



ARCUS

TORRANCE WIND FARM EXTENSION II

APPENDIX 11.1

BASELINE ORNITHOLOGY REPORT 2020-21

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Prepared By:

Arcus Consultancy Services

7th Floor
144 West George Street
Glasgow
G2 2HG

T +44 (0)141 221 9997 | E info@arcusconsulting.co.uk
w www.arcusconsulting.co.uk

Registered in England & Wales No. 5644976

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ABBREVIATIONS

BBS:	Breeding Bird Survey
BoCC:	Birds of Conservation Concern
BOU:	British Ornithologists' Union
BTO:	British Trust for Ornithology
FAS:	Flight Activity Surveys
SBL:	Scottish Biodiversity List
SPA:	Special Protection Area
SSSI:	Site of Special Scientific Interest
VP:	Vantage Point

1 INTRODUCTION

1.1 Background

This document supports Chapter 11 – Ornithology of the Torrance Wind Farm Extension II Environmental Impact Assessment (EIA) Report. Arcus Consultancy Services Ltd (Arcus) was commissioned by Infinergy (the Applicant) to evaluate the ornithological interest for a **proposed extension (“the Proposed Development”) to the operational Torrance Wind Farm** and Torrance Wind Farm Extension. Heart of Scotland Energy Facility, hereafter referred to as ‘the Site’, is located 1.5 km north of Harthill, North Lanarkshire, with approximate central co-ordinates NS 90138 65425. The Site Boundary and proposed turbine locations are shown in Figure 11.1.1, Appendix 1.

Baseline Ornithology Surveys of the Site commenced in September 2020. This report details the survey methods and results of the Baseline Ornithology Surveys (September 2020 to August 2021 inclusive). This document is supported by Appendix 11.2: Baseline Ornithology Report 2020-2021: Confidential Annex, which includes details of two Schedule 1 species that showed evidence of breeding or holding territory.

Species names used in this report follow the British List¹, which is maintained by the British **Ornithologists’ Union (BOU), with all species referred to by their British (English) vernacular** name. A list of scientific names, as well as details of relevant legislation and conservation status, of all bird species referred to in this report is provided in Table A2.1, Appendix 2.

1.2 Site Description

The Site comprises a mosaic of farmed arable land with commercial forestry plantations to the south. The wider area is largely similar to that within the Site, with the exception of the M8 motorway which lies adjacent to the south of the Site Boundary. Urban residential areas are also in close proximity to the Site, with Harthill directly to the south, and Blackridge and Armadale to the north and north-east respectively.

1.3 Statutory Sites Designated for Ornithological Features

A search was made for all statutory protected nature conservation sites within 10 km of the Site, and for SPAs and Ramsar Sites within 20 km. Two statutory designated sites for ornithological features have been identified within the search area, as detailed in Table 1, and shown in Figure 11.1.2, Appendix 1.

Table 1: Summary of statutory sites designated for ornithological interest

Site name	Designation(s)	Approximate distance and direction from the Site*	Qualifying ornithological interests
Slamannan Plateau	Special Protection Area (SPA) ² and Site of Special Scientific Interest (SSSI) ³	9.5 km north-west	Non-breeding taiga bean goose.

¹ **British Ornithologists’ Union.** (2017). The British List: A Checklist of Birds of Britain (9th edition). *Ibis* 160: 190-240.

² Slamannan Plateau SPA. Available from: <https://sitelink.nature.scot/site/9184> [Accessed: 16/11/22]

³ Slamannan Plateau SSSI. Available from: <https://sitelink.nature.scot/site/9171> [Accessed: 16/11/22]

Site name	Designation(s)	Approximate distance and direction from the Site*	Qualifying ornithological interests
Firth of Forth	SPA ⁴ , SSSI ⁵ and Ramsar Site ⁶	16.1 km north-east	<p><u>Non-breeding season</u></p> <ul style="list-style-type: none"> • Bar-tailed godwit; • Common scoter; • Cormorant; • Curlew; • Dunlin; • Eider; • Golden plover; • Goldeneye; • Great crested grebe; • Grey plover; • Knot; • Lapwing; • Long-tailed; • Mallard; • Oystercatcher; • Pink-footed goose; • Red-breasted merganser; • Red-throated diver; • Redshank; • Ringed; • Scaup; • Shelduck; • Slavonian grebe; • Turnstone; • Velvet scoter; • Waterfowl assemblage; and • Wigeon <p><u>Passage</u> Sandwich tern</p>
*From closest point			

2 METHODS

Based on the habitats present within the Site, the ornithological sensitivities known to occur in the area, and professional experience, the 2020-21 Baseline Ornithology Survey programme comprised the following:

- Flight Activity Surveys (FAS): September 2020 to August 2021;
- Breeding Bird Surveys (BBS): April to July 2021; and
- Breeding Raptor Surveys: March to August 2021

The breeding season Survey Areas were based on a previous Site Boundary at the time when surveys commenced, which was larger than the current Site Boundary for the

⁴ Firth of Forth SPA. Available from: <https://sitelink.nature.scot/site/8499> [Accessed: 16/11/22]

⁵ Firth of Forth SSSI. Available from: <https://sitelink.nature.scot/site/8163> [Accessed: 16/11/22]

⁶ Firth of Forth Ramsar Site. Available from: <https://sitelink.nature.scot/site/8424> [Accessed: 16/11/22]

Proposed Development. The previous Site Boundary which was used to determine the Survey Areas are shown on Figure 11.1.4, Appendix 1.

Full details of the methods followed for each of these surveys are provided below. Survey methods were based on current NatureScot guidance⁷. Note that all surveys were completed by Tim Drew, an experienced surveyor who has worked on a number of Arcus projects across Scotland.

2.1 Flight Activity Surveys

FAS were carried out between September 2020 and August 2021 (inclusive) using a series of watches from two Vantage Points (VPs) overlooking the Site, and a surrounding 500 m buffer, to record flight activity of target bird species. Target species included the following:

- All wild swan, goose (except Canada goose) and duck (except mallard) species;
- All raptor species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)⁸ and/or Annex I of the Birds Directive⁹;
- All wader species; and
- Any other Schedule 1/Annex I non-passerines.

The flight lines of all target species observed during the FAS were recorded on large scale maps in the field. Each recorded flight path was numbered and cross-referenced to the following flight data:

- Time (when first seen);
- Species, age and sex (when identification of age/sex was possible);
- Number of birds;
- Duration of flight within the viewshed; and
- Flight height in one of four height bands, on detection and at 15 second intervals thereafter. The height bands were as follows:
 1. 0-20 m;
 2. 20-40 m;
 3. 40-150 m; and
 4. >150 m.

In addition to recording target species flights, the number and activity of 'secondary' species was summarised every 5-minutes during each FAS. Secondary species included the following: Canada goose, mallard, grey heron, cormorant, sparrowhawk, buzzard, kestrel and raven. Recording of target species took priority over that of secondary species.

2.1.1 Vantage Point Locations

One VP was initially identified to cover the full area of the Site (VP 1 at NS 89537 65446). However, a second VP (VP 2 at NS 88546 64741) was added in early October following a change to the proposed turbine layout and extension to the Site Boundary.

The final VP locations and viewsheds are shown in Figure 11.1.3, Appendix 1.

2.1.2 Survey Effort

Surveys were stratified to cover all times of day including dawn and dusk periods. Watches lasted three hours with a 30-minute break in between watches. A total of 72 hours of survey were completed at each VP location. Six hours of survey were completed per month between September 2020 and August 2021 at VP 1. At VP 2, as the VP was added at a

⁷ NatureScot (2017) Survey Methods for Use in Assessing the Impacts of Onshore Wind farms on Bird Communities Version 2, NS Guidance, NS, Battleby.

⁸ Wildlife and Countryside Act 1981. Available from: <https://www.legislation.gov.uk/ukpga/1981/69> [Accessed: 16/11/22]

⁹ The Birds Directive (2009/147/EC). Available from: https://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm [Accessed: 16/11/22]

later date, surveys were not completed in September 2020. However, 12 hours were completed in October 2020 to account for this, with six hours of survey completed per month thereafter until August 2021 (inclusive).

Full details of survey dates, times and hourly weather conditions are presented in Tables A3.1 and A3.2, Appendix 3.

2.1.3 Disturbance Events

Disturbance events, such as human activity that either caused, or had the potential to disturb bird activity were also noted during the FAS.

2.2 Breeding Bird Survey

A BBS was undertaken between April and July 2021. In line with NatureScot guidance⁸, the survey followed an adapted Brown and Shepherd (1993)¹⁰ method with four survey visits completed at least seven days apart between April and July.

Although the survey focussed on identifying breeding waders, the method was further modified such that all species seen or heard were recorded on large scale maps using standard British Trust for Ornithology (BTO) species codes, as listed in Gilbert *et al.* (1998)¹¹.

Surveys were carried out in good weather conditions and lasted for up to nine hours. Further details of survey dates, times and weather conditions are provided in Table 2. The Survey Area is shown in Figure 11.1.4, Appendix 1.

Table 2: Survey times and weather conditions during the 2021 BBS

Date	Start	Finish	Wind*	Cloud**	Other
16/04/21	08:30	17:00	S, 2	3-5	No rain
14/05/21	08:30	16:55	NE, 2	8	No rain, temperature 5-11°C
10/06/21	08:15	17:15	SW, 3	8	No rain
29/06/21	08:00	16:00	E, 1	2	No rain
*Wind direction according to 16-point compass, wind speed according to Beaufort Scale					
**Cloud cover in eighths of sky (oktas)					

2.2.1 BBS Data Analysis

Upon completion of all four BBS visits, all registrations of non-passerines of conservation concern, and Schedule 1 passerines from the field maps were transferred to produce '**species summary maps**' from which the number and distribution of likely territories for each of these species could be determined. The method was based on that described by Bibby (2000)¹², with an element of professional judgement.

A precautionary approach was followed with a bird deemed to be holding a territory if breeding behaviour (e.g., singing, alarm-calling, adults carrying food) was observed or pairs of birds were observed in suitable habitat during just one of the four BBS visits. In addition, where a single bird was observed in the same area of suitable breeding habitat during multiple survey visits and it was considered likely that the species would be breeding, these registrations were also considered to represent a breeding territory.

¹⁰ Brown, A.F. and Shepherd, K.B. (1993) A method for censusing upland breeding waders. *Bird Study* 40: 189-195.

¹¹ Gilbert, G., Gibbons, D.W., Evans, J. (1998). *Bird Monitoring Methods*. RSPB, Sandy.

¹² Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S.H. (2000). *Bird Census Techniques*, 2nd edition. Academic Press, London.

2.3 Breeding Raptor Surveys

Six survey visits were completed between April and July (inclusive), covering areas of suitable breeding habitat within the Site and a 2 km buffer. In line with NatureScot guidance⁸, surveys focused on recording observations of breeding raptor species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)⁹ and/or Annex I of the Birds Directive¹⁰.

All Breeding Raptor Surveys were with completed with reference to the methods detailed in Hardey *et al.* (2013)¹³. This involved completing a combination of watches from VPs overlooking areas of suitable breeding habitat to identify any evidence of breeding (such as birds performing breeding displays or carrying prey), and walkovers of suitable habitat to search for nests and other signs of raptor presence (such as prey remains, pellets and feathers).

Although the surveys focussed on recording Schedule 1 and/or Annex I raptor species, **observations of 'secondary' raptor species (buzzard, sparrowhawk and kestrel) and raven** were also recorded. In addition, other target species (as defined in Section 2.1) and other species of conservation concern, which are defined as species listed on one or more of the following: Annex I of the Birds Directive, Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), the UK Birds of Conservation Concern (BoCC) Red or Amber lists¹⁴, and the Scottish Biodiversity List (SBL), were also recorded. Observations were recorded on large scale maps, with notes on behaviour taken where appropriate.

Surveys were carried out in good weather conditions and lasted for up to nine hours. Further details of survey dates, times and weather conditions are provided in Table 3. The Survey Area is shown in Figure 11.1.4, Appendix 1.

Table 3: Survey times and weather conditions during the 2021 Breeding Raptor Surveys

Date	Start	Finish	Wind*	Cloud**	Other
13/04/21	08:00	16:45	W, 2	7	No rain
23/04/21	08:30	17:15	S, 1-2	4	No rain, temperature 9-15°C
07/05/21	09:00	05:30	NNW, 2-3	6-8	No rain
07/06/21	08:45	17:20	NE, 2	5-6	No rain
22/06/21	09:05	17:20	SW, 2	5	No rain, temperature 13-19°C
16/07/21	08:50	17:10	W, 2-3	3-7	No rain, temperature 16-23°C
*Wind direction according to 16-point compass, wind speed according to Beaufort Scale					
**Cloud cover in eighths of sky (oktas)					

2.4 Survey Limitations

FAS surveys at VP 2 were not completed in September 2020 (see Section 2.1.1), however an additional six hours of survey were completed in October to account for this.

Flight start times were not noted for three target species flights on the 23/11/20, namely pink-footed goose, golden plover and curlew.

BBS and Breeding Raptor Surveys were carried out in suitable weather conditions. FAS were also generally carried out in suitable weather conditions, with good visibility during

¹³ Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). *Raptors: a field guide to survey and monitoring*, 3rd edition. The Stationery Office, Edinburgh.

¹⁴ Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D. and Win, I. (2021) *The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain*. British Birds 114, 723–747.

the majority of diurnal surveys. However, it was not always possible to avoid periods of poor weather including heavy rain, snow or strong winds, especially when conditions varied from those forecast. It is considered that undertaking surveys in a range of conditions is more likely to capture bird activity that is representative of the Site. As such, weather conditions are not considered to represent a significant constraint to the robustness of the baseline data obtained.

Dog walkers were observed occasionally during surveys, which may have influenced bird behaviour during surveys. However, this is considered to be part of the baseline conditions at the Site, and is not considered to represent a significant constraint to the robustness of the baseline data obtained.

There were no access restrictions to any of the Survey Areas however, the residential areas within Harthill were not surveyed during the BBS and Breeding Raptor Surveys. This is not considered to represent a significant constraint to the robustness of the baseline data obtained as target species surveyed were unlikely to be breeding within the densely built-up urban areas, and urban species are already subject to significant disturbance.

3 RESULTS

3.1 Flight Activity Surveys

3.1.1 Target Species Flights

A total of 30 flights by seven target species were recorded during the FAS. Pink-footed goose was the species recorded most frequently with a total of 12 flights, followed by curlew with eight flights. All other target species were recorded in very low numbers with fewer than eight flights of each species recorded across the survey period. A summary of all target species flights recorded during the FAS, broken down by species and season, is provided in Table 4. Full details of each target species flight are presented in Table A4.1, Appendix 4 and flight lines are shown in Figures 11.1.5-11.1.7, Appendix 1. An additional Schedule 1 species was nesting near the Site Boundary, flight details of which are provided in a Confidential Annex.

Table 4: Summary of target species flights recorded during the 2020-21 FAS

Species*	Schedule 1/Annex I listings	Conservation listings**	Number of flights			No. of birds per flight	Figure no.
			Breeding season (Mar-Aug 2021)	Non-breeding season (Sept 2020-Feb 2021)	Total		
Greylag goose	-	Amber	2	1	3	2-28	11.1.5
Pink-footed goose	-	Amber	4	8	12	2-110	
Teal	-	Amber	-	1	1	5	
Lapwing	-	Red, SBL	1	1	2	4-6	11.1.6
Golden plover	Annex I	SBL	2	1	3	18-31	
Curlew	-	Red, SBL	7	1	8	1-4	
Merlin	Schedule 1; Annex I	Red, SBL	-	1	1	1	11.1.7
Total no. of flights			16	14	30		

Species*	Schedule 1/Annex I listings	Conservation listings**	Number of flights			No. of birds per flight	Figure no.
			Breeding season (Mar-Aug 2021)	Non-breeding season (Sept 2020-Feb 2021)	Total		
*Species names and order follow the British List maintained by the BOU ¹ **Red = UK Birds of Conservation Concern (BoCC) Red list ¹⁵ ; Amber = UK BoCC Amber list ¹⁵ ; SBL = species included as priority species on the Scottish Biodiversity List							

3.1.2 Incidental Records of Target Species

Two incidental records of pink-footed goose were noted during FAS in September and November 2020:

- A flock of c. 190 birds were recorded flying south, approximately 2 km outside the Site Boundary at 08:12 on the 25/09/20; and
- A flock of c. 330 birds were recorded heading north of Blackridge outside of the survey area at 08:40 on the 27/11/20

3.1.3 Secondary Species Registrations

Twelve secondary species were recorded during the FAS, with herring gull recorded most frequently (during 32 visits), followed by buzzard (30 visits), lesser black-backed gull (14 visits) and raven (13 visits). All other secondary species recorded, including Canada goose, mallard, black-headed gull, common gull, great black-backed gull, cormorant, grey heron, sparrowhawk and kestrel, were recorded less frequently (during 11 visits or less). Secondary species were generally recorded in low numbers (one to five birds), with occasional larger flocks of gulls (up to 11 common gull and black-headed gull, 22 lesser black-backed gull and 43 herring gull).

In addition, there were occasional registrations of passerine species of conservation concern in large numbers, namely rook, starling, redwing and fieldfare. Rook were occasionally recorded with one flock of up to 42 birds recorded in March. Starling were occasionally recorded in moderate to large flocks of between 55 and 300 birds. There were two registrations of redwing, one with a flock of eight and one of 55. Fieldfare were recorded on several occasions in flocks of between 95 and 320, with two smaller flocks of 16 and 40 in April, and one large flock of 1550 in October.

3.1.4 Disturbance Events

A dog walker was present on the Site during several of the FAS on the dates and times detailed below:

- On the 25/09/20 between 11:40-11:50;
- On the 30/10/20 between 10:55-11:15;
- On the 27/11/20 between 11:30-12:10;
- On the 21/01/21 between 14:15-14:40;
- On the 08/03/21 between 15:10-15:20; and
- On the 04/08/21 between 18:35-19:05

3.2 Breeding Bird Surveys

3.2.1 *Species of Conservation Concern*

A total of 66 species were recorded during the BBS, including 38 species of conservation concern. Of these, 12 observations of non-passerine or Schedule-1 passerine species were analysed, including those of lapwing and curlew, the only waders recorded during BBS. Seven non-passerine/Schedule-1 passerine species showed evidence of breeding or holding territory within the Survey Area (Table 5). As two of these species are listed on Schedule 1, details are provided in the Confidential Annex and are not included in Table 5. The remaining five non-passerine/Schedule-1 passerine species were recorded, but not considered to be breeding or holding territory (Table 6). Note that potential breeding territories of birds observed outside the Survey Area were not analysed.

An additional three non-passerine species, namely woodpigeon, moorhen and sparrowhawk, were recorded within the Survey Area and may have bred within the Survey Area and wider area. However, individual registrations were not recorded or mapped, therefore analysis of territories for woodpigeon, moorhen and sparrowhawk could not be completed¹⁵. None of these species are priority bird species for assessment when considering the development of onshore wind farms in Scotland¹⁶.

Twenty-three non-Schedule 1 passerines of conservation concern were also recorded, most of which were confirmed or likely to have bred within the Survey Area: swift, rook, skylark, house martin, willow warbler, sedge warbler, grasshopper warbler, whitethroat, wren, starling, song thrush, mistle thrush, wheatear, house sparrow, dunnock, grey wagtail, meadow pipit, bullfinch, greenfinch, linnet, lesser redpoll, siskin and yellowhammer. As surveys of breeding farmland passerines is not generally recommended in NatureScot guidance⁸, territories of these species have not been analysed.

Approximate territory locations of species of conservation concern within the Survey Area are shown in Figure 11.1.8, Appendix 1. Territory locations are shown as the approximate mid-point of observations that were used to identify the territory.

Table 5: Non-passerine/Schedule-1 passerine species of conservation concern recorded during the BBS and considered to be breeding or holding territory

Species*	Schedule 1/ Annex I listings	Conservation listings**	Number of Territories		Details
			Within Site Boundary only	Within 500 m Buffer only	
Mallard	-	Amber	-	1	A pair was consistently recorded within suitable habitat just beyond the north-east of the Site Boundary.

¹⁵ At the time of the BBS, woodpigeon, moorhen and sparrowhawk were not of conservation concern (UK BoCC Green list). However, the most recent review of BoCC was published in December 2021 (UK BoCC 5) in which woodpigeon, moorhen and sparrowhawk are now on the UK BoCC Amber list.

¹⁶ NatureScot (2018) *Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected area*

Species*	Schedule 1/ Annex I listings	Conservation listings**	Number of Territories		Details
			Within Site Boundary only	Within 500 m Buffer only	
Curlew	-	Red, SBL	-	2	Individuals were consistently recorded feeding or in flight within the west and north-east of the Survey Area during most visits.
Black-headed gull	-	Amber, SBL	-	4	Four pairs were recorded just beyond the north-east of the Site Boundary during visits three and four.
Tawny owl	-	Amber	1	-	One was recorded calling within woodland plantation to the east of the Site during visit four in June.
Kestrel	-	Amber, SBL	-	1	Observations recorded during the Breeding Raptor Surveys were cross-referenced with observations recorded during BBS. Overall, kestrel was regularly recorded within the Breeding Raptor Surveys. One territory was identified within the north-east of the BBS Survey Area, with territories likely present within the wider area.

*Species names and order follow the British List maintained by the BOU¹

**Red = UK BoCC Red list¹⁵; Amber = UK BoCC Amber list¹⁵; SBL = species included as priority species on the Scottish Biodiversity List

Table 6: Non-passerine/Schedule-1 passerine species of conservation concern recorded during the BBS but not considered to be breeding or holding territory

Species*	Schedule 1/ Annex I listings	Conservation listings**	Details
Greylag goose	-	Amber	A pair were recorded flying south-east over the Site during visit three in June.
Lapwing	-	Red, SBL	A flock of four birds was recorded flying east during visit four in June.

Species*	Schedule 1/ Annex I listings	Conservation listings**	Details
Herring gull	-	Red, SBL	A pair were recorded circling over the Sewage Works, just beyond the south-east of the Site Boundary during visit two in May.
Lesser black-backed gull	-	Amber	One bird was recorded flying around the Sewage Works during visit four in June.
Fieldfare	Schedule 1	Red	Several flocks of up to 22 birds were recorded during visit one in April, presumed to be non-breeding migrants.
<p>*Species names and order follow the British List maintained by the BOU¹</p> <p>**Red = UK BoCC Red list¹⁵; Amber = UK BoCC Amber list¹⁵; SBL = species included as priority species on the Scottish Biodiversity List</p>			

3.2.2 Other Species

A further 28 bird species (not of conservation concern¹⁷) were recorded, many of which were considered likely to be breeding or holding territory within the Site; however, none were observed in particularly notable numbers or densities: tufted duck, pheasant, collared dove, coot, grey heron, buzzard, great spotted woodpecker, jay, magpie, jackdaw, carrion crow, raven, coal tit, blue tit, great tit, swallow, long-tailed tit, chiffchaff, blackcap, garden warbler, goldcrest, treecreeper, blackbird, robin, stonechat, pied wagtail, chaffinch, and goldfinch.

3.3 Breeding Raptor Surveys

3.3.1 Target Raptor Species

One target raptor species was recorded during the 2020 Breeding Raptor Surveys, with evidence of breeding. Details of this species are provided in the Confidential Annex.

3.3.2 Secondary Species

Four secondary species were observed during the surveys: buzzard, sparrowhawk, kestrel and raven. Registrations of each species are briefly summarised below.

- Sparrowhawk: sparrowhawk was frequently recorded during the Breeding Raptor Surveys, with prey remains (presumed sparrowhawk prey) also recorded within the Survey Area on several occasions. The species likely bred within the Survey Area, although no nest sites were identified.
- Buzzard: buzzard was frequently recorded during the Breeding Raptor Surveys with some juveniles recorded during later survey visits. No nest sites were identified, though the species likely bred within the Survey Area.
- Kestrel: kestrel was frequently recorded during the Breeding Raptor Surveys and was a confirmed breeder, with a juvenile male and a juvenile female recorded in July. Kestrel was also recorded during the BBS (detailed in Section 3.2), and records were cross-referenced for territory analysis. Identified territories are summarised in Table 5, and shown in Figure 11.1.8, Appendix 1.
- Raven: one flight of one individual was recorded in May, with no evidence of breeding observed.

¹⁷ Green-listed BoCC.

3.3.3 Disturbance Events

Disturbance from dog walkers at the Blairhill Quarry was recorded during visit 3 in May and visit 5 in June.

4 SUMMARY

4.1 Flight Activity by Target Species

A total of 30 flights by seven target species was recorded during the FAS. Pink-footed goose was the species recorded most frequently with a total of 12 flights, followed by curlew with eight flights. All other target species, including greylag goose, teal, lapwing, golden plover and merlin, were recorded in very low numbers with fewer than eight flights of each species recorded across the survey period (Table 4). There were also two incidental records of pink-footed goose observed outside of the Site Boundary, including a flock of c. 190 and one of c. 330 birds.

4.2 Breeding Birds of Conservation Concern

Thirty-eight species of conservation concern were recorded during the BBS, with observations of 12 non-passerine/Schedule-1 passerine species analysed. Seven non-passerine/Schedule-1 passerine species showed evidence of breeding or holding territory within the Survey Area (Table 5). The only territory identified within the Site is that of tawny owl. Territories of all other species, namely mallard, curlew, black-headed gull and kestrel were identified within 500 m of the Site Boundary. Territories were also identified for two Schedule-1-listed species, details of which are provided in the Confidential Annex.

An additional five non-passerine/Schedule-1 passerine species were recorded, but not considered to be breeding or holding territory (Table 6). Twenty-six non-Schedule 1 passerines of conservation concern were also recorded, most of which were confirmed or likely to have bred within the Survey Area. However, as explained in Section 3.2.1, territories of these species were not analysed.

4.3 Qualifying Interests of Nearby SPAs/SSSIs

Six qualifying interests of the Firth of Forth SPA, SSSI and Ramsar Site, namely pink-footed goose, mallard, lapwing, golden plover, curlew and cormorant were recorded within the Site during the FAS. Additionally, grey heron, the qualifying interest of Hamilton Low Parks SSSI, was recorded during the FAS and BBS. Due to the distance of these designated sites from the Site (as outlined in Table 1), there is unlikely to be connectivity between any qualifying interests and the Site, other than potentially pink-footed goose¹⁸.

¹⁸ NatureScot (2016) *Assessing Connectivity with Special Protection Areas (SPAs)*

APPENDIX 1: FIGURES

Figure 11.1.1: Site Boundary

Figure 11.1.2: Statutory Designated Sites

Figure 11.1.3: Vantage Point Locations and Viewsheds

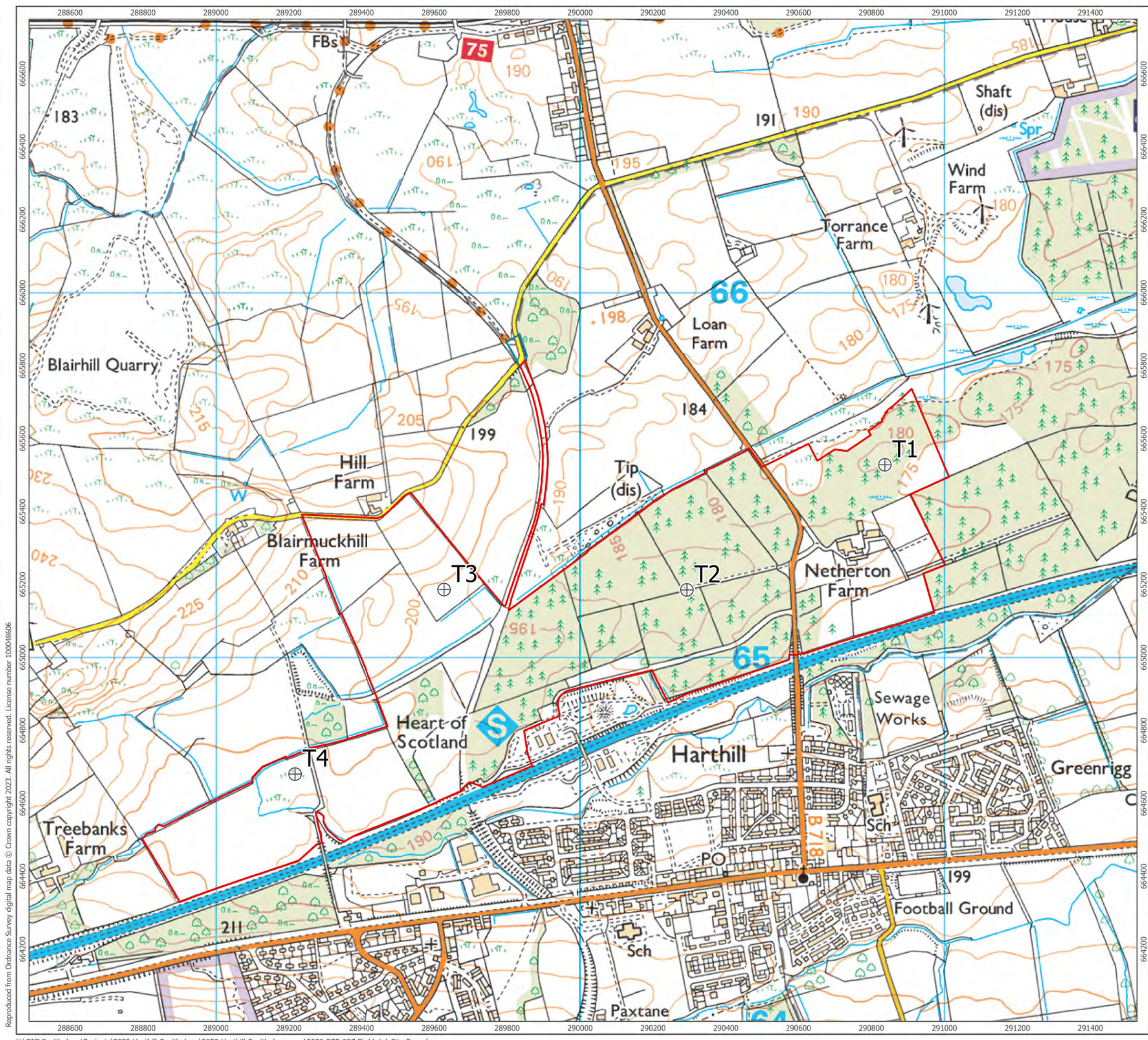
Figure 11.1.4: Ornithology Survey Areas

Figure 11.1.5: Flight Activity Surveys; Goose and Duck Flights

Figure 11.1.6: Flight Activity Surveys; Wader Flights

Figure 11.1.7: Flight Activity Surveys; Merlin Flights

Figure 11.1.8: Breeding Bird Territories



- Site Boundary
- Future Application Boundary
- + Proposed Turbine Location

1:10,000 Scale @ A3

0 0.25 0.5 km

Produced By: EA	Ref: 3959-REP-027
Checked By: SC	Date: 17/02/2023

Site Boundary
 Figure 11.1.1

Torrance Wind Farm Extension II
Appendix 11.1: Baseline
Ornithology Report 2020-21

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 Y:\GIS\Ornithology\Projects\3959 Harthill Ornithology\3959 Harthill Ornithology.aprx\3959-REP-027 Fig11.1.1 Site Boundary



- Site Boundary
- Future Application Boundary
- 20 km Buffer of Site Boundary
- Special Protection Areas
- Sites of Special Scientific Interest
- Ramsar Sites

Where the key does not match what is represented in the figure, the boundaries of the following designated sites overlap: Firth of Forth SPA, SSSI and Ramsar Site; and Slamannan Plateau SPA and SSSI.

1:160,000 Scale @ A3

0 2.5 5 km

▲ NORTH

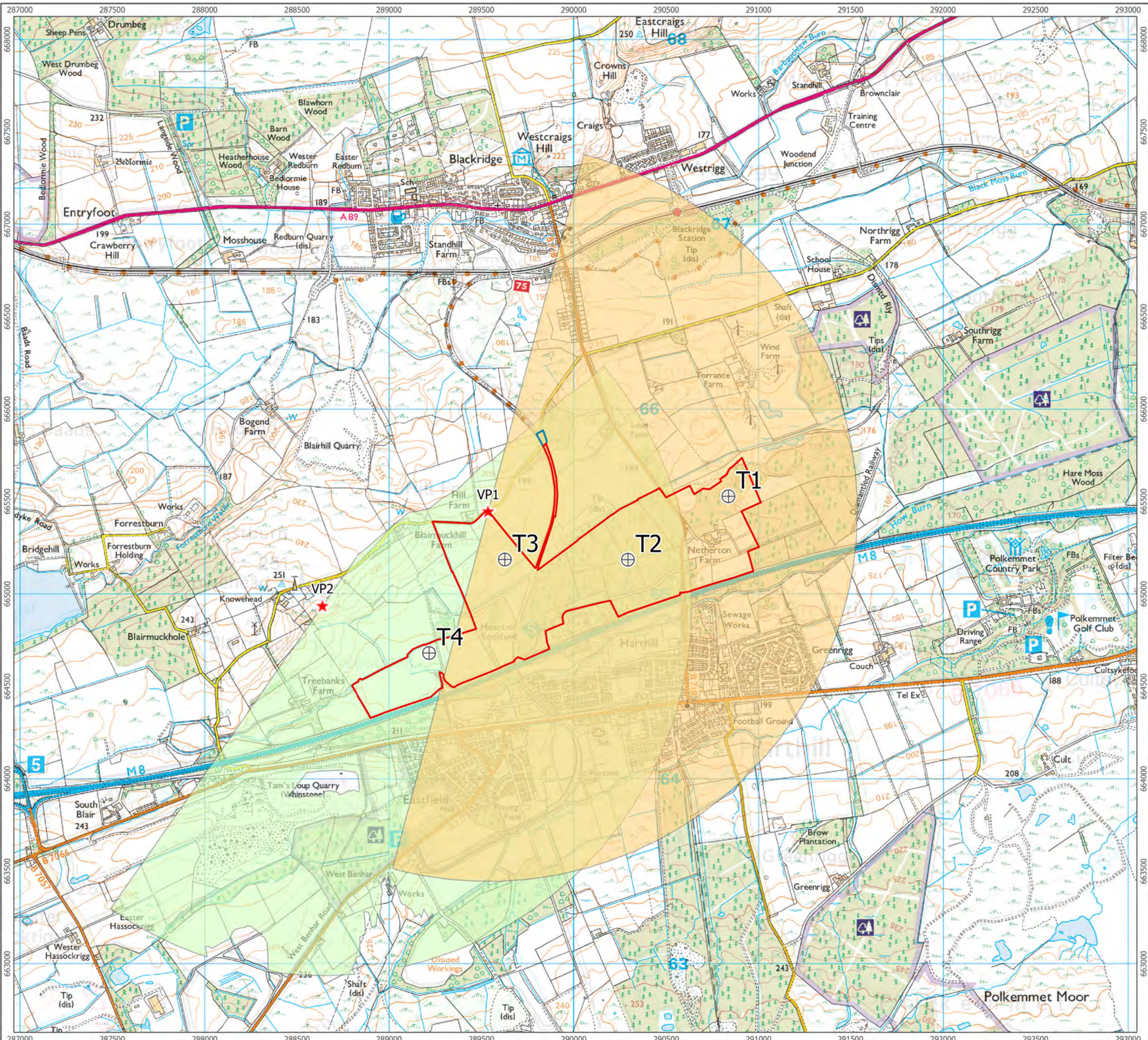
Produced By: EA	Ref: 3959-REP-028
Checked By: SC	Date: 17/02/2023

Statutory Designated Sites
 Figure 11.1.2

Torrance Wind Farm Extension II
Appendix 11.1: Baseline
Ornithology Report 2020-21

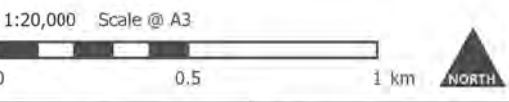
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- Site Boundary
- Future Application Boundary
- ⊕ Proposed Turbine Location
- ★ Vantage Points
- VP1 Viewshed
- VP2 Viewshed

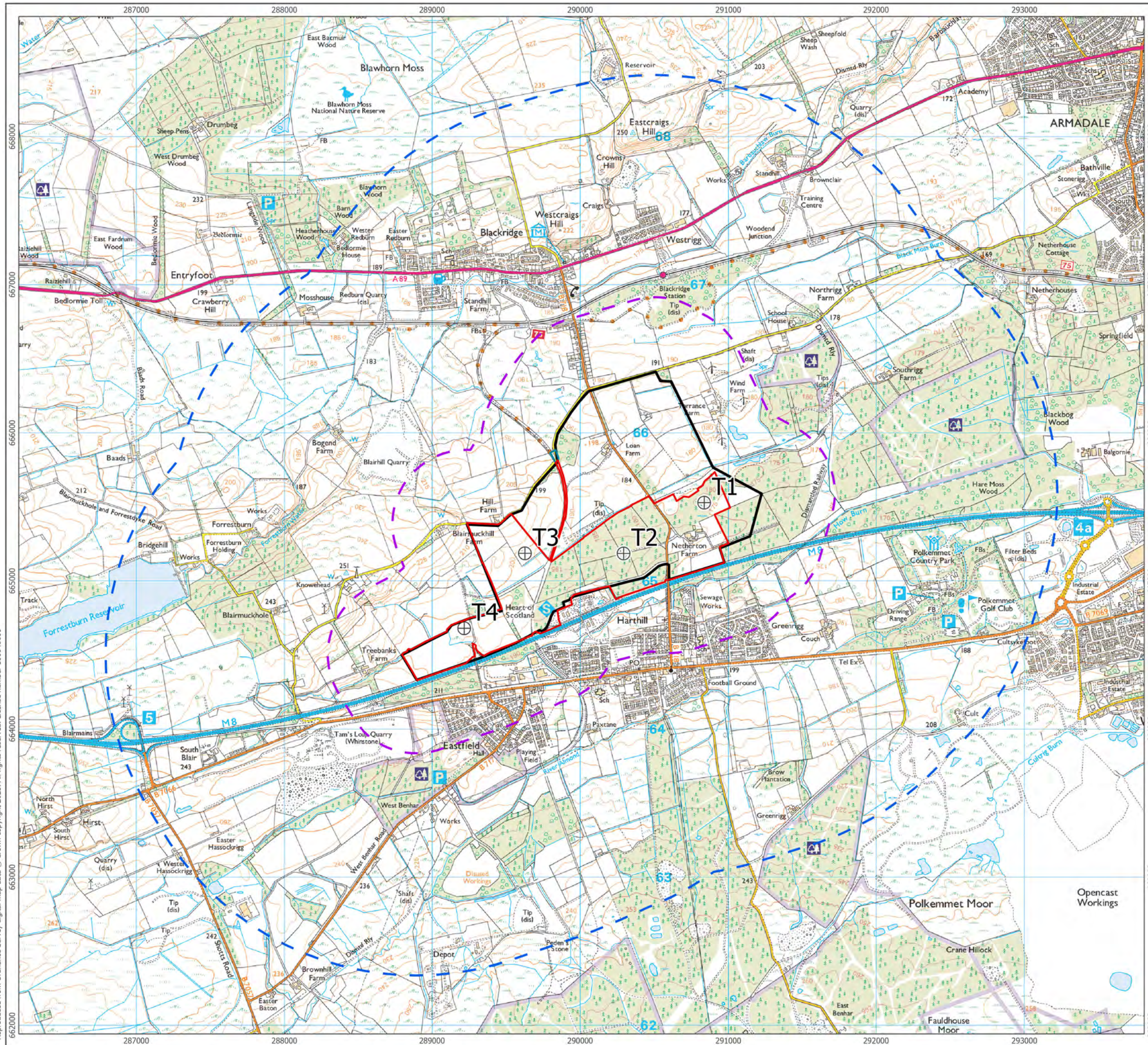
Viewsheds were calculated assuming a lowest rotor swept height of 30 m.



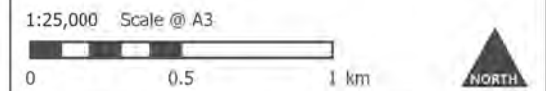
Produced By: EA	Ref: 3959-REP-029
Checked By: SC	Date: 17/02/2023

**Vantage Point Locations
 and Viewsheds**
 Figure 11.1.3
**Torrance Wind Farm Extension II
 Appendix 11.1: Baseline
 Ornithology Report 2020-21**

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 Y:\GIS\Ornithology\Projects\3959 Harthill Ornithology\3959 Harthill Ornithology.aprx\3959-REP-029 Fig11.1.3 Vantage Point Locations and Viewsheds



- Site Boundary
- Future Application Boundary
- Site Boundary at time of Surveys
- Proposed Turbine Location
- Breeding Bird Survey Area (500 m Buffer of Site Boundary)
- Breeding Raptor Survey Area (2 km Buffer of Site Boundary)

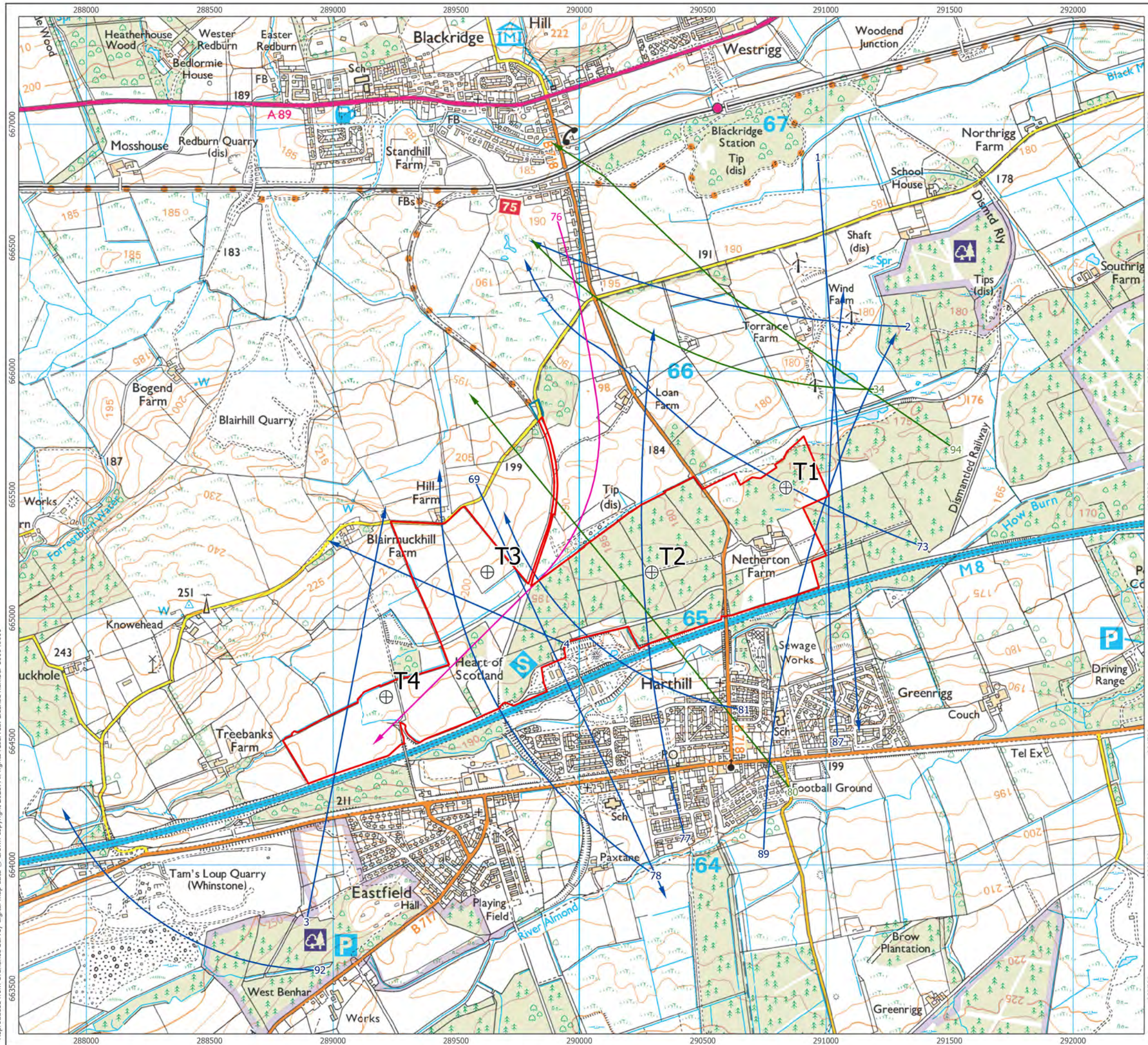


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Ornithology Survey Areas
Figure 11.1.4

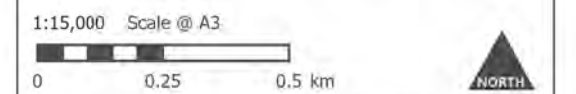
Torrance Wind Farm Extension II
Appendix 11.1: Baseline
Ornithology Report 2020-21

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- Site Boundary
- Future Application Boundary
- + Proposed Turbine Location
- Flight Lines
 - Greylag Goose
 - Pink-footed Goose
 - Teal

Each flight is labelled with a unique 'key number', which allows identification of individual flights, and corresponds with the key number in Table A4.1, Appendix 4

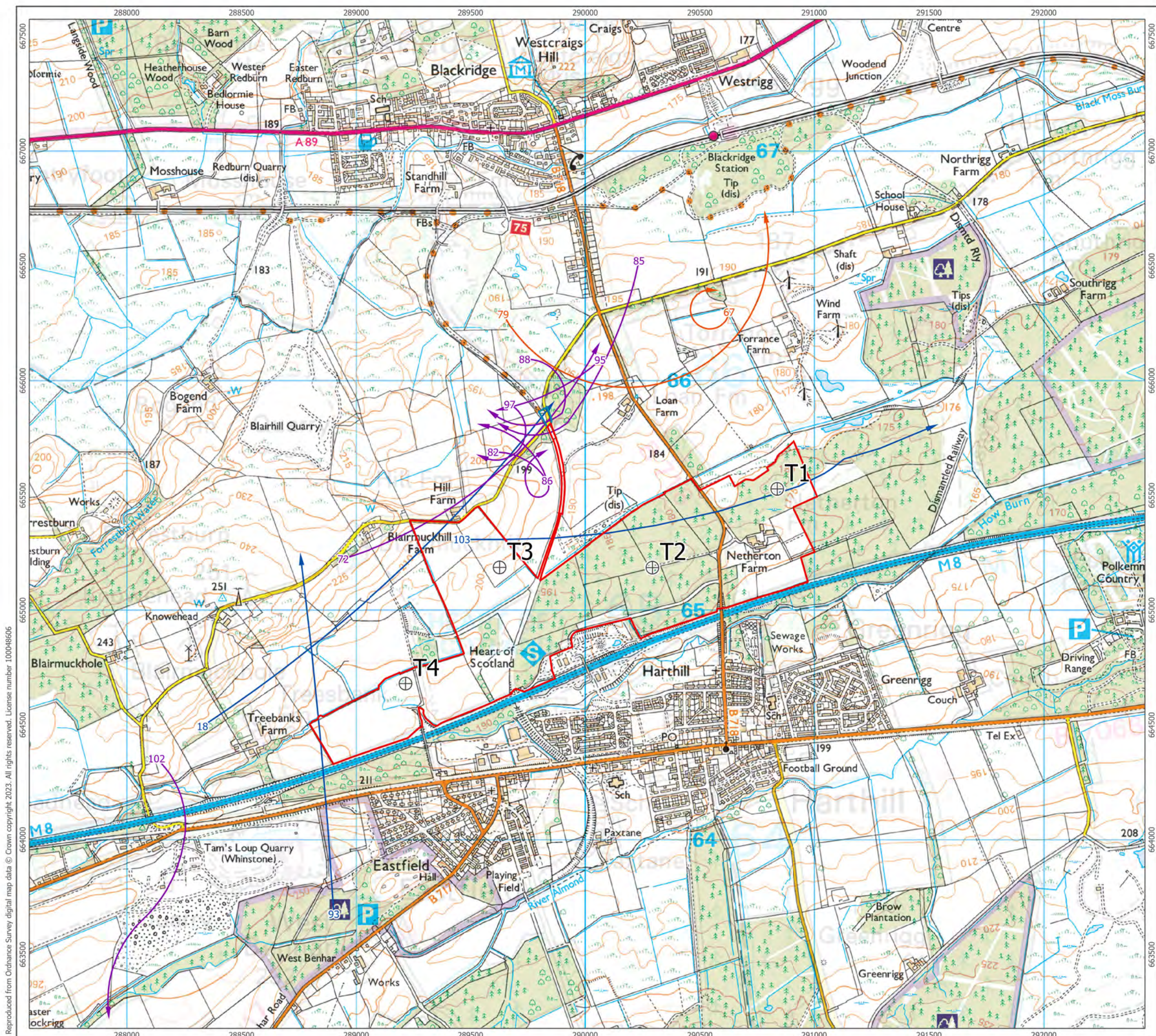


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Checked By: SC	Date: 17/02/2023

**Flight Activity Surveys;
Goose and Duck Flights**
Figure 11.1.5

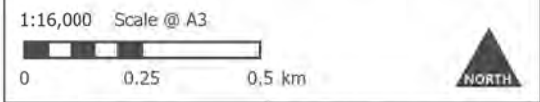
**Torrance Wind Farm Extension II
Appendix 11.1: Baseline
Ornithology Report 2020-21**

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- Site Boundary
- Future Application Boundary
- Proposed Turbine Location
- Flight Lines
- Curlew
- Golden Plover
- Lapwing

Each flight is labelled with a unique 'key number', which allows identification of individual flights, and corresponds with the key number in Table A4.1, Appendix 4

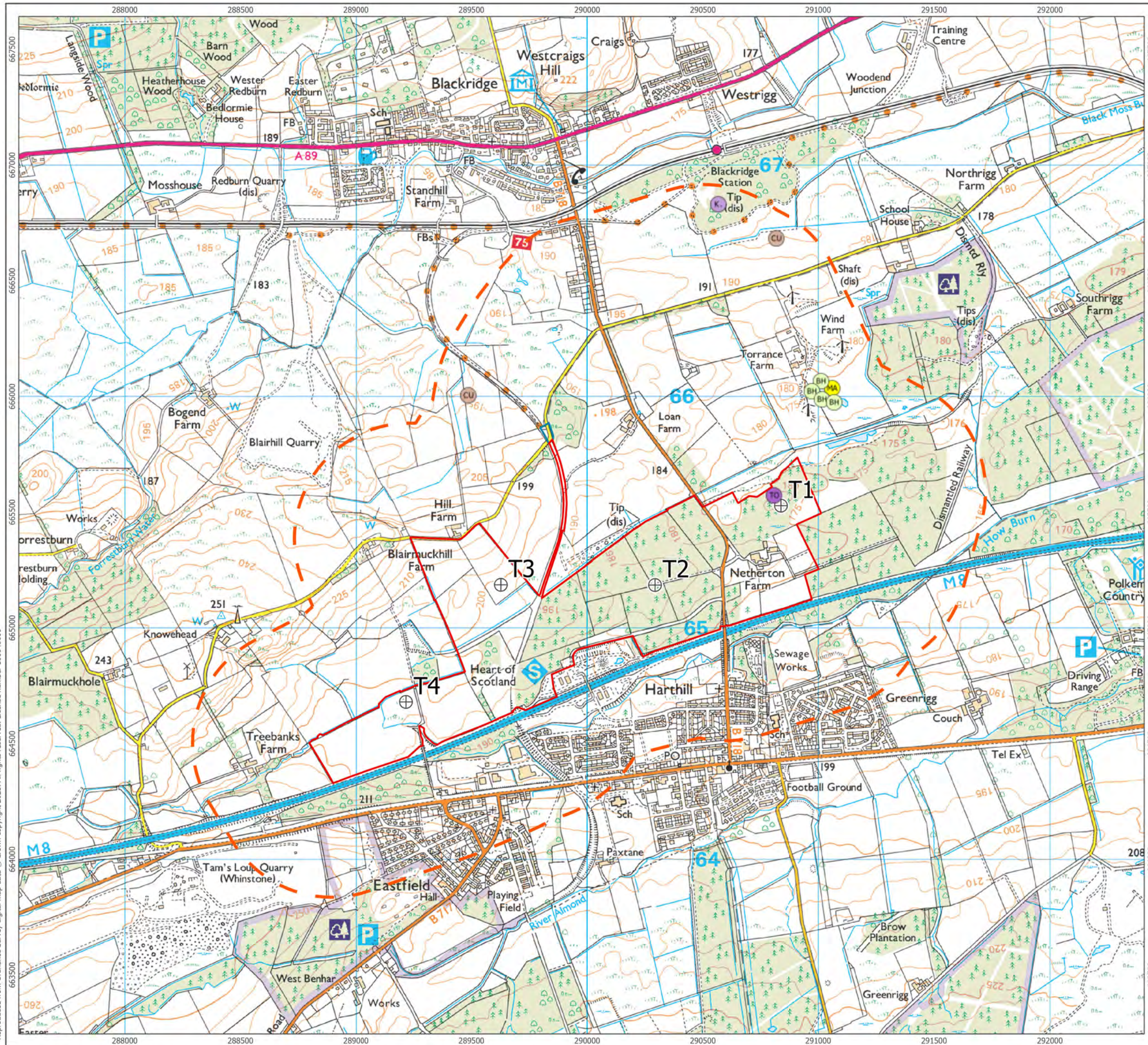


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Checked By: SC	Date: 17/02/2023



Flight Activity Surveys;
Wader Flights
 Figure 11.1.6

Torrance Wind Farm Extension II
Appendix 11.1: Baseline
Ornithology Report 2020-21

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- Site Boundary
 - Future Application Boundary
 - Breeding Bird Survey Area (500 m Buffer of Site Boundary)
 - Proposed Turbine Location
- Species**
- BH Black-headed Gull
 - CU Curlew
 - K Kestrel
 - MA Mallard
 - TO Tawny Owl

1:16,000 Scale @ A3



Produced By: EA	Ref: 3959-REP-034
Checked By: SC	Date: 17/02/2023

Breeding Bird Territories
Figure 11.1.8

Torrance Wind Farm Extension II
Appendix 11.1: Baseline
Ornithology Report 2020-21

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APPENDIX 2: BIRD SPECIES NAMES AND CONSERVATION DESIGNATIONS

Table A2.1 list provides English vernacular and scientific names for all bird species named in this report. Taxonomic order and nomenclature are **based on the BOU 'British List'**¹.

Table A2.1: List of English vernacular and scientific names of bird species mentioned in this report

Species*		Schedule 1/Annex I listings	Conservation listings**
English (British) vernacular name	Scientific name		
Canada goose	<i>Branta canadensis</i>	-	-
Greylag goose	<i>Anser anser</i>	-	Amber
Taiga bean goose	<i>Anser fabalis fabalis</i>	-	Red, SBL
Pink-footed goose	<i>Anser brachyrhynchus</i>	-	Amber
Wigeon	<i>Mareca penelope</i>	-	Amber
Mallard	<i>Anas platyrhynchos</i>	-	Amber
Teal	<i>Anas crecca</i>	-	Amber
Tufted duck	<i>Aythya fuligula</i>	-	-
Scaup	<i>Aythya marila</i>	Schedule 1	Red, SBL
Eider	<i>Somateria mollissima</i>	-	Amber
Velvet scoter	<i>Melanitta fusca</i>	Schedule 1	Red
Common scoter	<i>Melanitta nigra</i>	Schedule 1	Red, SBL
Long-tailed duck	<i>Clangula hyemalis</i>	Schedule 1	Red
Goldeneye	<i>Bucephala clangula</i>	-	Red
Red-breasted merganser	<i>Mergus serrator</i>	-	Amber
Pheasant	<i>Phasianus colchicus</i>	-	-
Swift	<i>Apus apus</i>	-	Red, SBL
Woodpigeon	<i>Columba palumbus</i>	-	Amber
Collared dove	<i>Streptopelia decaocto</i>	-	-
Moorhen	<i>Gallinula chloropus</i>	-	Amber
Coot	<i>Fulica atra</i>	-	-
Slavonian grebe	<i>Podiceps auratus</i>	Schedule 1, Annex I	Red, SBL
Lapwing	<i>Vanellus vanellus</i>	-	Red, SBL
Golden plover	<i>Pluvialis apricaria</i>	Annex I	SBL

Species*		Schedule 1/Annex I listings	Conservation listings**
English (British) vernacular name	Scientific name		
Grey plover	<i>Pluvialis squatarola</i>	-	Amber
Ringed plover	<i>Charadrius hiaticula</i>	-	Red
Curlew	<i>Numenius arquata</i>	-	Red, SBL
Bar-tailed godwit	<i>Limosa lapponica</i>	Annex I	Amber, SBL
Turnstone	<i>Arenaria interpres</i>	-	Amber
Knot	<i>Calidris canutus</i>	-	Amber
Dunlin	<i>Calidris alpina</i>	-	Red
Redshank	<i>Tringa totanus</i>	-	Amber
Black-headed gull	<i>Chroicocephalus ridibundus</i>	-	Amber, SBL
Common gull	<i>Larus canus</i>	-	Amber
Great black-backed gull	<i>Larus marinus</i>	-	Amber
Herring gull	<i>Larus argentatus</i>	-	Red, SBL
Lesser black-backed gull	<i>Larus fuscus</i>	-	Amber
Sandwich tern	<i>Thalasseus sandvicensis</i>	Annex I	Amber, SBL
Red-throated diver	<i>Gavia stellata</i>	Schedule 1, Annex I	SBL
Cormorant	<i>Phalacrocorax carbo</i>	-	-
Grey heron	<i>Ardea cinerea</i>	-	-
Sparrowhawk	<i>Accipiter nisus</i>	-	Amber
Buzzard	<i>Buteo buteo</i>	-	-
Tawny owl	<i>Strix aluco</i>	-	Amber
Great spotted woodpecker	<i>Dendrocopos major</i>	-	-
Kestrel	<i>Falco tinnunculus</i>	-	Amber, SBL
Merlin	<i>Falco columbarius</i>	Schedule 1, Annex I	Red, SBL, RBBP
Peregrine	<i>Falco peregrinus</i>	Schedule 1, Annex I	SBL
Jay	<i>Garrulus glandarius</i>	-	-
Magpie	<i>Pica pica</i>	-	-
Jackdaw	<i>Coloeus monedula</i>	-	-

Species*		Schedule 1/Annex I listings	Conservation listings**
English (British) vernacular name	Scientific name		
Rook	<i>Corvus frugilegus</i>	-	Amber
Carrion crow	<i>Corvus corone</i>	-	-
Raven	<i>Corvus corax</i>	-	-
Coal tit	<i>Parus ater</i>	-	-
Blue tit	<i>Cyanistes caeruleus</i>	-	-
Great tit	<i>Parus major</i>	-	-
Skylark	<i>Alauda arvensis</i>	-	Red, SBL
Swallow	<i>Hirundo rustica</i>	-	-
House martin	<i>Delichon urbicum</i>	-	Red
Long-tailed tit	<i>Aegithalos caudatus</i>	-	-
Willow warbler	<i>Phylloscopus trochilus</i>	-	Amber
Chiffchaff	<i>Phylloscopus collybita</i>	-	-
Sedge warbler	<i>Acrocephalus schoenobaenus</i>	-	Amber
Grasshopper warbler	<i>Locustella naevia</i>	-	Red, SBL
Blackcap	<i>Sylvia atricapilla</i>	-	-
Garden warbler	<i>Sylvia borin</i>	-	-
Whitethroat	<i>Curruca communis</i>	-	Amber
Goldcrest	<i>Regulus regulus</i>	-	-
Wren	<i>Troglodytes troglodytes</i>	-	Amber
Treecreeper	<i>Certhia familiaris</i>	-	-
Starling	<i>Sturnus vulgaris</i>	-	Red, SBL
Song thrush	<i>Turdus philomelos</i>	-	Amber, SBL
Mistle thrush	<i>Turdus viscivorus</i>	-	Red
Redwing	<i>Turdus iliacus</i>	Schedule 1	Amber, SBL
Blackbird	<i>Turdus merula</i>	-	-
Fieldfare	<i>Turdus pilaris</i>	Schedule 1	Red
Robin	<i>Erithacus rubecula</i>	-	-

Species*		Schedule 1/Annex I listings	Conservation listings**
English (British) vernacular name	Scientific name		
Stonechat	<i>Saxicola rubicola</i>	-	-
Wheatear	<i>Oenanthe oenanthe</i>	-	Amber
House sparrow	<i>Passer domesticus</i>	-	Red, SBL
Dunnock	<i>Prunella modularis</i>	-	Amber, SBL
Grey wagtail	<i>Motacilla cinerea</i>	-	Amber
Pied wagtail	<i>Motacilla alba</i>	-	-
Meadow pipit	<i>Anthus pratensis</i>	-	Amber
Chaffinch	<i>Fringilla coelebs</i>	-	-
Bullfinch	<i>Pyrrhula pyrrhula</i>	-	Amber, SBL
Greenfinch	<i>Chloris chloris</i>	-	Red
Linnet	<i>Linaria cannabina</i>	-	Red, SBL
Lesser redpoll	<i>Acanthis cabaret</i>	-	Red, SBL
Goldfinch	<i>Carduelis carduelis</i>	-	-
Siskin	<i>Spinus spinus</i>	-	SBL
Yellowhammer	<i>Emberiza citrinella</i>	-	Red, SBL
<p>*Species names and order follow the British List maintained by the BOU¹</p> <p>**Red = UK BoCC Red list¹⁵; Amber = UK BoCC Amber list¹⁵; SBL = species included as priority species on the Scottish Biodiversity List</p>			

APPENDIX 3: SURVEY TIMES AND WEATHER CONDITIONS

Flight Activity Surveys

Full details of the 2020-21 FAS at both VP locations, including hourly weather conditions, are presented below in Tables A3.1 and A3.2.

Table A3.1: Survey times and hourly weather conditions during the 2020-21 FAS from VP 1

Date	Survey start time	Survey end time	Hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
25/09/20	08:00	11:00	1	2	N	0	2	2	2	0	0	
			2	2	N	0	2	2	2	0	0	
			3	2	N	0	2	2	2	0	0	
	11:30	14:30	1	2	N	6	2	2	2	0	0	
			2	3	N	5	2	2	2	0	0	
			3	3	N	3	2	2	2	0	0	
23/10/20	08:05	11:05	1	2	SW	1	8	1	1	0	0	Drizzle
			2	2	SW	1	8	1	1	0	0	Drizzle
			3	2	SW	0	8	2	2	0	0	Drizzle
	11:35	14:35	1	2	SW	1	8	1	1	0	0	Drizzle
			2	2	SW	1	8	1	1	0	0	Dry
			3	2	SW	1	8	1	1	0	0	Dry
27/11/20	08:00	11:00	1	2	S	0	5	2	2	1	0	-2 °C
			2	2	S	0	7	2	2	1	0	-1 °C
			3	2	S	0	8	2	2	0	0	1 °C
	11:30	14:30	1	2	S	0	8	2	2	0	0	5 °C
			2	2	S	0	8	2	2	0	0	
			3	2	S	0	8	2	2	0	0	5 °C

Appendix 11.1: Baseline Ornithology Report, 2020-21
 Torrance Wind Farm Extension II

Date	Survey start time	Survey end time	Hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
14/12/20	09:15	12:15	1	3	SSW	1	8	2	2	0	0	Drizzle
			2	3	SSW	1	8	2	2	0	0	Drizzle
			3	3	SSW	0	8	2	2	0	0	Dry
	12:45	15:45	1	3	SSW	0	8	2	2	0	0	
			2	3	SSW	0	8	2	2	0	0	
			3	3	SSW	0	8	2	2	0	0	
21/01/21	09:55	12:55	1	1	WSW	0	8	2	2	0	3	Snow showers
			2	2	WSW	0	8	2	2	0	3	Snow showers
			3	2	WSW	0	6	2	2	0	1	3cm snow on ground
	13:25	16:25	1	2	WSW	0	5	2	2	0	1	3cm snow on ground
			2	2	WSW	0	4	2	2	0	1	3cm snow on ground
			3	2	WSW	0	4	2	2	0	1	3cm snow on ground
15/02/21	07:40	10:40	1	3	S	0	8	2	2	0	1	Melting (10cm) snow on ground
			2	3	S	0	8	2	2	0	1	Melting (10cm) snow on ground
			3	3	S	0	8	2	2	0	1	Melting (10cm) snow on ground
	11:10	14:10	1	3	S	1	8	2	2	0	1	Melting (10cm) snow on ground
			2	3	S	0	8	2	2	0	1	Melting (10cm) snow on ground
			3	3	S	0	8	2	2	0	1	Melting (10cm) snow on ground
08/03/21	11:30	14:30	1	3	WSW	1	8	2	2	0	0	Drizzle
			2	3	WSW	1	8	2	2	0	0	Drizzle
			3	3	WSW	0	8	2	2	0	0	Dry
	15:00	18:00	1	3	WSW	1	8	2	2	0	0	Drizzle
			2	2	WSW	0	8	2	2	0	0	Drizzle

Date	Survey start time	Survey end time	Hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
			3	2	WSW	0	8	2	2	0	0	Drizzle
09/04/21	06:25	09:25	1	1	NW	0	2	2	2	1	0	Slight ground frost
			2	1	NW	0	2	2	2	0	0	
			3	1	NW	0	1	2	2	0	0	
	09:55	12:55	1	1	NW	0	2	2	2	0	0	
			2	2	NW	0	2	2	2	0	0	
			3	2	NW	0	2	2	2	0	0	
04/05/21	14:30	17:30	1	2	NE	1	7	2	2	0	0	Drizzle
			2	2	NE	0	6	2	2	0	0	Dry
			3	2	NE	0	6	2	2	0	0	
	18:00	21:00	1	2	NE	0	5	2	2	0	0	Breeze
			2	2	NE	0	7	2	2	0	0	
			3	2	NE	0	7	2	2	0	0	
11/06/21	15:00	18:00	1	5	SW	0	4	2	2	0	0	
			2	5	SW	0	6	2	2	0	0	
			3	5	SW	0	4	2	2	0	0	
	18:30	21:30	1	5	SW	0	3	2	2	0	0	16 °C
			2	5	SW	0	4	2	2	0	0	
			3	5	SW	0	3	2	2	0	0	13 °C
27/07/21	14:45	12:45	1	2	S	1	6	2	2	0	0	20 °C
			2	2	S	1	7	2	2	0	0	
			3	2	S	0	7	2	2	0	0	19 °C
	18:15	21:15	1	2	S	3	6	2	2	0	0	Heavy Shower, 19 °C

Date	Survey start time	Survey end time	Hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
			2	2	S	3	7	2	2	0	0	Heavy Shower, 19 °C
			3	2	S	1	7	2	2	0	0	Light rain, 17 °C
24/08/21	06:00	09:00	1	1	E	0	8	0	1	0	0	Mist, visibility 1 km
			2	1	E	0	8	0	1	0	0	
			3	1	E	0	6	2	0	0	0	Clear
	09:30	12:30	1	1	E	0	2	2	2	0	0	15°C
			2	1	E	0	2	2	2	0	0	
			3	1	E	0	1	2	2	0	0	21°C

Key:

- Wind speed: according to Beaufort Scale
- Wind direction: according to 16-point compass
- Rain: 0 = None; 1 = Drizzle/Mist; 2 = Light showers; 3 = Heavy showers; 4 = Light rain; 5 = Heavy rain
- Cloud cover: in eighths of sky (oktas)
- Cloud height: 0 = <150 m; 1 = 150-500 m; 2 = >500 m
- Visibility: 0 = Poor (<1 km); 1 = Moderate (1-2 km); 2 = Good (>2 km)
- Frost: 0 = None; 1 = Ground frost; 2 = All day frost
- Snow: 0 = None; 1 = On site; 2 = On high ground

Table A3.2: Survey times and hourly weather conditions during the 2020-21 FAS from VP 2

Date	Survey start time	Survey end time	Hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
22/10/20	08:00	11:00	1	2	W	1	8	2	2	0	0	Drizzle
			2	2	W	0	8	2	2	0	0	Dry
			3	2	W	0	8	2	2	0	0	Dry

Date	Survey start time	Survey end time	Hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
	11:30	14:30	1	2	W	0	8	2	2	0	0	
			2	2	W	0	8	2	2	0	0	
			3	2	W	0	8	2	2	0	0	
30/10/20	10:10	13:10	1	2	SW	0	5	2	2	0	0	10 °C
			2	3	SW	0	4	2	2	0	0	
			3	3	SW	0	4	2	2	0	0	10 °C
	13:40	16:40	1	3	SW	0	3	2	2	0	0	10 °C
			2	3	SW	0	4	2	2	0	0	
			3	3	SW	0	4	2	2	0	0	9 °C
23/11/20	09:15	12:15	1	3	W	0	3	2	2	0	0	
			2	3	W	0	5	2	2	0	0	
			3	3	W	0	7	2	2	0	0	
	12:45	15:45	1	3	W	0	4	2	2	0	0	
			2	3	W	0	4	2	2	0	0	
			3	3	W	0	4	2	2	0	0	
18/12/21	08:40	11:40	1	3	S	0	8	2	2	0	0	
			2	3	S	0	8	2	2	0	0	
			3	3	S	0	8	2	2	0	0	
	12:10	15:10	1	3	S	0	8	2	2	0	0	
			2	3	S	4	8	2	2	0	0	Light rain
			3	3	S	4	8	2	2	0	0	Light rain
18/01/21	08:15	11:15	1	3	SW	0	4	2	2	0	0	
			2	3	SW	0	5	2	2	0	0	

Appendix 11.1: Baseline Ornithology Report, 2020-21
 Torrance Wind Farm Extension II

Date	Survey start time	Survey end time	Hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
	11:45	14:45	3	3	SW	0	5	2	2	0	0	
			1	3	SW	0	6	2	2	0	0	
			2	3	SW	0	4	2	2	0	0	
			3	3	SW	0	4	2	2	0	0	
25/02/21	11:00	14:00	1	4	SW	0	4	2	2	0	0	
			2	4	SW	0	4	2	2	0	0	
			3	4	SW	0	5	2	2	0	0	
	14:30	17:30	1	4	SW	0	6	2	2	0	0	
			2	4	SW	0	7	2	2	0	0	
			3	4	SW	0	7	2	2	0	0	
22/03/21	06:00	09:00	1	2	SW	0	6	2	2	0	0	
			2	2	SW	0	8	2	2	0	0	
			3	3	SW	0	8	2	2	0	0	
	09:30	12:30	1	3	SW	0	8	2	2	0	0	
			2	3	SW	0	8	2	2	0	0	
			3	4	SW	0	8	2	2	0	0	
20/04/21	14:00	17:00	1	1	SSW	2	6	2	2	0	0	
			2	2	SSW	0	7	2	2	0	0	
			3	2	SSW	0	8	2	2	0	0	
	17:30	20:30	1	2	SSW	0	8	2	2	0	0	
			2	2	SSW	4	8	2	2	0	0	
			3	2	SSW	0	8	2	2	0	0	
26/05/21	04:55	07:55	1	2	NW	0	8	1	1	0	0	Cloud over hill tops

Date	Survey start time	Survey end time	Hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes		
			2	2	NW	0	8	2	2	0	0			
			3	2	NW	0	8	2	2	2	0	0		
			08:25	11:25	1	2	NW	0	8	2	2	0	0	
			2	3	NW	0	8	2	2	2	0	0		
			3	3	NW	0	8	2	2	2	0	0		
21/06/21	04:55	07:55	1	2	NE	1	8	2	2	0	0	Drizzle		
			2	2	NE	0	8	2	2	2	0	0	Dry	
			3	2	NE	0	8	2	2	2	0	0	Dry	
	08:25	11:25	1	2	NE	0	8	2	2	2	0	0		
			2	2	NE	0	7	2	2	2	0	0		
			3	3	NE	0	7	2	2	2	0	0		
15/07/21	04:55	07:55	1	2	W	0	3	2	2	0	0	13 °C		
			2	2	W	0	2	2	2	2	0	0		
			3	2	W	0	2	2	2	2	0	0	15 °C	
	08:25	11:25	1	2	W	0	2	2	2	2	0	0	16 °C	
			2	1	W	0	2	2	2	2	0	0		
			3	1	W	0	1	2	2	2	0	0	19 °C	
04/08/21	14:25	17:25	1	2	S	0	4	2	2	0	0	20°C		
			2	2	S	0	3	2	2	2	0	0		
			3	2	S	0	3	2	2	2	0	0	21°C	
	17:55	20:55	1	2	S	0	5	2	2	2	0	0	19°C	
			2	1	S	0	7	2	2	2	0	0		
			3	1	S	0	7	2	2	2	0	0	14°C	

Date	Survey start time	Survey end time	Hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow	Notes
<p>Key:</p> <ul style="list-style-type: none"> • Wind speed: according to Beaufort Scale • Wind direction: according to 16-point compass • Rain: 0 = None; 1 = Drizzle/Mist; 2 = Light showers; 3 = Heavy showers; 4 = Light rain; 5 = Heavy rain • Cloud cover: in eighths of sky (oktas) • Cloud height: 0 = <150 m; 1 = 150-500 m; 2 = >500 m • Visibility: 0 = Poor (<1 km); 1 = Moderate (1-2 km); 2 = Good (>2 km) • Frost: 0 = None; 1 = Ground frost; 2 = All day frost • Snow: 0 = None; 1 = On site; 2 = On high ground 												

APPENDIX 4 – DETAILS OF TARGET SPECIES FLIGHTS

Details of each target species flight recorded during the 2020-21 FAS are presented below in Table A4.1.

Table A4.1: Details of each target species flight recorded during the 2020-21 FAS, listed by species

Species*	VP	Date	Flight start time	Flight duration (s)	Minimum no. of birds	Key no.***	Notes
Greylag goose	VP1	27/11/20	08:12	151	28	34	Regular transit/commuting, heading north
	VP1	08/03/21	17:09	159	11	80	Regular transit, flew out of sight, heading north over Site
	VP1	11/06/21	16:08	153	2	94	Regular transit, flew out of sight
Pink-footed goose	VP1	25/09/20	09:39	158	38	1	Regular transit, flew out of sight, migrating south
	VP1	23/10/20	10:57	158	27	2	Regular transit, flew out of sight, flock heading north-west
	VP2	30/10/20	15:22	193	65	3	Regular transit, flew out of sight, flock heading north-east
	VP2	23/11/20	Not recorded	138	2	4	Calling over the Site, regular transit, flew out of sight

Species*	VP	Date	Flight start time	Flight duration (s)	Minimum no. of birds	Key no.***	Notes
	VP2	18/12/20	09:14	152	38	69	Commuting
	VP1	21/01/21	12:08	190	110	73	Regular transit, flew out of sight, heading south, flying high
	VP2	25/02/21	16:49	191	86	77	Regular transit, flew out of sight, heading north-west over the Site
	VP2	25/02/21	17:14	180	45	78	Regular transit, flew out of sight, heading north-west over the Site
	VP2	22/03/21	06:14	133	85	81	Regular transit, heading north-west over the Site
	VP1	09/04/21	10:32	160	95	87	Regular transit, flew out of sight
	VP1	09/04/21	11:50	176	70	89	Regular transit, flew out of sight
	VP2	20/04/21	14:55	123	70	92	Regular transit, flew out of sight
Teal	VP1	21/01/21	15:34	158	5	76	Three males and two females, regular transit/commuting; flew out of sight
Lapwing	VP1	14/12/20	15:01	76	6	67	Foraging, circling
	VP1	08/03/21	15:31	143	4	79	Regular transit, flew out of sight, heading east over the Site
Golden plover	VP2	23/11/20	Not recorded	152	18	18	Regular transit, flew out of sight, heading north-east over the Site
	VP2	20/04/21	16:55	112	18	93	Regular transit, flew out of sight
	VP1	24/08/21	11:07	152	31	103	Regular transit/commuting, flew out of sight, heading south-east
Curlew	VP2	18/01/21	12:41	135	1	72	Regular transit, flew out of sight, flew behind VP and over the Site heading north-east
	VP1	09/04/21	07:08	90	1	82	Adult, foraging, landed in grassy field
	VP1	09/04/21	08:48	106	1	85	Adult, foraging, landed, breeding behaviour ('bubbling' breeding call when landed)

Species*	VP	Date	Flight start time	Flight duration (s)	Minimum no. of birds	Key no.***	Notes
	VP1	09/04/21	10:10	49	1	86	Adult, foraging, flew out of sight, breeding behaviour ('bubbling' breeding call)
	VP1	09/04/21	10:57	40	1	88	Adult, flew out of sight, breeding behaviour ('bubbling' breeding call)
	VP1	04/05/21	14:57	49	1	97	Adult, breeding behaviour, calling and flying behind VP
	VP1	11/06/21	17:02	89	1	95	Adult, flew out of sight, calling and flying lower behind VP viewshed
	VP2	15/07/21	Not recorded	127	4	102	Regular transit/commuting, flew out of sight, heading south-west
Merlin	VP1	14/12/20	13:11	108	1	62	Immature male, hunting low over the Site
<p>*Species names and order follow the British List maintained by the BOU¹</p> <p>**Flight start time was not recorded during the survey however, the flight occurred between 09:15 and 12:15 for pink-footed goose and golden plover, and between 04:55 and 07:55 for curlew.</p> <p>***Key numbers allow identification of individual flights, and correspond with the numbers shown on Figures 5-7, Appendix 1</p>							