

# Appendix 8.1 Ornithology Summary Report September 2020 – August 2022

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## Introduction

### **Overview**

ITP Energised was appointed by the Applicant to write a technical report to summarise a suite of ornithological surveys that were designed and commissioned by the Applicant in support of a proposed wind farm development at Nisthill, Orkney (hereafter referred to as the site). The site centres on Ordnance Survey Grid Reference HY 30194 27012 and its location is shown on Figure 1N.

### **Site Description**

The site measures 120.33 ha and is located in the north of Orkney Mainland, approximately 24 km to the north-east of Stromness. The site comprises agricultural grassland, wet heath and blanket bog and is used to rear livestock, mainly cattle. In the centre of the site is a single existing wind turbine. Loch of Swannay borders the site to the east and Loch of Hundland lies approximately 500 m south-west. Hundland Hill is the highest point at 106 m in the centre of the site with land sloping away in all directions. There are no named waterbodies or structures within the site boundary although the site does contain drainage ditches. The wider landscape comprises similar habitats with scattered residential properties.

## Aims

This report presents the ornithological survey work undertaken in support of the Proposed Development between September 2020 and August 2022.

Collectively, the objectives of the surveys were to:

- Map the distribution of breeding birds, including scarce and priority species;
- Record the presence and abundance of birds considered to be of a conservation priority; and
- Quantify the level of flight activity by birds of potential conservation importance.

## Legislation and Biodiversity

### **Legislation**

All relevant legislation and guidance documents have been considered as part of this assessment, as referenced in this report (a summary of pertinent nature conservation legislation is presented below).

Of particular relevance are:

- Council Directive 2009/147/EC on the conservation of wild birds (the Birds Directive);
- The Ramsar Convention on Wetlands 1976;
- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive);
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);

- The Wildlife and Natural Environment (Scotland) Act 2011 (as amended); and
- The Nature Conservation (Scotland) Act 2004 (as amended), which places a statutory duty on all public bodies to further the conservation of biodiversity through the Scottish Biodiversity Strategy, with Scottish priority species and habitats listed on the Scottish Biodiversity List (SBL), itself based on the former UK Biodiversity Action Plan (UKBAP), and regional biodiversity targets defined through a Local Biodiversity Action Plan (LBAP). The LBAP of relevance to this report is the Orkney LBAP.

### **International Conventions and Directives**

#### *The Birds Directive (2009/147/EC)*

The European Union (EU) Directive on the Conservation of Wild Birds (2009/147/EC) was first adopted in 1979 and is the primary mechanism for delivering the EU's obligations under the Convention on Biological Diversity (CBD), and the Ramsar and Bonn Conventions. Collectively, the Birds and Habitats Directives require Member States to take action in order to protect all bird species and their habitats which includes the designation of Special Protection Areas (SPAs) in respect to species listed on Annex I of the Directive.

#### *Ramsar Convention on Wetlands*

The Convention on Wetlands of International Importance (the Ramsar Convention) was adopted in Iran in February 1971 and came in to force in the UK in May 1976. The Convention considers the subject area of wetland conservation and comprises three elements of activity:

- The designation of wetlands of international importance as Ramsar sites;
- The promotion of the sustainable use of all wetlands in the territory of each country; and
- International co-operation with other countries to further the sustainable use of wetlands and their resource.

#### *The Habitats Regulations*

In Scotland, the Habitats Directive is translated into specific legal obligations by the Conservation (Natural Habitats, &c.) Regulations 1994. This piece of legislation is usually known as the Habitats Regulations.

The Habitats Regulations cover the requirements for:

- Special Areas of Conservation (SACs) and SPAs, which are sites that are internationally important for threatened habitats and species; making a network of sites designated together and known collectively as the Natura2000 network;
- Species requiring strict protection – i.e., European protected species; and
- Other aspects of the Habitats Directive including the management, surveillance and reporting for sites in order to ensure the favourable status of species and habitats are maintained.

The Habitats Regulations have been most recently amended in 2012.

#### *The Convention on Biological Diversity (CBD)*

The CBD was adopted at the Earth Summit in Rio de Janeiro, Brazil in June 1992, and came into force in December 1993. It was the first global treaty to provide a legal framework for biodiversity conservation. The treaty has three primary goals:

- The conservation of biological diversity;
- The sustainable use of its components; and

- The fair and equitable sharing of the benefits arising from the use of genetic resources.

Signatories are required to create and enforce national strategies and action plans to conserve, protect and enhance biological diversity.

The UK Government ratified the convention and published the UKBAP in 1994 and to compliment the UKBAP, separate biodiversity strategies for each of the devolved governments have been subsequently developed, including the Scottish Biodiversity Strategy, launched in 2004.

### **National Legislation**

#### *The Wildlife and Countryside Act*

The Wildlife and Countryside Act 1981 (as amended) (WCA) is the principal mechanism for wildlife protection in the UK. Schedule 1 of the Act lists bird species that are afforded special protection. The principal designation established under the Act is the citation of Sites of Special Scientific Interest (SSSI).

The Act also makes it an offence (with exception to species listed in Schedule 2) to intentionally:

- Kill, injure, or take any wild bird;
- Take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- Take or destroy an egg of any wild bird.

### ***Biodiversity***

#### **Biodiversity Duty Report**

Under the Nature Conservation (Scotland) Act 2004, all public bodies are required to further the conservation of biodiversity when carrying out their public responsibilities and duties. Following an amendment to the Wildlife and Natural Environment (Scotland) Act 2011, public bodies are required to publish a publicly available report on the actions they have taken to meet this biodiversity duty. The first report was required to be submitted by 1st January 2015, with the next reporting round in 2018.

#### **Scottish Biodiversity List**

Scottish Ministers created the SBL in 2005 in order to satisfy the requirements under Section 2(4) of the Nature Conservation (Scotland) Act 2004 and to assist public bodies in carrying out conservation of biodiversity, and to provide the general public with information regarding conservation within Scotland. The list contains habitats, plants and species which are deemed to be of principal importance to the Scottish population and meet the social and scientific criteria. This report focuses on the scientific value of the SBL entries.

Species details, including a list of scientific criteria and reasoning for inclusion to the list, can be located within the Scottish Biodiversity List: Technical Report (Scottish Government, 2013).

#### **The Orkney Local Biodiversity Action Plan**

First produced in 2003, the most recent version of the Orkney LBAP was launched in 2018 and covers the period 2018-2022. The Orkney LBAP outlines species and habitats that are important to Orkney, along with actions that can be taken to protect them. The appendix of the latest LBAP revision includes a list of bird species that are considered to be of conservation concern in Orkney (Orkney Islands Council, 2013).

Species outlined in the Orkney LBAP of relevance to this study and the site include:

- Hen harrier (*Circus cyaneus*);
- Curlew (*Numenius arquata*);

- Lapwing (*Vanellus vanellus*);
- Redshank (*Tringa totanus*); and
- Ringed plover (*Charadrius hiaticula*).

### ***Birds of Conservation Concern***

The BoCC, is a collaboration between the Statutory Nature Conservation Bodies (SNCBs), Royal Society for the Protection of Birds (RSPB), British trust for Ornithology (BTO), Wildfowl and Wetlands Trust (WWT), Game and Wildlife Conservation Trust (GWCT) and several other organisations. It uses an approach based on quantitative assessments against standardised criteria, in order to place individual bird species on 'Red', 'Amber' or 'Green' lists to indicate different levels of conservation concern. Red in the context of BoCC is not the same as IUCN's Red List, though IUCN status is one of the criteria used in BoCC assessment. Collectively, the changes in the numbers and proportions of species on Red, Amber or Green lists provide a gauge of the broad direction of status of UK birds and point to the degree of threat they face, as well as the efficacy of conservation measures taken (Stanbury *et al.*, 2021).

Birds on the Red and Amber lists are subject to at least one of the factors listed below:

- Red - red list species are those that are globally threatened, have had an historical population decline in the UK from 1800 -1995, a rapid (> or = 50%) decline in UK breeding population over the past 25 years, or a rapid (> or = 50%) contraction of UK breeding range over the past 25 years;
- Amber - amber listed species have had a historical population decline from 1800-1995 but are recovering; population size has more than doubled over the past 25 years, a moderate (25-49%) decline in UK breeding population over the past 25 years, a moderate (25-49%) contraction of UK breeding range over the past 25 years, a moderate (25-49%) decline in UK non-breeding population over the past 25 years, or species with unfavourable conservation status in Europe also known as Species of European Conservation Concern (SPEC); and
- Green - green listed species have no identified threat to their population status.

## **Methods**

### ***Overview***

This section describes the methods used for the ornithological surveys, which comprised a combination of desk study and field survey.

### ***Desk Study***

An ornithological desk study was undertaken to compile existing baseline data for the site and local area.

In terms of nature conservation designations, the desk study aims to identify international designations such as SPAs, Ramsar wetlands within 10km of the site and national statutory designations such as SSSIs, National Nature Reserves (NNRs) or Marine Nature Reserves (MNRs) within 5 km of the site boundary, extending to 20km for SPAs designated species of geese that are known to travel long distances to forage. Only ornithological features are considered relevant to the present study. Any Local Nature Conservation Sites (LNCSSs) or non-statutory designations, such as Local Biodiversity Sites, were identified within a 2km distance of the site boundary.

Existing records that are freely available for commercial use of protected or otherwise notable species (e.g. SBL/LBAP priority species) were identified with a 5km distance of the site boundary. Records from the last 10 years were considered relevant to the study. In addition, SNH outlined historic records of breeding seabirds on the island collected by the JNCC (2018).

Data for priority / notable species and designated sites were obtained from the following databases:

- National Biodiversity Network (NBN) Atlas;
- Scottish Natural Heritage (SNH) SiteLink;
- Scotland’s Environment Interactive Map; and
- MAGIC: Nature on the Map.

In addition, the Orkney Raptor Study Group (ORSG) were contacted to obtain breeding records for Schedule 1/Annex 1 raptors and owls within 2km of the site boundary, extended to 5 km for hen harrier and short-eared owl for the previous three years.

### **Field Surveys**

#### **Determination and Selection of Vantage Points**

Knowledge of the local area and initial site scoping identified that VP surveys would be required to account for the potential presence of ‘scarce’ diurnal raptors, waterfowl and wading bird species within and adjacent to the site.

Two VPs at were established one to the south of the site looking north and one to the north of the site looking south, using GIS software combined with Ordnance Survey digital data. The VP locations were placed to cover the area of the site which is displayed within Figure 1. The VP locations and the corresponding viewsheds were verified during a site visit in September 2020. VP locations and bearings are provided in Table 1 and the viewsheds are shown in Figure 1.

**Table 1 – VP Locations and Orientation**

<b>VP</b>	<b>Grid Reference</b>	<b>Bearing</b>
1	HY 30772 26110	180 <sup>0</sup>
2	HY 29925 27995	0 <sup>0</sup>

#### **Diurnal Vantage Point Surveys**

Surveys at the site commenced in September 2020, during which Information on bird flight activity was collected throughout timed watches using recommended guidance and methods as outlined by SNH (2017). A total of 24 months of data has been gathered in order to support a future Ecological Impact Assessment (EclA) for the Proposed Development. Surveyors undertook the surveys in such a way as to minimise the potential for disturbance impacts on bird behaviour associated with their presence near the site, including arriving at the survey point a minimum of 15 minutes prior to the commencement of each VP watch.

All surveys were stratified, where possible, across three daylight periods (termed ‘dawn’, ‘day’ and ‘dusk’) to allow for diurnal variation in activity rates. All surveys comprised watches lasting no more than three hours in duration and a minimum of 30 minutes break was observed by the surveyor between subsequent watches.

All surveys were undertaken by a single observer in a wide range of weather conditions, but mainly in conditions of good ground visibility (> 2 km) and timings were adjusted to account for changes in sunrise and sunset times within each survey season.

During each VP watch, two methods of recording were used comprising focal sampling of target species and activity summaries of secondary species. Observations were recorded using six height bands which were:

- HB1: < 20 m;
- HB2: 20 ≥ < 50 m;

- HB3:  $50 \geq < 100$  m;
- HB4:  $100 \geq < 150$  m;
- HB5:  $150 \geq < 200$  m; and
- HB6:  $\geq 200$  m

Target species selected for the surveys included all Schedule 1 raptors and owls, divers, skuas, swans and geese (bar greylag or Canada goose).

Flightline data were noted in the field onto recording sheets and later transferred to a Microsoft Excel spreadsheet for analysis. Each flightline recorded during each VP watch was annotated on to a survey map and cross-referenced to its corresponding data entry on the recording sheet.

The total number of survey hours by season at each VP location comprised:

- VP1 – 2 x 36 hours breeding season;
- VP1 – 2 x 36 hours non-breeding season;
- VP2 – 2 x 36 hours breeding season; and
- VP2 – 2 x 36 hours non-breeding season.

A snapshot count recording method was implemented three secondary species which included all gull species, golden plover and greylag goose. Snapshot counts were undertaken at the end of each 5-minutes (except when a primary target species was being followed or written up). During each snapshot count, the number of individuals of each species flying at risk height within pre-defined recording zones was recorded during one or two relatively rapid sweeps across the viewing arc. Individual birds were counted only once and allocated to the at-risk height band within the recording zone in which they were first detected.

A total of two recording zones at each VP were used (Figure 1) and four at- height bands, these were used: 0 – 50 m; 50 – 100 m; 100 – 150 m and 150 – 200 m.

Full details of the survey dates and timings are shown in Annex A: Table A1-1.

### **Breeding Bird Walkover Surveys**

A Brown and Shepherd (B&S) type method of census for upland breeding wader populations (Brown and Shepherd, 1993) was used to survey the site for breeding birds (as per Bibby *et al.*, 2000 and Gilbert *et al.*, 1998). The site and where access was possible a 500m survey buffer were surveyed. In addition to the wader populations the walkover visits were used to identify a number of other ground nesting species such as skuas, gulls and terns as well as passerine species.

A total of four breeding bird survey visits were undertaken between April and July 2021 and 2022. Surveys took cognisance of SNH guidance (SNH, 2017) and were undertaken of open areas within the Study Area. The survey approach focussed on identifying approximate numbers of breeding pairs of each target species including: Annex 1, WCA Schedule 1, red list and/or SBL/Orkney Local Biodiversity Action Plan species.

The standard method for the B&S survey involves two complete mapping visits during the breeding season to allow for differences in detection rates between early and late breeding species, however, four survey visits were undertaken, as recommended (SNH, 2017). The B&S survey was modified slightly so that visits were undertaken in line with recommended guidance and timed to avoid the main periods of rapidly changing bird activity at dawn and dusk and to account for species other than just waders. Subsequent survey visits were completed while ensuring more than the minimum two week period between visits.

When individuals or pairs of birds were encountered, the ornithologist determined whether the bird(s) were different from any previous observations. This involved careful attention to the whereabouts and movements of birds, together with birds' sex and plumage characteristics. To



minimise the risk of double counting, behaviour and location of birds were carefully observed so that previously encountered birds were not recorded twice. Surveys were not conducted in winds greater than Beaufort Force 5 or in persistent rain, or when visibility was poor (i.e. less than 500 m).

The survey visits were undertaken on:

2021

- Survey visit 1 (April): 14th April;
- Survey visit 2 (May): 17th May;
- Survey visit 3 (June): 16th June; and
- Survey visit 4 (July): 7th July.

2022

- Survey visit 1 (April): 11th April;
- Survey visit 2 (May): 16th May;
- Survey visit 3 (June): 6th June; and
- Survey visit 4 (July): 3rd July.

#### **Breeding Raptor Surveys**

Surveys for breeding raptors were completed following methods as described in Hardey *et al.* (2013). A four-visit walkover survey approach was used, with survey visits being spaced between April and July 2021 and April and July 2022 covering the site and a 2km site buffer study area (where access permissions allowed). The survey area is continuously scanned for target species during the walkover. This includes stops at “mini” vantage points where the view is scanned for a period (usually 15-20 minutes) across suitable habitat for target species.

The first survey visit is primarily to detect displaying birds and/or territory occupancy by the various target species. A second visit is then used to identify active nests. The third visit is then carried out to check for the presence of young birds, and the final fourth visit is used to record fledged young (Hardey *et al.*, 2013).

Survey visits took place during the 2021 and 2022 breeding seasons on:

2021

- Survey visit 1 – 11th and 19th April;
- Survey visit 2 – 10th and 18th May;
- Survey visit 3 – 8<sup>th</sup> and 19th June; and
- Survey visit 4 – 10th July.

2022

- Survey visit 1 – 14th and 25th April;
- Survey visit 2 – 2nd and 25th May;
- Survey visit 3 – 2nd and 14th June; and
- Survey visit 4 – 16th July.

#### **Winter Walkover Surveys**

A winter walkover survey was completed covering the site in its entirety, with six visits completed between October and March in both winter seasons 2020 - 2021 and 2021 - 2022 to identify winter

roosting and foraging bird populations within the Study Area. The surveys were carried out in line with methods detailed in Gilbert *et al.* (2011) and consisted of six visits undertaken on:

Year 1

- Survey visit 1: 18th October 2020;
- Survey visit 2: 24th November 2020;
- Survey visit 3: 17th December 2020;
- Survey visit 4: 11th January 2021;
- Survey visit 5: 15th February 2021; and
- Survey visit 6: 9th March 2021.

Year 2

- Survey visit 1: 12th October 2021;
- Survey visit 2: 1st November 2021;
- Survey visit 3: 13th December 2021;
- Survey visit 4: 12th January 2022;
- Survey visit 5: 13th February 2022; and
- Survey visit 6: 24th March 2022.

As with the breeding walkover bird surveys, the winter walkover survey focused on identifying the presence and/or absence for each target species including Annex 1, Schedule 1, red list, WPL and Orkney LBAP species.

**Hen Harrier Roost Surveys**

A hen harrier roost survey was completed covering suitable habitat the site and 500m survey buffer, with six visits completed between October and March in both winter seasons 2020 - 2021 and 2021 - 2022 to identify winter roosting hen harrier within the Study Area. The surveys were carried out in line with methods detailed in Hardey *et al.* (2013) and consisted of six visits each undertaken on:

Year 1

- Survey visit 1: 19th October 2020;
- Survey visit 2: 24th November 2020;
- Survey visit 3: 14th December 2020;
- Survey visit 4: 12th January 2021;
- Survey visit 5: 16th February 2021; and
- Survey visit 6: 9th March 2021.

Year 2

- Survey visit 1: 17th October 2021;
- Survey visit 2: 13th November 2021;
- Survey visit 3: 13th December 2020;
- Survey visit 4: 11th January 2022;
- Survey visit 5: 13th February 2022; and

- Survey visit 6: 9th March 2022.

### Survey limitations

There were no issues with general access at the site and all surveys were carried out according to current recommended guidelines and took place during appropriate weather conditions.

## Baseline

### Desk Study

#### Site Designations

As summarised in Table 2, and displayed on Figure 2, four international and three national nature conservation designations occur within 10 km and 5 km of the site respectively.

**Table 2 Nature Conservation Designations (bird qualifying features only) within 10 km of the site**

Name	Designation	Distance & Direction	Qualifying Features	
Orkney Mainland Moors	SPA IBA	Adjacent SSE	Species:	Breeding and wintering/non-breeding hen harrier ( <i>Circus cyaneus</i> )  Breeding red-throated diver ( <i>Gavia stellata</i> )  Breeding short-eared owl ( <i>Asio flammeus</i> )
West Mainland Moors	SSSI	Adjacent SSE	Assmeblage:	Upland breeding birds.
Loch of Isbister and the Loons	SSSI	4.6 km SW	Assmeblage:	Breeding bird assemblage.
			Species	Breeding Pintail ( <i>Anus acuta</i> ).
Rousay	SPA	4.2 km NE	Assemblage:	A seabird assemblage of international importance.
			Species:	Breeding Arctic tern ( <i>Sterna paradisaea</i> ).
	SSSI	8.2 km NE	Assemblage:	Breeding bird assemblage (moorland), seabird colony.
			Species:	Breeding Arctic skua, Arctic tern, guillemot( <i>Uria aalge</i> ) and kittiwake( <i>Rissa tridactyla</i> ).
North Orkney	SPA	4.3 E	Species:	Breeding red-throated diver.  Non-breeding great northern diver ( <i>Gavia immer</i> ), Slavonian grebe ( <i>Podiceps auritus</i> ) and

Name	Designation	Distance & Direction	Qualifying Features	
				migratory velvet scoter ( <i>Melanitta fusca</i> ).
Marwick Head	SPA	5.6 km W	Assemblage:	A seabird assemblage of international importance.
			Species:	Migratory guillemot.

#### Non-statutory Designations

Four locally designated sites, all Local Nature Conservation Site (LNCS), designated for ornithological reasons within 2km of the site boundary (OIC, 2017b). A single RSPB reserve and Important Bird Area (IBA) which is shown in Table 2 lie within 2km of the site. All non-statutory designations are displayed in Figure 2 and outlined in Table 3 below.

**Table 3 Non-Statutory Nature Conservation Designations within 2 km of the site**

Name	Designation	Distance & Direction	Qualifying Features
Loch of Swannay	LNCS	Inside and adjacent E	The site comprises the loch itself, fringing marshy grassland along parts of the shore (round much of the loch, improved grassland reaches to or very nearly to the shore), and some nearby rough grassland. Features of note include several habitats and its bird assemblage (including red-throated diver and waders)
Birsay Moors	RSPB reserve	Overlaps and adjacent S	The site allows visitors to see hen harriers, short-eared owls, Arctic skuas and red-throated diver.
Loch of Hundland	LNCS	40m W	This site comprises the Loch of Hundland and areas of marsh at its northern and southern ends. Features of note include several habitats and its bird assemblage (including birds of prey, red-throated diver and waders)
Costa Hill, Evie/Birsa	LNCS	1.5 km NE	An area of heather moorland with patches of grassland. Features of note include several habitats and its bird assemblage (including peregrine and waders).
Loch of Boardhouse	LNCS	1.9 km W	The site comprises the loch, areas of marsh and marshy grassland at its south-eastern end, and the lower course of the Burn of Kirbister where it enters the loch. Features of note include several habitats and its bird

Name	Designation	Distance & Direction	Qualifying Features
			assemblage (including red-throated diver, wintering wildfowl and waders).

## Survey Results

### Target Species

A total of eight target species were recorded during VP surveys completed between September 2020 and March 2022; hen harrier, peregrine (*Falco peregrinus*), short-eared owl, red-throated diver, whooper swan (*Cygnus cygnus*), Greenland white-fronted goose (*Anser albifrons flavirostris*), Arctic skua (*Stercorarius parasiticus*) and great skua (*Stercorarius skua*).

#### Hen Harrier

A total of 67 flights of individual hen harrier were recorded throughout the VP surveys, with flight activity recorded all year round. The total flight time recorded was 8,373 seconds of which 6,790 seconds was recorded within the site (Appendix A: Table A2&A3; Figure 3). Of the 6,790 seconds recorded within the site a total of 6,852 seconds was recorded below 20m and a total of 38 seconds recorded at potential collision height (PCH) which is 25m-180m. Flight activity was constant throughout the 24 month period with 29 flights in year 1 and 38 in Year 2.

The 2021 breeding raptor walkover identified two hen harrier nests, all out with the site but within the 2km survey buffer (See Confidential Figure 7).

The desk study identified a total of nine probable or confirmed breeding records in 2019, six in 2020 and eight in 2021 for hen harrier. There are no records within the site, the nearest being over 500m from the site boundary (See Confidential Figure 9a).

A single ringtail (female / immature type) hen harrier was recorded roosting on 9<sup>th</sup> March 2020 with two ringtail birds seen entering the same location in October 2021. The roost site was outside the site and is shown in Confidential Figure 7.

#### Merlin

A single merlin flight of 10 seconds was recorded from VP surveys on 28<sup>th</sup> August 2022 ((Appendix A: Table A2&A11; Figure 4)). A was recorded flying south through the survey area during the breeding raptor walkover surveys but no evidence of breeding was recorded. The desk study identified two breeding records for merlin, one in 2020 and one in 2021 both records were in close proximity meaning it is considered likely both records relate to the same breeding pair. The breeding records are over 2km from the site (See Confidential Figure 9c).

#### Peregrine

Four flights of individual peregrine were recorded during VP surveys, the flights were spread across the survey period with one in each of November 2020, April 2021, August 2021 and October 2021 (Annex A: Table A1-2 & Table A1-6; Figure 4). The flight duration recorded totalled 1,023 seconds with 460 seconds within the site and 416 seconds recorded at PCH.

No evidence of breeding activity for this species within 2km of the site was evident during breeding raptor walkover surveys.

#### Short-eared owl

A total of 20 flights of individual short-eared owl were recorded throughout the VP surveys, with all flight activity recorded during the breeding seasons with 13 flights between May and June 2021 and seven flights between May and July 2022. The total flight time recorded was 2,887 seconds of which

2,778 seconds was recorded within the site, the majority of which was below 20m with a total of 381 seconds recorded at PCH (Appendix A: Table A2&A6; Figure 4).

The 2021 breeding raptor walkover identified a total of three breeding territories, all outwith the site boundary but within the 2km survey buffer (See Confidential Figure 7). Short-eared owl nests are extremely difficult to locate with any degree of accuracy without causing significant disturbance to the birds therefore the centres of the territories as shown in Figure 7 are an estimate of the location based on their behaviour and the available habitat.

The desk study identified a single breeding territory for short-eared owl in 2020 and four in 2021, all outside the site boundary (See Confidential Figure 9b). The 2021 territories which were outlined by the desk study are closely aligned with the ones recorded during field surveys at the site with one further record outside the 2 km survey buffer.

#### Whooper Swan

A single flight of three whooper swans was recorded on 1<sup>st</sup> December 2020 from VP surveys (Annex A: Table A1-2 & Table A1-8; Figure 5). The total flight time was 52 seconds all at PCH.

#### White-fronted Goose

A single flight of 13 white-fronted geese was recorded on 22<sup>nd</sup> February 2021 from VP surveys (Annex A: Table A1-2 & Table A1-7; Figure 5). The total flight time was 323 seconds all recorded to the south outside the site boundary.

#### Red-Throated Diver

Red-throated diver were recorded on 12 occasions totalling 13 birds from VP surveys, all of the flightlines were recorded between April and September with a single flight in September 2020, eight flights between April and July 2021 and three flights between May and June 2022. The flights were all recorded across the site north-east to north-west or vice-versa between Loch of Swannay and Loch of Hundland (Appendix A: Table A2&A5; Figure 5). The total flight time recorded was 2,179 seconds of which 1,258 seconds was recorded within the site and a total of 1,200 seconds was recorded at PCH.

No evidence of breeding activity was recorded for this species during the breeding bird walkover survey although an adult with an unfledged juvenile was recorded on Loch of Swannay which indicates there was a breeding pair somewhere on this waterbody.

#### Great Skua

Forty-three flights totalling 47 great skua were recorded during the VP surveys with all flights recorded between May and September (Appendix A: Table A2&A4; Figure 6). The total flight time recorded was 2,036 seconds, of which 1,743 was in the site and 1,499 seconds was recorded at PCH.

No evidence of breeding activity was recorded for this species during the breeding bird walkover survey.

#### Arctic Skua

Arctic skua were recorded five times, twice in June 2021, once in July 2021, once in May 2022 and once in June 2022 from VP surveys (Appendix A: Table A2&A3; Figure 6) with a total flight time recorded of 209 seconds within the site, of which 185 seconds was recorded at PCH.

No evidence of breeding activity was recorded for this species during the breeding bird walkover survey.

### **Marsh Harrier and Common Raptor Species**

Marsh harrier were not recorded during field surveys but two breeding records were identified during the desk study, the records were both in 2021 and over 1km from the site (See Confidential Figure 9c).

A buzzard (*Buteo buteo*) nest was identified during the breeding raptor walkover surveys (See Confidential Figure 7) and the presence of kestrel (*Falco tinnunculus*) and sparrowhawk (*Accipiter nisus*) was also noted outside the site boundary but no evidence of breeding was recorded.

### **Waders**

#### **Curlew**

Curlew (*Numenius arquata*) were regularly recorded within the site between September 2020 and March 2021. Curlew were record in small numbers from VP surveys during all months with a peak count of 20 in February 2021.

Breeding bird surveys identified a total of three (one probable and two possible) breeding attempts for curlew in the east of the site in 2021 (Figure 8a) and a total of six breeding attempts (2 probable, 4 possible) during 2022 surveys (Figure 8b). All the territories were registered within the site.

#### **Lapwing**

Lapwing (*Vanellus vanellus*) were regularly recorded within the site between September 2020 and March 2021. Lapwing were record in small numbers from VP surveys during the majority of months with a peak count of 35 in January 2021.

A total of three (one probable and two possible) breeding attempts for lapwing were recorded in the east of the site in 2021 (Figure 8a) and seven (five probable, two possible) breeding attempts in 2022 (Figure 8b). All (bar one territory in 2022) were recorded within the site with four recorded within 200m of the nearest infrastructure. Lapwing were commonly recorded in low numbers during each of the wintering bird survey visits.

#### **Oystercatcher**

Oystercatcher (*Haematopus ostralegus*) were infrequently recorded within the site during the non-breeding season with small numbers recorded regularly during the breeding season. A peak count of 28 was recorded in March 2021.

A total of four (two probable and two possible) breeding attempts for oystercatcher were recorded in the east of the site in 2021 (Figure 8a) and 2022 (one probable and three possible). (Figure 8b). Oystercatcher were commonly recorded in low numbers during each of the wintering bird survey visits.

### **Other waders**

A further nine wader species were recorded during surveys between September 2020 and March 2021.

A single possible breeding territory was recorded for each of common sandpiper (*Actitis hypoleucos*), redshank (*Tringa totanus*) and ringed plover (*Charadrius hiaticula*) with all three territories in the east of the site in 2021 (See Figure 8a). Redshank and ringed plover were very occasionally recorded during VP surveys.

Similar results were recorded for four species in 2022 although two common sandpiper territories and a single redshank territory were recorded (Figure 8b). Small numbers of snipe (*Gallinago gallinago*) were recorded from VP surveys throughout the year, while individuals were flushed from

Site during both wintering bird surveys. A total of two snipe breeding attempts were recorded both outside the site boundary to the south-east (Figure 8b)..

Golden plover (*Pluvialis apricaria*) were not recorded as a breeding species but were commonly recorded during winter VP surveys with peak counts of 55 in March 2022, 39 in December 2021 and 25 in November 2020. Small groups were recorded within the site during the winter walkover surveys.

Dunlin (*Calidris alpina*) were recorded occasionally during VP surveys with seven and one bird recorded in June 2021 and seven in November 2021. Whimbrel (*Numenius phaeopus*) were on a total recorded on four occasions during VP surveys with a total of 27 individuals noted in May and June 2021. Small numbers of woodcock (*Scolopax rusticola*) were flushed from the site during winter walkover surveys. A group of seven turnstone (*Arenaria interpres*) was recorded during VP surveys on 18th January 2022.

No evidence of breeding activity was recorded for either of these four species during the breeding bird walkover survey.

### **Other Wildfowl and Divers**

#### **Greylag Goose**

Greylag goose (*Anser anser*) were frequently recorded all year round with a total of 370 records during the snapshot counts from VP surveys. Greylag goose have a large feral breeding population on Orkney and a total of eight breeding records were recorded in the east of the site.

#### **Pink-Footed Goose**

Three records of pink-footed goose (*Anser brachyrhynchus*) totalling 123 individuals were recorded during the snapshot counts from VP surveys.

#### **Mallard, Teal, Tufted duck and Wigeon**

A pair of teal (*Anas crecca*) were recorded breeding within the site. Mallard (*Anas platyrhynchos*), tufted duck (*Aythya fuligula*) and wigeon (*Anas penelope*) were all recorded on Loch of Swanney during the breeding bird survey but no evidence of breeding was noted. Mallard, wigeon and teal were recorded occasionally from VP surveys.

### **Seabirds and Gulls**

#### **Arctic Tern and Fulmar**

Arctic tern (*Sterna paradisaea*) were recorded on two occasions (one on 4th May and three on 20th July) and fulmar (*Fulmarus glacialis*) were recorded occasionally during the breeding season from VP surveys but no evidence of breeding activity was recorded for either of these two species during the breeding bird walkover survey.

#### **Gulls**

Gulls were commonly recorded during the snapshot counts with common gull (*Larus canus*) recorded on 147 occasions and great black-backed gull (*Larus marinus*) on 149 occasions the most frequently recorded. Black-headed gull (*Chroicocephalus ridibundus*) were recorded on 25 occasions, herring gull (*Larus argentatus*) 28 occasions and lesser black-backed gull (*Larus fuscus*) on 8 occasions were also all recorded during VP surveys.

Common gull and great black-backed gull were recorded during breeding bird surveys but no evidence of breeding was noted.

#### **Other Species**

A small number of passerine species were recorded as breeding in the site, including BoCC red listed skylark (*Alauda arvensis*) and stonechat (*Saxicola rubicola*). A further BoCC Red list species not



outlined in the sections above were recorded during bird surveys (starling (*Sturnus vulgaris*)) and two BoCC Amber list species, meadow pipit (*Anthus pratensis*) and rock dove (*Columba livia*), but no evidence of breeding was recorded for these three species.

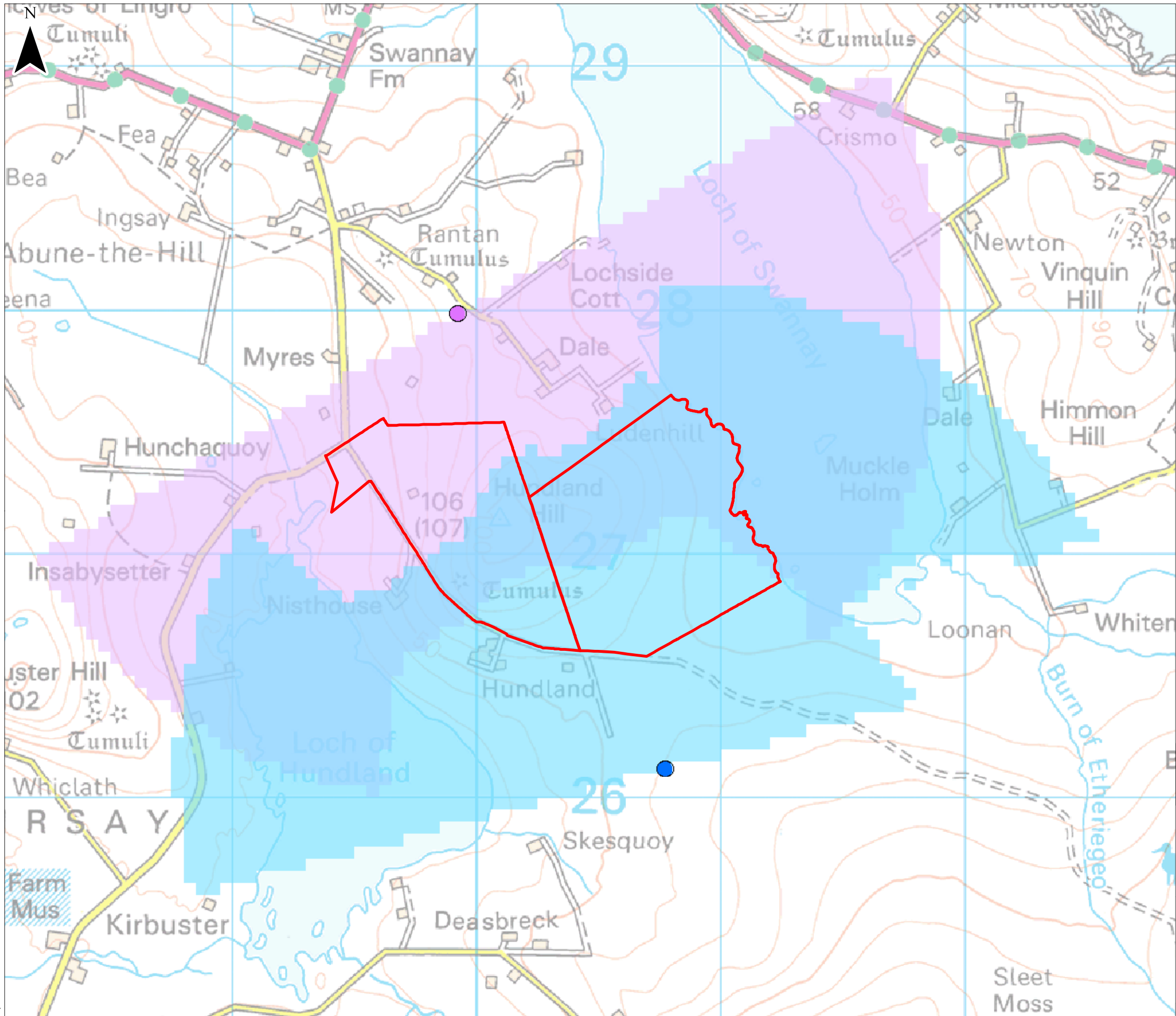
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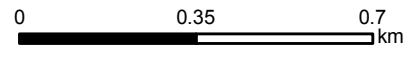
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## Figures

## Figure 1 Vantage Point Locations and Viewsheds



- KEY:**
- Site Boundary
  - VP1
  - VP2
  - Viewshed VP1
  - Viewshed VP2



Scale 1:15,000 @ A3



Nisthill Wind Farm EclA  
Technical Appendix 8.1

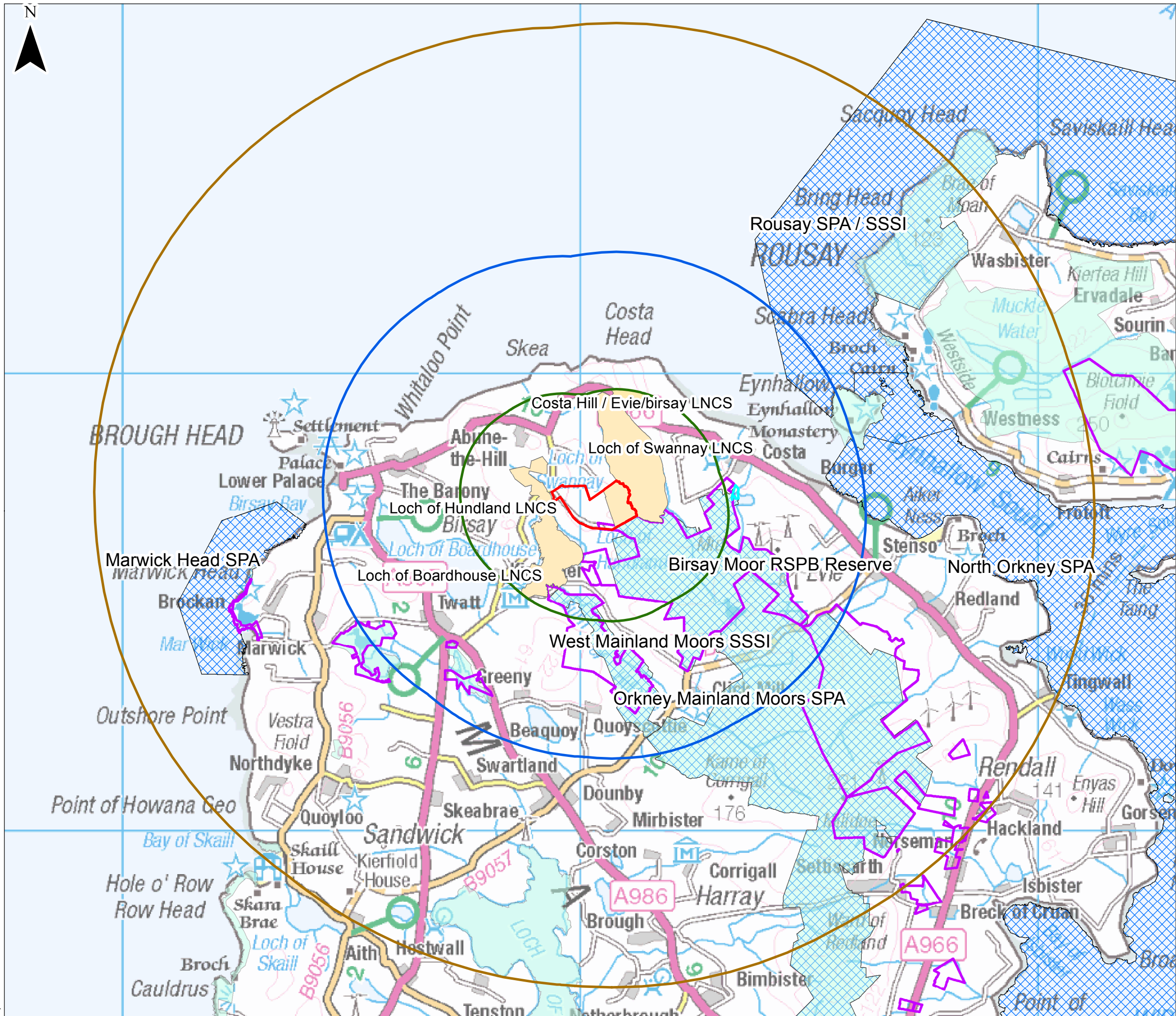
**Ornithology Technical Report - Figure 1**

**VP Locations and Viewsheds**

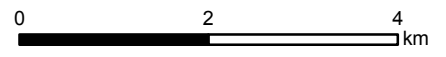
Date: 23/06/2022 Drawn by: AT Checked by: MF Version: V1

Project Number: 356

## Figure 2 Ornithological Designations



- KEY:**
- Site Boundary
  - Buffer (2 km)
  - Buffer (5 km)
  - Buffer (10 km)
  - Special Protection Area (SPA)
  - Site of Special Scientific Interest (SSSI)
  - RSPB Reserve
  - Local Nature Conservation Site (LNCS)



Scale 1:80,000 @ A3



Nisthill Wind Farm EclA  
Technical Appendix 8.1

**Ornithological Technical Report - Figure 2**

**Ornithological Designations**

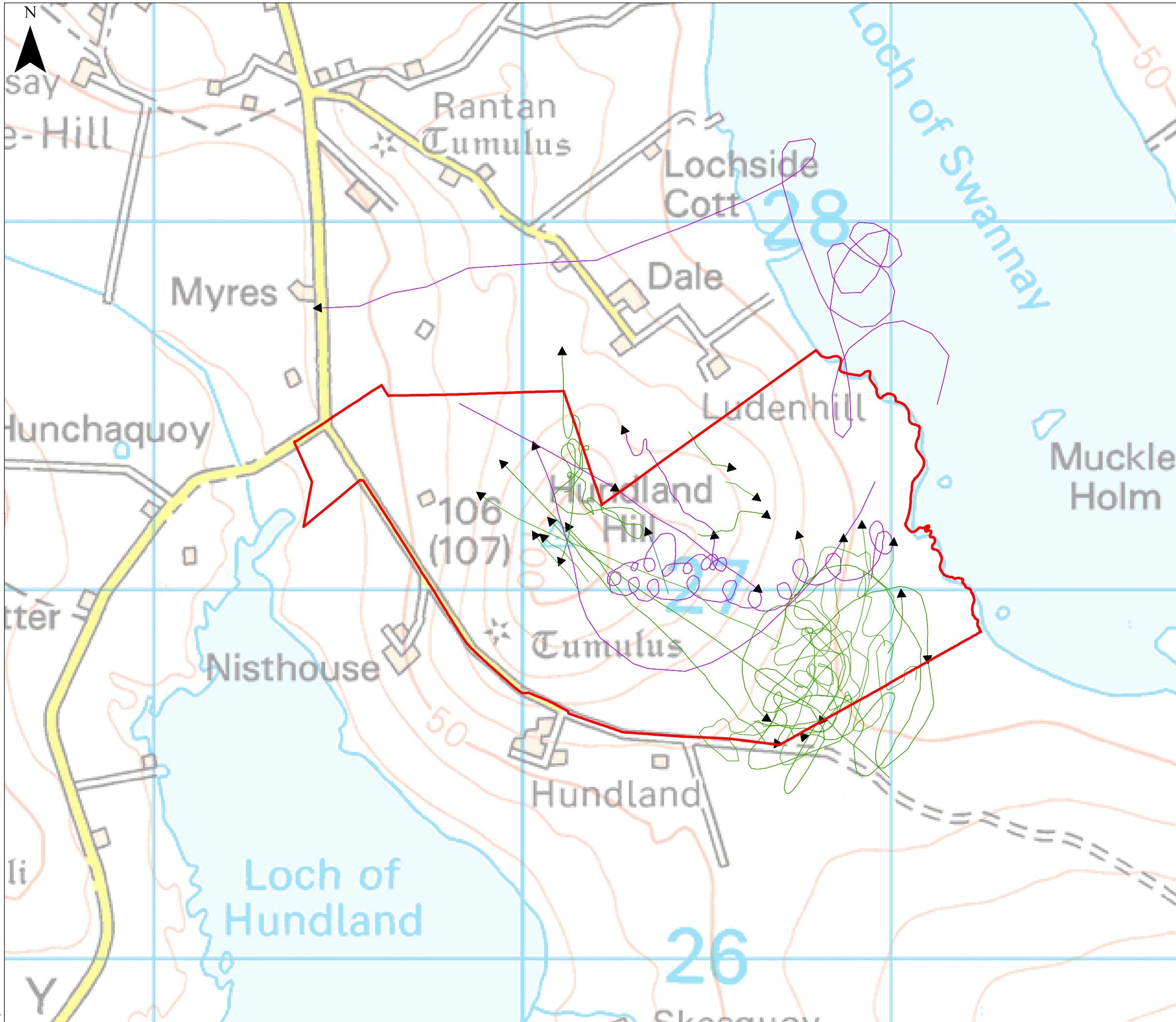
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Project Number: 3586



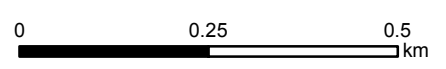
### Figure 3 Hen Harrier Flightlines (CONFIDENTIAL)

## Figure 4 Short eared Owl and Peregrine Flightlines



**KEY:**

- Site Boundary
- Species**
- Peregrine
- Short-eared owl
- Merlin



Scale 1:10,000 @ A3

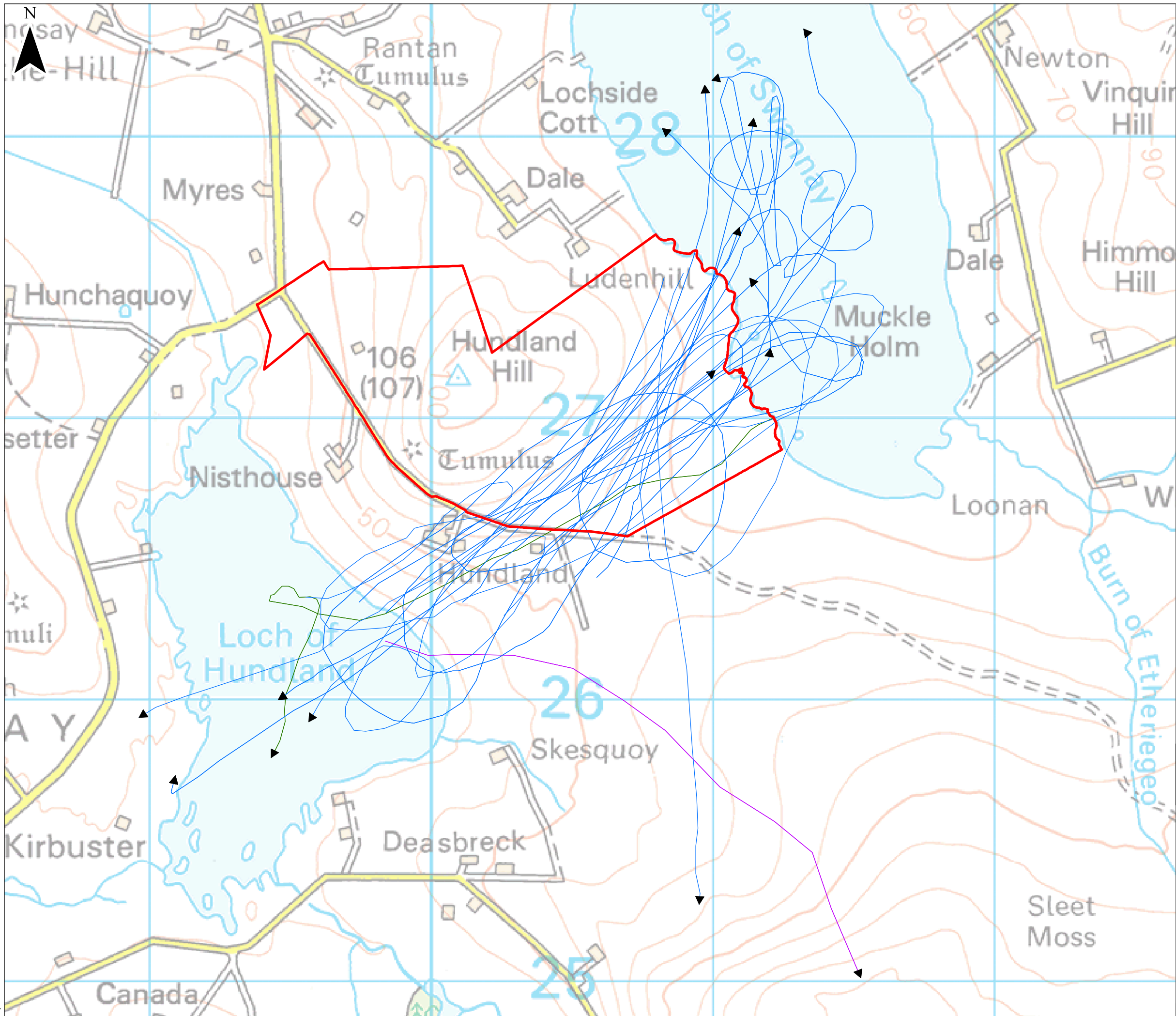


Nisthill Wind Farm EclA  
 Technical Appendix 8.1  
**Ornithology Technical Report - Figure 4**  
**Merlin /**  
**Peregrine / Short-eared Owl Flightlines**

Date: 12/10/2022	Drawn by: AT	Checked by: MF	Version: v1
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Project Number: 3586

## Figure 5 Red Throated Diver, White Fronted Goose and Whooper Swan Flightlines

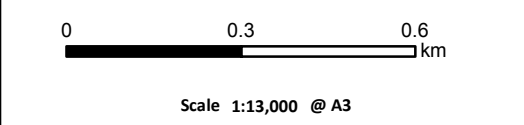


**KEY:**

- Site Boundary

**Species**

- ▶ White-fronted goose
- ▶ Red-throated diver
- ▶ Whooper swan



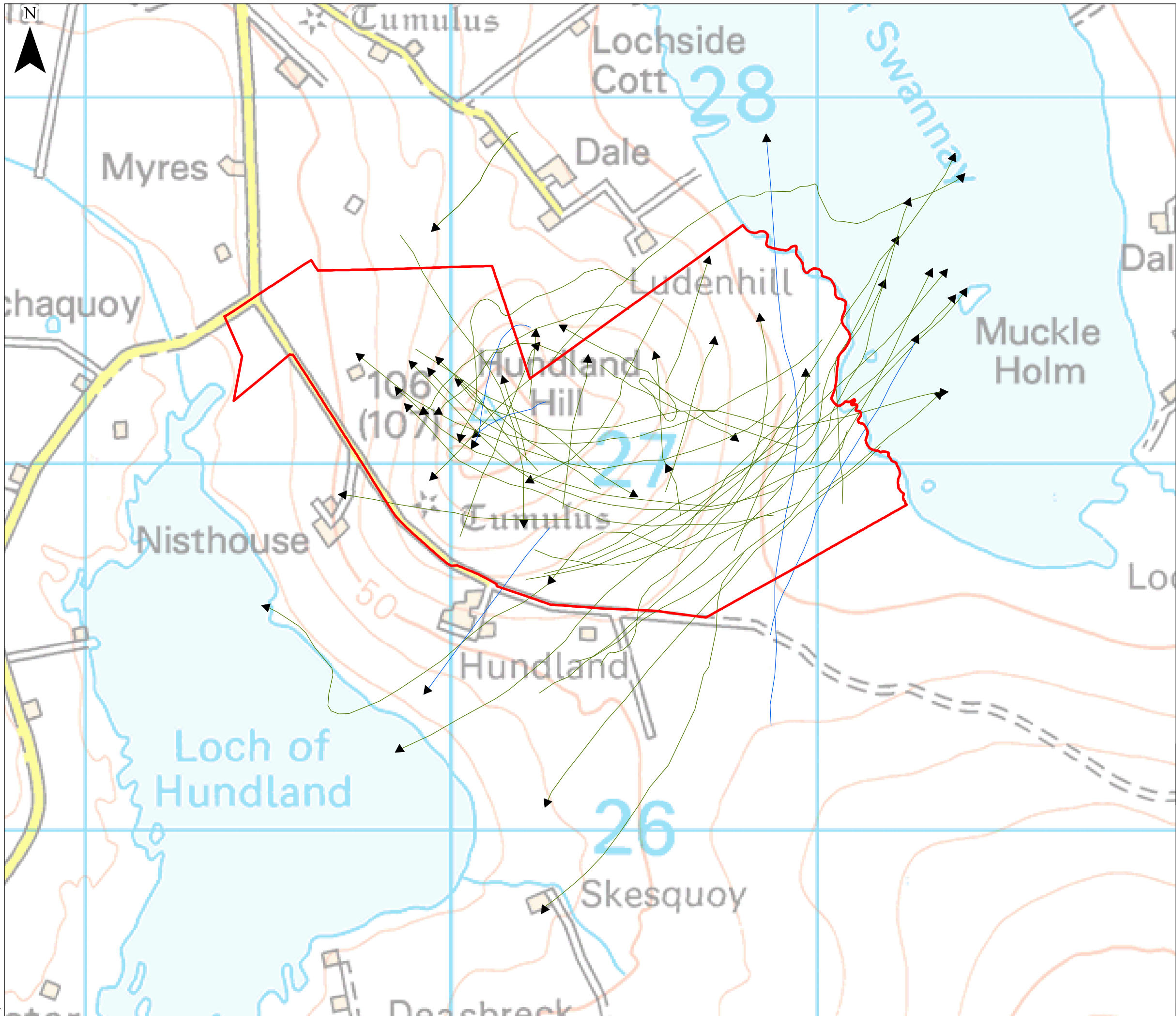
Nisthill Wind Farm EclA  
Technical Appendix 8.1

**Ornithology Technical Report - Figure 5  
Red-throated diver / Whooper Swan  
and White-fronted goose Flightlines**

Date: 04/10/2022	Drawn by: AT	Checked by: MF	Version: v1
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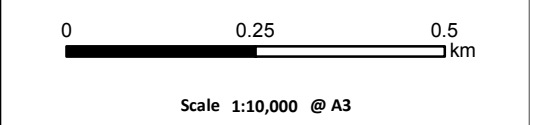
Project Number: 3586

## Figure 6 Skua Flightlines



**KEY:**

- Site Boundary
- Species**
- ▶ Arctic skua
- ▶ Great skua



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 Technical Appendix 8.1  
**Ornithology Technical Report - Figure 6**  
**Skua Flightlines**

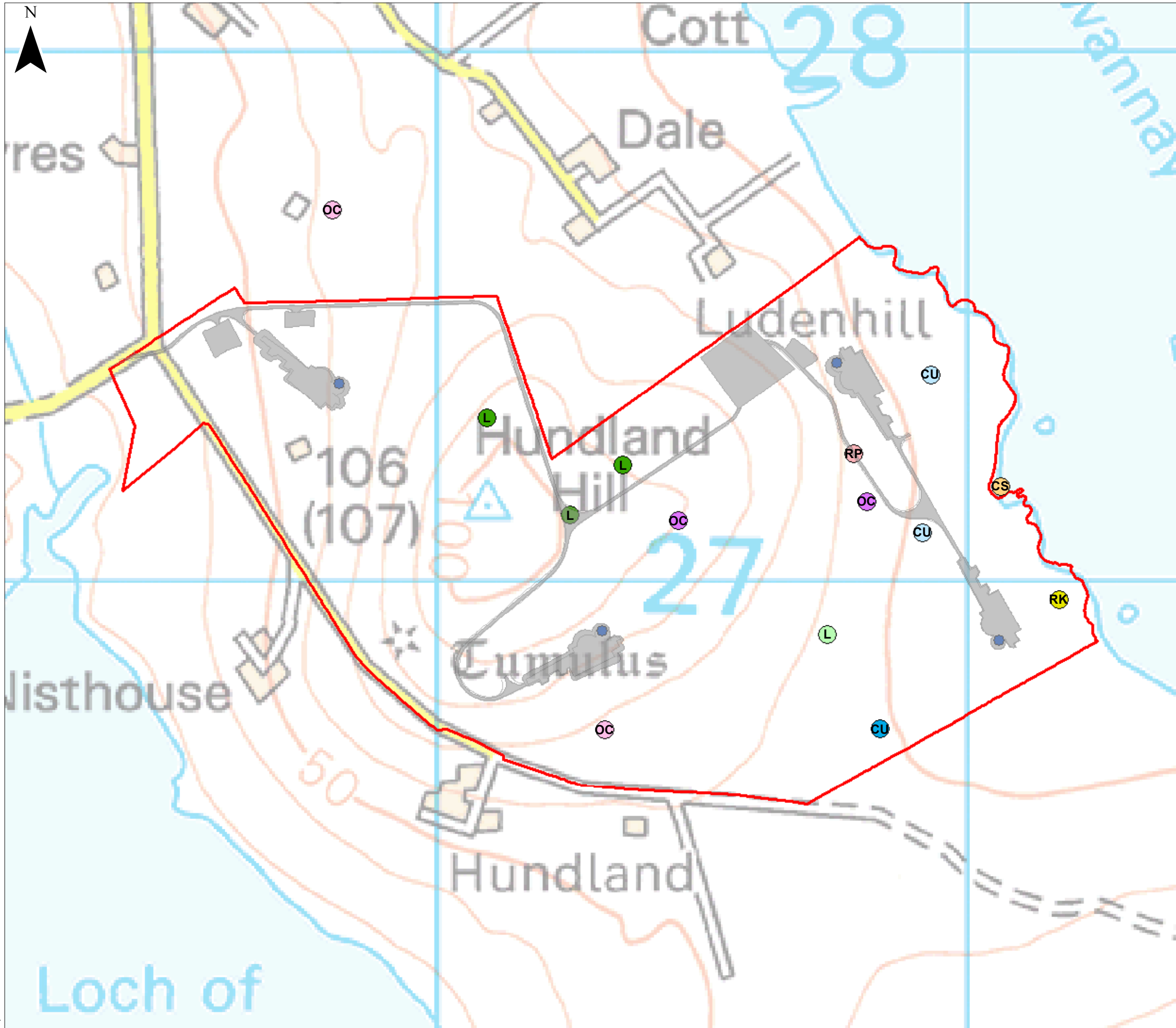
Date: 04/10/2022	Drawn by: AT	Checked by: MF	Version: v1
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Project Number: 3586

## Figure 7 Raptor Territories (CONFIDENTIAL)



## Figure 8a Wader Territories 2021



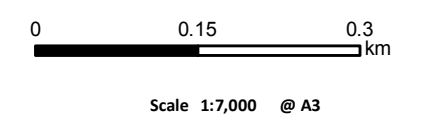
**KEY:**

- Site Boundary

**Territories**

**Species - Status**

- Common Sandpiper (CS) - Possible
- Curlew (CU) - Possible
- Curlew (CU) - Probable
- Lapwing (L) - Possible
- Lapwing (L) - Probable
- Oystercatcher (OC) - possible
- Oystercatcher (OC) - Probable
- Redshank (RK) - Possible
- Ringed Plover (RP) - Possible



Nisthill Wind Farm EclA  
 Technical Appendix 8.1

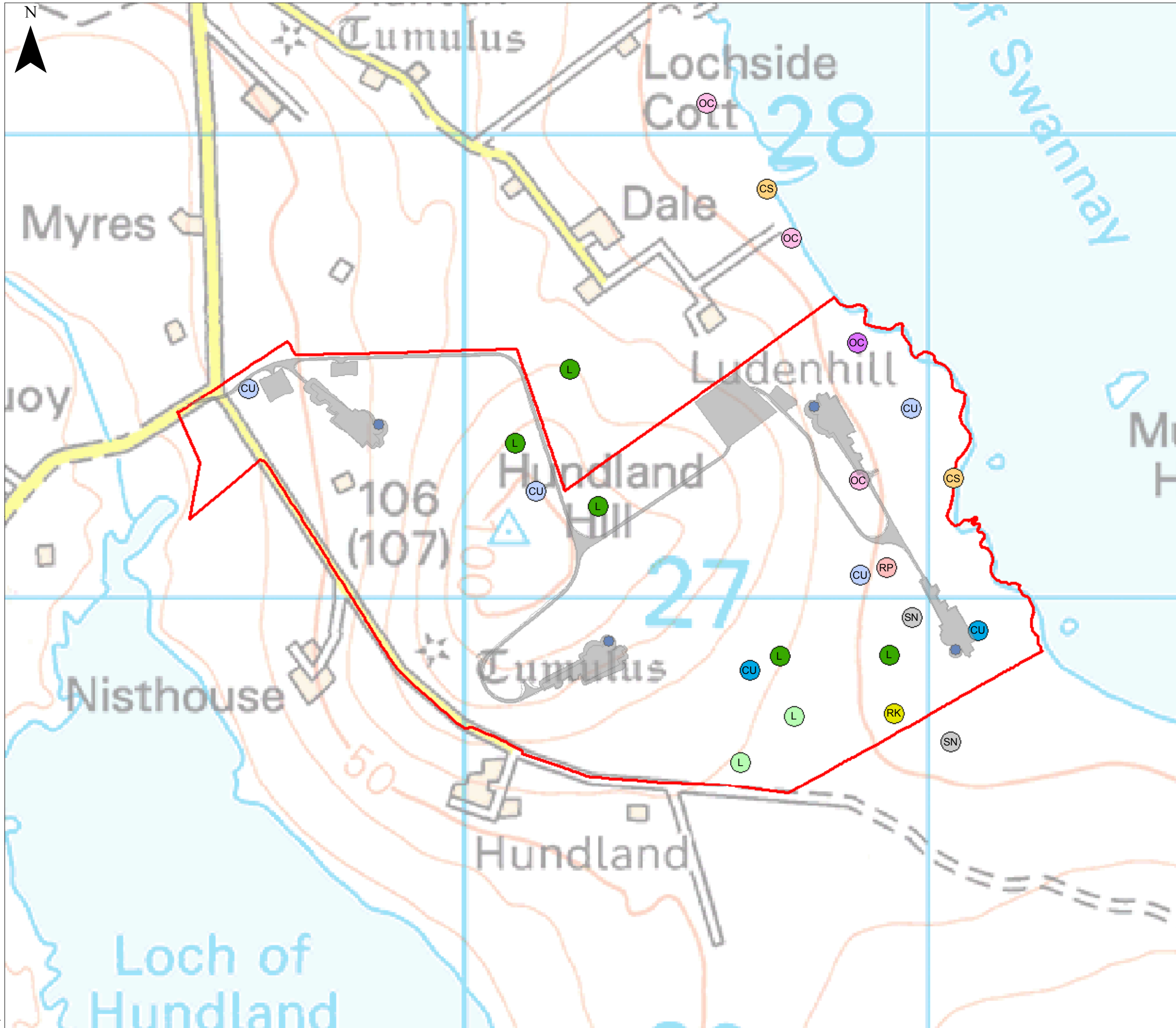
**Ornithology Technical Report - Figure 8a**

**Wader Territories 2021**

Date: 27/06/2022	Drawn by: AT	Checked by: MF	Version: v1
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Project Number: 3366

## Figure 8b Wader Territories 2022

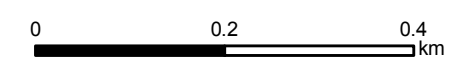


**KEY:**

Site Boundary

**Species - Status**

- Common Sandpiper (CS) - Possible
- Curlew (CU) - Possible
- Curlew (CU) - Probable
- Lapwing (L) - Possible
- Lapwing (L) - Probable
- Oystercatcher (OC) - Possible
- Oystercatcher (OC) - Probable
- Redshank (RK) - Possible
- Ringed Plover (RP) - Possible
- Snipe (SN) - Possible



Scale 1:8,000 @ A3



Nisthill Wind Farm EclA  
 Technical Appendix 8.1  
**Ornithology Technical Report Figure 8b**  
**Wader Territories 2022**

Date: 27/06/2022	Drawn by: AT	Checked by: MF	Version: v1
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Project Number: 3366

## Figure 9a Desk Study Results – Hen Harrier (CONFIDENTIAL)

Figure 9b Desk Study Results – Short-eared Owl  
(CONFIDENTIAL)

## Figure 9c Desk Study Results – Other Raptors (CONFIDENTIAL)

## Annex A: Survey Data

Table A1-1 – VP Watch Details

VP	Date	Session	Time start	Time finish	Total duration	Wind direction	Wind strength	Pptn	Cloud cover (8s)	Cloud base	Visibility across site
1	01-Sep-20	am	07:30	10:30	3	Se	2	0	0	+500	Very Good
2	01-Sep-20	pm	11:30	14:30	3	S	3-4	0	4	+500	Good
2	21-Sep-20	am	08:10	11:10	3	Sw	4-5	0	8	+500	Good
1	21-Sep-20	pm	12:00	15:00	3	Sw	4	0	8	+500	Good
1	06-Oct-20	dawn	06:50	09:50	3	E	2	0	8	+500	moderate
1	06-Oct-20	dusk	16:15	19:15	3	E	1	0	7	+500	Good
2	13-Oct-20	dawn	07:30	10:30	3	Nne	4	0	8	+500	Good
1	13-Oct-20	pm	12:00	15:00	3	Ne	4	0	8	+500	Good
2	02-Nov-20	am	08:00	11:00	3	W	3	0	7	+500	Good
1	02-Nov-20	pm	12:00	15:00	3	Wsw	3	0	7	+500	Good
1	17-Nov-20	am	08:00	11:00	3	Sw	2	0	8	+500	Good
2	17-Nov-20	pm	12:00	15:00	3	Sw	2-3	0	8	+500	Good
1	01-Dec-20	am	08:00	11:00	3	Sw	2	0	8	+500	Good
2	01-Dec-20	pm	12:00	15:00	3	S	2-3	0	8	+500	Good
2	15-Dec-20	am	09:00	12:00	3	S	2-3	0	3	+500	Good
1	15-Dec-20	dusk	12:45	16:15	3.5	S	2	0	2	+500	Very Good
1	05-Jan-21	dawn\am	08:00	11:00	3	N	0-1	0	2	+500	moderate
2	05-Jan-21	pm	12:00	15:00	3	Nw	1	0	3	+500	Good
2	19-Jan-21	am	08:00	11:00	3	W	2	0	8	300	Good
1	19-Jan-21	pm	12:00	15:00	3	Wsw	1-2	0	7	+500	Good
2	01-Feb-21	am	07:30	10:30	3	N	0-1	0	0	+500	Good
1	01-Feb-21	pm	12:30	15:30	3	N	0-1	0	2	+500	Good
1	22-Feb-21	am	09:30	12:30	3	Sw	3	0	0	+500	Very Good
2	22-Feb-21	pm	13:30	16:30	3	Sw	4	0	0	+500	Very Good
1	08-Mar-21	am	08:00	11:00	3	W	1	1	5	300	Good
2	08-Mar-21	pm	13:00	16:00	3	W	1	0	7	+500	Good
2	23-Mar-21	am	07:30	10:30	3	S	2	0	8	+500	Good
1	23-Mar-21	pm	15:00	18:00	3	Ssw	4	0	8	+500	Good
1	07-Apr-21	pm	14:00	17:00	3	Nw	3	0	5	+500	Good
2	10-Apr-21	am	07:00	10:00	3	W	2-3	0	5	+500	Good
1	19-Apr-21	dawn	04:30	07:30	3	Sse	2-3	0	7	+500	Good
2	19-Apr-21	pm	13:00	16:00	3	S	3	0	8	+500	Good
2	04-May-21	pm	15:00	18:00	3	N	4	0	5	+500	Good



VP	Date	Session	Time start	Time finish	Total duration	Wind direction	Wind strength	Pptn	Cloud cover (8s)	Cloud base	Visibility across site
1	04-May-21	pm\dusk	19:00	22:00	3	N	4	0	6	+500	Good
2	25-May-21	am	06:00	09:00	3	N	2	0	7	+500	Good
1	25-May-21	pm	13:00	16:00	3	Ne	3	0	7	+500	Good
1	07-Jun-21	pre dawn	03:30	06:30	3	N\A	0	0	3	+500	Very Good
2	08-Jun-21	pm	19:00	22:00	3	E	2	0	5	+500	Good
2	15-Jun-21	am	07:00	10:00	3	S	0-1	0	2	+500	Very Good
1	15-Jun-21	pm	11:00	14:00	3	S	2	0	5	+500	Good
2	12-Jul-21	am	09:00	12:00	3	N\A	0	0	8	300	Good
1	12-Jul-21	pm	14:00	17:00	3	N	0-1	0	8	400	Good
2	20-Jul-21	am	07:00	10:00	3	Wnw	2	0	8	300	Good
1	20-Jul-21	pm	18:00	21:00	3	N	1	0	8	+500	Good
1	03-Aug-21	dawn	05:00	08:00	3	S	1	0	8	+500	Good
2	03-Aug-21	pm	12:00	15:00	3	Se	2	0	8	+500	Good
2	24-Aug-21	dawn	06:00	09:00	3	W	2	0	7	+500	Good
1	24-Aug-21	pm	15:00	18:00	3	Nw	2	0	8	+500	Good
2	14-Sep-21	am	08:00	11:00	3	Se	1	0	2	+500	Good
1	14-Sep-21	pm	13:00	16:00	3	S	2	0	4	+500	Good
1	28-Sep-21	am	07:00	10:00	3	S	3	0	0	+500	Good
2	28-Sep-21	pm	16:00	19:00	3	S	4	0	3	+500	Good
2	12-Oct-21	am	07:15	10:15	3	N\A	0	0	8	+500	Good
1	12-Oct-21	pm	14:00	17:00	3	W	0-1	0	5	+500	Good
1	25-Oct-21	am	08:00	11:00	3	Ssw	3	0	7	+500	Good
2	25-Oct-21	pm	12:00	15:00	3	Sw	3	0	7	+500	Good
2	06-Nov-21	am	08:00	11:00	3	Sw	4	0	3	+500	Good
1	07-Nov-21	pm	13:30	16:30	3	Wnw	5	0	8	+500	Good
1	16-Nov-21	am	09:00	12:00	3	S	4	0	7	+500	Good
2	16-Nov-21	dusk	13:00	16:00	3	S	4	0	8	+500	Good
2	07-Dec-21	am	09:00	12:00	3	S	2	0	2	+500	Good
1	07-Dec-21	dusk	12:50	15:50	3	SE	2	0	8	+500	Good
1	20-Dec-21	am	08:30	11:30	3	N\A	0	0	8	+500	Good
2	20-Dec-21	pm	12:30	15:30	3	N\A	0	0	7	+500	Good
1	18-Jan-22	am	08:30	11:30	3	Sw	1-2	0	3	+500	Good
2	18-Jan-22	pm	12:30	15:30	3	Sw	2-3	0	7	+500	Good
2	24-Jan-22	am	08:00	11:00	3	W	2	0	8	450	Good
1	24-Jan-22	pm\dusk	13:00	16:45	3.45	W	3	0	8	450	Good
1	07-Feb-22	dawn	07:30	10:30	3	S	3	0	8	450	Good

VP	Date	Session	Time start	Time finish	Total duration	Wind direction	Wind strength	Pptn	Cloud cover (8s)	Cloud base	Visibility across site
2	07-Feb-22	pm	11:40	14:40	3	S	4	0	8	450	Good
1	15-Feb-22	pm	14:00	17:00	3	W	5	0	8	+500	Good
2	21-Feb-22	am	09:00	12:00	3	Nw	4	0	2	+500	Good
1	07-Mar-22	am	08:00	11:00	3	N\A	0	0	6	+500	Good
2	07-Mar-22	pm	12:00	15:00	3	Sw	0-1	0	7	+500	Good
2	14-Mar-22	am	07:00	10:00	3	S	1	0	0	+500	Very Good
1	14-Mar-22	pm	13:00	16:00	3	S	2	0	6	+500	Good
2	19-Apr-22	pm	11:00	14:00	3	Sw	4	0	4	+500	Good
1	10-May-22	dawn	05:00	08:00	3	S	2-3	0	7	+500	Good
2	10-May-22	am	09:00	12:00	3	Sw	3	0	8	+500	Good
2	16-May-22	am	06:00	09:00	3	ESE	3	0	5	+500	Good
1	16-May-22	dusk	19:00	22:00	3	S	4	0	7	+500	Good
2	07-Jun-22	am	08:30	11:30	3	Ne	2	0	7	+500	Good
1	07-Jun-22	pm	17:00	20:00	3	Ne	2	0	7	+500	Good
1	21-Jun-22	am	10:00	13:00	3	N	1	0	7	+500	Good
2	21-Jun-22	pm	18:00	21:00	3	N\A	0	0	8	+500	Good
2	14-Jul-22	am	07:00	10:00	3	Wnw	2	0	8	+500	Good
1	14-Jul-22	pm	11:00	14:00	3	Wnw	2	0	8	+500	Good
1	26-Jul-22	dawn	04:30	07:30	3	Nw	2	0	7	+500	Good
2	26-Jul-22	am	08:30	11:30	3	Nw	2	0	7	+500	Good
1	02-Aug-22	pm	13:30	16:30	3	Sw	4	0	7	+500	Good
2	02-Aug-22	pm	17:30	20:30	3	Sw	3	0	8	+500	Good
2	29-Aug-22	am	08:00	11:00	3	E	1-2	0	8	+500	Good
1	29-Aug-22	pm	12:00	15:00	3	Se	2	0	8	+500	Good

**Table A1-2 Summary of Target Species Flight Time**

Species	Flights	Number of Birds	Sum of Duration (Seconds)	Total In site	Sum HB1 (<20m)	Sum HB2- HB5( 20 ≥ < 200 m)	Sum HB3 (>200m)
Arctic skua	5	6	265	209	24	185	-
Great skua	43	47	2036	1743	244	1499	-
Hen harrier	67	67	8373	6790	6852	38	-
Merlin	1	1	10	10	10	0	-
Peregrine	4	4	1023	460	0	460	-

Red-throated diver	12	13	2179	1258	58	1200	-
Short-eared owl	20	20	2887	2778	2397	381	-
White-fronted goose	1	13	323	0	-	0	-
Whooper swan	1	3	112	52	-	52	-

KEY - HB1: <20m; HB2: 20 ≥ < 50m; HB3: 50 ≥ < 100m; HB4 : 100 ≥ < 150m; HB5: 150 ≥ < 200 m; HB6 : >200m;

**Table A1-3 Flight Time Arctic Skua**

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
07-Jun-21	1	1		06:10	40	10		10				
15-Jun-21	1	1		13:45	128	114		114				
20-Jul-21	2	1		07:48	24	24	24					
16-May-22	2	2	ad	07:03	31	31		31				
21-Jun-22	1	1		12:10	42	30		30				

**Table A1-4 Flight Time Great Skua**

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
25-May-21	2	1		06:20	42	25			25			
25-May-21	2	1		08:37	48	48			48			
25-May-21	1	1		13:15	18	18	18					
25-May-21	1	1		13:52	42	42		42				
25-May-21	1	1		15:16	90	30		30				
25-May-21	1	1		15:21	10	10	10					
07-Jun-21	1	1		05:01	40	40			40			
07-Jun-21	1	1		05:18	55	55			55			

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
07-Jun-21	1	1		05:21	31	31		31				
07-Jun-21	1	1		05:59	20	8		8/				
07-Jun-21	1	1		06:12	70	55			55			
07-Jun-21	1	1		06:15	14	14	14					
15-Jun-21	1	1		13:00	66	52		52				
15-Jun-21	1	1		13:12	115	105			105			
20-Jul-21	2	1		08:26	42	42			42			
20-Jul-21	1	1		19:07	40	40			40			
20-Jul-21	1	1		20:51	67	48			48			
03-Aug-21	1	3		07:02	48	48			48			
24-Aug-21	2	1		08:37	51	51	51					
24-Aug-21	2	1		09:00	53	53	53					
24-Aug-21	1	1		16:51	49	49		49				
24-Aug-21	1	1		17:03	68	68			68			
14-Sep-21	2	1		08:54	41	41			41			
28-Sep-21	1	1		08:40	40	40			40			
16-May-22	1	1	ad	19:41	73	61		61				
16-May-22	1	1	ad	20:50	32	32			32			
07-Jun-22	2	1		09:46	21	21			21			
07-Jun-22	2	1		11:57	62	62			62			
07-Jun-22	1	1		19:38	27	27		27				
21-Jun-22	1	1		10:22	35	21			21			
21-Jun-22	1	1		11:05	48	30			30			
21-Jun-22	1	1		11:59	21	21		21				
21-Jun-22	1	1		12:40	18	18		18				
14-Jul-22	1	1		11:28	57	36			36			
14-Jul-22	1	1		12:30	35	30		30				

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
14-Jul-22	1	1		13:15	51	35			35			
26-Jul-22	2	1		09:27	42	42	42					
02-Aug-22	1	1		15:07	19	19		19				

**Table A1-5 Flight Time Hen Harrier**

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
01-Sep-20	1	1	ad ♂	10:10	282	282	282					
21-Sep-20	1	1	brown	13:04	309	309	309					
06-Oct-20	1	1	brown	08:19	255	255	255					
06-Oct-20	1	1	brown	18:31	45	45	45					
06-Oct-20	1	1	brown	18:38	61	61	61					
13-Oct-20	1	1	brown	14:25	192	89	89					
17-Nov-20	1	1	brown	09:11	291	291	291					
01-Dec-20	1	1	ad♂	09:48	327	282	282					
15-Dec-20	1	1	brown	13:56	177	90	90					
15-Dec-20	1	1	brown	15:30	92	41	41					

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
05-Jan-21	2	1	♀	14:11	45	40	40					
19-Jan-21	1	1	brown	14:07	96	96	96					
01-Feb-21	1	1	brown	13:30	34	34	34					
08-Mar-21	1	1	ad ♂	09:19	252	250	250					
08-Mar-21	2	1	ad ♂	14:51	69	69	69					
07-Apr-21	1	1	ad ♂	15:15	82	82	82					
10-Apr-21	2	1	ad♂	08:22	57	57	57					
10-Apr-21	2	1	♀	08:55	130	130	130					
19-Apr-21	1	1	♀	05:27	63	63	63					
04-May-21	2	1	ad♂	17:11	36	36	36					
04-May-21	1	1	ad♂	19:20	60	60	60					
04-May-21	1	1	ad♂	20:57	32	32	32					
04-May-21	1	1	ad♂	21:15	49	49	49					
25-May-21	2	1	ad♂	07:51	93	93	93					
07-Jun-21	1	1	ad♂	04:55	185	180	180					
07-Jun-21	1	1	♀	05:36	25	20	20					
15-Jun-21	2	1	ad♂	07:47	183	173	173					
15-Jun-21	1	1	♀	12:52	48	48	48					
24-Aug-21	1	1	ad ♂	17:32	127	127	127					
28-Sep-21	1	1	brown	07:54	69	69	69					
12-Oct-21	1	1	brown	15:15	48	48	48					
12-Oct-21	1	1	brown	16:51	81	81	81					
12-Oct-21	1	1	brown	16:54	60	60	60					
06-Nov-21	2	1	brown	08:12	182	38		38				
16-Nov-21	1	1	ad ♂	11:26	42	42	42					
07-Dec-21	2	1	brown	09:32	41	41	41					

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
07-Dec-21	2	1	brown	10:42	382	382	382					
07-Dec-21	1	1	brown	14:10	43	43	43					
07-Dec-21	1	1	brown	14:39	129	37	37					
07-Dec-21	1	1	ad ♂	14:54	183	35	35					
18-Jan-22	1	1	brown	09:25	173	173	173					
18-Jan-22	1	1	brown	10:04	26	26	26					
24-Jan-22	1	1	brown	15:33	128	49	49					
24-Jan-22	1	1	ad♂	15:50	273	41	41					
24-Jan-22	1	1	brown	15:56	82	10	10					
07-Feb-22	1	1	brown	08:15	318	263	263					
07-Feb-22	1	1	ad♂	09:46	23	23	23					
15-Feb-22	1	1	brown	15:37	71	32	32					
21-Feb-22	2	1	brown	11:23	42	42	42					
14-Mar-22	2	1	♀	09:21	61	61	61					
19-Apr-22	2	1	ad♂	09:00	198	0	198					
10-May-22	2	1	ad♂	05:40	369	358	358					
10-May-22	1	1	ad♂	06:32	121	0						
10-May-22	1	1	♀	06:49	21	21	21					
10-May-22	1	1	ad♂	11:20	60	60	60					
16-May-22	1	1	ad♂	07:16	39	39	39					
16-May-22	2	1	ad♂	07:43	388	388	388					
16-May-22	2	1	ad♂	20:32	27	27	27					
07-Jun-22	2	1	ad♂	18:14	43	43	43					
07-Jun-22	1	1	ad♀	18:55	193	193	193					
14-Jul-22	1	1	♀	13:42	63	63	63					
26-Jul-22	1	1	ad♂	07:18	19	19	19					

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
02-Aug-22	1	1	ad ♀	14:18	36	36	36					
02-Aug-22	1	1	♀	16:01	189	189	189					
29-Aug-22	1	1	1st yr	12:30	372	301	301					
29-Aug-22	1	1	ad♂	14:02	18	18	18					
29-Aug-22	2	1	ad♂	14:49	63	63	63					
19-Apr-22	2	1	ad♂	09:00	198	0	198					

**Table A1-6 Flight Time Peregrine**

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
17-Nov-20	2	1		13:14	658	95					95	
07-Apr-21	1	1	ad	16:10	307	307		27	280			
03-Aug-21	1	1		07:36	39	39			39			
12-Oct-21	2	1		09:34	19	19		9	10			

**Table A1-7 Flight Time Red Throated Diver**

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (seconds)	Total In Site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
01-Sep-20	1	2	Ads	08:39	189	37		37				
19-Apr-21	1	1	ad	06:01	244	98				98		
04-May-21	1	1	ad	19:35	42	27			27			
04-May-21	1	1	ad	20:40	199	160			160			
25-May-21	1	1		14:58	300	229		49	180			
07-Jun-21	1	1		04:18	79	31				31		
07-Jun-21	1	1		05:03	379	318	58		260			



Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (seconds)	Total in Site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
15-Jun-21	1	1		12:10	59	48			48			
20-Jul-21	1	1		20:16	43	35				35		
10-May-22	1	1	ad	07:24	244	193			193			
16-May-22	1	1	ad	21:30	83	19			19			
21-Jun-22	1	1		11:28	318	63			63			

**Table A1-8 Flight Time Short Eared Owl**

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
04-May-21	1	1	ad♂	20:01	240	196	66	130				
04-May-21	1	1	ad♂	21:22	18	18	18					
04-May-21	1	1	ad♂	21:29	173	173	65	108				
04-May-21	1	1	ad♂	21:50	108	108	108					
25-May-21	2	1	ad♂	06:30	241	221	221					
25-May-21	2	1		06:46	19	19	19					
25-May-21	2	1		07:48	32	32	32					
07-Jun-21	1	1		03:57	88	88	88					
07-Jun-21	1	1		04:50	43	43	43					
07-Jun-21	1	1	♂	05:42	82	75		75				
07-Jun-21	1	1		06:21	19	19	19					
08-Jun-21	2	1	♂	21:08	340	340	340					
15-Jun-21	2	1		08:16	21	21	21					
16-May-22	1	1	ad♂	21:07	345	345	345					
16-May-22	1	1	ad♂	21:37	15	15	15					
16-May-22	1	1	ad♂	21:50	195	195	195					
07-Jun-22	1	1	ad♂	19:03	68	68		68				

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
07-Jun-22	1	1	ad♂	19:50	427	400	400					
26-Jul-22	1	1	ad♀	05:21	382	370	370					
26-Jul-22	1	1		06:01	31	32	32					

**Table A1-9 Flight Time White Fronted Goose**

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
22-Feb-21	1	13	ads	11:28	323			323				

**Table A1-10 Flight Time Whooper Swan**

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
01-Dec-20	1	3	2 ads 1 juv	10:37	112	52			52			

**Table A1-11 Merlin**

Date	VP	Number of Birds	Age/Sex	Time	Sum of Duration (Seconds)	Total In site	Sum HB1	Sum HB2	Sum HB3	Sum HB4	Sum HB5	Sum HB6
29-Aug-22	2	1		14:33	10	10	10					