilbert *et al.*, (1998)<sup>9</sup> was followed. Areas of potentially suitable habitat within 2 km of the Proposed Development (open moorland, woodland edges, open glades within woodland) were checked by surveyors in late May for black grouse leks. Surveys were conducted within two hours of dawn on clear and calm days to maximise lek detectability.

Black grouse surveys were undertaken on 28<sup>th</sup> and 29<sup>th</sup> May 2018. The dates of survey fall outwith the optimum survey window as described in Gilbert *et al.*, (1998)<sup>9</sup> due to surveys being commissioned in late May. Lek locations are shown in **Figure 8.8**. Results from black grouse surveys are contained in **Appendix 8.2**. Details of survey dates, times and weather conditions are provided in **Appendix 8.3**.

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<sup>8</sup> Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013) Raptors: a field guide to survey and monitoring (3<sup>rd</sup> Edition). The Stationery Office, Edinburgh.

<sup>9</sup> Gilbert, G., Gibbons, D.W. and Evans, J. (1998). Bird Monitoring Methods. RSPB, Sandy