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Breeding bird survey
Sneaton Moor & Ugglebarnby Moor

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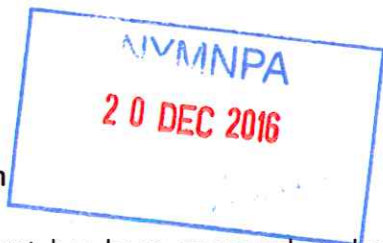


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Appendix 1. Photographs





Introduction

This document has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) and details the breeding birds survey of the Sneaton Moor and Ugglebarnaby Moor. This survey is required to discharge condition 53 of the North York Moors National Park Authority (NYMNP A) planning permission NYM/2014/0676/MEIA and has been prepared in accordance with current good practice and in line with all relevant environmental legislation.

Condition Compliance

Condition NYMNP A 53: Snipe and Curlew surveys at Ugglebarnaby Moor and Sneaton Moor

Condition	Compliance with Condition NYMNP A-53
A breeding birds survey of Ugglebarnaby Moor and Sneaton Moor to identify the extent of their use as breeding habitat by snipe and curlew must be undertaken and completed prior to the Commencement of Development at the Doves Nest Farm site. Before the results of this survey are known, noise emitted within the breeding season 15 March to 31 August inclusive must be controlled to levels that would not disturb curlew and snipe breeding on Ugglebarnaby Moor or Sneaton Moor.	Breeding bird (snipe and curlew) survey document outlines survey methodology and survey findings
Should the surveys indicate the presence of curlew and snipe breeding on Ugglebarnaby Moor or Sneaton Moor, mitigation measures must be agreed with the MPA and be implemented before noise at levels likely to disturb curlew or snipe during the breeding season April to August inclusive is emitted from Doves Nest Farm. The survey methodology shall be agreed with the MPA in advance of the surveys being undertaken.	Given the absence of snipe and the distance of curlew from the construction works, no specific mitigation measures are required

Methodology

The two survey areas are shown on Figure 1. These comprise the whole of Ugglebarnaby Moor (the area to the north) and the area of Sneaton Low Moor that is indicated to the south. Each of the two moorland areas is approximately 80ha in extent.

The survey methodology was agreed with Natural England and North York Moors National Park Authority. This methodology is based on Brown & Shepherd (1993) but adapted with respect to timing in line with the findings of Reed *et al* (1985) that breeding waders are more readily detected early in the day. Also three surveys were undertaken rather than the two surveys used in Brown & Shepherd (1993) in order to provide a greater degree of accuracy

Surveys were spread across the period April to June with the three surveys being undertaken on 27th April, 13th May and 14th June 2016.

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All areas of the survey sites were approached to within 100m by walking transects across each moor. As well as recording any sightings or calls of Common Snipe *Gallinago gallinago* or Curlew *Numenius arquata* as they walked the transects, surveyors stopped periodically at roughly 100m intervals to scan for presence of the birds, including looking back over the sections that had already been walked.

Surveys were completed before 11am to coincide with periods of higher bird activity in line with Reed *et al* (1985). Adverse weather conditions such as strong winds and persistent rain were avoided. Timings and weather conditions for each survey are given in Table 1 below.

All registrations of Common Snipe and Curlew were drawn onto paper maps at the time that they were made. The direction of flight or the area covered by territorial displays was indicated. Although a hand held GPS was carried, in practice the birds were generally in the order of 100m or more from the observer and in most cases were not static, so it was more useful to map the areas used by the birds with reference to ground features while they were under observation.

Surveys were led by Ian Bond, who is a Chartered Environmentalist and a full member of the Chartered Institute of Ecology & Environmental Management and who is an experienced bird surveyor.

Table 1. Times of surveys and weather conditions

Date	Start	Finish	Rain	Beaufort	Temperature (°C)
27/04/16	07:00	10:15	Dry	4	5
13/05/16	07:00	09:30	Dry	3	8
14/06/16	07:15	09:45	Dry	2	13

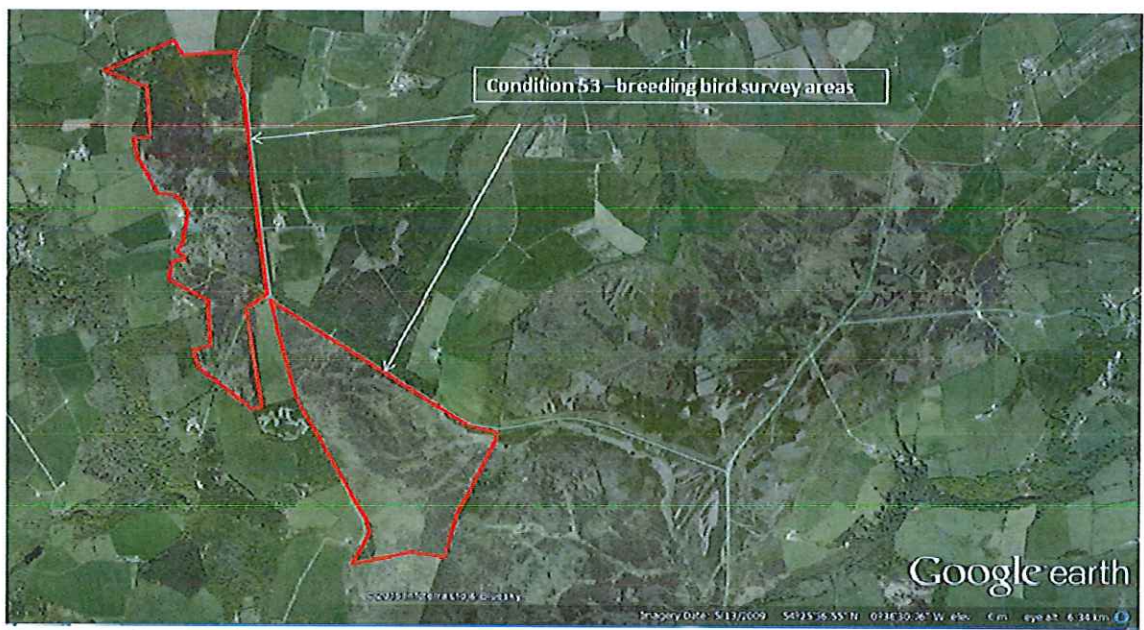


Figure 1. Survey areas
Site description

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Photographs of both Ugglebarnby Moor and Sneaton Moor are shown in Appendix 1

Ugglebarnby Moor is now becoming colonised with Scot's pine *Pinus sylvestris* and Silver birch *Betula pendula*. A typical view is shown in Photograph 1. At the southern end the majority of the moor is somewhat damp and the ground vegetation largely comprises dense tussocks of Purple Moor-grass *Molinia caerulea* and Cross-leaved Heath *Erica tetralix*. Though where the ground is elevated at the southern end there are areas of Bilberry, *Vaccinium myrtillus*, and Bracken, *Pteridium aquilinum*. The vegetation in this part of the moor is unmanaged and consequently tall. Towards the north and north-west the moor is a little drier, less wooded and comprises mainly of Heather *Calluna vulgaris* and Gorse *Ulex europaeus*. There has been limited management of the heath in places towards the northern end, resulting in some variety in the structure of the vegetation in this part of the moor. A view across the northern end of the moor can be seen in Photograph 2.

Sneaton Moor is largely devoid of trees. It rises noticeably from north to south with the northern edge towards the road the moor being waterlogged. The major vegetation components along the northern side are Cross-leaved Heath and Peat moss *Sphagnum* sp., with some large patches of rushes *Juncus* sp. towards the south-east corner. The remainder of the moor is rank, unmanaged Heather although on the highest ground to the south this has been grazed back hard over a limited area and has grassy patches that are dominated by Mat grass *Nardus stricta*. The moor from the north-west corner, looking south-east, can be seen in Photograph 3. The moor from the north-east corner, looking west, can be seen in Photograph 4.

Both Snipe and Curlew breed in open habitats and both are more abundant where vegetation structure is relatively heterogenous (Pearce-Higgins & Grant, 2006). Snipe prefer fens and marshes with few birds being recorded in other habitats, whereas Curlew show a strong selection for bog/mire and unimproved grassland (Henderson et al, 2002). Relating these preferences to potential breeding habitat on Ugglebarnby and Sneaton Moors, would indicate that there may be suitable breeding habitat for Snipe at the south east section of Sneaton Moor. For Curlew the southern end of Sneaton Moor would also seem to be suitable breeding habitat, both in the area where there is grassland adjacent to tall heath or where there is *Juncus* adjacent to tall heath. The southern part of Ugglebarnby Moor may well be too wooded for both species but the northern end which is more open and has some variation within the vegetation structure may well be suitable as breeding habitat for curlew.

Results

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Survey 1: 27th April 2016

Sneaton Moor

Curlews were noted on or in proximity to Sneaton Moor on several occasions. All registrations of Curlew for this survey are shown in Figure 2 with a description of each given below.

No Snipe were observed on Sneaton Moor.

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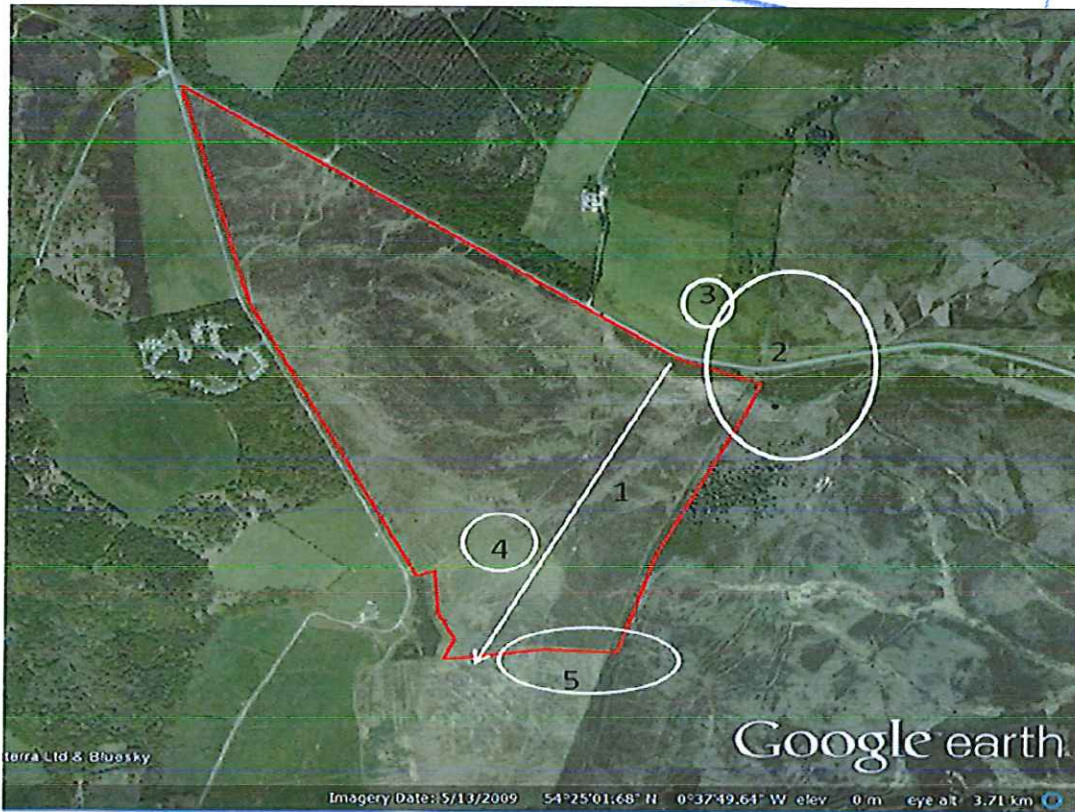


Figure 2. Locations of Curlew on Sneaton Moor on Survey 1.

1. A Curlew flew quickly and directly across the moor at a low level. This appeared to be commuting behaviour and the bird was not seen to land.
2. A Curlew was engaged in display flight for several minutes. This may have been initiated by a small group of Black-headed gull *Chroicocephalus ridibundus* in the area although it continued once the gulls had passed.
3. The Curlew displaying in Area 2 landed at this location.
4. A Curlew was engaged in a brief display flight in this area.
5. At the same time as the bird in Area 4 lifted in display flight, a second Curlew took off in display flight. A third Curlew could be seen on the wall in Area 5. A few minutes later two Curlews could be seen on the wall together while a third Curlew was engaged briefly in display flight.

Ugglebarnby Moor

No Snipe, Curlew were observed on Ugglebarnby Moor during Survey 1.

Survey 2: 13th May 2016

Sneaton Moor

No Snipe or Curlew were observed on Sneaton Moor during Survey 2.

Ugglebarnby Moor

No Snipe, Curlew were observed on Ugglebarnby Moor during Survey 2.

Survey 3: 14th June 2016



Sneaton Moor

Curlews were observed in almost exactly the same locations as on the first survey. All registrations of Curlew for this survey are shown in Figure 3 with a description of each given below.

No Snipe were observed on Sneaton Moor.

Ugglebarnby Moor

No Snipe or Curlew was observed on Ugglebarnby Moor during Survey 3.

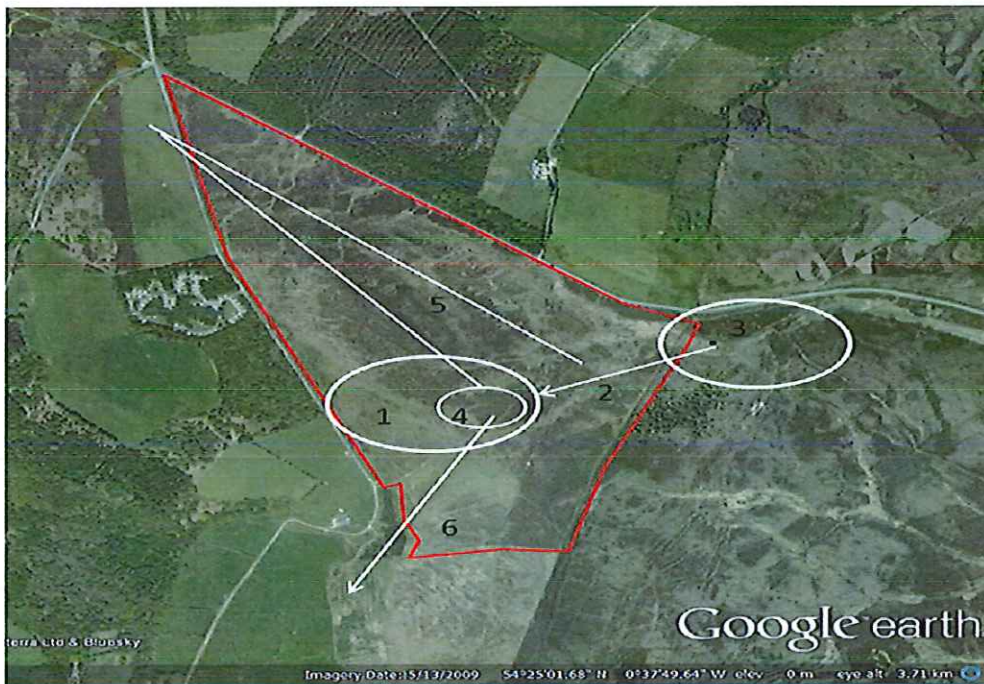


Figure 3. Locations of Curlew on Sneaton Moor on Survey 3.

1. A Curlew was engaged in display flight for several minutes, circling in the area indicated before landing within that area
2. Whilst the Curlew was displaying in area 1, a second Curlew approached the first along the line indicated in 2 and then returned along the same route.
3. Approximately five minutes after the first two Curlew observations, a Curlew flew west-east across area 3 and landed out of sight, outside of the survey area.
4. A Curlew was disturbed by surveyors and flew briefly west-east across area 4 before landing again.
5. Three Curlews flew high along the length of Sneaton Moor and then back along almost the same trajectory. Two of the Curlews dropped in area 4.
6. The third Curlew that had flown the length of Sneaton Moor and back, as indicated in Target Note 5 in Figure 3, continued on a south west trajectory, beyond the survey area.



Conclusions

Curlews were seen to be engaged in territorial behaviour in the same two locations in both Surveys 1 and 3. It is therefore concluded that these represent established territories.

One Curlew territory is on Sneaton Moor itself, centred on the area marked as 4 in Figures 2 and 3. A second Curlew territory is immediately to the east of Sneaton Moor in the area indicated as 2 on Figure 2 and as 3 on Figure 3. It is possible that there is a third Curlew territory just south of Sneaton Moor.

Both of the identified Curlew territories are approximately 1km from the construction site boundary in Haxby Plantation.

No Common Snipe were seen on either of the survey areas on any occasion.

No Curlew was seen on Ugglebarnby Moor. The majority of Ugglebarnby Moor is likely to be of reduced suitability for breeding Curlew as it is becoming wooded.

The results of a study published in the Journal of Applied Ecology (Vol 49 (2), pp. 386-394) by James Pearce-Higgins et al states the following:

"Our results suggest that curlew populations may decline by about 40% as a result of disturbance from construction work (based upon a mean survey area across all sites equivalent to a 620-m circular buffer around the turbines). This supports earlier work demonstrating a 30% lower density of birds within a 1-km buffer around turbines than expected from the habitat."

While this work related to wind farms, it is considered reasonable to assume that the principles would also apply to other large-scale construction activities. The results of the 2016 breeding bird surveys of Sneaton Moor and Ugglebarnby Moor concluded that both of the identified curlew territories are approximately 1km from Haxby Plantation where only very minor construction works, related to the construction of the site access and internal access road will occur. The bulk of the main construction works are north of Haxby Plantation and involve spoil movement. Furthermore no common snipe were seen on either of the survey areas on any occasion and the modelled noise levels within the centre of Sneaton Moor will not exceed 70dB.

Given the complete absence of common snipe from either survey area and the distance of the identified curlew territories from the construction site, it is unlikely that any significant noise disturbance would occur and therefore no mitigation measures have been recommended.

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References

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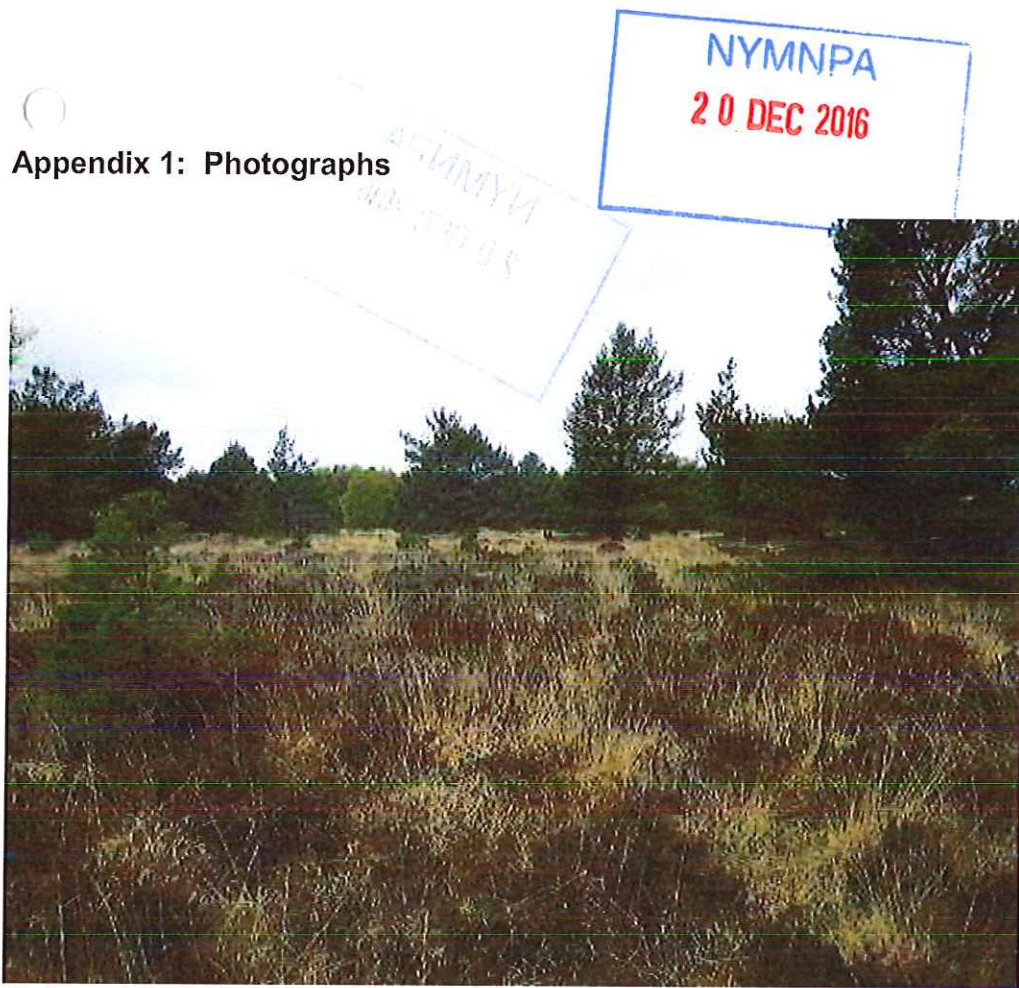
I.G. Henderson , A.M. Wilson , D. Steele & J.A. Vickery (2002) Population estimates, trends and habitat associations of breeding Lapwing *Vanellus vanellus*, Curlew *Numenius arquata* and Snipe *Gallinago gallinago* in Northern Ireland in 1999, Bird Study, 49:1, 17-25

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Appendix 1: Photographs



Photograph 1. Typical view of Ugglebarnby Moor



Photograph 2. The more open area at the north-west corner of Ugglebarnby Moor



Photograph 3. Sneaton Moor looking south-east



Photograph 4. Sneaton Moor looking west from the south-east corner of the moor