

Torfichen Proposed Wind Farm

Technical Appendix 9.1: Breeding Bird Survey 2021



Report to Renewable Energy Systems Ltd

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November 2021



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TORFICHEN WIND FARM: BREEDING BIRD SURVEYS 2021

Introduction

1. This report describes the breeding bird survey work carried out for the proposed Torfichen wind farm, (hereafter referred to as the 'Proposed Development'). It provides a breeding season's baseline data on the bird populations, activity and flight paths within the vicinity of the potential wind farm site, to inform subsequent ornithological impact assessment.
2. The surveys have been designed with reference to current NatureScot survey guidance on bird surveys for wind farms (SNH 2017). The surveys were undertaken by Carl Mitchell and Larry Griffin, both highly experienced bird surveyors.
3. All details of the nesting locations of species specially protected from disturbance under Schedule 1 of the Wildlife and Countryside Act, so should remain confidential following NatureScot guidance (SNH 2016). They are reported separately in the confidential Technical Appendix 9.8.

Study Area

4. The site is located approximately 4 km south of Gorebridge and 9.5 km south-east of Penicuik, within the northern edge of the Moorfoot Hills in the Midlothian Council (MC) area. The breeding bird survey area was chosen to include all areas within the possible zone of ornithological influence of the Proposed Development. This included the Proposed Development site, plus a 500 m buffer for the main breeding bird surveys (the core survey area, following NatureScot guidance, SNH 2017) and a 2 km buffer for the key species surveys (the wider survey area), where access was possible and where there was potentially suitable habitat. The extents of these areas are shown in **Figure 1**. The main core survey area covered a total area of 18.5 km² and the wider survey area 49.9 km². It comprised predominantly upland moorland habitat, currently used mainly for grazing sheep and deer, with agriculturally improved grassland on the lower ground in the northern part of the site. It lies mainly within the '*Border Hills*' NatureScot Natural Heritage Zone (NHZ20), though the northern edge of the survey area is within the '*Eastern Lowlands*' (NHZ16).

Breeding Bird Survey Methods

5. The aim of the breeding season fieldwork was to obtain data on the importance of the potential wind farm site and its surrounds for breeding birds, and on the flight lines of key target species. They included moorland bird surveys, raptor surveys and black grouse surveys.

Core breeding bird survey

6. The main breeding bird walkover survey followed the standard moorland survey method (Brown and Shepherd 1993) but with two additional visits as recommended in

current NatureScot guidance (SNH 2017). They commenced in April and continued through to July, and were done between 8:30 hours and 18:00 hours. The survey dates were 28/29 April, 6/9, 14/15 and 23/24 May, 5/6 and 17/20 June and 21/24 and 30 July 2021. These surveys covered all of the open (i.e. non-forested) habitat within a buffer zone of 500 m around the developable area where access/viewing was possible. Access was not possible into some of the buffer to the north of the site (agriculturally-improved grassland where cattle/deer prevented access), and moorland areas to the south (outside the land ownership) where surveys were restricted to public access. The restricted access area is shown in **Figures 2-13**.

7. All bird locations and behaviour were mapped to 1:10,000 scale, using the standard British Trust for Ornithology (BTO) Common Birds Census notation. All species were recorded. In addition, the survey effort per unit area was standardised to make the surveys as repeatable as possible, recording systematically for approximately 2 hours per km². A route was chosen to ensure that all parts of the study area were covered to within about 100 m of the observer, where access was possible. The survey route was plotted onto the survey map as it was carried out.
8. The surveys avoided strong winds, heavy rain, fog and low cloud. Birds were located by walking, listening and scanning by eye and with binoculars. Standard BTO notation will be used to record the birds' activities; singing, calling, carrying nest material, nests or young found, repetitively alarmed adults, disturbance displaying, carrying food or in territorial dispute.
9. The survey data were analysed to determine spatially distinct clusters of records, equivalent to breeding territories (following Brown and Shepherd 1993), with the number of such territories used to calculate the breeding population for each species (Gilbert *et al.* 1998). A record in potentially suitable breeding habitat on a single visit was considered sufficient to indicate a potential breeding attempt.

Raptor breeding surveys

10. As the survey area was considered likely from the results of the desk study and the site location to be used by a range of scarce raptors, raptor surveys of a 2 km buffer zone around the developable area were undertaken during April-July 2021. Raptor surveys comprised walkovers where access was allowed, supplemented by a series of mini-Vantage Points (VPs) (shorter watches from additional VPs) to cover other areas, to detect displaying or nesting behaviour during the breeding season of raptor species in accordance with methods described in Gilbert *et al.* (1998) and Hardey *et al.* (2013). Surveys recorded all Schedule 1 and Annex I raptor species but with a focus on those species where potentially suitable breeding habitat for these species is present (including goshawk, red kite, peregrine, barn owl and short-eared owl). This included four survey visits, undertaken on 20 April, 18 May, 10/18 June and 6/8 July.

Black Grouse Survey

11. Black grouse surveys were undertaken following the methods outlined in Gilbert *et al.* (1998). All suitable black grouse habitat within the site boundary and a 2 km buffer was surveyed. Surveys were carried out on 1/5/9 May, 22 and 24/25 May. Areas of suitable habitat outwith the site to which access was not possible were scanned with binoculars from the site boundary, from publicly accessible locations and from

suitable VPs within the site. A minimum three-visit survey was undertaken as follows (though additional data was also collected during other surveys):

- Visit 1: site visit to assess habitat for black grouse suitability;
- Visit 2: areas of suitable habitat with the potential to support lekking black grouse were visited twice on different mornings to establish presence/absence; and
- Visit 3: any locations where black grouse were recorded as present during the second visit were revisited in order to provide an accurate count of the number of lekking birds present. The survey was undertaken one hour prior to dawn until one hour after dawn.

Vantage point surveys

12. VP surveys were carried out to determine bird flight activity within the Proposed Development site to assess collision risk. The surveys quantified the bird numbers that could potentially be at risk of collision (including roost flight observations at dawn/dusk). All flight lines of target species were mapped, and the flight height of each flock was recorded. Target species included all EU Birds Directive Annex 1 species, Wildlife & Countryside Act (1981) Schedule 1 species and Red-listed birds of Conservation Concern (Eaton *et al.* 2015), as per NatureScot (SNH 2017).
13. The specific aim of the VP surveys was to collect data on key target species flight activity to enable estimates to be made of:
 - The time spent flying over the survey area;
 - The relative use made of different parts of the survey area; and
 - The proportion of flying time spent at different elevations above the ground.
14. Three VPs were used to cover the Proposed Development site. The computer-generated viewsheds (using Global Mapper v21) are shown in **Figure 1**. For each VP, a basic 36 hours' VP survey during the breeding season from each VP was carried out (as set out in NatureScot guidance, SNH 2017), spread evenly across the breeding season.
15. All key target species flights (and any other species of specific nature conservation interest) were recorded, irrespective of their distance from the VP. Observations were carried out throughout daylight hours but not in periods of severely reduced visibility (<3 km).
16. During the VP surveys, all key target species flights were mapped and cross-referenced to a standard recording form using a numbering system, and the flight height of each was recorded. To estimate flight height as accurately as possible, available reference structures were used. Heights were estimated as accurately as possible and recorded as a raw estimate, rather than being summarised to height classes. Below 10 m estimates were made to 1 m, between 10 and 20 m to 2 m, between 20 m and 50 m to 5 m, and above 50 m to 10 m. When birds were observed over an extended period, estimates of flight height were recorded every 30 seconds. The activity during each flight was also recorded. Particular attention was paid to any observations of birds at rotor height.

Breeding bird survey 2021 results

Core breeding bird survey

17. The breeding bird populations found within the core breeding bird survey area during the 2021 breeding bird surveys are summarised in **Table 1**.

Table 1. Breeding bird populations in the Torfichen core survey area during April-July 2021.

Species	Estimated numbers of breeding pairs
Mute Swan	1
Greylag Goose	25
Teal	2
Mallard	6
Tufted Duck	4
Red Grouse	18
Black Grouse	9
Red-legged Partridge	1
Quail	1
Pheasant	20
Little Grebe	1
Buzzard	13
Kestrel	4
Moorhen	1
Oystercatcher	7
Golden Plover	2
Lapwing	33
Snipe	27
Curlew	87
Redshank	3
Black-headed Gull	313
Woodpigeon	99
Cuckoo	2
Long-eared Owl	1
Great Spotted Woodpecker	1
Skylark	327
Sand Martin	3
Swallow	9
Tree Pipit	2
Meadow Pipit	450
Pied Wagtail	3
Wren	16
Dunnock	5
Robin	21
Redstart	1
Whinchat	3
Stonechat	5
Wheatear	22
Blackbird	14
Song Thrush	16
Mistle Thrush	12
Chiffchaff	4
Willow Warbler	35
Goldcrest	7
Spotted Flycatcher	1
Blue Tit	5
Great Tit	5

Species	Estimated numbers of breeding pairs
Coal Tit	9
Magpie	2
Jackdaw	12
Rook	65
Carrion Crow	38
Raven	5
Starling	1
Chaffinch	50
Goldfinch	2
Siskin	5
Linnet	3
Lesser Redpoll	3
Common Crossbill	2
Reed Bunting	8

18. The distributions of the breeding birds of conservation importance within the survey area in 2021 are shown on **Figures 2 to 13**. The more abundant species (i.e. 10 or more breeding pairs) of conservation interest have been presented separately for clarity.
- **Greylag Goose (Figure 2)** - this species was found only on the western side of the survey area, in the vicinity of Gladhouse Reservoir.
 - **Red Grouse (Figure 3)** - widely distributed across the moorland habitat that is found mainly in the southern part of the survey area.
 - **Lapwing (Figure 4)** - the two main areas used by this species were the western edge of the survey area in the vicinity of Gladhouse Reservoir, and on the moorland fringe in the north-eastern part.
 - **Snipe (Figure 5)** - mainly found in the central part of the survey area, with fewer on the higher moorland to the southern and in the areas of more improved agricultural grassland in the north.
 - **Curlew (Figure 6)** - abundant over most of the survey area, though at lower density in the areas of more improved agricultural grassland in the north.
 - **Other breeding waders (Figure 7)** - three further species of waders were recorded breeding within the core breeding bird survey area in lower numbers: oystercatcher, golden plover and redshank. They were widely scattered across the open ground within the survey area with no notable concentrations.
 - **Skylarks (Figure 8)** and **Meadow Pipit (Figure 9)** were both abundant over all the open moorland habitat within the survey area, though with less on the lower areas of more agriculturally-improved grassland in the north of the survey area.
 - **Song Thrush, (Figure 10), Mistle Thrush (Figure 11) Willow Warblers (Figure 12)** and were all widely distributed but largely restricted to the woodland habitats.
19. Other less abundant species of conservation importance (**Figure 13**) were found mainly in the fringes of the survey area and mostly associated with woodland habitats, with no important concentrations noted and few within the Proposed Development site itself. Of note in a regional context is the black-headed gull breeding colony on the southern edge of the survey area. The 300 pairs breeding at that site are sufficient to be considered of regional importance.

20. Additional species seen during the breeding bird surveys but not showing any evidence of breeding within the survey area included (peak counts): shelduck (2), cormorant (8), peregrine (1), whimbrel (1), lesser black-backed gull (41), herring gull (106), great black-backed gull (1) and house martin (2).

Black Grouse survey results

21. Two black grouse leks were located during the surveys, the main one on the south-eastern edge of the core survey area (peak count seven males), and a second smaller lek (with 1-2 lekking males) within the site at its western end. Their locations are shown in **Figure 14**, together with the other black grouse records during the surveys. The lek counts are summarised in **Table 2**.

Table 2. Black grouse lek counts at Torfichen, May 2021

Lek	Date	Number of males
Main (SE)	1/5/21	7
	6/5/21	5
	9/5/21	5
	10/5/21	6
	12/5/21	7
	15/5/21	6
	24/5/21	6
	25/5/21	7
Western	1/5/21	1
	5/5/21	2

Raptor survey results

22. **Short-eared Owl** - one pair of short-eared owls was found breeding, nesting in the 2 km buffer zone. Its location and flight lines observed during the raptor and the VP surveys are shown in **Figure 15**. Though the nest site was located outside the core survey area (and the Proposed Development site), there was still some foraging/flight activity observed within the site.
23. **Red Kite** - there was a single record of this species seen overflying during the VP surveys (see **Figure 21**), and no evidence of breeding within the core or the wider survey area.
24. **Peregrine** - there was a single record of this species overflying during the core breeding bird surveys and five during the VP surveys (see **Figure 21**), and no evidence of breeding within the core or the wider survey area.
25. **Long-eared Owl** - there were two records of this species in a forestry plantation bloc in the north-eastern part of the survey area (see **Figure 21**), indicating that it was likely to have been breeding in this area.

Vantage Point Survey Results

26. The rates of bird flight movement observed across the survey area during the vantage point surveys are summarised in **Table 2**. This gives the flight rate per hour recorded in each month and the total number of flights recorded.
27. **Table 2** also gives the percentage of flights of each species that were recorded at rotor height (30 – 180 m above ground level).

Table 2. Bird flight rates recorded over the Torfichen survey area during April-August 2021 vantage point surveys. N = 36 hours total observation from each of the three VPs.

Species	Flight rate (birds/hour)					Total number of birds overflying	% flights at rotor height
	April	May	June	July	Aug		
Greylag Goose	0	1.81	2.15	0.64	0.10	123	33%
Shelduck	0	0.06	0	0	0	2	0%
Teal	0	0.03	0	0	0	1	0%
Mallard	0	0.22	0	0	0	7	20%
Red Grouse	0	0.06	0	0	0	2	0%
Black Grouse	0	0.06	0	0	0	2	0%
Grey Heron	0	0.03	0	0	0	1	100%
Red Kite	0	0.03	0	0	0	1	0%
Sparrowhawk	0.07	0.09	0.04	0	0	5	0%
Buzzard	1.93	1.69	1.05	1.33	1.13	156	64%
Kestrel	0.59	1.44	1.05	0.41	0.10	89	33%
Peregrine	0.07	0.06	0	0.05	0.05	5	60%
Oystercatcher	0	0.16	0.26	0.18	0	15	33%
Golden Plover	0	0.22	0	0	0	7	100%
Lapwing	1.19	4.09	3.78	2.20	0.10	283	11%
Snipe	0	1.22	0.18	0	0	43	40%
Curlew	3.04	3.84	2.81	0.37	0.25	241	13%
Redshank	0	0.06	0	0	0	2	0%
Lesser Black-backed Gull	0	0.88	0.04	0.14	0.05	33	67%
Long-eared Owl	0	0	0.04	0	0	1	0%
Short-eared Owl	0	0.03	0.13	0	0	4	0%
Raven	0.15	0.44	0.70	0.37	0.89	58	50%

28. Key species' flight lines are mapped in **Figures 16-20**. Greylag goose flight activity (**Figure 16**) was concentrated in the western part of the survey area, in proximity to Gladhouse Reservoir.
29. Lapwing flights (**Figure 17**) were concentrated around their two main breeding areas (the western edge of the survey area in the vicinity of Gladhouse Reservoir, and on the moorland fringe in the north-eastern part).
30. Snipe flights (**Figure 18**) were recorded mainly in the western part of the survey area.
31. Curlew flight activity was widespread across most of the survey area, reflecting their abundance and their wide breeding distribution (**Figure 19**).

32. Other breeding wader (oystercatcher, golden plover and redshank) flight activity (**Figure 20**) was broadly similar to the distribution of the breeding birds, distributed widely over the open habitats of the core breeding bird survey area.
33. Other scarce raptors (**Figure 21**) (red kite, peregrine and long-eared owl) were only seen very infrequently, but no particular concentrations of activity were apparent.

Conservation Evaluation of Breeding Bird Populations

34. The conservation value of the breeding bird populations was determined using the criteria specified in **Table 3** (from Percival 2007) and is summarised in **Table 4**. This includes the criteria adopted by NatureScot in Guidelines for Selection of Biological Sites of Special Scientific Interests (SSSIs) (Drewitt *et al.* 2020), using 1% of the resource to define international and national importance (Frost *et al.* 2021). An additional category of regional importance was assigned for species approaching the threshold for national importance and those for which the survey area held a notable concentration (>1%) in a NHZ context (Wilson *et al.* 2015). A further category of 'local importance' was used for species that did not reach regional importance but were still of some ecological value. This included all species on the red or amber lists of the 'Birds of Conservation Concern' (Eaton *et al.* 2015) that did not reach national or regional importance at the Proposed Development site. National (GB) and International wintering waterfowl baseline populations have been taken from the most recently published population figures (Frost *et al.* 2021) from the national Wetland Birds Survey and other species from Woodward *et al.* (2020). In addition, listing on Annex 1 of the EU Birds Directive, Schedule 1 of the Wildlife and Countryside, NERC Act Section 41 priority species and Scottish Biodiversity Action Plan (BAP) species were all considered in the evaluation process.

Table 3. Definition of terms relating to the sensitivity of the ornithological receptors at the site.

Conservation Value	Definition
VERY HIGH	Cited interest of Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and SSSIs. Cited means mentioned in the citation text for the site as a species for which the site is designated (SPAs/SACs) or notified (SSSIs).
HIGH	Other species that contribute to the integrity of an SPA or SSSI. A local population of more than 1% of the national population of a species. EU Birds Directive Annex 1, EU Habitats Directive priority habitat/species and/or W&C Act Schedule 1 species. Ecologically sensitive species, e.g. large birds of prey or rare birds (<300 breeding pairs in the UK).
MEDIUM	Regionally important population of a species, either because of population size (>1% NHZ) or distributional context. NERC Act Section 41 priority species (if not covered above).
LOW	Any other species of conservation interest, e.g. species listed on the Birds of Conservation Concern not covered above. Scottish BAP species (if not covered above).

Table 4. Conservation evaluation of the breeding bird populations in the core Torfichen survey area.

Species	Estimated breeding pairs 2021	>1% NHZ	EU Birds Dir Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK priority sp	Scottish BAP sp	Conservation Value
<i>Breeding Species:</i>								
Mute Swan	1				A			Low
Greylag Goose ²	25				A			Low
Teal ³	2				A			Low
Mallard	6				A			Low
Tufted Duck	4							Nil
Red Grouse ¹	18				A	✓		Medium
Black Grouse ³	5	✓			R	✓	✓	Medium
Red-legged Partridge	1							Nil
Quail	1			1	A			High
Pheasant	20							Low
Little Grebe ³	1							Nil
Buzzard ²	13							Nil
Kestrel	4				A		✓	Low
Moorhen	1							Nil
Oystercatcher ²	7				A			Low
Golden Plover ²	2		✓				✓	High
Lapwing	33				R	✓	✓	Medium
Snipe ²	27	✓			A			Medium
Curlew ²	87	✓			R	✓	✓	Medium
Redshank ²	3				A			Low
Black-headed Gull	313	✓			A			Medium
Woodpigeon	99							Nil
Cuckoo ^{2,5}	2				R	1	✓	Medium
Short-eared Owl ^{3,5}	(1)	✓	✓		A		✓	High
Long-eared Owl	1	✓						Medium
Great Spotted Woodpecker	1							Nil
Skylark	327				R	✓	✓	Medium
Sand Martin	3							Nil
Swallow	9							Nil
Tree Pipit	2				R	✓	✓	Medium
Meadow Pipit	450				A			Low
Pied Wagtail	3							Nil
Wren	16							Nil
Dunnock	5				A	✓		Medium
Robin	21							Nil
Redstart	1				A			Low
Whinchat ²	3				R			Low
Stonechat ²	5							Nil
Wheatear ¹	22							Nil
Blackbird	14							Nil
Song Thrush	16				R	✓	✓	Medium
Mistle Thrush	12				R			Low
Chiffchaff	4							Nil
Willow Warbler	35				A			Low
Goldcrest	7							Nil
Spotted Flycatcher	1				R	✓	✓	Medium

Species	Estimated breeding pairs 2021	>1% NHZ	EU Birds Dir Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK priority sp	Scottish BAP sp	Conservation Value
Blue Tit	5							Nil
Great Tit	5							Nil
Coal Tit	9							Nil
Magpie	2							Nil
Jackdaw	12							Nil
Rook	65							Nil
Carrion Crow	38							Nil
Raven ³	5							Nil
Starling	1				R	✓		Medium
Chaffinch	50							Nil
Goldfinch	2							Nil
Siskin	5						✓	Low
Linnet	3				R	✓	✓	Medium
Lesser Redpoll	3				R	✓	✓	Medium
Common Crossbill	2			✓				High
Reed Bunting	8				A	✓	✓	Medium
<i>Additional non-breeding species:</i>	<i>Peak count</i>							
Shelduck	2				A			Low
Cormorant	8							Nil
Peregrine	1		✓	✓			1	High
Whimbrel	1			✓	R			High
Lesser Black-backed Gull	41				A			Low
Herring Gull	106				R	✓	✓	Medium
Great Black-backed Gull	1				A			Low
House Martin	2				A			Low

Note: superscripts indicate contribution to the JNCC breeding bird assemblage score for the main habitat within the survey area, 'Upland moorland and grassland with waterbodies'.

35. Three high value species were recorded breeding within the core breeding bird survey area during 2021; quail, golden plover and common crossbill, and one (short-eared owl) within the wider 2 km buffer.
36. Seventeen breeding species were classed as medium conservation value: red grouse, black grouse, lapwing, snipe, curlew, black-headed gull, long-eared owl, cuckoo, skylark, tree pipit, dunnoek, song thrush, spotted flycatcher, starling, linnet, lesser redpoll and reed bunting. All were classed as medium value because they occurred at the site in regionally important numbers (>1% NHZ population: snipe, curlew, black-headed gull and long-eared owl) and/or for their listing on the UK BAP list of priority species. They are mostly farmland species that have declined widely across Britain but are still common and widespread.
37. A further fourteen breeding species were classed as low sensitivity, through their listing on RSPB *et al.*'s (Eaton *et al.* 2015) amber lists of birds of conservation concern and/or the Scottish Biodiversity List.
38. The overall conservation value of the breeding bird community, measured from the core survey data as the breeding bird assemblage score, was 38. This is just below the threshold for national importance (40) but above the threshold for regional

importance (20) for the main habitat within the survey area, 'Upland moorland and grassland with water bodies' (Drewitt *et al.* 2020). The core survey area therefore supports a regionally important breeding bird community.

Conclusions

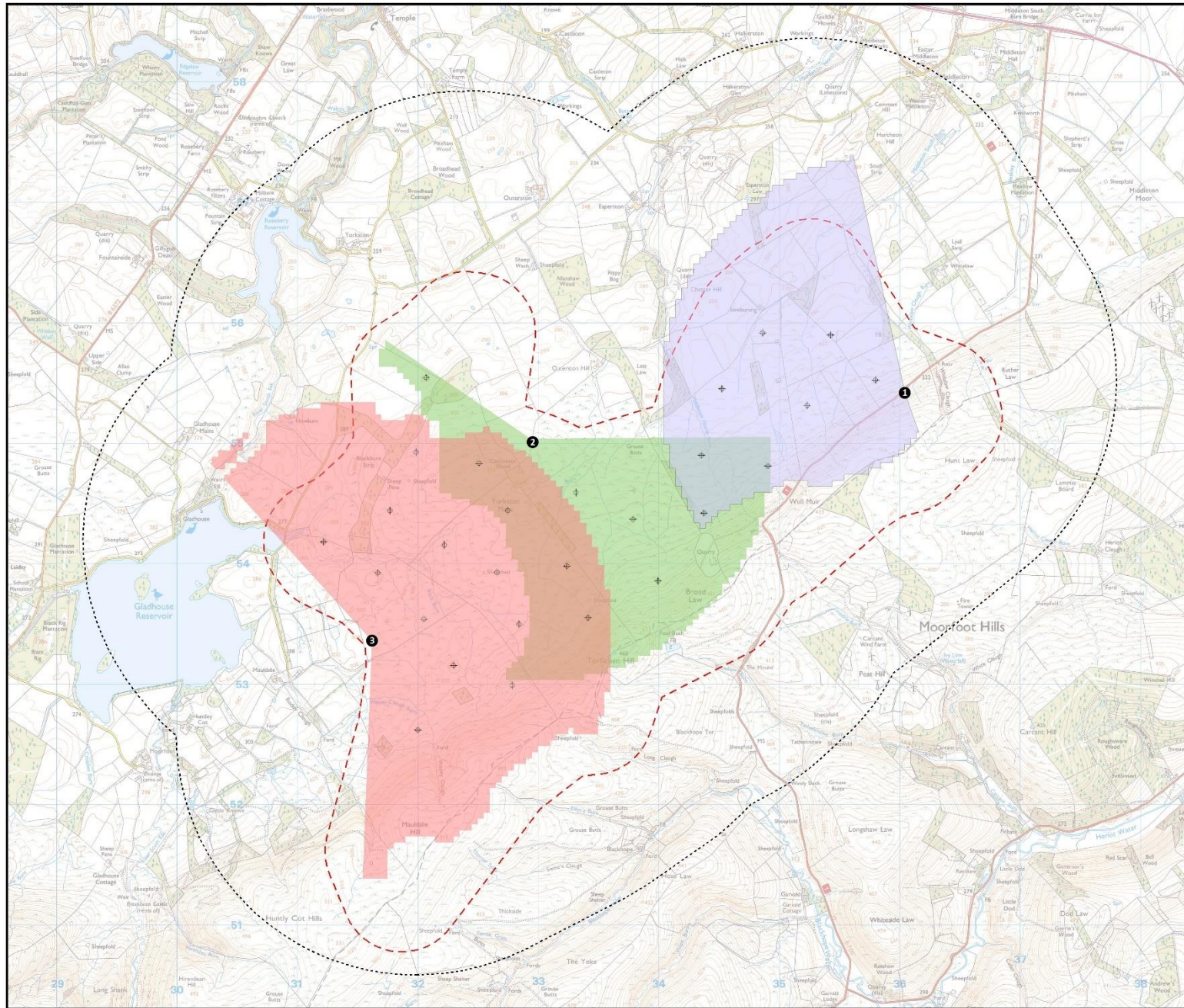
39. The 2021 breeding bird surveys have found that the survey area supports a range of upland breeding species of regional importance. This included regionally important numbers of black grouse, snipe, curlew, black-headed gull, short-eared owl and long-eared owl. Most of these were found on the periphery of the site and should be largely avoided in the site design, though the site itself did hold high densities of breeding snipe and curlew.
40. Two species specially protected from disturbance under Schedule 1 of the 1981 Wildlife and Countryside Act were found breeding in the core survey area, quail and common crossbill. Both though were outside the area where they would be likely to be affected by the wind farm – see **Technical Appendix 9.8**. Two EU Annex 1 species were also breeding in the area, golden plover (2 pairs within the core area) and short-eared owl (one pair in the 2 km buffer).
41. The main target species at risk of collision would be the high densities of breeding waders using the site, particularly lapwing and curlew. Raptor flight activity over the site at rotor height (other than buzzard) occurred at only a very low level.
42. Careful site design and appropriate mitigation should be applied. Preliminary spatial constraints identified within the current site boundary in relation to breeding birds comprised (see **Figure 22**):
 - Black grouse – 500 m buffer proposed around the two lek sites (after Ruddock and Whitfield 2007). One of these (on the south-eastern edge of the survey area) held more grouse (peak seven males). The smaller lek within the Proposed Development site held fewer birds (peak two males) and was used less frequently - data from further surveys should help ascertain how important this lek is and whether a full 500 m buffer needs to be applied in the final site design.
 - Short-eared owl – 500 m buffer around nest site proposed (after Ruddock and Whitfield 2007), though it should be noted that this species can move between years, so further baseline surveys will assist in finalising any buffers for this species.
 - Black-headed gull (regionally important breeding colony) – 500 m buffer proposed around the main colony, both to reduce disturbance of the colony but particularly to reduce collision risk (where flight activity is more concentrated in proximity to the colony).
43. It is not considered necessary to implement any buffers for either of the two Schedule 1 species breeding in the survey area. Quail are highly variable in their breeding locations between years. Common crossbill are unlikely to be affected as a forest species (unless any felling of trees were required).
44. Given the widespread distribution of curlew across the site, it will be difficult to avoid this species in the design process, so alternative mitigation measures, e.g. habitat enhancement away from the wind farm, are likely to be required.

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**Torfichen Hill
Wind Farm**

FIGURE 1
**Breeding Bird
Survey Areas
and VP Viewsheds**



KEY:

- VP locations
- ⊕ Indicative turbines
- VP1 viewshed
- VP3 viewshed
- VP2 viewshed
- Wider Survey Area
- Core breeding bird survey area



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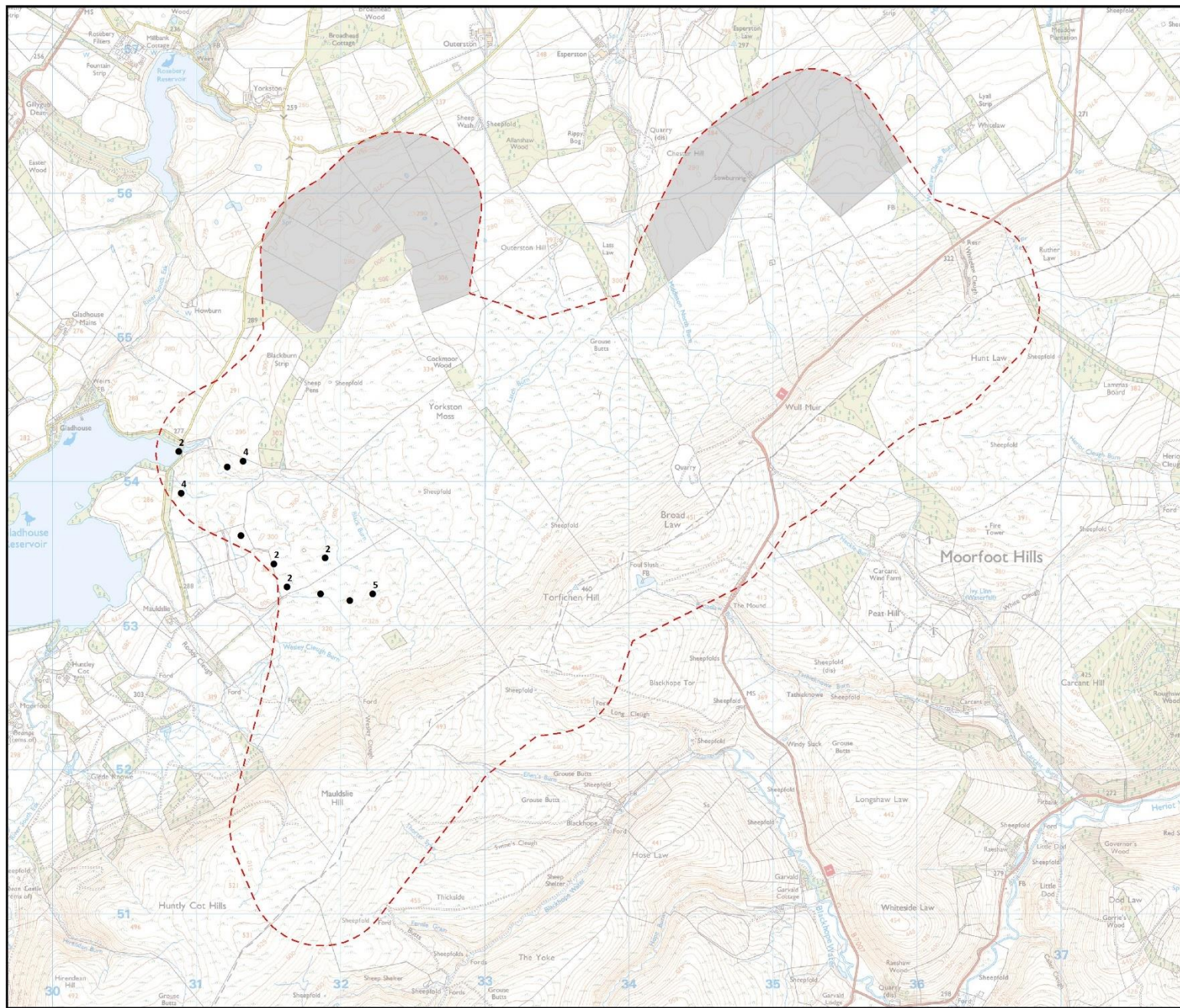
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DRAWING NUMBER: TH2021-1

SCALE - 1:30,000 @ A3

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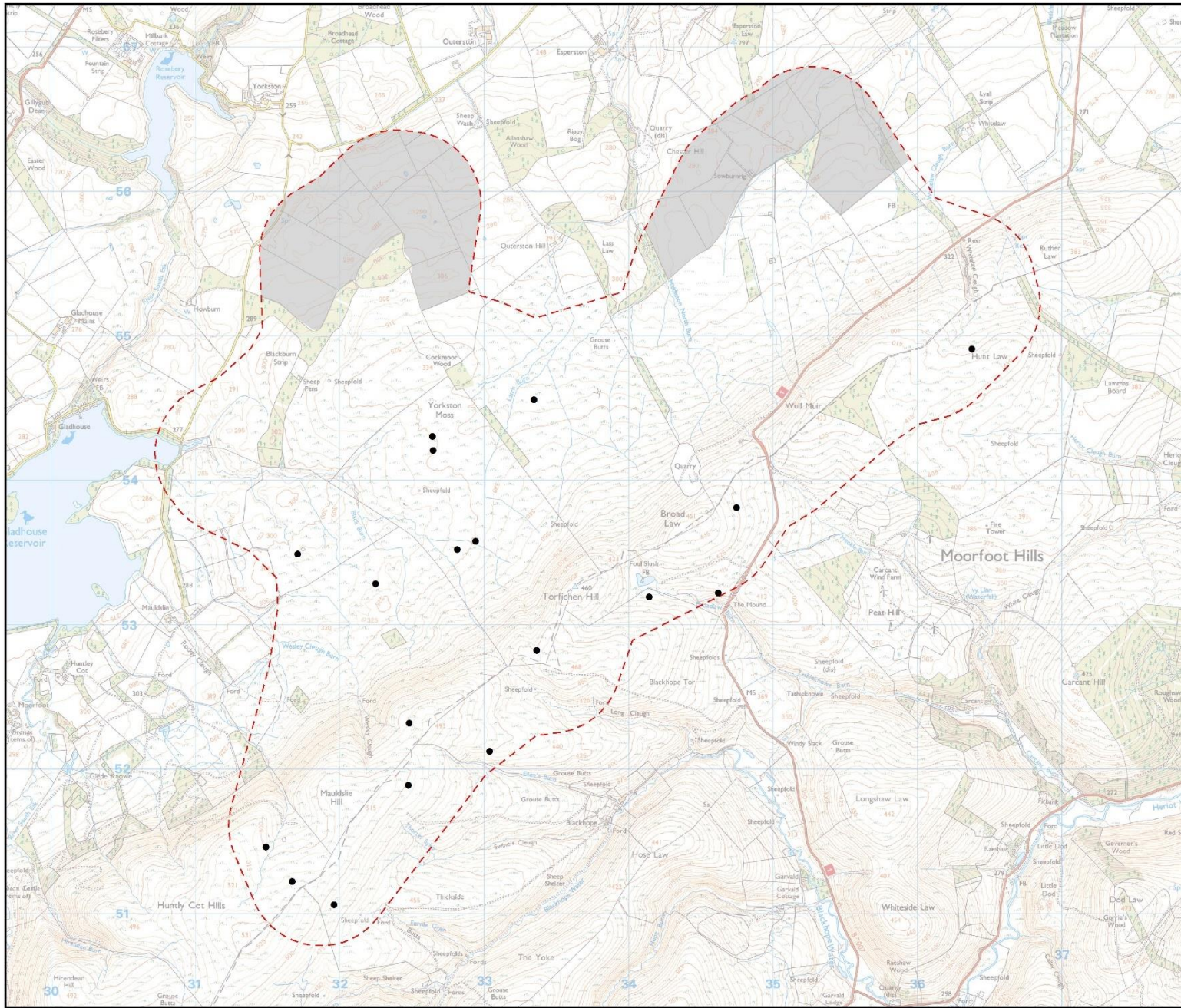
**Torfichen Hill
Wind Farm**

FIGURE 2
**Breeding Distribution
of Greylag Goose, 2021**

- KEY:**
- Approx. breeding location
 - Area of limited access (stock)
 - - - Core breeding bird survey area



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DRAWING NUMBER: TH2021-1	
SCALE - 1:25,000 @ A3	
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FIGURE 3
**Breeding Distribution
of Red Grouse, 2021**

- KEY:**
- Approx. breeding location
 - Area of limited access (stock)
 - - - Core breeding bird survey area



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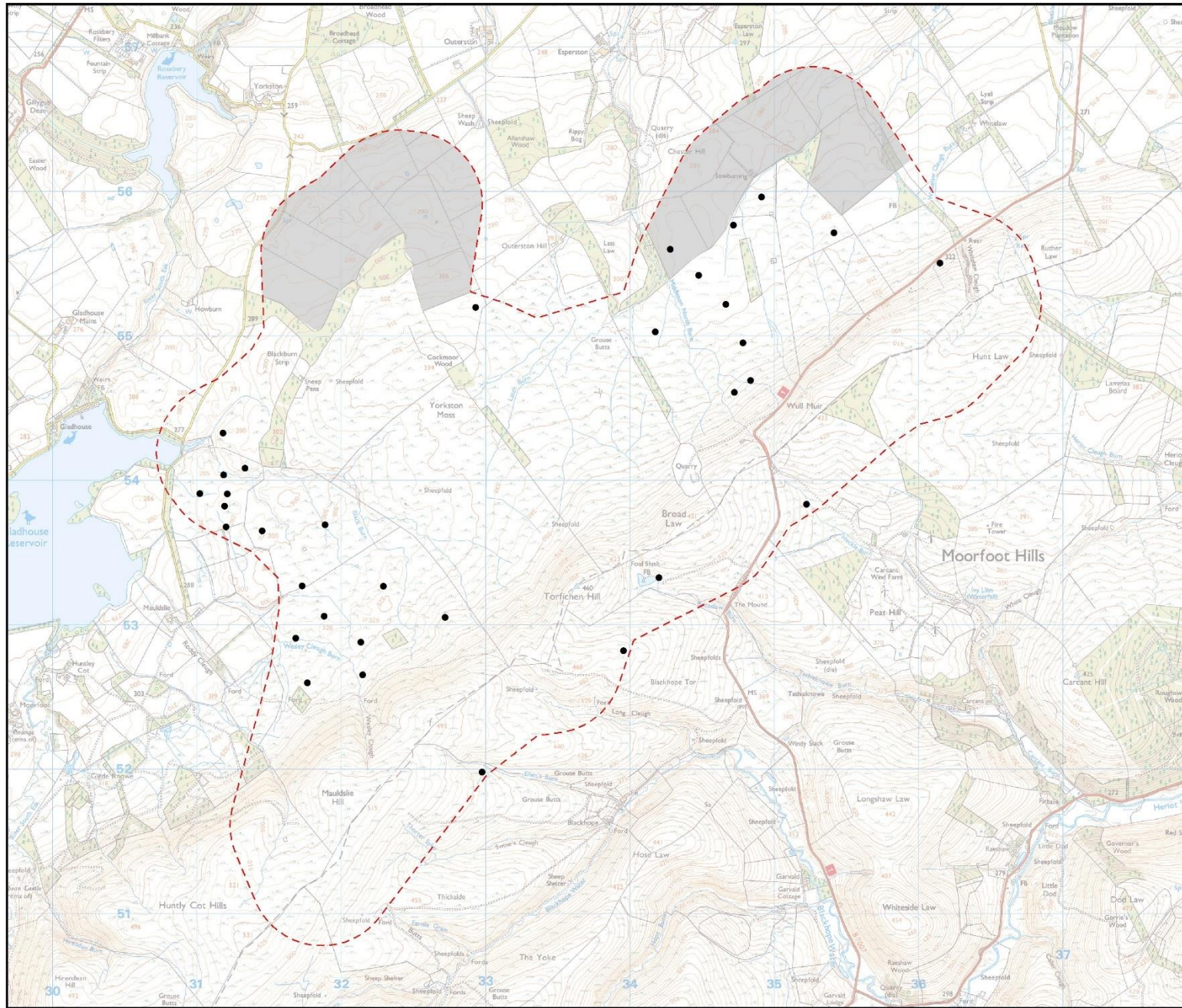
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DRAWING NUMBER	TH2021-1
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SCALE - 1:25,000 @ A3

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FIGURE 4
**Breeding Distribution
of Lapwings, 2021**

- KEY:**
- Approx. breeding location
 - Area of limited access (stock)
 - Core breeding bird survey area



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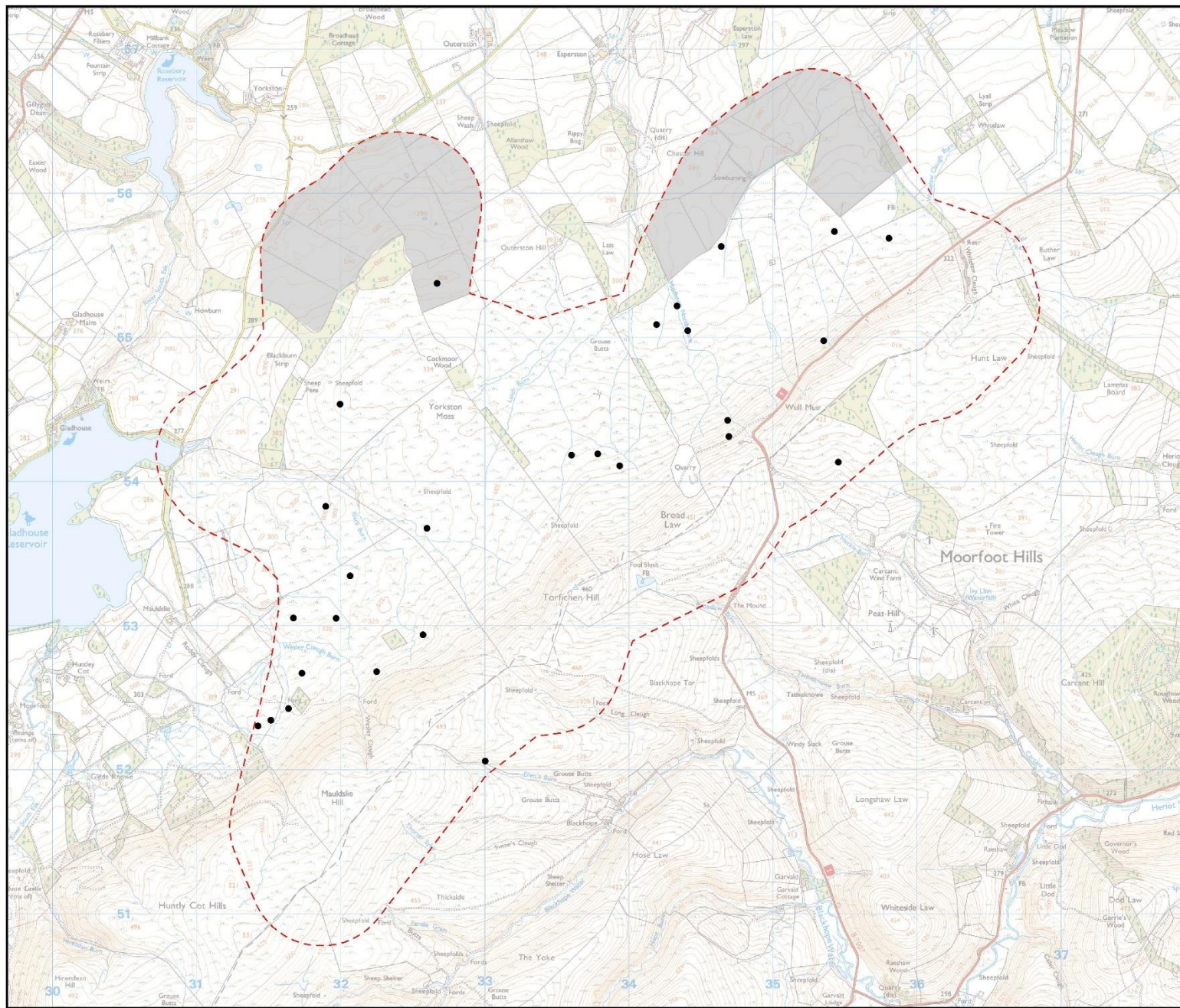
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OSPAR NUMBER	TH2021-1
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**FIGURE 5
Breeding Distribution
of Snipe, 2021**

- KEY:**
- Approx. breeding location
 - Area of limited access (stock)
 - Core breeding bird survey area



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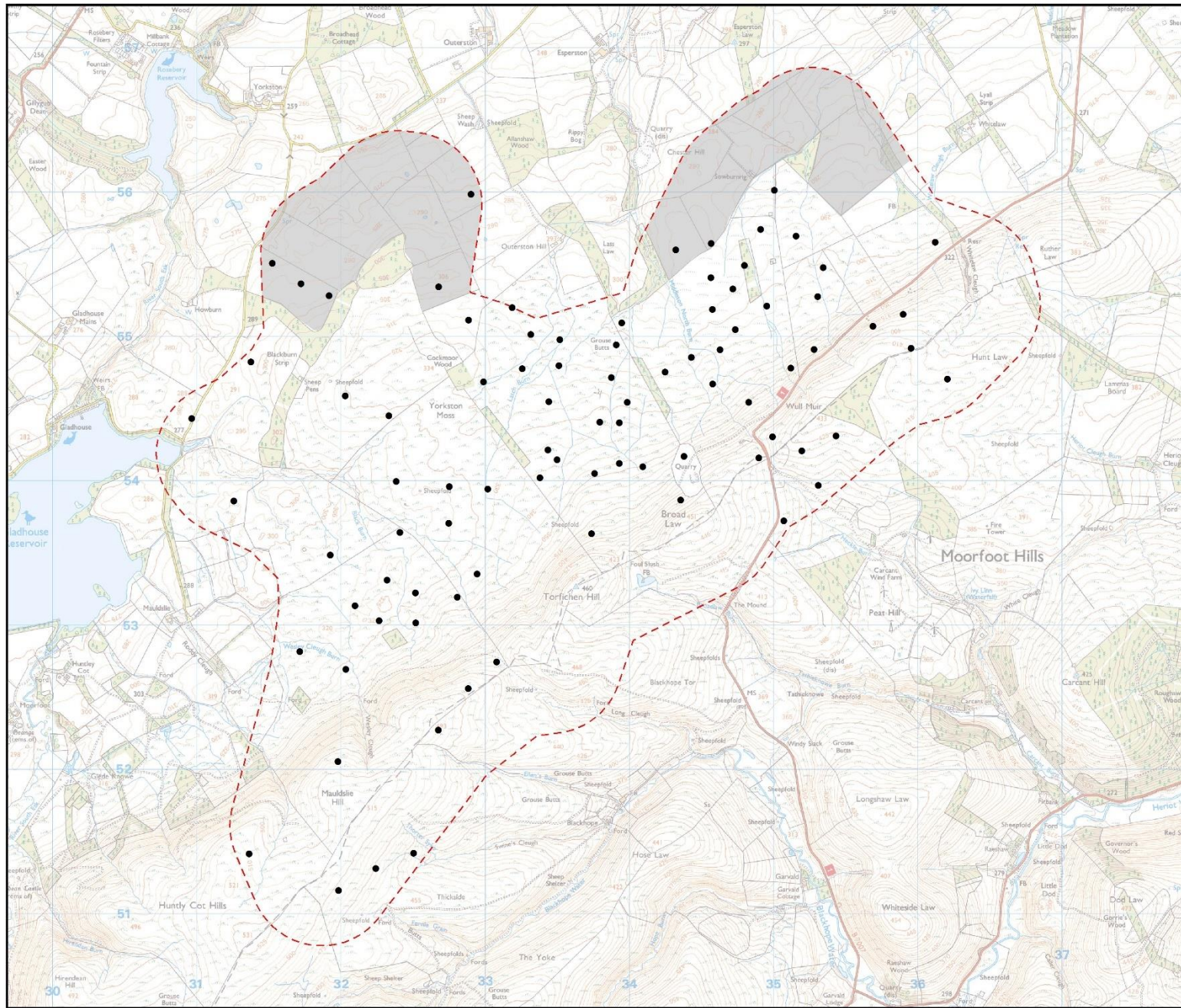
LAYOUT DATE: N/A DRAWING NO.: N/A

DRAWING VERSION: TH2021-1

SCALE - 1:25,000 @ A3

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FIGURE 6
**Breeding Distribution
of Curlew, 2021**

- KEY:**
- Approx. breeding location
 - Area of limited access (stock)
 - Core breeding bird survey area



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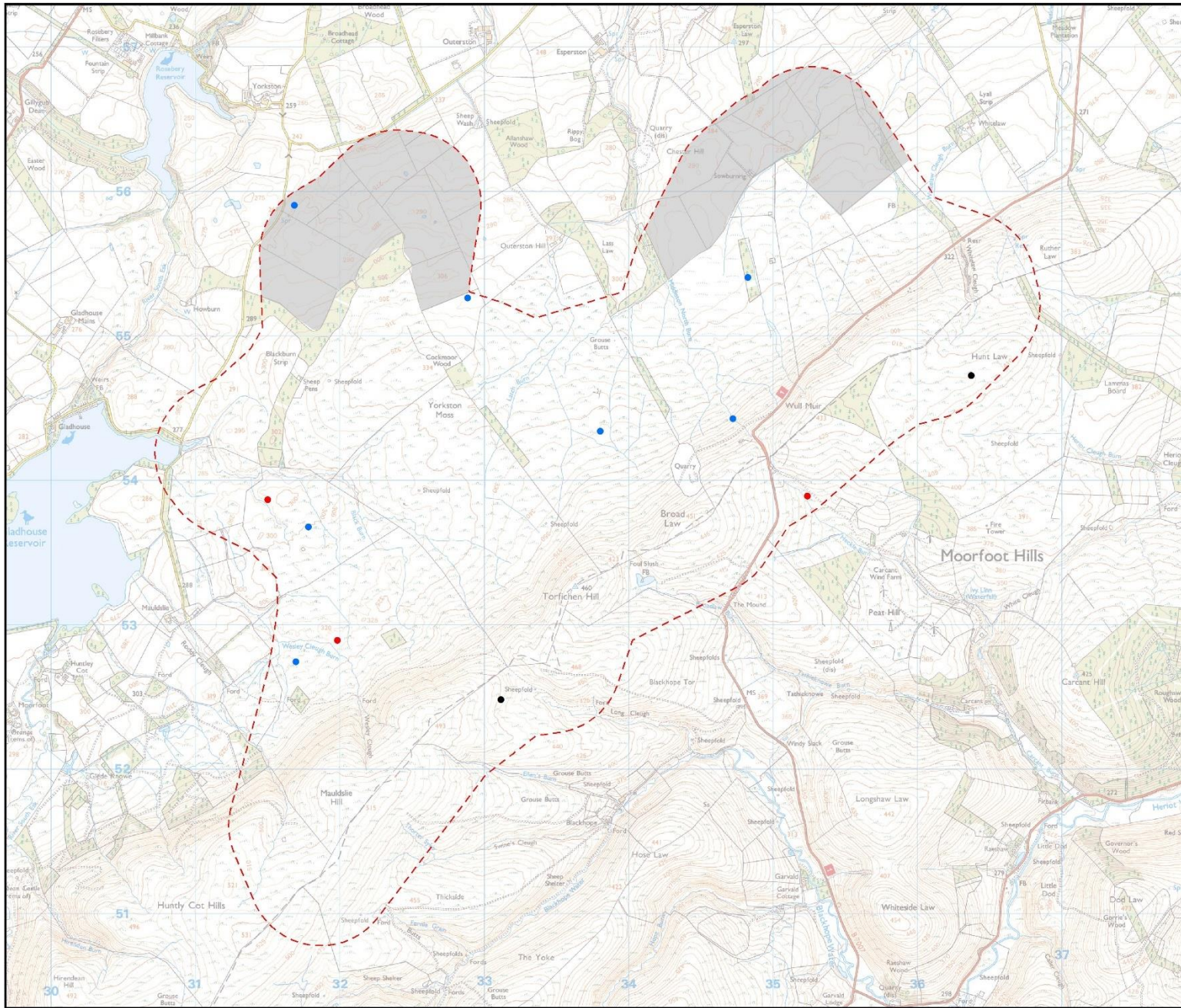
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DRAWING NUMBER	TH2021-1
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SCALE - 1:25,000 @ A3

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FIGURE 7
**Breeding Distribution
of Other Waders 2021**

KEY:

Species

- Golden Plover
- Oystercatcher
- Redshank
- Area of limited access (stock)
- - - Core breeding bird survey area



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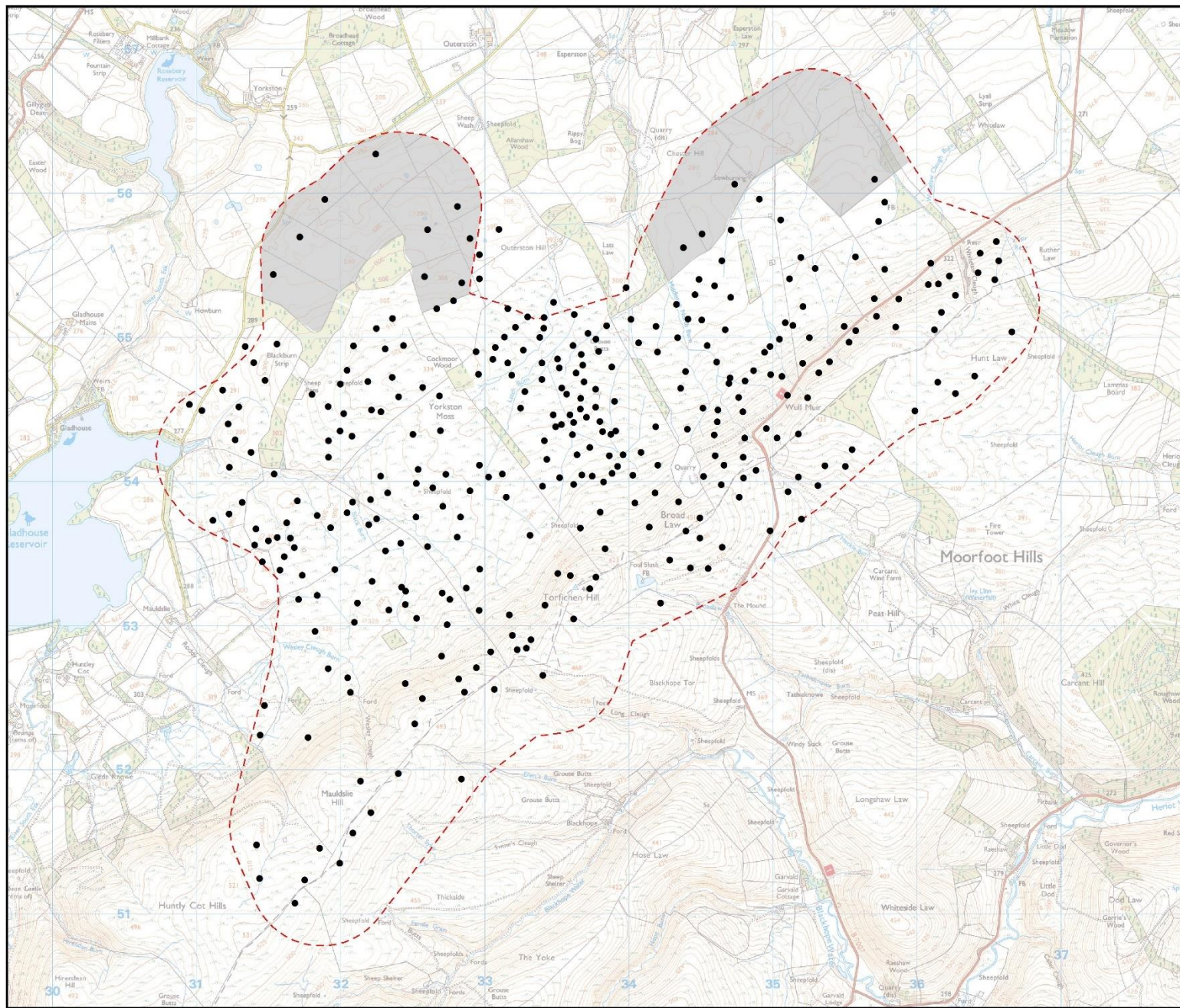
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CHARTER NUMBER	TH2021-1
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FIGURE 8
**Breeding Distribution
of Skylark, 2021**

- KEY:**
- Approx. breeding location
 - Area of limited access (stock)
 - - - Core breeding bird survey area



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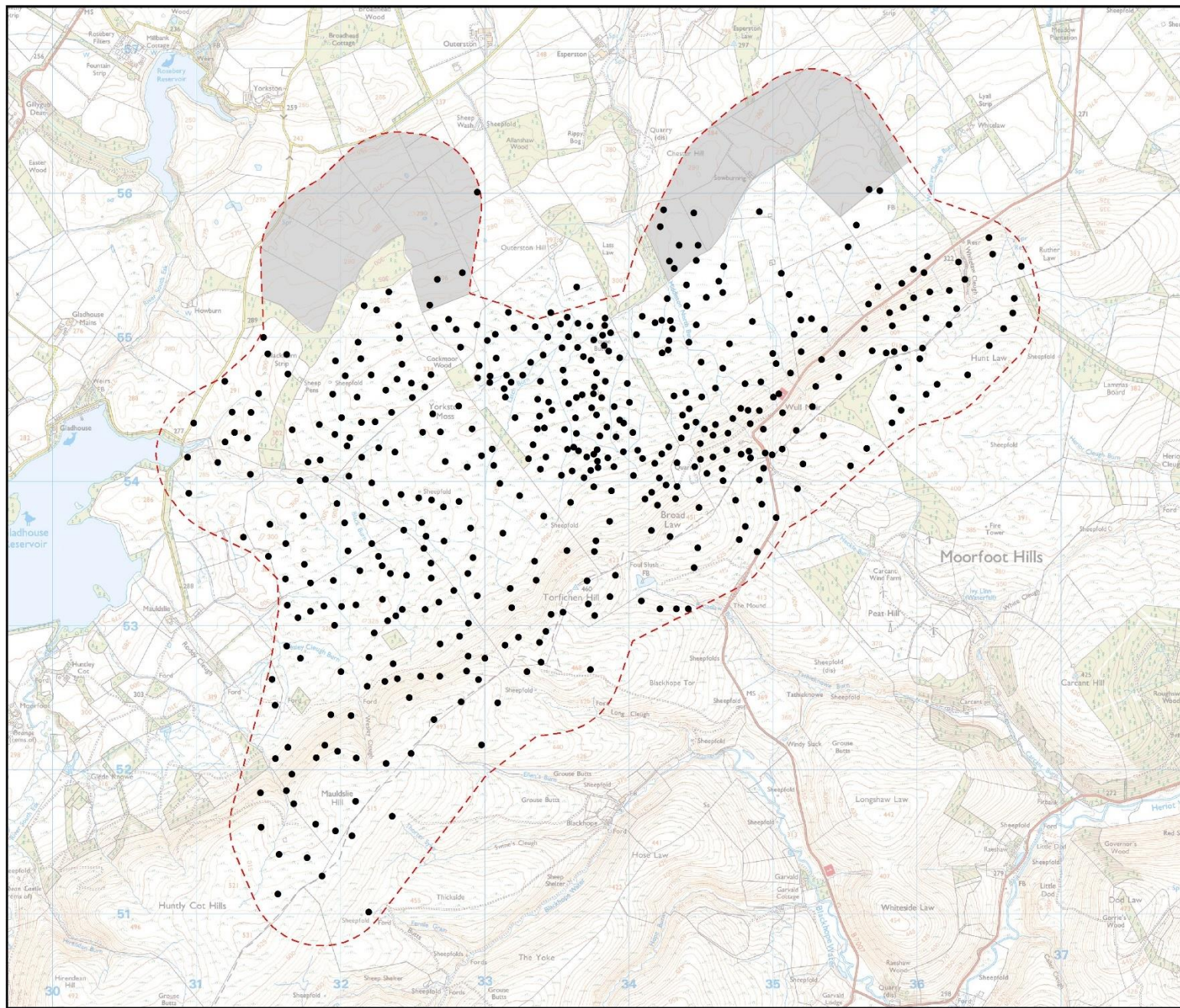
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TH2021-1

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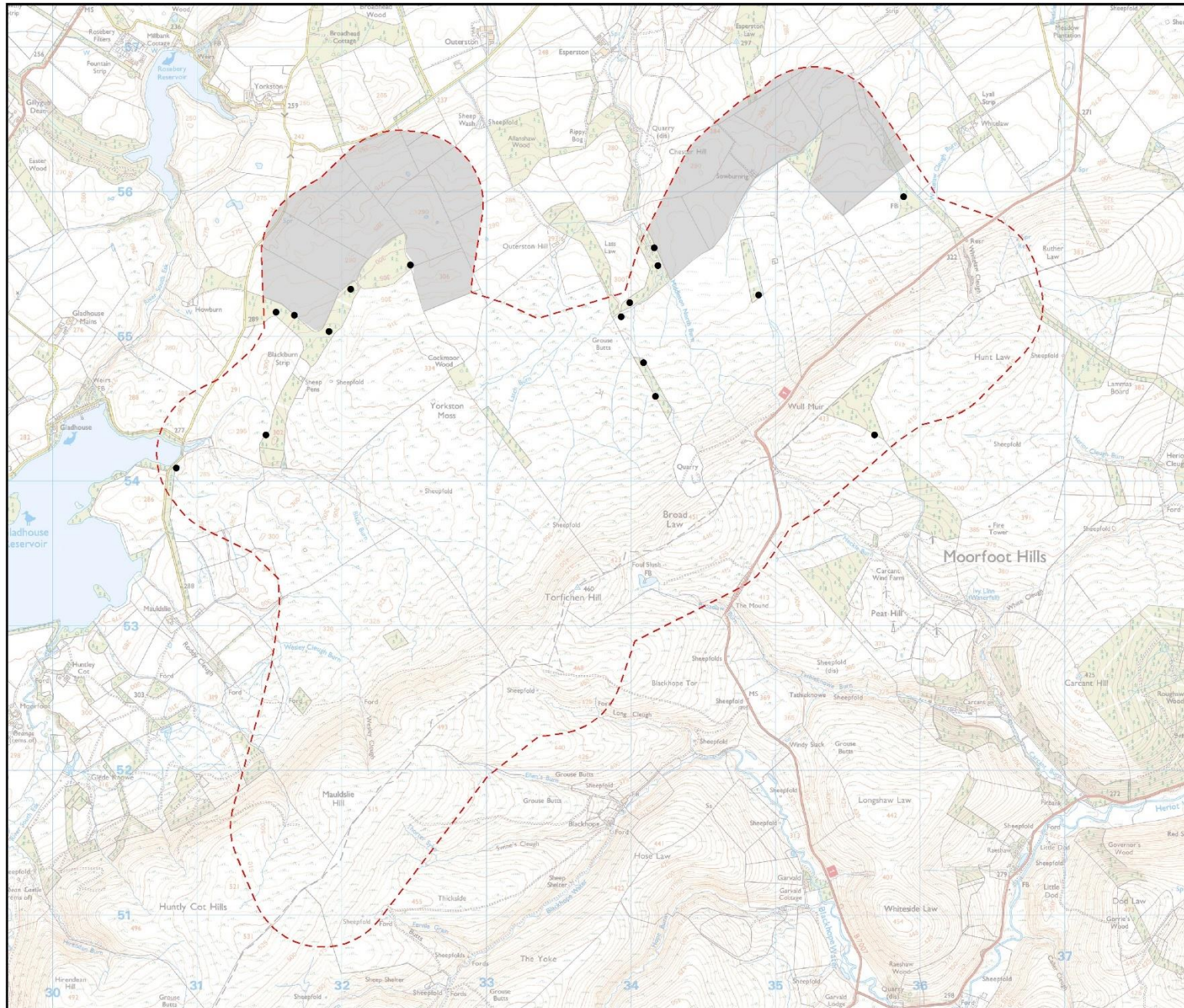
**Torfichen Hill
Wind Farm**

FIGURE 9
**Breeding Distribution
of Meadow Pipit, 2021**

- KEY:**
- Approx. breeding location
 - Area of limited access (stock)
 - - - Core breeding bird survey area



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LAST DATE: N/A	FLOWER NO: N/A
DRAWING NUMBER: TH2021-1	
SCALE - 1:25,000 @ A3	
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FIGURE 10
**Breeding Distribution
of Song Thrush, 2021**

KEY:

- Approx. breeding location
- Area of limited access (stock)
- - - Core breeding bird survey area



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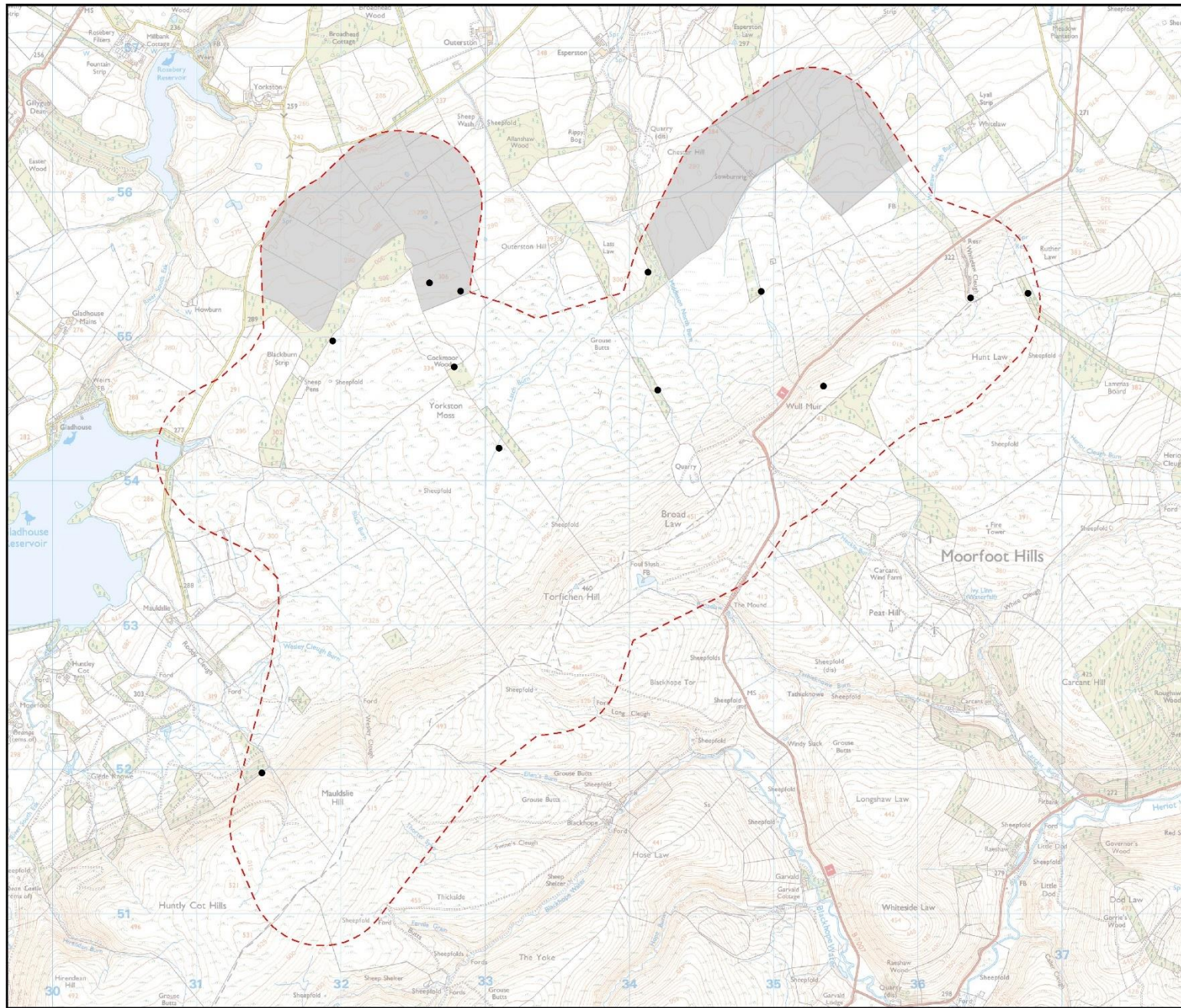
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CHARTER NUMBER	TH2021-1
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FIGURE 11
**Breeding Distribution
of MistleThrush, 2021**

- KEY:**
- Approx. breeding location
 - Area of limited access (stock)
 - Core breeding bird survey area



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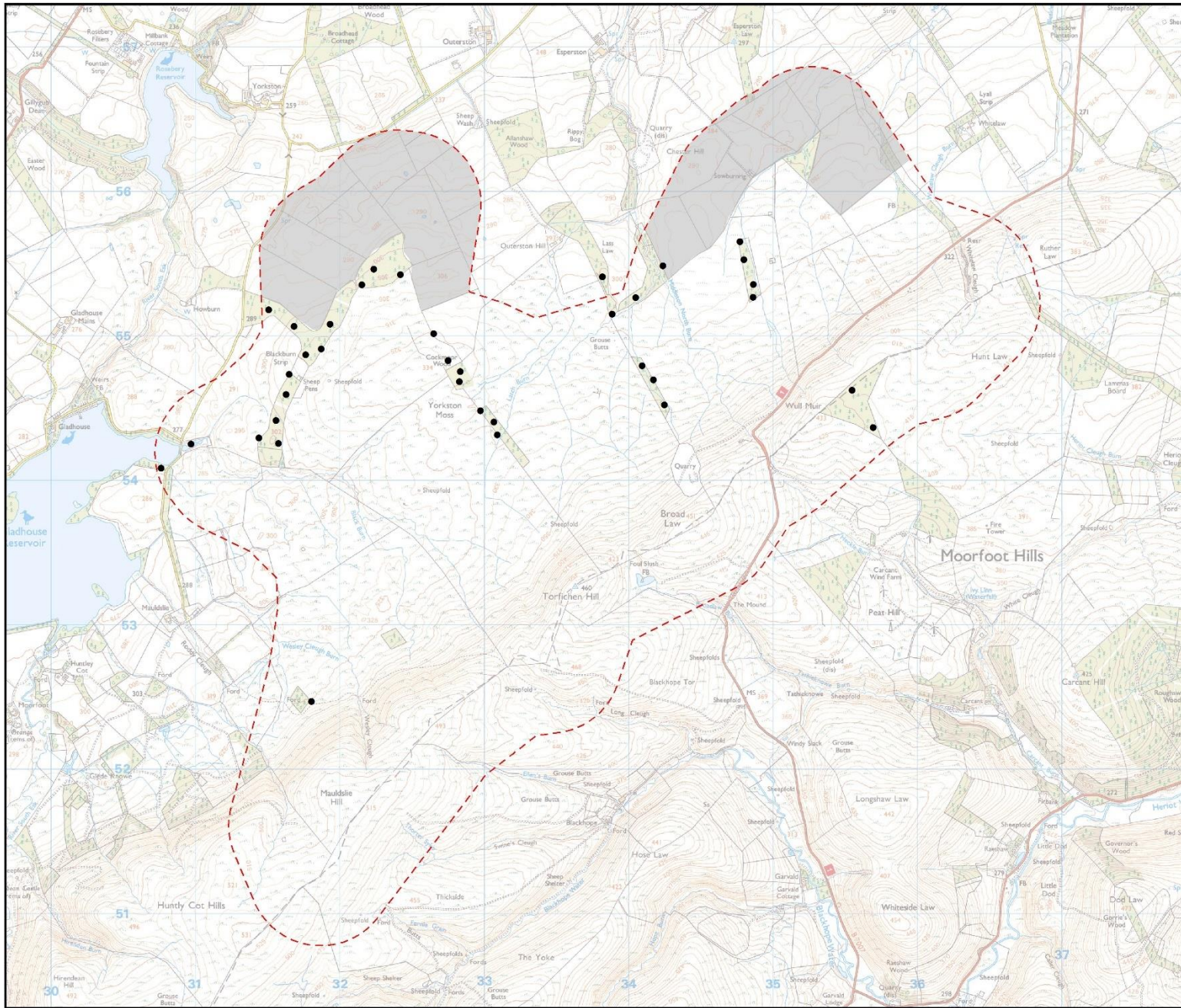
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CHARTER NUMBER	TH2021-1
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SCALE - 1:25,000 @ A3

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FIGURE 12
**Breeding Distribution
of Willow Warbler, 2021**

- KEY:**
- Approx. breeding location
 - Area of limited access (stock)
 - - - Core breeding bird survey area



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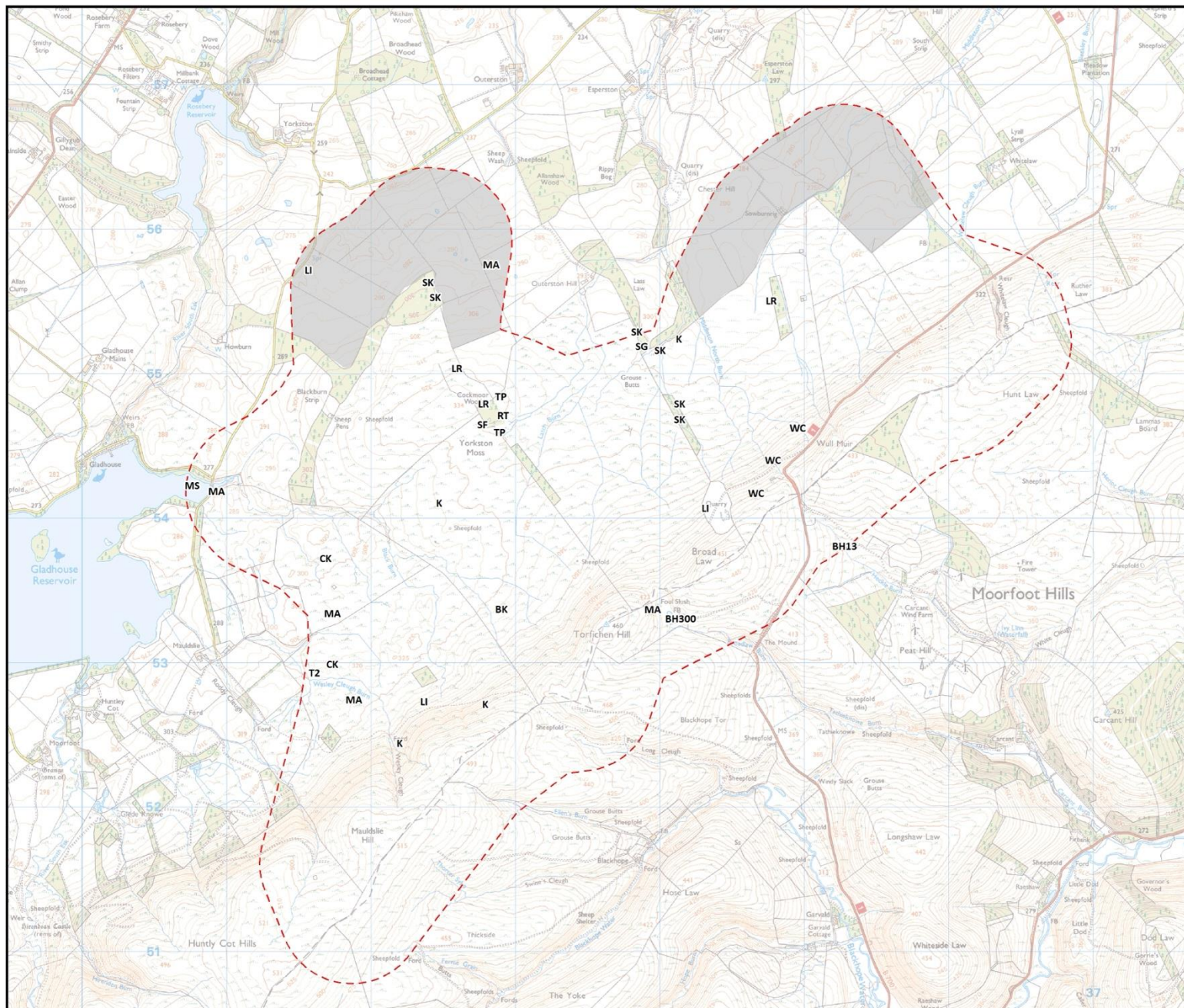
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OSPARS NUMBER	TH2021-1
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SCALE - 1:25,000 @ A3

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FIGURE 13
**Breeding Distribution
of Other Species, 2021**

- KEY:**
- Core breeding bird survey area
 - Area of limited access (stock)
 - Approx. breeding location
 - MS - Mute swan
 - T - Teal
 - MA - Mallard
 - K - Kestrel
 - BH - Black-headed Gull
 - CK - Cuckoo
 - TP - Tree Pipit
 - RT - Redstart
 - WC - Whinchat
 - SF - Spotted Flucatcher
 - SG - Starling
 - SK - Siskin
 - LI - Linnet
 - LR - Lesser Redpoll



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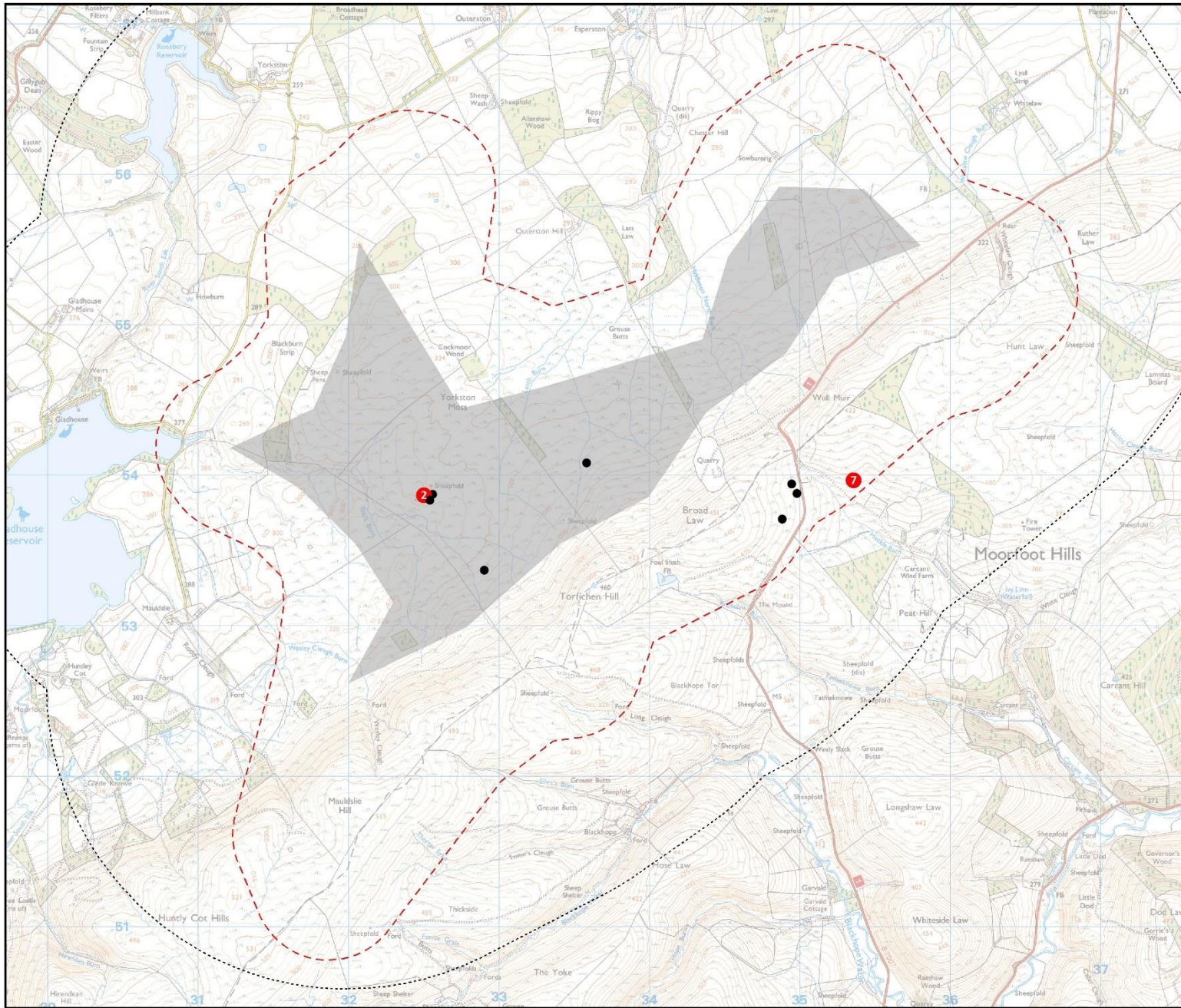
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DATE OF SURVEY: TH2021-1

SCALE - 1:25,000 @ A3

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Wind Farm**

FIGURE 14
**Black Grouse lek
locations and additional
records 2021**

KEY:

Black Grouse:

- Lek (peak males)
- Additional records
- Indicative turbine envelope
- Wider Survey Area
- - - Core breeding bird survey area



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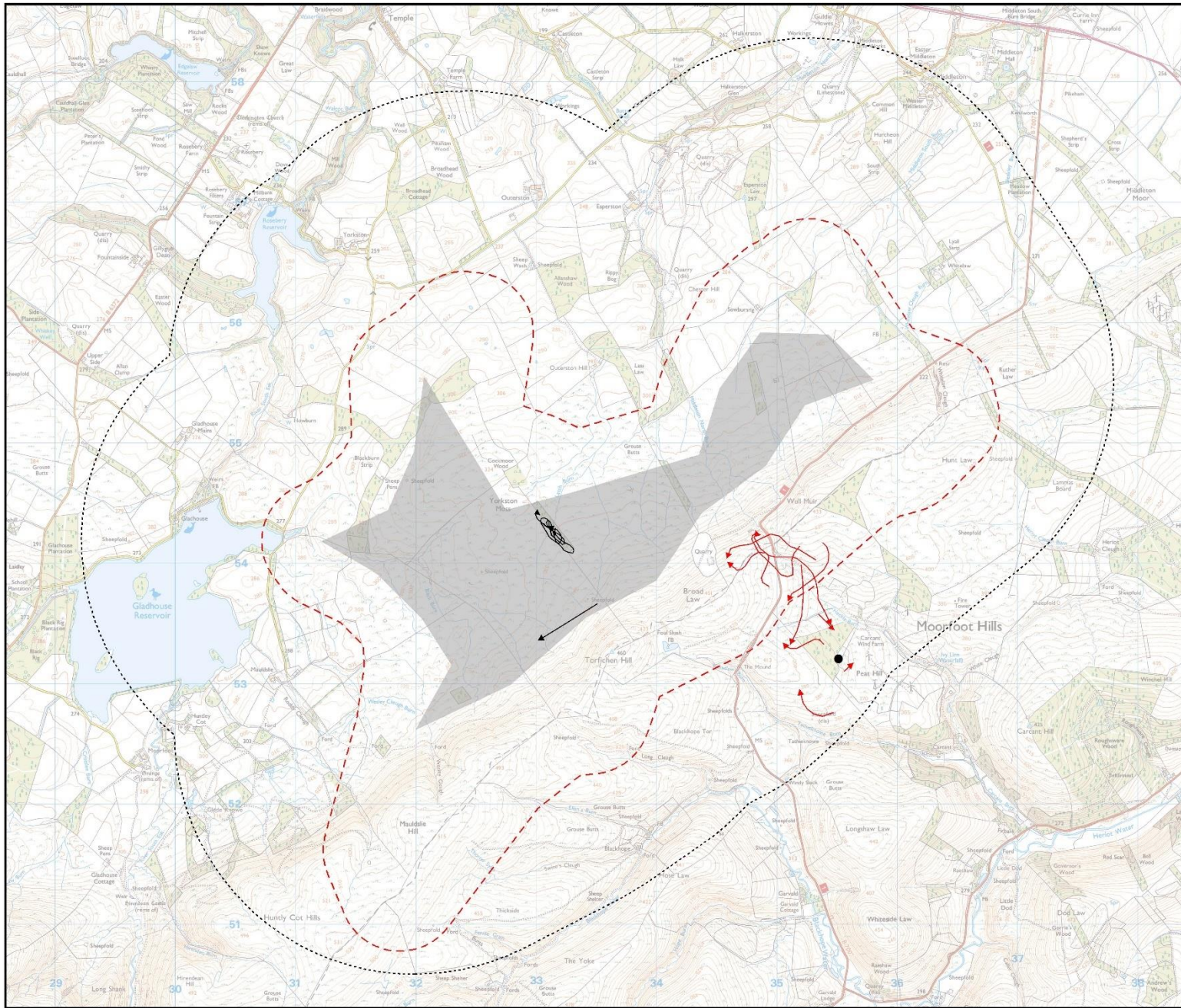
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PROJECT NUMBER	TH2021-1
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SCALE - 1:24,000 @ A3

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Wind Farm**

FIGURE 15
Short-eared Owl
flight activity
Apr-Aug 2021

KEY:

- Approx. nest location
- VP survey flight lines
- Raptor survey flight lines
- ▭ Indicative turbine envelope
- ⋯ Wider raptor survey area
- - - Core breeding bird survey area



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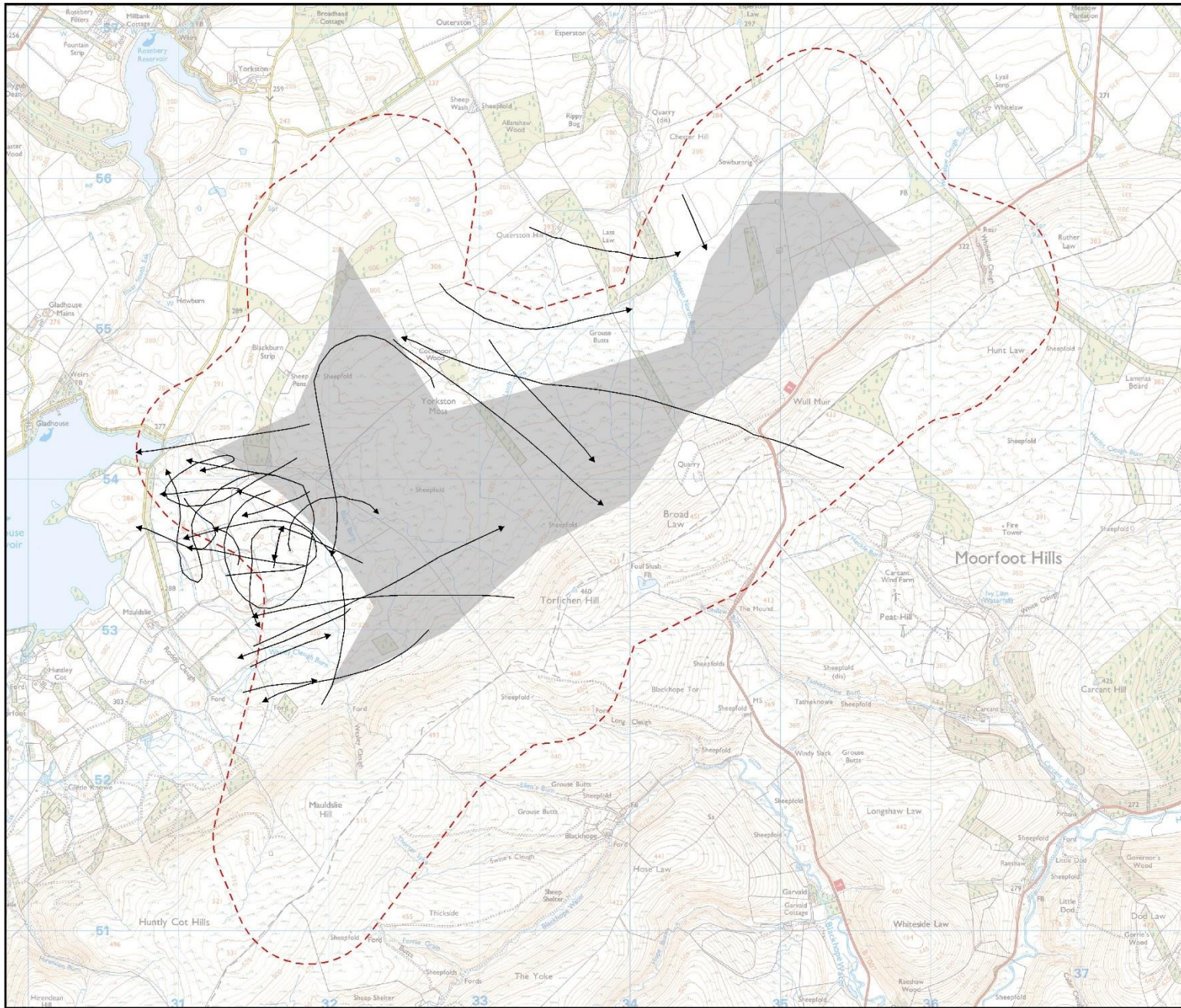
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DRAWING NUMBER	TH2021-1
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FIGURE 16
VP Survey Flight Lines
Apr-Aug 2021
Greylag Goose

KEY:

- Flight lines
- Indicative turbine envelope
- Core breeding bird survey area



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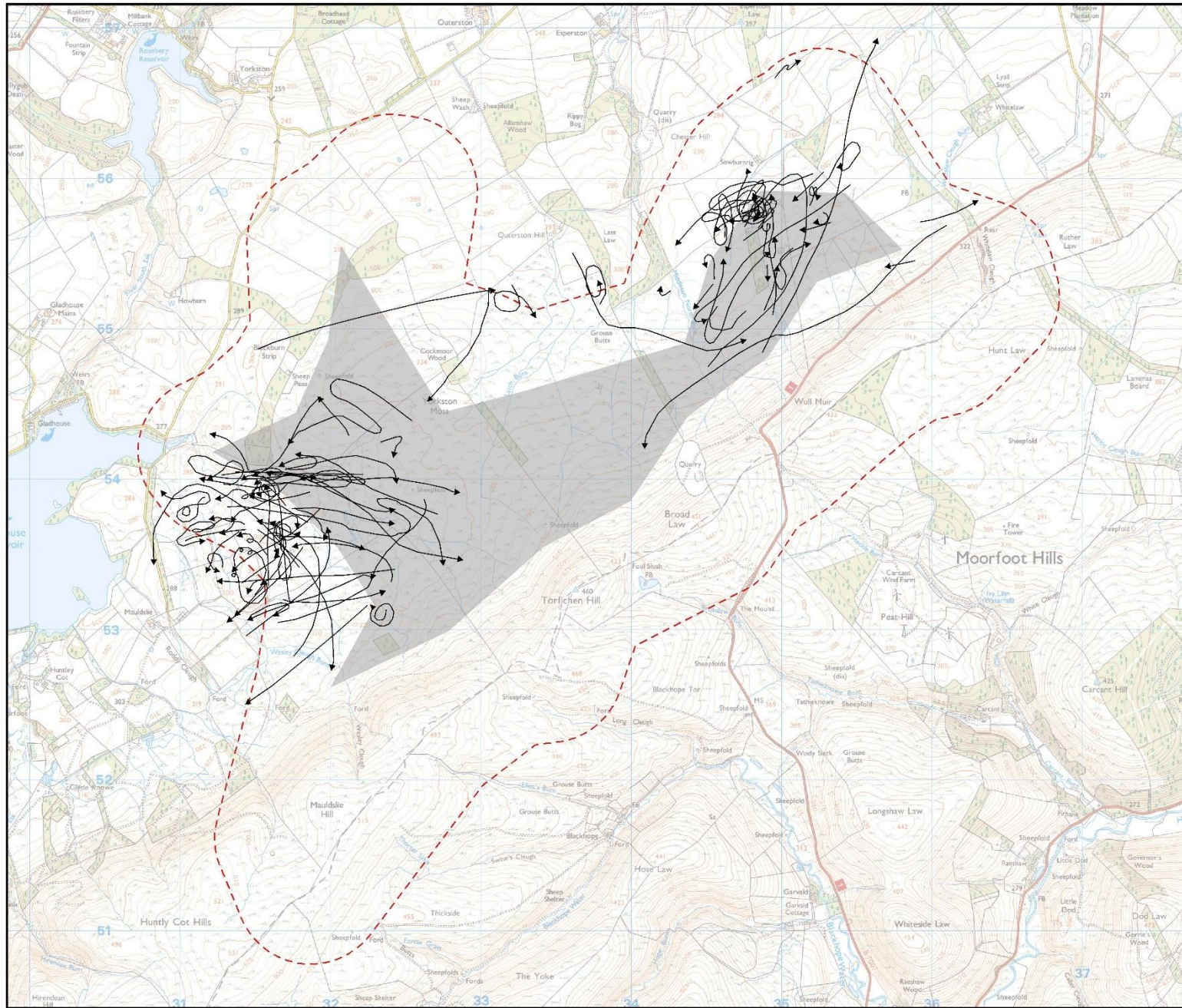
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PROJECT NUMBER	TH2021-1
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SCALE - 1:24,000 @ A3

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**FIGURE 17
VP Survey Flight Lines
Apr-Aug 2021
Lapwing**

KEY:

- Flight lines
- Indicative turbine envelope
- - - Core breeding bird survey area



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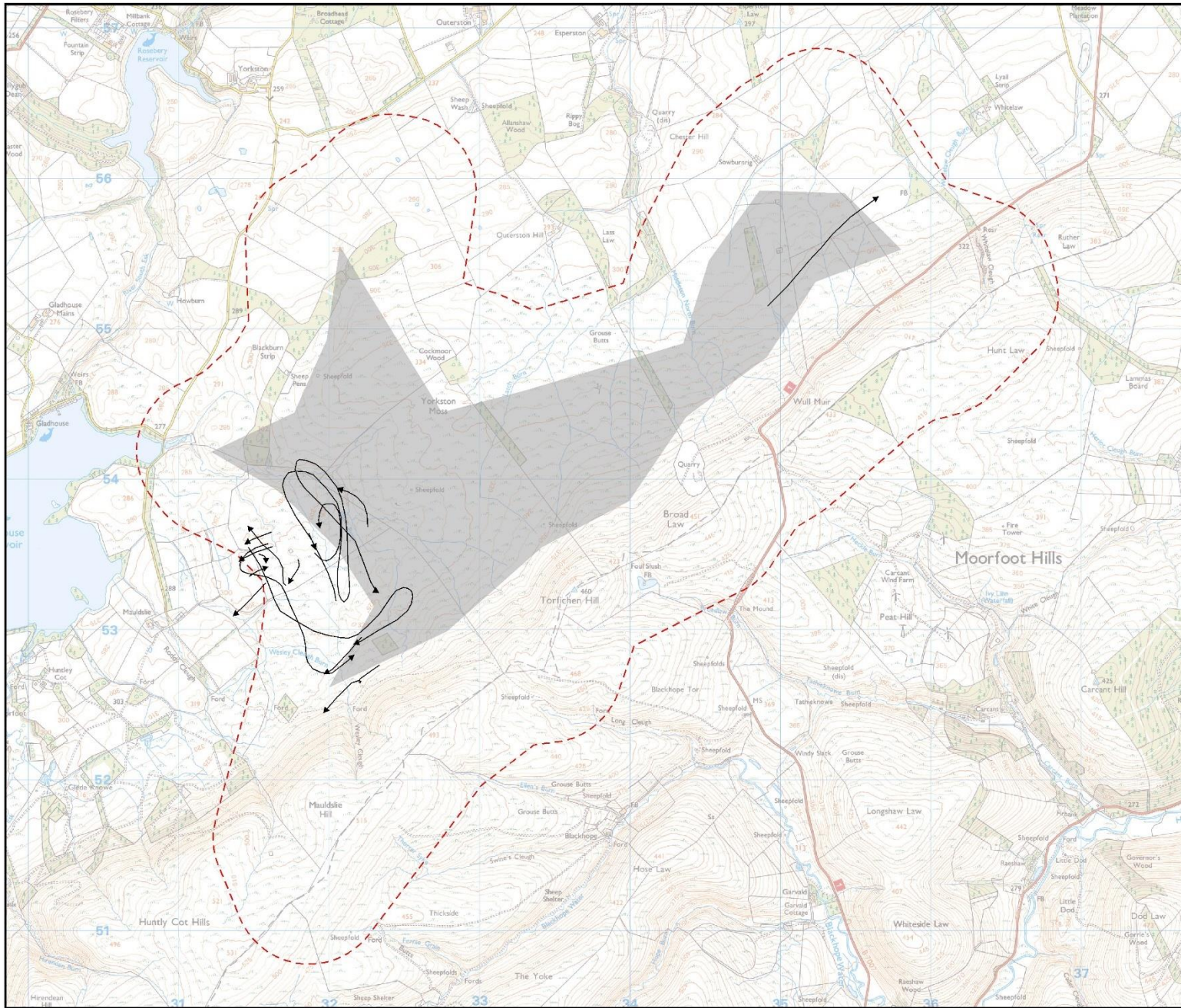
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PROJECT NAME:	TH2021-1
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SCALE - 1:24,000 @ A3

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Wind Farm**

FIGURE 18
VP Survey Flight Lines
Apr-Aug 2021
Snipe

KEY:

- Flight lines
- Indicative turbine envelope
- - - Core breeding bird survey area



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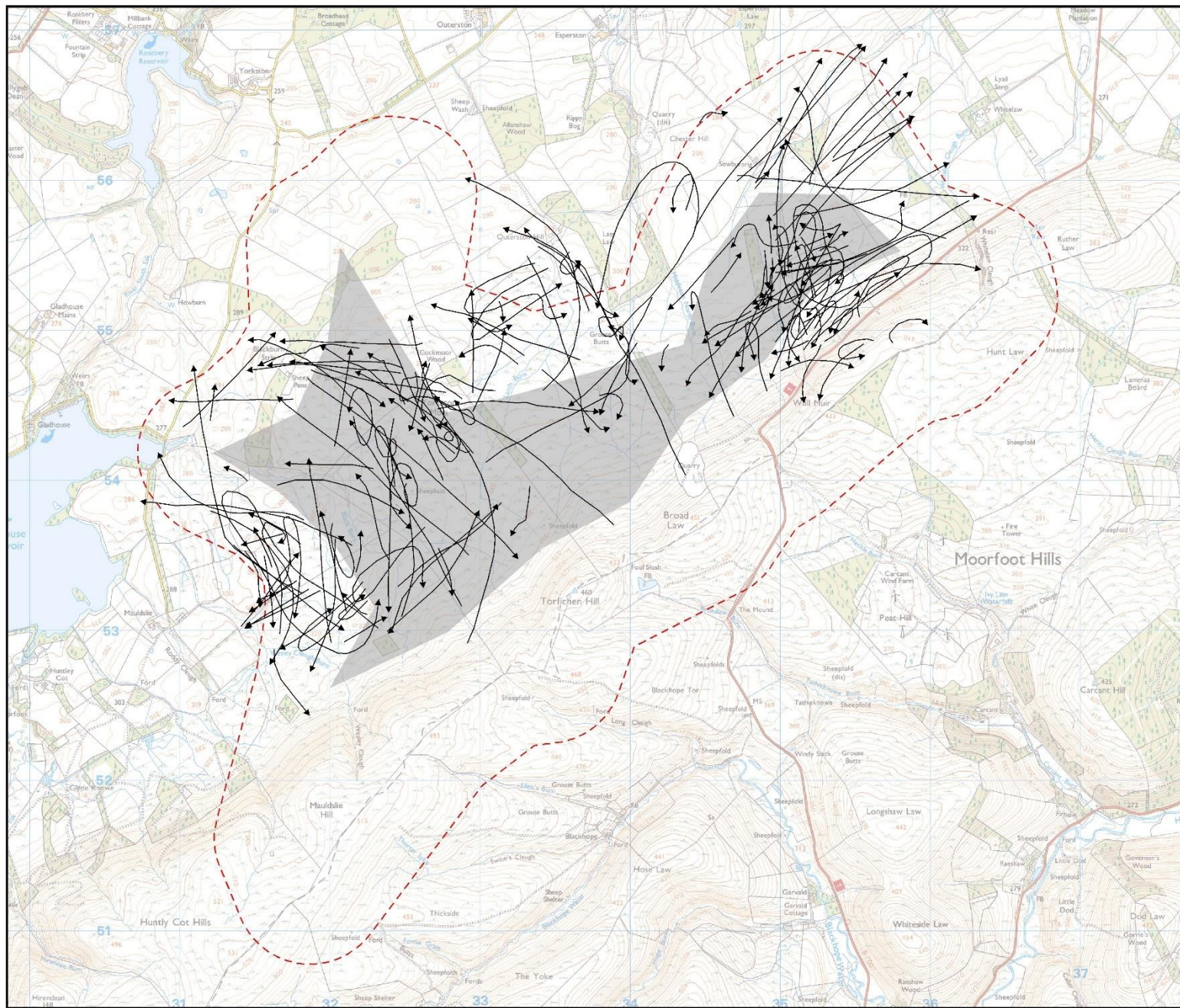
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PROJECT NUMBER	TH2021-1
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SCALE - 1:24,000 @ A3

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FIGURE 19
VP Survey Flight Lines
Apr-Aug 2021
Curlew

- KEY:**
- Flight lines
 - Indicative turbine envelope
 - - - Core breeding bird survey area



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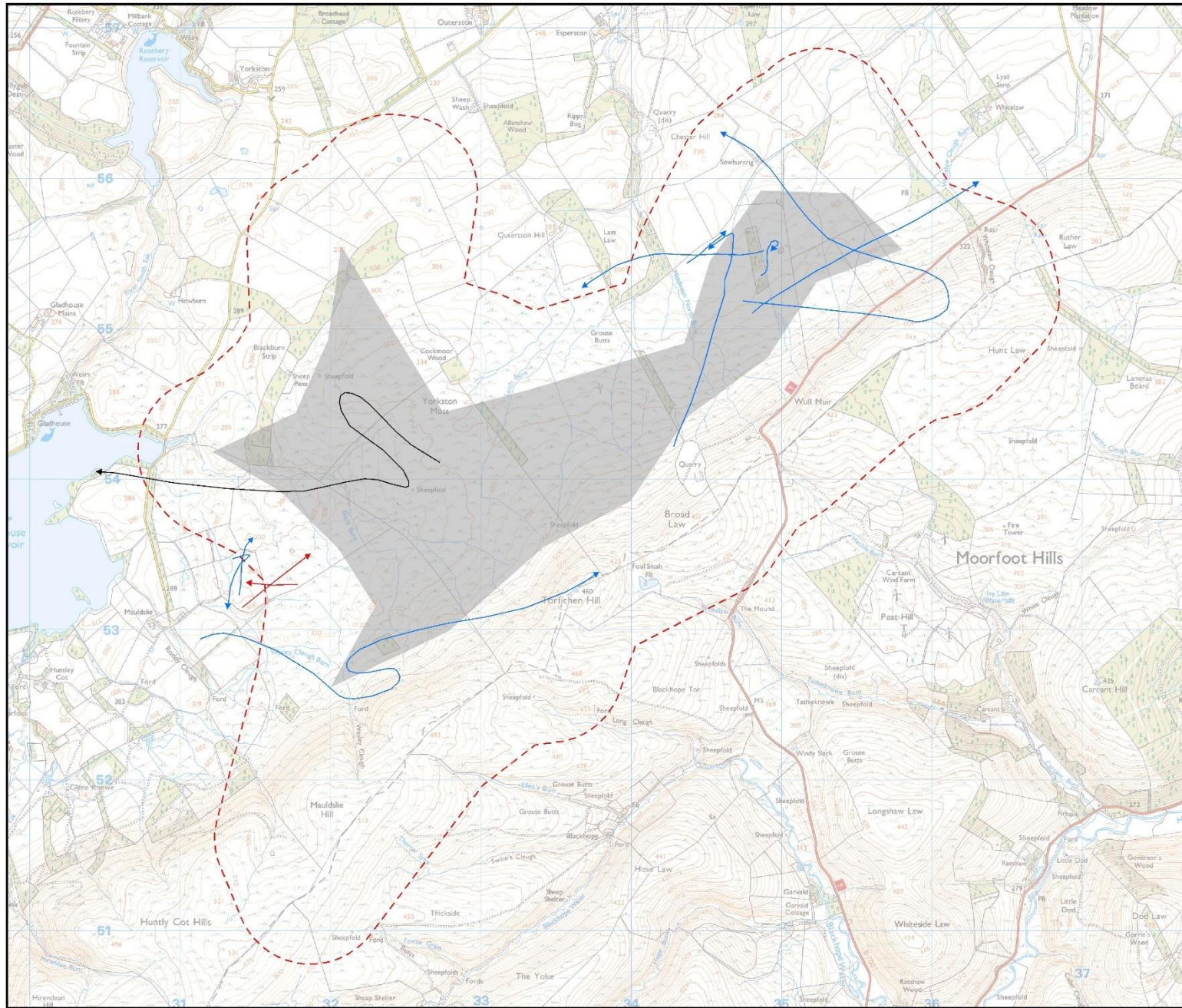
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**Torfichen Hill
Wind Farm**

FIGURE 20
VP Survey Flight Lines
Apr-Aug 2021
Other waders

KEY:

Flight lines:

- Golden Plover
- Oystercatcher
- Redshank

- Indicative turbine envelope
- Core breeding bird survey area



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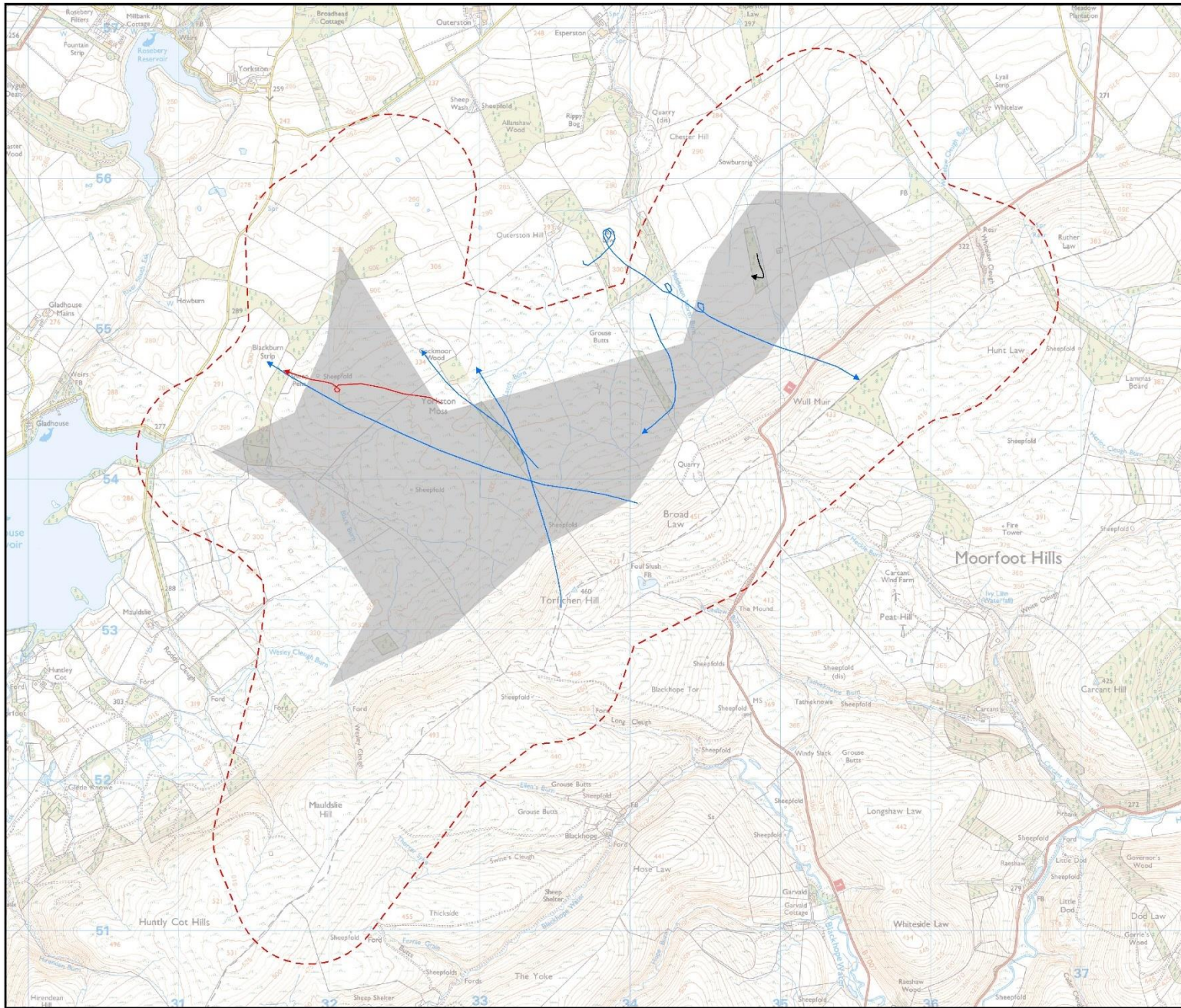
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SCALE - 1:24,000 @ A3

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FIGURE 21
VP Survey Flight Lines
Apr-Aug 2021
Scarce raptors

KEY:

Species

-  Red Kite
-  Long-eared Owl
-  Peregrine
-  Indicative turbine envelope
-  Core breeding bird survey area



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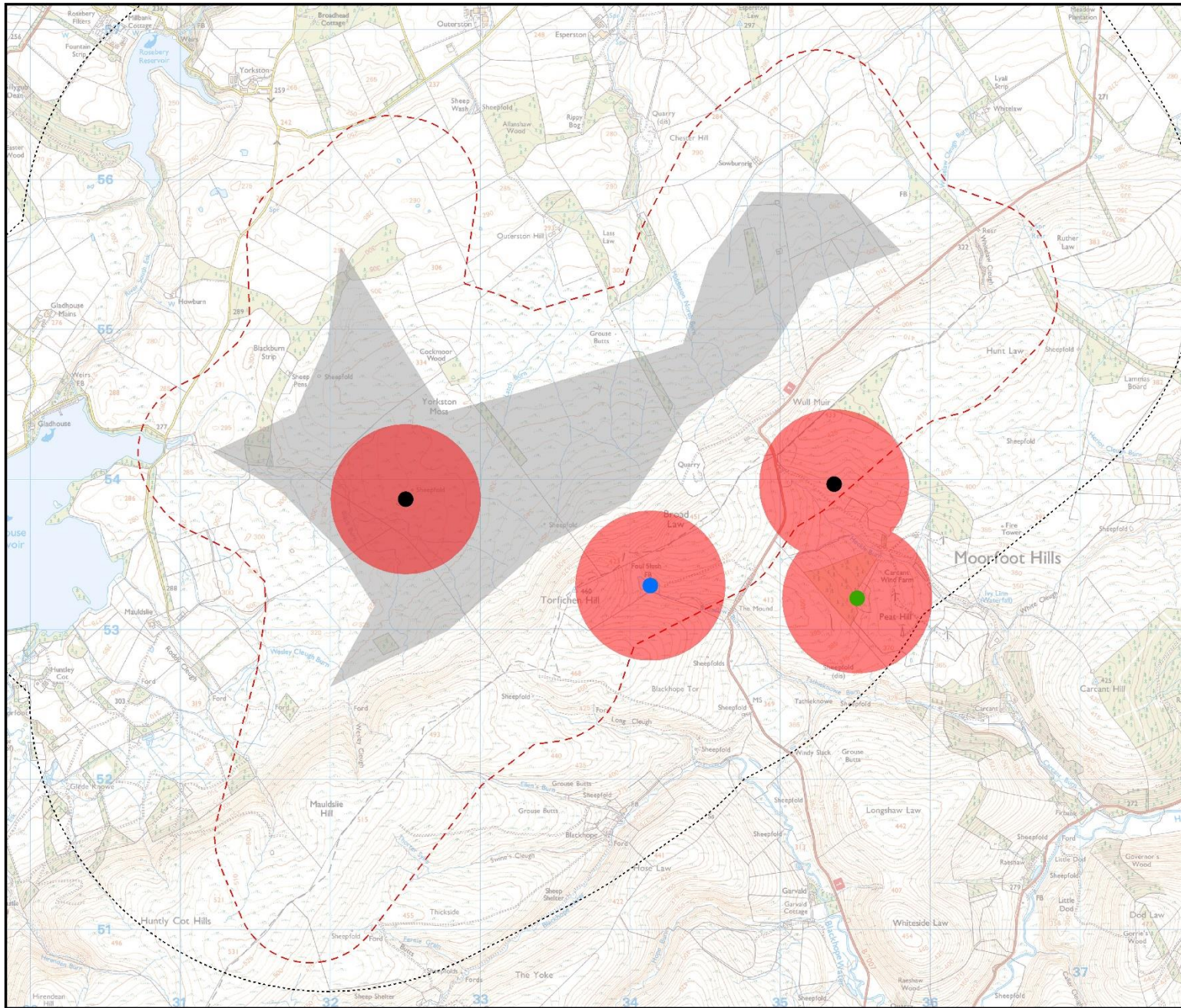
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SCALE - 1:24,000 @ A3

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**Torfichen Hill
Wind Farm**

**FIGURE 22
Initial Proposed
Ornithological Constraints
(Breeding 2021)**

KEY:

Constraint

- Black Grouse lek
- Black-headed Gull colony
- Short-eared Owl nest
- Initial constraint buffers
- Indicative turbine envelope
- Wider Survey Area
- Core breeding bird survey area



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PROJECT NO:	N/A	REVISION NO:	N/A
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WORKING NUMBER:	TH2021-1
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BREEDING BIRD SURVEYS 2021

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APPENDIX 1. VANTAGE POINT SURVEY DATA

Survey Information

Date	Vantage Point No	Start time	Finish time	Weather	Observer
30/04/2021	2	10:30	13:30	sunny, cloudy, slightly breezy	Carl Mitchell
30/04/2021	2	14:00	17:00	sunny, cloudy, slightly breezy	Carl Mitchell
30/04/2021	2	17:30	19:00	sunny, cloudy, slightly breezy	Carl Mitchell
30/04/2021	1	12:10	15:10	sunny, cloud 4/8, wind 2-3 NE	Larry Griffin
30/04/2021	1	15:40	18:40	sunny, cloud 3/8, 3 NE	Larry Griffin
09/05/2021	1	08:05	09:35	cloud 6/8, wind 2-3 S	Larry Griffin
05/05/2021	3	13:00	16:00	sunny, cloud 4/8, wind 1-3 N	Larry Griffin
05/05/2021	3	16:30	18:00	cloud 6/8, wind 3 N	Larry Griffin
09/05/2021	3	10:00	13:00	cloud 7/8, wind 3 S	Larry Griffin
11/05/2021	2	12:10	15:10	windy early on with sunny spells; later wind dropped then cloudy	Carl Mitchell
11/05/2021	2	15:40	18:40	windy early on with sunny spells; later wind dropped then cloudy	Carl Mitchell
11/05/2021	2	19:10	20:40	windy early on with sunny spells; later wind dropped then cloudy	Carl Mitchell
13/05/2021	1	09:40	11:10	calm, foggy at start but clearing from 9:30	Larry Griffin
13/05/2021	1	11:35	14:35	calm, foggy at start but clearing from 9:30	Larry Griffin
13/05/2021	1	15:35	16:05	wind 1 N, cloud 7 but misty at height and beyond 2 km, fog returned at 16:05 until atleast 17:00	Larry Griffin
15/05/2021	1	05:25	08:25	cloud 8/8, cold 7C, little wind	Carl Mitchell
24/05/2021	3	07:45	10:15	cloud 8, wind 3-4 W	Larry Griffin
24/05/2021	3	14:30	17:30	cloud 7, wind 3-4 W	Larry Griffin
25/05/2021	3	08:40	10:40	cold, cloudy 8/8, showers on/off	Carl Mitchell
05/06/2021	1	08:15	11:30	cloud 2/8, wind 1 SW	Larry Griffin
05/06/2021	1	19:00	22:00	cloud 6/8, wind 3 W	Larry Griffin
06/06/2021	3	05:25	08:25	cloud 4/8, wind 1-2 SW	Larry Griffin
06/06/2021	3	09:00	10:30	cloud 2/8, wind 2 W	Larry Griffin
06/06/2021	2	14:05	15:35	cloud 4/8, wind 2 W	Larry Griffin
06/06/2021	3	18:00	21:00	cloud 4/8, wind 2 W	Larry Griffin
17/06/2021	2	15:45	18:45	dry, cloud 4/8, light wind from NW	Carl Mitchell
17/06/2021	2	19:15	22:15	warm evening, light breeze from NW	Carl Mitchell
18/06/2021	1	16:00	17:30	light breeze, warm, dry	Carl Mitchell
23/07/2021	2	05:25	05:45	first thing fine, but haar rolled in at 05:45, cleared at 06:50 then cool, cloudy and little wind	Carl Mitchell
23/07/2021	2	06:51	09:21	first thing fine, but haar rolled in at 05:45, cleared at 06:50 then cool, cloudy and little wind	Carl Mitchell
23/07/2021	2	10:05	13:05	cloudy, warming up to 20C, little wind, hot and sunny from 11:00	Carl Mitchell
23/07/2021	3	10:15	13:15	overcast, very warm, clear, cloud 7/8, wind 2 E	Larry Griffin
23/07/2021	3	17:00	20:00	sunny, turning to 2 N, cloud 1/8, hot!	Larry Griffin
23/07/2021	3	20:30	22:00	sunny, warm, wind 1 N, cloud 1/8	Larry Griffin
23/07/2021	2	18:00	19:00	warm summer evening 20C, slight breeze, high cloud 4/8	Carl Mitchell
24/07/2021	1	06:45	09:45	some fog in patches at start, wind 1 SE, cloud 1/8, hot and sunny pm	Larry Griffin
24/07/2021	1	15:30	18:30	some fog in patches at start, wind 1 SE, cloud 1/8, hot and sunny pm	Larry Griffin
24/07/2021	1	19:00	19:30	some fog in patches at start, wind 1 SE, cloud 1/8, hot and sunny pm	Larry Griffin
24/07/2021	1	19:45	21:15	some fog in patches at start, wind 1 SE, cloud 1/8, hot and sunny pm	Larry Griffin
01/08/2021	2	20:20	21:50	warm evening, no wind, midges, cooled at 21:30, too dark to see at 21:50	Carl Mitchell
02/08/2021	2	05:10	08:10	cool, cloudy 8/8, slight breeze from SW	Carl Mitchell
02/08/2021	2	08:40	10:55	sunny, warm morning, cloud 4/8, breeze from SW	Carl Mitchell
02/08/2021	1	12:00	15:00	fine and sunny, cloud 6/8, slight breeze, ideal	Carl Mitchell
02/08/2021	1	15:30	17:30	fine and sunny, cloud 6/8, slight breeze, ideal	Carl Mitchell
30/08/2021	1	10:05	11:50	sunny, no clouds, warm, slight breeze, (cloudy by 11am 7/8)	Carl Mitchell
02/08/2021	3	18:25	21:25	cloudy, breezy with sunny spells, later wind dropped, cool after 8pm	Carl Mitchell
03/08/2021	3	05:05	08:05	bright and sunny, no cloud, ground mist at first, soon cleared (looking into sun)	Carl Mitchell
03/08/2021	3	08:35	09:05	bright and sunny, no cloud, ground mist at first, soon cleared (looking into sun)	Carl Mitchell
03/08/2021	3	09:05	09:25	bright and sunny, no cloud, ground mist at first, soon cleared (looking into sun)	Carl Mitchell

Key Species Data

VP	Date	Time	Species	Count	Direction of flight	Flight height (r)	Activity	Time bird observed (sec)	Notes
2	30/04/2021	10:51	CU	2	S	15		10	territorial flight, bubbling
2	30/04/2021	12:40	CU	1	SE	15		20	territorial flight, bubbling
2	30/04/2021	12:43	CU	1	NW	4		10	
2	30/04/2021	13:04	CU	1	SE	9		20	bird form 5 returning
2	30/04/2021	14:06	CU	1	NNE	11		20	same as 1? Return from feeding
2	30/04/2021	15:58	CU	3	circle	13	circle	120	territorial flight, bubbling
2	30/04/2021	16:21	CU	2	E	25		35	same as 4
2	30/04/2021	16:27	CU	1	NW	14		25	
2	30/04/2021	17:34	CU	2	WNW	12		20	to feed
2	30/04/2021	17:39	CU	2	N	15		25	to feed
2	30/04/2021	17:41	CU	1	NW	20		20	
2	30/04/2021	18:03	CU	1	ESE	10		10	returning to nest, same as 18
2	30/04/2021	18:05	CU	1	SE	10		10	
1	30/04/2021	12:18	CU	1	N	35	fly	80	
1	30/04/2021	12:17	L	2	N	18	display	20	
1	30/04/2021	13:13	CU	1	NE	20	fly	5	seen in FOV while tracking buzzard
1	30/04/2021	13:12	L	1	SW	10	fly	5	seen in FOV while tracking buzzard
1	30/04/2021	13:18	L	1	W	15	fly	5	seen in FOV while tracking buzzard
1	30/04/2021	13:33	L	3		11	display	60	displaying together; complex
1	30/04/2021	13:34	CU	2		25	display	25	landed on field together
1	30/04/2021	13:50	L	3	SW	13	display	50	
1	30/04/2021	14:22	CU	1	NE	25	display	20	slow flight and landed
1	30/04/2021	14:43	CU	1	NE	8	fly	20	
1	30/04/2021	14:49	CU	1	SW	5	fly	10	
1	30/04/2021	15:48	CU	1	S	6	fly	10	landed on moor
1	30/04/2021	16:20	CU	2	E	75	display	40	
1	30/04/2021	17:01	CU	2	SW	30	display	30	one above the other
1	30/04/2021	17:12	CU	2	N	13	display	120	
1	30/04/2021	17:13	CU	1	WNW	5	fly	2	
1	30/04/2021	17:19	CU	1	NE	10	fly	10	
1	30/04/2021	17:34	L	2	W	23	display	180	mostly at about 30m but looping and diving
1	30/04/2021	17:41	CU	1	S	4	fly	4	
1	30/04/2021	18:04	PE	1	S	55	fly	50	
1	30/04/2021	18:13	L	2		25	display	15	
1	30/04/2021	18:20	L	2		18	display	40	
1	30/04/2021	18:23	CU	2	NE	40	fly	50	
1	30/04/2021	18:27	CU	1	NE	45	fly	40	
1	30/04/2021	18:28	CU	2	NE	25	fly	30	
1	09/05/2021	08:06	CU	1	SW	15	display	15	
1	09/05/2021	08:37	CU	1	N	8	display	20	
1	09/05/2021	08:41	L	1	N	10	display	20	
1	09/05/2021	08:48	CU	1	SE	2	fly	15	
1	09/05/2021	08:48	CU	1	NE	4	fly	5	
1	09/05/2021	08:52	L	1	SW	4	display	50	
1	09/05/2021	08:56	CU	3	S	4	display	40	
1	09/05/2021	09:02	L	1	N	5	display	10	
1	09/05/2021	09:06	L	3	SW	13	fly	120	
1	09/05/2021	09:16	L	3	NE	6	display	60	
1	09/05/2021	09:23	CU	1	NE	5	display	10	
3	05/05/2021	13:06	CU	1	E	15	display	20	
3	05/05/2021	13:08	CU	1	S	8	fly	25	
3	05/05/2021	13:09	L	1	NW	5	display	10	
3	05/05/2021	13:16	L	1	W	5	display	50	
3	05/05/2021	13:20	L	1	E	40	fly	10	rose up to chase raven briefly
3	05/05/2021	13:24	GJ	2	W	8	fly	15	
3	05/05/2021	13:24	CU	1	W	10	fly	10	
3	05/05/2021	13:26	GJ	2	WSW	5	fly	10	
3	05/05/2021	13:28	GJ	2	S	18	fly	50	

3	05/05/2021	13:33	GJ	2	N	3	fly	10	disturbed by deer
3	05/05/2021	13:46	L	1		10	display	50	display
3	05/05/2021	13:48	L	2		10	display	20	rose to mob crow (outside area)
3	05/05/2021	14:01	L	2		10	fly	20	not shown as overlapping other local flights with
3	05/05/2021	14:03	CU	1	NE	15	display	15	
3	05/05/2021	14:04	L	1		5	display	20	not shown as local to VP 3
3	05/05/2021	14:10	L	2		4	display	40	not shown as local to VP 3
3	05/05/2021	14:13	L	1		3	fly	10	not shown as local to VP 3
3	05/05/2021	14:15	L	2		5	soar	40	not shown as local to VP 3
3	05/05/2021	14:17	CU	1	NW	8	soar	30	
3	05/05/2021	14:26	CU	1	NE	10	soar	40	
3	05/05/2021	14:26	CU	1	SSW	10	soar	5	
3	05/05/2021	14:29	CU	1	SW	5	soar	30	
3	05/05/2021	14:39	L	1		5	soar	10	not shown as local to VP 3
3	05/05/2021	14:45	RK	1	NE	10	display	10	calling
3	05/05/2021	14:54	L	2	NW	10	soar	120	
3	05/05/2021	15:03	L	1	E	5	fly	20	
3	05/05/2021	15:04	L	1		15	display	10	not shown as local to VP 3
3	05/05/2021	15:10	CU	1	SW	5	display	20	d
3	05/05/2021	15:11	L	2	SW	20	fly	10	
3	05/05/2021	15:12	L	1		2	display	5	not shown as close to VP3
3	05/05/2021	15:16	PE	1	WNW	60	fly	120	
3	05/05/2021	15:17	L	1		2	display	30	not shown as close to VP3
3	05/05/2021	15:21	CU	3		3	display	10	not shown as close to VP3
3	05/05/2021	15:27	GP	7	W	45	fly	40	
3	05/05/2021	15:26	L	5		13	display	30	not shown as close to VP3
3	05/05/2021	15:33	L	1		5	display	20	not shown as close to VP3
3	05/05/2021	15:36	L	3		8	display	60	not shown as close to VP3
3	05/05/2021	15:44	RK	1	W	10	display	20	
3	05/05/2021	15:46	SN	1	WSW	2	fly	5	disturbed by deer
3	05/05/2021	15:46	L	1		10	display	20	not shown as close to VP3
3	05/05/2021	15:49	CU	1		12	display	30	not shown as close to VP3
3	05/05/2021	15:55	L	2		5	display	10	not shown as close to VP3
3	05/05/2021	16:39	L	1	NE	15	fly	40	
3	05/05/2021	16:42	L	1		10	display	40	
3	05/05/2021	16:49	CU	1	NW	10	display	30	approx 20 mins reduced vis due to snow after thi
3	05/05/2021	17:06	SE	1	SW	2	display	20	"V" flapping then down to ground
3	05/05/2021	17:08	BK	2		1	display	420	male displaying on open grass, approached by fe
3	05/05/2021	17:18	CU	3	NE	4	display	20	
3	05/05/2021	17:30	L	2		13	fly	20	by VP3 to mob gull
3	05/05/2021	17:34	CU	1	S	4	fly	10	
3	05/05/2021	17:40	L	3		6	display	40	
3	05/05/2021	17:41	CU	1		6	display	20	at VP3 part mobbing gull
3	05/05/2021	17:41	L	2		6	display	20	at VP3 part mobbing gull
3	05/05/2021	17:46	CU	1	W	30	fly	30	fairly persistent sleet/hail but vis still ok
3	09/05/2021	10:02	SN	2		50	display		drumming display flight
3	09/05/2021	10:05	L	2		3	display	40	wader flights within room of V3
3	09/05/2021	10:05	GJ	2	NE	10	fly	20	
3	09/05/2021	10:06	GJ	2	SSW	3	fly	5	
3	09/05/2021	10:10	L	10		5	display	30	not shown as near VP3
3	09/05/2021	10:12	L	1		3	display	125	
3	09/05/2021	10:19	L	1		3	display	30	
3	09/05/2021	10:29	CU	1	N	5	display	10	
3	09/05/2021	10:30	L	1	NW	8	display	20	mobbing crow
3	09/05/2021	10:33	KT	1	WNW	15	fly	80	
3	09/05/2021	10:33	CU	1	SSW	5	fly	10	
3	09/05/2021	10:36	CU	2		3	display	20	not shown as near VP3
3	09/05/2021	10:36	L	2		4	display	30	not shown as near VP3
3	09/05/2021	10:38	CU	1		2	display	10	not shown as near VP3
3	09/05/2021	10:42	L	1		2	display	10	not shown as near VP3
3	09/05/2021	10:50	GJ	2		2	fly	20	not shown as near VP3
3	09/05/2021	10:51	L	1		2	display	10	not shown as near VP3
3	09/05/2021	10:52	L	3		3	display	20	not shown as near VP3
3	09/05/2021	10:55	L	2		6	display	80	not shown as near VP3
3	09/05/2021	11:05	GJ	3	WNW	8	fly	20	
3	09/05/2021	11:07	GJ	2	W	10	fly	30	
3	09/05/2021	11:10	L	1		3	display	20	not shown as near VP3
3	09/05/2021	11:11	GJ	2		5	fly	40	not shown as near VP3
3	09/05/2021	11:16	CU	1		2	fly	10	not shown as near VP3
3	09/05/2021	11:23	L	2		5	display	70	not shown as near VP3
3	09/05/2021	11:25	CU	2		2	display	10	not shown as near VP3

3	09/05/2021	11:36	CU	1 SSE	3 display	30	
3	09/05/2021	11:39	CU	1 NNW	5 display	40	
3	09/05/2021	11:40	L	2	6 display	30	not shown as near VP3
3	09/05/2021	11:04	L	1	2 fly	10	not shown as near VP3
3	09/05/2021	11:47	CU	1	2 display	20	
3	09/05/2021	11:55	CU	2 WNW	12 fly	40	
3	09/05/2021	11:59	CU	2 W	8 fly	50	
3	09/05/2021	12:04	CU	1 NNE	5 display	10	
3	09/05/2021	12:06	L	2	5 display	20	not shown as near VP3
3	09/05/2021	12:07	L	2	3 display	10	not shown as near VP3
3	09/05/2021	12:10	SN	1 SW	45 display	60	
3	09/05/2021	12:23	L	1	4 display	30	not shown as near VP3
3	09/05/2021	12:26	L	1 NW	15 fly	60	
3	09/05/2021	12:28	CU	1	4 display	30	not shown as near VP3
3	09/05/2021	12:32	CU	2	7 display	40	not shown as near VP3
3	09/05/2021	12:36	L	1 circle	6 display	30	
1	13/05/2021	10:05	CU	1 SSW	8 display	20	
1	13/05/2021	10:50	CU	1 SW	20 display	25	
1	13/05/2021	10:55	CU	1 W	5 display	10	
1	13/05/2021	11:36	CU	1 N	5 display	10	
1	13/05/2021	11:38	L	1 NE	40 fly	120	
1	13/05/2021	11:38	CU	1 NE	40 fly	20	
1	13/05/2021	11:37	L	1	5 display	10	briefly flew up to join lapwing 5 as it passed
1	13/05/2021	11:40	CU	1 NE	20 fly	40	
1	13/05/2021	11:43	CU	1 NE	3 display	20	
1	13/05/2021	11:58	L	1	6 display	30	mobbing crow
1	13/05/2021	12:08	CU	1	10 display	90	
1	13/05/2021	12:08	L	2	50 display	20	display
1	13/05/2021	12:10	CU	1 SW	30 fly	30	
1	13/05/2021	12:17	CU	1	6 display	80	
1	13/05/2021	12:30	CU	1 ENE	55 fly	40	
1	13/05/2021	12:35	L	1	3 display	40	mobbing pheasant
1	13/05/2021	12:50	CU	1 NE	15 fly	35	
1	13/05/2021	12:52	CU	1 W	8 fly	40	
1	13/05/2021	12:54	CU	1 NE	5 display	15	
1	13/05/2021	12:55	CU	1	30 fly	60	
1	13/05/2021	12:56	L	1 WSW	2 fly	10	
1	13/05/2021	12:59	CU	1 NE	8 display	30	
1	13/05/2021	13:14	L	1 NNE	45 fly	80	
1	13/05/2021	13:50	CU	1 SW	25 fly	100	had same dangling leg as on bird flight path; 8 at
1	13/05/2021	13:55	CU	1 NW	10 display	20	
1	13/05/2021	13:56	OC	4 E	45 display	60	calling, one broke away and headed NW
1	13/05/2021	13:59	CU	2 SW	2 display	10	
1	13/05/2021	14:12	CU	1 SW	20 display	60	
1	13/05/2021	14:12	L	1 SW	5 fly	5	mobbing crow
1	13/05/2021	14:20	CU	1 N	8 display	20	
1	13/05/2021	14:28	CU	1 W	10 display	20	
1	13/05/2021	14:29	CU	1 NE	35 fly	70	
1	13/05/2021	14:34	CU	3	4 display	50	complex interchange of 3 birds
1	13/05/2021	15:50	CU	1 NE	10 display	15	
1	13/05/2021	15:54	L	1	6 display	70	
1	13/05/2021	16:18	CU	1 NE	12 display	40	
1	15/05/2021	05:59	CU	1 SSE	6	33	
1	15/05/2021	06:11	CU	1 NW	11	20	to feed
1	15/05/2021	06:32	CU	1 NE	9	12	to feed
1	15/05/2021	06:47	SN	1 NE	175	38	
1	15/05/2021	07:02	OC	1 NE	28	24	

1	15/05/2021	07:16	CU	1	ENE	9	31	
1	15/05/2021	07:32	L	1	N	40	18	part display, landed
1	15/05/2021	07:53	L	2	SE	150	100	
3	24/05/2021	07:50	L	2	WNW	15	20	fly
3	24/05/2021	08:05	SN	1	N	25	60	display drumming display flight
3	24/05/2021	08:06	GJ	2	N	5	10	fly
3	24/05/2021	08:07	CU	2	NW	5	25	display first bird joined by another rising from bog
3	24/05/2021	08:08	CU	1	SW	2	10	display
3	24/05/2021	08:09	L	1	SW	4	20	display overhead
3	24/05/2021	08:16	CU	1	NNE	25	20	fly
3	24/05/2021	08:16	L	1	NW	10	10	fly
3	24/05/2021	08:18	SN	1	N	30	10	display
3	24/05/2021	08:18	CU	1	N	40	30	fly
3	24/05/2021	08:18	CU	1	NNW	2	10	fly
3	24/05/2021	08:25	CU	1		10	140	display
3	24/05/2021	08:27	SN	3	SW	10	15	display
3	24/05/2021	08:27	SN	1	NE	4	5	display
3	24/05/2021	08:30	SN	2		25	20	display not shown as within 100m of VP3
3	24/05/2021	08:33	SN	1		40	30	display not shown as within 100m of VP3
3	24/05/2021	08:33	SN	1		15	60	display not shown as within 100m of VP3
3	24/05/2021	08:38	CU	2	SW	6	20	display
3	24/05/2021	08:43	CU	1	NW	5	5	display
3	24/05/2021	08:45	CU	1	N	40	40	display
3	24/05/2021	08:46	L	1		8	10	display not shown as within 100m of VP3
3	24/05/2021	08:50	L	1	E	25	50	display
3	24/05/2021	08:51	L	1	W	10	10	display
3	24/05/2021	08:52	CU	1	NW	5	10	display
3	24/05/2021	08:53	GJ	2	ENE	2	10	fly
3	24/05/2021	08:55	SN	10		6		display from 08:55 more local snipe flights too complex
3	24/05/2021	09:05	PE	1	NNW	25	60	fly food in talons
3	24/05/2021	09:06	CU	2		8	30	display not shown as within room of VP3
3	24/05/2021	09:07	CU	1		5	5	display not shown as within room of VP3
3	24/05/2021	09:07	CU	1		5	5	display not shown as within room of VP3
3	24/05/2021	09:08	CU	2	NW	40	50	fly
3	24/05/2021	09:23	SN	4		80		display from 09:23 to 09:45 within 100m of VP3
3	24/05/2021	09:34	L	1	E	10	10	display
3	24/05/2021	09:36	GJ	2	NE	30	50	fly
3	24/05/2021	09:46	GJ	2	N	3	40	fly took off from VP3
3	24/05/2021	09:53	GJ	1	NW	10	30	fly
3	24/05/2021	09:53	SN	1		50		display within 100m of VP3
3	24/05/2021	09:55	GJ	2	N	10	60	fly flight in all direction
3	24/05/2021	10:02	L	2		5	40	display flight in all direction
3	24/05/2021	10:03	L	1	W	23	50	fly
3	24/05/2021	10:05	CU	3	SW	15	70	display two bird joined by a third lifting from bog
3	24/05/2021	10:09	L	1	E	5	40	display
3	24/05/2021	10:13	CU	1	NW	3	60	display
3	24/05/2021	14:39	SN	1	S	5	5	fly
3	24/05/2021	14:40	L	2	NE	6	5	display
3	24/05/2021	14:45	L	1	NE	10	20	display mobbing crow
3	24/05/2021	14:54	CU	1	N	5	50	display
3	24/05/2021	14:56	L	3		4	20	display within 100m of VP3, complex flights
3	24/05/2021	14:58	SN	1	SW	5	5	fly
3	24/05/2021	14:58	L	1	SSW	8	10	fly
3	24/05/2021	15:00	CU	1	SW	20	15	fly
3	24/05/2021	15:01	CU	1		3	30	fly same vector as 50
3	24/05/2021	15:13	CU	1	SW	13	70	display
3	24/05/2021	15:20	L	2	W	4	60	display
3	24/05/2021	15:30	GJ	5	WSW	6	20	fly
3	24/05/2021	15:36	SN	1	NW	40	40	display
3	24/05/2021	15:48	CU	2	N	8	40	fly
3	24/05/2021	15:50	L	1	NW	6	10	display
3	24/05/2021	16:30	L	1		5	20	mobbing lapwing mobbing snipe
3	24/05/2021	16:30	SN	1		5	20	mobbed being mobbed by lapwing
3	24/05/2021	16:33	CU	2	W	8	50	fly
3	24/05/2021	16:40	GJ	17	SE	18	20	fly
3	24/05/2021	16:42	CU	1	WSW	25	30	fly
3	24/05/2021	16:43	CU	1	S	13	90	fly
3	24/05/2021	16:43	CU	2	SW	10	30	fly
3	24/05/2021	16:44	SN	1		40	20	display within 100m of VP3
3	24/05/2021	16:48	SN	1		4	5	fly within 100m of VP3
3	24/05/2021	16:53	L	1		4	40	fly within 100m of VP3
3	24/05/2021	16:54	L	1		5	40	fly within 100m of VP3
3	24/05/2021	16:58	SN	2		3	10	fly within 100m of VP3
3	24/05/2021	17:11	SN	1	SW	50	30	display
3	24/05/2021	17:14	CU	2		8	30	display within 100m of VP3
3	25/05/2021	08:42	CU	1	S	15	24	on territory

3	25/05/2021	08:55	L	1 NE	45	25	
3	25/05/2021	08:58	CU	2 S	28	30	
3	25/05/2021	09:34	L	2 N	13	36	
3	25/05/2021	09:55	CU	2 S	45	16	on territory
3	25/05/2021	10:00	CU	1 WSW	15	10	same flight line as 74, so not shown
3	25/05/2021	10:03	GJ	2 N	50	20	
3	25/05/2021	10:11	CU	1 NNW	40	25	to feeding grounds
3	25/05/2021	10:34	GJ	2 SSW	60	18	
1	05/06/2021	08:29	CU	1 SSW	10	20	
1	05/06/2021	08:44	CU	1 SW	3	50	
1	05/06/2021	08:44	CU	1	5	30	cannot find on map
1	05/06/2021	08:54	CU	1 E	6	20	
1	05/06/2021	09:08	L	1 SW	25	40	
1	05/06/2021	09:35	OC	1 NE	5	80	
1	05/06/2021	10:14	CU	3 SW	5	30	
1	05/06/2021	10:42	CU	2 SSW	6	20	
1	05/06/2021	10:45	CU	1 NE	8	50	
1	05/06/2021	10:47	CU	1 N	1	30	mobbing crow
1	05/06/2021	11:06	L	1 N	40	20	
1	05/06/2021	19:19	CU	1 S	5	20	
1	05/06/2021	19:25	CU	1 NE	2	10	
1	05/06/2021	19:31	L	3 NE	3 display	15	
1	05/06/2021	19:32	CU	1 N	3 display	40	
1	05/06/2021	19:33	L	1 SW	3 fly	40	
1	05/06/2021	19:36	CU	3 WSW	4 display	30	
1	05/06/2021	19:37	CU	2 WSW	7 display	20	
1	05/06/2021	19:39	CU	1 SSW	10 fly	60	
1	05/06/2021	19:54	CU	1 NE	25 display	40	
1	05/06/2021	20:17	CU	1 N	6 display	20	
1	05/06/2021	20:26	CU	1 SW	8 display	30	
1	05/06/2021	20:37	CU	1 NNW	25 display	70	
1	05/06/2021	20:45	CU	1 NW	20 fly	130	calling but not normal display flight
1	05/06/2021	20:50	CU	1 NNE	38 fly	40	calling
1	05/06/2021	21:05	LE	1 S	2 hunt		hunting from post to post or conifer at edge of w
3	06/06/2021	05:38	L	12 SSE	5 fly	30	mobbing sparrowhawk, arrow simplified
3	06/06/2021	05:56	L	1 E	6 fly	40	
3	06/06/2021	05:56	GJ	2 W	15 fly	30	
3	06/06/2021	06:08	CU	1 NNW	4 display	60	
3	06/06/2021	06:10	CU	1 SE	2 fly	20	
3	06/06/2021	06:19	L	2 WSW	2 fly	30	
3	06/06/2021	06:21	L	6 SW	9 fly	40	
3	06/06/2021	06:21	SN	1 SE	5 display	10	
3	06/06/2021	06:28	CU	1 SE	10 fly	70	
3	06/06/2021	06:29	OC	3 S	4 display	40	
3	06/06/2021	06:29	CU	1 SE	10 fly	20	
3	06/06/2021	06:30	CU	1 SW	6 fly	20	
3	06/06/2021	06:45	SE	1 SE	15 display		edge of woods and surrounding moor to 50m, m
3	06/06/2021	06:48	GJ	6 SE	30 fly	40	
3	06/06/2021	07:01	L	1 ENE	70 fly	60	
3	06/06/2021	07:05	CU	1 SE	13 display	140	
3	06/06/2021	07:08	SN	2 SE	23 display	70	chasing, then split up
3	06/06/2021	07:09	CU	1 NNW	5 fly	20	
3	06/06/2021	07:16	L	2 W	4 display	20	chasing
3	06/06/2021	07:17	OC	1 N	5 fly	20	
3	06/06/2021	07:35	L	2 W	4 display	10	2nd bird joined it briefly from ground
3	06/06/2021	07:42	CU	1 S	8 display	40	
3	06/06/2021	07:42	CU	1 S	8 display	20	
3	06/06/2021	07:42	CU	1 W	10 display	20	
3	06/06/2021	07:53	GJ	4 SW	15 fly	60	
3	06/06/2021	07:55	L	1 SE	15 display	30	
3	06/06/2021	07:56	CU	1 W	25 fly	20	
3	06/06/2021	07:59	CU	2 NNW	15 fly	20	
3	06/06/2021	09:06	SN	1 NE	22 display	80	
3	06/06/2021	09:19	L	1 SW	14 fly	40	thermallling and calling
3	06/06/2021	09:27	CU	1 W	15 display	120	
3	06/06/2021	09:41	L	3 E	9 fly	20	
3	06/06/2021	09:53	CU	2 W	10 fly	110	2 birds joined and then left first one

2	06/06/2021	14:25	GJ	15	WNW	145	fly	180	
2	06/06/2021	14:35	CU	1	NE	20	fly	70	
3	06/06/2021	18:07	L	16	E	8	fly	30	
3	06/06/2021	18:11	L	1	N	11	fly	80	
3	06/06/2021	18:15	CU	1	NW	40	fly	30	overhead at Une Point
3	06/06/2021	19:02	GJ	15	W	50	fly	30	
3	06/06/2021	19:15	L	1	N	15	fly	20	
3	06/06/2021	19:26	GJ	2	E	15	fly	30	
3	06/06/2021	19:35	CU	1	N	28	fly	140	
3	06/06/2021	19:35	CU	1	NW	5	display	10	
3	06/06/2021	19:41	CU	1	NW	18	display	90	
3	06/06/2021	19:42	CU	1	SW	5	display	10	
3	06/06/2021	19:45	L	1	SE	8	fly	40	
3	06/06/2021	19:49	L	2	ESE	6	fly	30	gradually dispersing back onto moor from flock c
3	06/06/2021	19:50	CU	1	W	28	fly	40	
3	06/06/2021	19:56	L	1	E	10	fly	30	
3	06/06/2021	20:03	SE	2	NW	11	display	150	one dropping prey to other in air, very close to fc
3	06/06/2021	20:06	L	1	NE	8	fly	20	
3	06/06/2021	20:14	L	1	NE	6	fly	20	
3	06/06/2021	20:15	CU	2	NE	7	display	20	
3	06/06/2021	20:17	CU	1	S	1	display	10	
3	06/06/2021	20:24	GJ	5	SE	60	fly	30	
3	06/06/2021	20:29	L	11	E	12	fly	30	
3	06/06/2021	20:41	L	1	WNW	10	fly	20	
3	06/06/2021	20:46	L	8	SW	5	fly	30	
3	06/06/2021	20:51	CU	1	NE	13	display	40	
2	17/06/2021	16:10	CU	2	NW	15		20	off feeding
2	17/06/2021	16:35	CU	1	NNW	40		65	return from feeding, landed
2	17/06/2021	17:14	CU	1	NW	40		15	to feed
2	17/06/2021	17:22	CU	1	NW	70		65	return from feeding, landed
2	17/06/2021	17:49	CU	1	SSW	20		24	return from feeding, landed
2	17/06/2021	19:16	CU	1	SW	10		22	return from feeding, landed
2	17/06/2021	20:10	L	1	NE	60		105	displaying, but then longer flight
2	17/06/2021	20:13	L	1	SE	55		54	
2	17/06/2021	20:50	CU	2	SW	13		20	same flight line as 14
2	17/06/2021	21:14	CU	1	SSE	48		40	
1	18/06/2021	16:12	L	2	ENE	50		17	to feed
1	18/06/2021	16:37	CU	1	NE	75		36	to feed
1	18/06/2021	17:18	L	1	SW	60		55	landed
1	18/06/2021	17:25	OC	1	NNE	65		48	landed
2	23/07/2021	07:20	CU	1	NE	15		12	resident
2	23/07/2021	07:28	GJ	7	SSE	43		32	
2	23/07/2021	07:38	L	4	SE	6		25	post breeding flock (resident?)
2	23/07/2021	07:44	CU	2	N	20		45	to feed in fields
2	23/07/2021	08:52	CU	2	N	35		35	to feed in fields
2	23/07/2021	10:31	L	3	NW	13		44	circling, then heading off to feed in field, same as
2	23/07/2021	11:08	GJ	7	SE	80		10	same as 3
2	23/07/2021	12:45	PE	1	SE	85	soar	120	soaring and chased woodpigeon
3	23/07/2021	10:55	L	1	N	25	mob	10	went up briefly to harass buzzard
3	23/07/2021	18:28	L	12	W	10	fly	40	
3	23/07/2021	18:46	L	2	N	10	mob	10	mobbed the buzzard briefly
3	23/07/2021	19:00	L	16	E	5	fly	20	
3	23/07/2021	19:08	L	3	E	10	mob	20	mobbed the buzzard family
3	23/07/2021	20:53	L	4	NW	4	fly	40	
3	23/07/2021	21:26	OC	2	ENE	50	fly	80	pair calling constantly
2	23/07/2021	18:25	L	3	SSW	38		23	
2	23/07/2021	18:41	CU	1	SE	8		10	returning from feeding in fields
1	24/07/2021	19:58	OC	1	N	5	fly	10	drops in to feed
1	24/07/2021	20:02	CU	2	NE	33	fly	80	
1	24/07/2021	20:19	OC	1	W	25	fly	50	#5 above leaving
2	01/08/2021	20:22	CU	1	SW	20		54	resident, alarm calling
2	01/08/2021	20:31	CU	1	SW	23		31	same bird as 1
2	02/08/2021	07:43	CU	2	SE	13		20	resident, disturbed by shepherd
2	02/08/2021	07:58	PE	1	NW	23		28	juv
2	02/08/2021	10:38	CU	1		13			resident, disturbed by shepherd on quad bike
2	02/08/2021	10:42	GJ	2	E	48		28	
3	03/08/2021	08:39	L	2	SW	20		23	