Breezy Hill Energy Project
Additional Information - Ornithology

Technical Appendix 7.1

Brockwell Energy

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Tables in Text

1.0 Introduction

MacArthur Green (now part of SLR) was commissioned by Brockwell Energy to complete ornithological surveys for the proposed Breezy Hill Energy Project, north of Dalmellington in East Ayrshire (hereafter referred to as 'the Proposed Development'). The surveys were conducted between April 2020 and August 2024 to inform an assessment of the potential ornithological effects of the Proposed Development on the species assemblage present.

This technical report summarises the methods employed and the results of these field surveys and is supported by the following Annexes.

- **Annex A**: Ornithological Legal Protection;
- **Annex B**: Ornithological Survey Methodologies;
- **Annex C**: Ornithological Survey Effort and General Information;
- **Annex D**: Ornithological Survey Results; and
- **Annex E**: Collision Risk Assessments.

Confidential information relating to species listed on Annex 1 of the EU Birds Directive or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) is detailed in **Confidential Appendix 7.2**.

2.0 Legal Protection

With limited exceptions, all wild birds and their eggs are protected by law. Specific levels of protection are determined by a species' inclusion on certain lists. **Annex A** to this report details the various levels of legal protection afforded to UK bird species.

3.0 Field Survey Methods

The following surveys were undertaken at the Site between April 2020 and August 2024:

- Flight activity surveys (two breeding seasons and two non-breeding seasons), from between two and three vantage points (VPs) depending on the season (see EIA **Figure 7.3**);
- Winter walkover surveys (two non-breeding seasons), 500 m survey buffer;
- Scarce breeding bird surveys (three breeding seasons), 2 km survey buffer; and
- Black grouse surveys (three breeding seasons), 1.5 km survey buffer.

Survey methods followed the recommended NatureScot guidance (2025a[i]) version available at the time of survey and methods are described in detail within **Annex B**. Where possible, each survey was carried out within buffer distance from the Site specific to that method (e.g. 2 km buffer for the scarce breeding bird surveys) and these are detailed within **Annex B**.

Target species for surveying/recording were defined from the following lists and refined on the basis of the species perceived sensitivity to onshore wind farm developments (e.g. as set out in NatureScot guidance, 2025a[i] and Annex 1 of NatureScot guidance, 2025b[ii]).

- Annex I of the EU Birds Directive[iii];
- Schedule 1 the Wildlife and Countryside Act 1981 (as amended)[iv]; and
- Species (excluding passerines) included on the Birds of Conservation Concern (BoCC) red list (Stanbury *et al.* 2022[v] and Stanbury *et al*. 2024[vi]).

Secondary species for survey/recording were defined as the non-red list raptor and owl species (i.e. buzzard, kestrel, sparrowhawk, tawny owl and long-eared owl), amber or green listed waders, feral species (e.g. Canada goose), mallard, raven and any notable Schedule 1 or red listed passerine species observed during surveys.

4.0 Field Survey Results

All valid surveys were undertaken during suitable weather conditions (as described within **Annex B**). Where weather conditions deteriorated below acceptable conditions (see definitions in **Annex B**), surveys were either suspended or additional surveys were undertaken. In the case of flight activity surveys, any time where the visibility was <1 km was excluded from total survey effort and subsequent analysis.

Schedule 1/Annex 1 surveys were carried out by appropriately licensed surveyors. All survey data were reviewed, inputted, and analysed by MacArthur Green (now part of SLR).

Survey effort and results of the field surveys are detailed within **Annex C** and **Annex D**. The following sections summarise the results from each survey undertaken.

4.1 Flight Activity

The flight activity surveys recorded all target species' flight activity within the Site and beyond. These data have been used in subsequent collision risk modelling, with flights used including those within the 'Collision Risk Analysis Area' (CRAA) (i.e. the area to be occupied by operational turbines, together with a 500 m buffer).

Flight activity surveys across the 2020 and 2021 breeding seasons and 2020/2021 and 2021/2022 non-breeding seasons were undertaken between two and three VPs. Valid survey effort[1] is summarised in **Table 7.1.1**.

Further details are provided within **Annex B, C** and **D**.

Table 7.1.1: Summary of total hours of valid survey per VP in each season

Period	VP1	VP2	VP3
2020 breeding season	36	45	-
2020/2021 non-breeding season	41	45	48
2021 breeding season	36	36	45
2021/2022 non-breeding season	41	36.5	36.08

A total of ten target species were recorded during the flight activity surveys. Full details are provided in **Annex D**.

For each species across the whole flight activity survey period, **Table 7.1.2** shows the total number of flights recorded and the total number of birds recorded[2]. The bird seconds are calculated for each observation as the product of flight duration and number of individuals. This is then summed per species to give the total bird seconds recorded across the entire surveyed period.

[1] Hours where visibility was >1 km are not considered valid for use in collision risk modelling as less than half the 2 km viewshed can be seen.

[2] This includes flights that would not technically be 'at-risk' of collision (e.g. recorded outwith the CRAA and/or not at rotor height).

Table 7.1.2: Target species recorded and total number of flights recorded during flight activity surveys, 2020-2022

Species	Total number of flightlines recorded	Total number of birds recorded	Total bird seconds recorded
Curlew	4	4	164
Golden plover	4	14	751
Goshawk	16	16	872
Hen harrier	2	2	110
Herring gull	3	3	63
Hobby	1	1	120
Merlin	1	1	20
Osprey	4	4	124
Peregrine falcon	4	4	145
Whooper swan	1	2	12

Flightlines Used in Collision Mortality Risk Modelling

Only flightlines identified to be within the CRAA and recorded within the 2 km viewshed of the associated VP were considered in subsequent collision risk modelling. **Annex E** provides details of the bird seconds from flights identified to be 'at- risk':

- 'At-risk' defined as – a flight having at least part of its duration (i) at Potential Collision Height (PCH)[3]; (ii) within the CRAA; and (iii) recorded within the 2 km viewshed of the associated VP.
- PCH is defined as – the altitude between the minimum and maximum blade height[4] (taken to be from 13.9 m to 149.9 m for the Proposed Development).

It should be noted that whilst whooper swan were recorded during flight activity surveys, no flights were considered to be 'at-risk'[5]. Collision mortality risks have therefore not been calculated for this species.

Full survey results detailing the findings from each survey visit (including target species' flightlines considered not 'at-risk' and secondary species information) can be found within **Annex D**. Only bird seconds for observations identified as within the CRAA and associated viewshed are considered in the following discussions. Full target species results are detailed within **Annex D** and the collision risk calculations are detailed in **Annex E**.

Collision Mortality Risks

The bird seconds for target species flights within the CRAA and at PCH were input into the NatureScot Collision Risk Model (CRM) (Band *et al.,* 2007[vii]) to estimate collision mortality risks per season. The CRM calculations for each species can be found in **Annex E** and **Table 7.1.3** presents a summary of estimated collision risks.

[3] In some cases, only part of a total flight duration was recorded at PCH, and it is assumed that this proportion is applicable for that part of the flight within the CRAA and 2 km viewshed area.

[4] Where the actual rotor blade altitude differs from the pre-defined survey height bands, the collision risk model accounts for this difference on the assumption of an even flight distribution within each particular survey height band, and an adjustment can be made to estimate total flight duration at actual rotor blade altitude.

[5] i.e. the flights were either not within the CRAA or at PCH.

Table 7.1.3: Estimated collision mortality risks.

Species	Mean breeding	Mean non-breeding	Mean annual	No. of years per collision[6]
Curlew	0.0141	0.0060	0.0200	50
Golden plover	0	0.0384	0.0384	26.1
Goshawk	0.0344	0.0078	0.0422	23.7
Hen harrier	0	0.0018	0.0018	541
Herring gull	0.0001	0	0.0001	13,040
Hobby	0.0022	0	0.0022	459
Merlin	0	0.0004	0.0004	2,566
Osprey	0.0029	0	0.0029	347
Peregrine falcon	0.0014	0.0017	0.0031	325

4.2 Scarce Breeding Birds

Scarce breeding bird surveys were conducted during the 2020 (April to August), 2021 (March to August) and 2024 (March to August) breeding seasons.

Goshawk, osprey and peregrine falcon were all identified to be breeding/potentially breeding within the survey area and breeding activity is summarised in **Table 7.1.4**. **Confidential Technical Appendix 7.2** contains the full details of all breeding activity. Hen harrier, hobby and merlin were also recorded during surveys but were not considered to be breeding/no breeding attempts were located.

Buzzard, kestrel, sparrowhawk and tawny owl (secondary raptor/owl species) were also recorded across the survey area and are likely to have bred within the wider area.

Full details of the scarce breeding bird surveys are provided within **Annex C** and **Annex D** and **Confidential Technical Appendix 7.2** and survey methodology is provided within **Annex B**.

Table 7.1.4: Scarce breeding bird summary

Species	2020	2021	2024
Goshawk	N/A	N/A	Potential territory, breeding activity unconfirmed
Osprey	N/A	N/A	One territory; two young fledged.
Peregrine falcon	N/A	One territory; breeding success unknown.	N/A

4.3 Black Grouse

Surveys to identify areas of black grouse activity, locate lek locations and establish lek size were conducted in the 2020, 2021 and 2024 breeding seasons during April, May and June. Surveys identified three lek locations with lek 3 recording the largest numbers in 2020 (**Table**

[6] Based on mean annual collision risk.

7.1.5). Full details of the black grouse surveys are provided within **Annex C** and **Annex D** and survey methodology is provided within **Annex B**.

Table 7.1.5: Black grouse lek activity: 2020 to 2024

Lek	2020		2021		2024	
	Maximum number of males recorded	Maximum number of females recorded	Maximum number of males recorded	Maximum number of females recorded	Maximum number of males recorded	Maximum number of females recorded
3	2	-	-	-	-	-
4	1	-	-	-	-	-
6	1	-	-	-	-	-

4.4 Moorland Breeding Bird Surveys

Upland breeding wader species were not a focus of the surveys, as the Site is mostly comprised of unsuitable habitat (a mixture of plantation and former opencast mining areas). Common sandpiper, ringed plover and snipe were identified to be breeding around the Gibson's Hill loch. Full details of upland breeding wader species recorded are provided within **Annex D**.

4.5 Winter Walkover

Winter walkover surveys were conducted during the 2020/2021 and 2021/2022 non-breeding seasons. Surveys recorded the following target species (**Table 7.1.6**). Full details of the winter walkover surveys are provided within **Annex C** and **Annex D** and survey methodology is provided within **Annex B**.

Table 7.1.6: Winter walkover: target species records (number of birds recorded per visit), 2020/2021 and 2021/2022

Species	2020/2021 non-breeding season		2021/2022 non-breeding season	
	Number of records	Total number of birds	Number of records	Total number of birds
Golden plover	-	-	2	92
Goshawk	2	2	1	1
Merlin	1	1	1	1
Peregrine falcon	2	2	1	1
Ringed plover	-	-	1	2

[i] NatureScot (2025a) Recommended Bird Survey Methods to inform impact assessment of Onshore Windfarms. Available at: https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms

[ii] NatureScot (2025b) Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas. Available at: https://www.nature.scot/doc/guidance-note-assessing-significance-impacts-bird-populations-onshore-wind-farms-do-not-affect

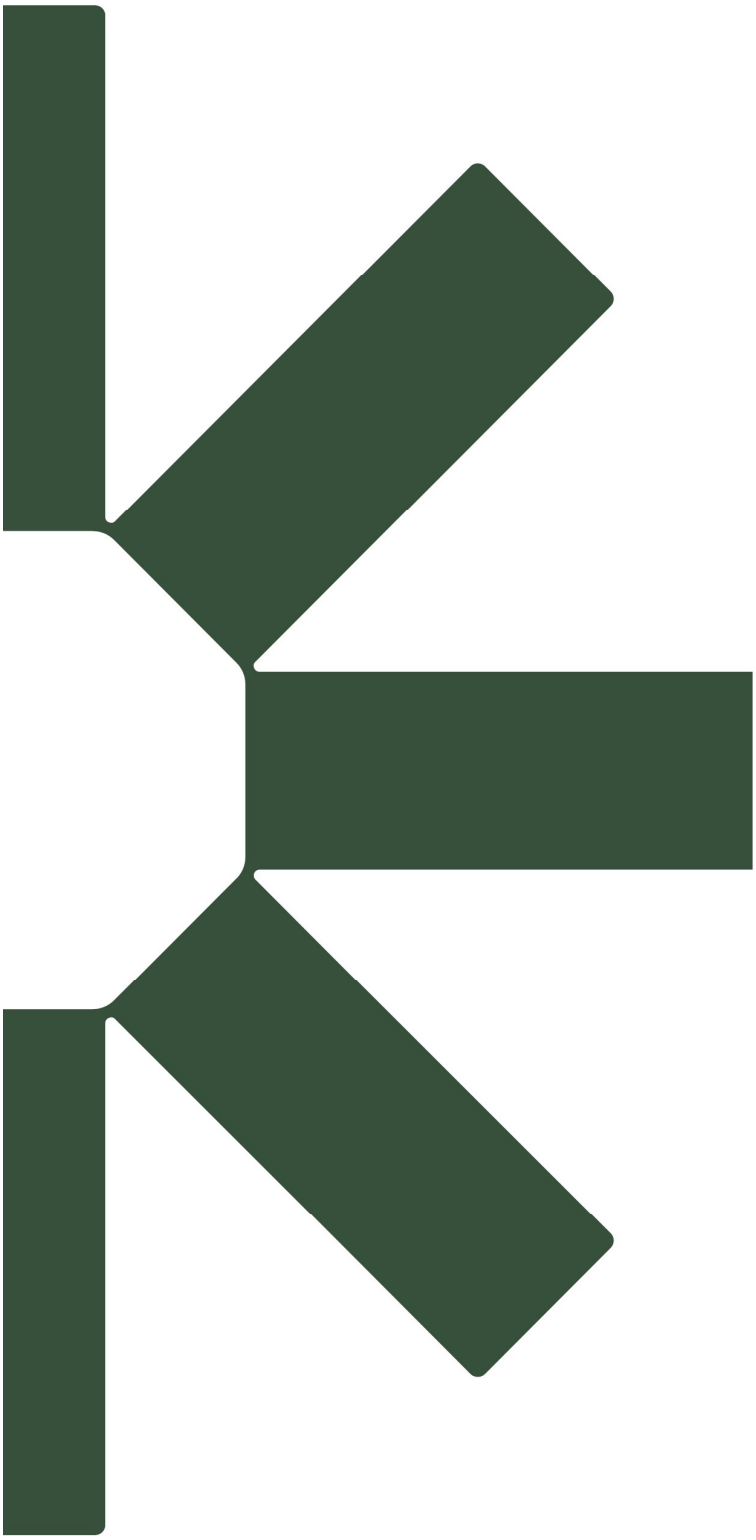
[iii] Directive 2009/147/EC of the European Parliament and of the Council. Available at: https://www.legislation.gov.uk/eudr/2009/147/contents

[iv] Scottish Government (1981). Wildlife and Countryside Act 1981. Available at: https://www.legislation.gov.uk/ukpga/1981/69

[v] 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, pp. 723-747

[vi] Stanbury, A. J., Burns, F., Aebischer, N. J., Baker, H., Balmer, D. E., Brown, A., Dunn, T., Lindley, P., Murphy, M., Noble, D. G., Owens, R., and Quinn, L. (2024) The status of the UK's breeding seabirds: an addendum to 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, 117, pp. 471-487.

[vii] Band, W., Madders, M. & Whitfield, D.P. (2007) Developing field and analytical methods to assess avian collision risk at wind farms. In: de Lucas, M., Janss, G.F.E. & Ferrer, M. (Eds.) Birds and Wind Farms: Risk Assessment and Mitigation, pp 259-275. Quercus, Madrid.



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