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.

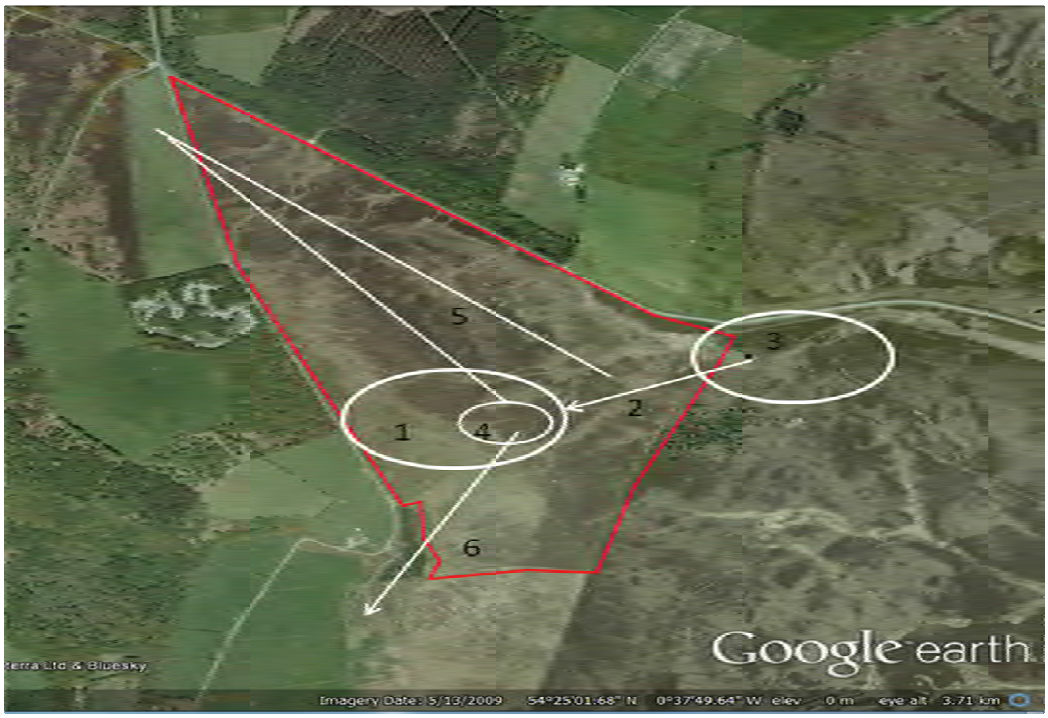

Figure 3. Locations of Curlew on Sneaton Moor on Survey 3.

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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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

Report ID: INCA 201610 Rev1

Nightjar survey
Haxby Plantation & Ugglebarnby Moor

Ian Bond
July 2016

This report has been produced for Royal HaskoningDHV for the purpose of fulfilling a planning condition in relation to the York Potash project.

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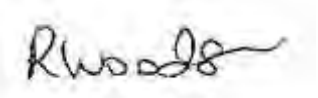

Robert Woods
Director
Industry Nature Conservation Association
July 2016

Contents

Introduction

This document has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) and details the results of Nightjar survey Haxby Plantation & Ugglebarnby Moorfor at Doves' Nest Farm. This survey is required to discharge condition 54 of the North York Moors National Park Authority (NYMNPA) 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 NYMNPA 54: Nightjar Surveys at Haxby Plantation and Ugglebarnby Moor

Condition	Compliance with Condition NYMNPA-54
Breeding birds surveys of Haxby Plantation, the wooded heath to its east, and Ugglebarnby Moor to identify the extent of their use as breeding habitat by nightjar must be undertaken and completed prior to the Commencement of Development at the Doves Nest Farm site. Before the results of these surveys are known, noise emitted within the breeding season 15 May to 30 September inclusive must be controlled to levels that would not disturb nightjar breeding at Haxby Plantation, or the wooded heath to its east or Ugglebarnby Moor.	Nightjar survey document outlines survey methodology and survey findings
Should the surveys indicate the presence of nightjar breeding on Ugglebarnby Moor or Haxby Plantation, mitigation measures must be agreed with the MPA and be implemented before noise at levels likely to disturb nightjar during the breeding season 15 May to 30 September inclusive is emitted from development at the Doves Nest Farm site. The survey methodology shall be agreed with the MPA in advance of the surveys being undertaken.	The modelled noise levels are below 50dBA (c. 42dB for the nocturnal times and 45dBA for the daytime), therefore no specific mitigation measures are required.

Site description

The survey areas are shown outlined in red in Figure 1 below. These comprise the whole of Ugglebarnby Moor, which is the larger area highlighted to the west; two small areas within Haxby Plantation and the wooded heath to the east of Haxby Plantation. The survey area on Ugglebarnby Moor is around 80ha in extent and the combined area of the survey areas identified in Haxby Plantation and the wooded heath to its east is around 10ha.

Figure 1. Survey areas

Photographs of the survey areas 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 (Appendix 1). At the southern end 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*. Towards the north and north-west it is a little drier, less wooded and comprises mainly of Heather *Calluna vulgaris* and Gorse *Ulex europaeus*. There has been some minor management of the heath in places towards the northern end, resulting in some variety in the structure of the vegetation. A view across part of the northern end of the moor can be seen in Photograph 2.

Haxby Plantation is largely comprised of mature conifers. The survey areas, which appear quite open in Figure 1, which is from a 2008 aerial photograph, are now densely vegetated with birch trees of over 2m in height. The wooded heath to the east of Haxby Plantation is still fairly open heath at the southern end, resembling the southern end of Ugglebarnby Moor in its vegetation, i.e. Purple Moor-grass and Cross-leaved Heath with scattered young pines. The northern end is more densely vegetated with young trees, mainly birch. It is also damper than the southern end with rushes, *Juncus sp,* being notable in the ground flora. A typical view of the southern end of this wooded heath can be seen in Photograph 3.

Methodology

The surveys followed the methodology of Conway et al (2007) with respect to time of day and season and suitable weather conditions. Details of the timing of the surveys and weather conditions are given in Table 1 below.

Table 1. Times of surveys and weather conditions

Date	Start	Finish	Sunset	Rain	Beaufort	Temperature (°C)
16/06/16	21:45	22:45	21:39	Fog	2	15
07/07/16	21:35	22:40	21:35	Dry	2	14

The methodology that had been agreed with NE and the planning authority, again in line with Conway et al (2007), stated that transects would be walked across each of the survey areas so that surveyors passed within 200m of all areas of suitable nightjar habitat. Subsequent reconnaissance of Ugglebarnby Moor identified that it would not be safe to walk across the moor in the dark due to the lack of tracks and nature of the vegetation and topography. Consequently this element of the survey was modified. On the first survey a surveyor was stationed towards the north of Ugglebarnby Moor, at the location marked as 1 on Figure 2, while a static, automated bat detector was set to record towards the south of the moor at the location marked as 2 on Figure 2. This change in methodology was considered acceptable as far as demonstrating whether nightjar were using that part of the moor as automated acoustic recorders have been demonstrated to be significantly more effective than human surveyors in detecting nightjar, Zwart et al (2014). However due to a technical problem with the acoustic detector, it was considered that a more reliable method for the southern end of the moor, that also took account of safety considerations, was to have a surveyor undertake a transect in a vehicle. Consequently on the second survey one surveyor drove along the two roads that dissect the southern end of the moor, stopping at various points on each road for 10 minutes at each stop to survey for nightjar, while a second surveyor operated towards the northern end of Ugglebarnby Moor, somewhat further north than on the first survey, walking a short transect where it was safe to do so.

In Haxby Plantation and the adjacent wooded heath, the surveyor walked a transect that went through or immediately adjacent to each of the survey areas.

The positions and transect routes of the surveyors for both surveys are shown in Figure 2.

Figure 2. Survey routes and locations. The transect route on 16th June is shown in white and the transect routes on 7th July are shown in red.

Survey constraints

Weather conditions were considered to be suitable on each survey night. Although there was fog during the first survey the temperature was high and the wind was light. It was noted that there was a considerable amount of bird calls, including Song Thrush, *Turdus philomelas* and Woodcock, *Scolopax rusticola* during the survey and that these carried well in excess of 200m.

The survey on Ugglebarnby Moor was restricted due to the nature of the terrain, much of which could not be safely negotiated in low light levels. Furthermore, technical problems with the static bat detector meant that evidence for presence/absence of breeding nightjar at the southern end of Ugglebarnby Moor could not be relied on for the first survey. However given the successful results of the second survey there would be no material gain in a third survey of the southern part of Ugglebarnby Moor.

On the second survey all potentially suitable areas of Ugglebarnby Moor, except for a small area at the far north east, were surveyed to within 300m. Although this is further than the 200m used in Conway et al (2007), which was originally proposed for this survey, experience indicates that nightjar calls can be heard in excess of 300m in suitable weather conditions so it is considered that this

would not have affected the results of the survey to any material extent. This is born out by the results of the second survey.

Within Haxby Plantation, several trees had fallen across one point of the planned survey transect route which has been identified during the initial site survey. Consequently this change curtailed the completion of this survey transect in its entirety on the first survey, as shown in Figure 2. Nevertheless from the furthest point east that the transect reached on the first survey, part of the wooded heath was within 200m of the surveyor and all of the suitable nightjar habitat on that heath was within 300m, so any nightjar present there were likely to have been heard in any case. On the second survey there were no constraints and all areas of suitable habitat on the wooded heath were approached to within 100m.

Survey personnel

Surveys were carried out by Ian Bond CEnv MCIEEM, Dr Robert Woods and Ken Smith. All surveyors are employed by INCA and have previous experience in surveying for nightjars. Additional personnel were employed to accompany surveyors where required due to reasons of health and safety.

Results

Survey 1: 16th June 2016

Haxby Plantation

Nightjar was heard calling within the larger of the former clearings for much of the survey period, commencing 16 minutes after sunset. A single bird was seen in flight. The locations where the bird was encountered are shown in Figure 3 with details given in Table 2. The locations of both the calls and the flight were all close together, with no more than 50m between any two encounters. On no occasion during the survey were two males heard calling simultaneously in Haxby Plantation. Conway (2007) established a threshold of 350m to differentiate between male nightjar territories at times when males are not heard calling simultaneously, therefore this should be considered as a single calling male.

Although it was not possible to physically access the wooded heath to the east of Haxby Plantation on the first survey, no nightjars were heard calling from that location.

Figure 3. Locations of nightjar encounters in Haxby Plantation 16 June 2016

Table 2. Details of nightjar encounters in Haxby Plantation on 16 June 2016

Time	Location	Activity recorded
21.55-22.02	1	Continuous nightjar churring calls
22:03	1	Nightjar seen to fly over the spruce plantation in the direction indicated by the arrow
22:14 – 22:16	2	Continuous nightjar churring calls
22:37 – 22:40	3	Intermittent nightjar churring calls

Ugglebarnby Moor

There were no encounters with nightjar on Ugglebarnby Moor during the first survey.

Survey 2: 7th July 2016

Haxby Plantation

There were no encounters with nightjar in Haxby Plantation and the wooded heath to its east during the second survey.

Ugglebarnby Moor

Nightjar was encountered at several locations on Ugglebarnby Moor during the second survey. The locations where nightjar were encountered are shown in Figure 4 with details given in Table 3. At least four individual nightjars were encountered. At the southern end of Ugglebarnby Moor the

churring calls of two males were heard simultaneously at a distance of around 200m apart, indicating that they represent two separate breeding territories. Towards the northern end of the moor a single male was heard churring briefly and two nightjars were glimpsed briefly as they flew together in a courtship display.

Figure 4. Locations of nightjar encounters on Ugglebarnby Moor on 7 July 2016

Table 3. Details of nightjar encounters in Haxby Plantation on 7 July 2016

Time	Location	Activity recorded
22:25 – 22:30	1	Nightjar churring heard and a single bird was seen in flight.
22:25 – 22:30	2	Nightjar churring was heard simultaneously with the bird at point 1
22:30	3	A single bird was seen in flight flying in the direction of point 4
22:33	4	Churring heard briefly, less than one minute
22:35	5	Two nightjars seen in flight with one closely pursuing the other.

Assessment

A single male nightjar was heard calling for a sustained period in Haxby Plantation on the first survey on 16th June however no nightjar were found on the second survey on 7th July. The presence of nightjar in Haxby Plantation was unexpected as the former clearings are now densely vegetated with birch saplings in excess of 2m in height and in any case only extend for a little over one hectare, which is very much towards the lower end of the size range of nightjar breeding territories. A

possible explanation for this is that the encounter on 16th June was with a male prospecting for a mate early in the season but which was ultimately unsuccessful in what is sub-optimal habitat. There was no sign of nightjar in the wooded heath to the east of Haxby Plantation on either survey. This area would appear to contain at least 2-3ha of suitable nightjar habitat but is perhaps somewhat sub-optimal as it is surrounded on two sides by closely grazed pasture.

On Ugglebarnby Moor there appears to be at least two nightjar territories at the southern end, with the locations of the simultaneously churring males indicating that the boundary is approximately the road running north west, known as Lousy Hill Lane. The more northerly of these two calling males was approximately 600m south of the nightjar that was heard calling towards the northern end of Ugglebarnby Moor. Conway (2007) established a threshold of 350m to differentiate between male nightjar territories at times when males are not heard calling simultaneously. This should therefore be considered as a third nightjar territory on Ugglebarnby Moor.

While the surveys have established with a high level of certainty that there are three nightjar breeding territories on Ugglebarnby Moor, it is possible that the moor supports further pairs. Nevertheless it is unlikely that the carrying capacity of the moor is much beyond the three pairs that were encountered. Cadbury (1981) found on average density of nightjars of one pair per 21.3ha. The extent of Ugglebarnby Moor south of Lousy Hill Lane is only around 18ha this area so would typically just support the one nightjar territory that was found there.

There is roughly 30ha of potentially suitable habitat between Lousy Hill Lane and the nightjar calling at location 4, which again would be of the order that would typically support two nightjar territories.

There is nothing to indicate whether or not the bird calling at location 4 was at the northern boundary of its territory but if it were then there is approximately a further 20ha of suitable habitat north of location 4 which could potentially support a further nightjar territory. Nevertheless even if there were a further nightjar breeding territory at the northern limit of the moor it would be further away from the development than those locations where nightjar has been shown to be present. Therefore the degree of uncertainty as to the presence/absence of breeding nightjar at the northern end of Ugglebarnby Moor is immaterial as far as the fulfilment of the condition is concerned.

Nightjar territories do of course vary somewhat in size, for example Berry (1979) found that territories ranged from 5.9-25.2ha per pair. However in patches of habitat <1km², the total area of Ugglebarnby Moor is 0.8km², territory locations are further from the edge than would be expected if distributed randomly (Bright et al, 2007). Therefore given the edge effects of the road and the agricultural areas which surround Ugglebarnby Moor on all sides, the number of nightjar territories is likely to be lower than might be the case if Ugglebarnby Moor was part of a larger habitat patch. Taking that into consideration it is considered likely that the three territories that were positively identified represent the total number of nightjar breeding territories on Ugglebarnby Moor. Nevertheless, regardless of the total number of individual territories, the extent of use of Ugglebarnby Moor by breeding nightjar has been determined as a result of these surveys.

Conclusion

Nightjar surveys have been carried out in each of the areas stipulated in planning condition NYMNPA-54 of the permission for the York Potash mine. The surveys followed the standard methodology for nightjar surveys with the exception that the standard, transect methodology was adapted on Ugglebarnby Moor to take account of safety concerns with the terrain. Nevertheless it is considered that the revised methodology was satisfactory for the purpose of the survey, i.e. to identify the extent of its use as breeding habitat by nightjar.

It has been established with a high level of certainty that there are at least three nightjar breeding territories on Ugglebarnby Moor. It is considered likely that this represents the extent of the current use of Ugglebarnby Moor by breeding nightjar.

A single nightjar was present in Haxby Plantation but this was only present during the survey in the early part of the year. It is considered that the absence of nightjar during the later survey indicates that the earlier record was of a single male unsuccessfully prospecting for a mate.

Nightjar was not recorded on the wooded heath to the east of Haxby Plantation on either of the surveys.

In respect of noise disturbance to nightjar, the majority of all of the available literature relates to the species' vulnerability to nest predation caused by (or associated with) human and/or dog presence within breeding territories. It is unlikely that there will be no increase in such recreational use of the nightjar breeding territories on Ugglebarnby Moor during the construction or operation of the mine. However, there remains the potential for construction noise to impact upon the species. However results of study published by Argus Ecology succinctly described the issue as:

"In the case of nightjar, a reduction in the detectability of males churring by paired or prospective females could affect breeding success. An analysis of recordings of churring males indicates a peak sound pressure level in the 1-2kHz frequency bands (Hayes McKenzie Partnership, 2010). They would therefore be most sensitive to increased noise in this frequency range. Road traffic noise typically shows a peak sound pressure at 1kHz frequency, due particularly to tyre noise (Sandberg, 2003) and could therefore have a proportionately greater masking effect on nightjar churring than on the vocalisation of other species in the 2-6kHz frequency range.

There are no UK guidelines for assessment of the masking effect of road traffic noise on birds. In USA a standard of 60dB(A) has commonly been applied, although Dooling & Popper (2007) propose that a level of 55dB(A) would be precautionary. In Germany, a standard of 52dB(A) has been applied to define a zone of significant impact on corncrake within a Special Protection Area (ECONAT, 2008); corncrake are regarded as particularly sensitive to traffic noise masking effects, and are another species with predominantly nocturnal calls. Corncrake calls have more variable and wider frequency spectra than nightjar, but they do include calls with maximal amplitude in the 1-2kHz frequency range (Osiejuk & Olech, 2004; Ręk, 2013). It is therefore likely that nightjar would experience comparable masking effects, so a 50dB(A) level would be precautionary."

Therefore a 50dBA noise limit at the centre of the nightjar territories on Ugglebarnby Moor will be adhered to throughout the construction phase. The modelled noise levels are consistently below 50dBA (c. 42dB during nocturnal times and 45dBA during the daytime), therefore no further mitigation measures are considered as being required. Should the modelled noise levels alter and become above 50dBA, restrictions on the activities will be required during the nightjar breeding season (which is typically between 1 May and 31 August), and only during nocturnal times, i.e. between 2100 and 0600hrs.

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Appendix 1: Photographs

Photograph 1. Typical view of Ugglebarnby Moor

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

Photograph 3. The southern end of the wooded heath east of Haxby Plantation

REPORT

Phase 3 - Woodsmith Mine Protected Species Management Plan - Birds

Client: Sirius Minerals Plc

Reference: 40-RHD-WS-70-EN-PL-0012 Rev 0

Revision: 00/Final

Date: 30/03/2017

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Document title: Phase 3 - Woodsmith Mine Protected Species Management Plan - Birds

Document short title: Phase 3 – WOODSMITH MINE PROTECTED SPECIES MANAGEMENT PLAN - BIRDS
Reference: 40-RHD-WS-70-EN-PL-0012 Rev 0
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Project name: North Yorkshire Polyhalite Project
Project number: RHDHV021
Author(s): Jack Douglas

Drafted by:	Jack Douglas
Checked by:	Claire Smith
Date / initials:	30/03/2017
Approved by:	Matthew Hunt
Date / initials:	30/03/2017

Classification
Project related

Royal HaskoningDHV

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Table of Tables

1 Introduction

1.1.1 In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to North York Moors National Park Authority (NYMNPA) for permission to develop a polyhalite mine and underground Mineral Transport System (MTS). Planning consent was subsequently granted in 2015 subject to conditions.

1.1.2 This document has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) and details a Protected Species Management Plan (PSMP) for breeding birds for the Phase 3 (see Paragraph 1.1.4 below) Works at Woodsmith Mine (formerly known as 'Dove's Nest Farm'). This document is required to partially satisfy the requirements of condition 52 of NYMNPA planning permission NYM/2014/0676/MEIA. It has been prepared in accordance with current good practice and in line with all relevant environmental legislation. This planning condition states that:

Table 1-1 Condition NYMNPA-52 Protected Species Management Plan – Birds

Condition	Compliance with Condition NYMNPA-52
Protected Species Management Plans (PSMPs) shall be submitted to the MPA [Mineral Planning Authority] prior to the commencement of Preparatory Works which shall not commence until the PSMPs have been agreed in writing by the MPA	This document is for breeding birds during the Phase 3 works and is ongoing throughout Phase 3.
The agreed details shall subsequently be followed unless modifications are agreed in writing with the MPA.	
The PSMPs may establish a programme of submissions to the MPA such that details are approved prior to works affecting different species and areas of the sites, shall concern protected species affected directly by works at the Dove's Nest Farm and Lady Cross Plantation sites, shall detail minimum requirements for mitigating or compensating for effects on protected species, shall require all licences that may be required in respect of effects on or re-location of protected species and their habitat to be obtained and complied with, and shall include but not be limited to consideration of the following a. Bats (all species) b. Badger c. Adder d. Common lizard particularly at western side of Lady Cross Plantation e. Other protected reptiles f. Water vole g. Common Crossbill h. Goshawk	This PSMP relates to breeding birds only.

1.1.3 This document only details the works required for the Phase 3 Works. It does not include any activities at Lady Cross Plantation, as these works have been deferred. Updates to this plan will be prepared for subsequent construction phases and following any design or method change. The NYMNPA has confirmed that it supports this approach.

1.1.4 The Phase 3 Works comprise the following:

- General site clearance including demolition of all farm buildings and sheds, and localised tree and scrub clearance, as shown on drawing 40-ARI-WS-71-CI-DR-1051.
- Excavation and construction of the south western extension of the upper tiered working platform at around 203m AOD, as shown on drawing 40-ARI-WS-71-CI-DR-1053.

- Excavation and construction of the Platform for the Construction Welfare Facility, Parking Area and Concrete Batching Plant, as shown on drawing 40-ARI-WS-71-CI-DR-1053.
- Construction of temporary and permanent soil mounds, including the basal liner for a future storage facility in the northeast corner of the site for non-hazardous non-inert spoil and three topsoil, subsoil and inert material storage bunds in the southwestern area of the site, as shown on drawings 40-ARI-WS-71-CI-DR-1053 and 40-ARI-WS-71-CI-DR-1055, with earthworks volumes presented in 40-ARI-WS-71-CI-DR-1054.
- Construction of surface water drainage, a temporary surface water attenuation pond and temporary wetland in the southern area and two permanent attenuation ponds and two wetland areas in the north eastern area, as shown on Drawing 40-ARI-WS-71-CI-DR-1050;
- Construction of a spring and groundwater drainage layer in the north eastern area, discharging into a wetland area, as shown in drawing 40-ARI-WS-71-CI-DR-1080.
- Installation and commissioning of temporary dewatering as shown in drawing 40-ARI-WS-71-CI-DR-1058.
- Erection on site of the Concrete Batching Plant as shown in drawing 40-ARI-WS-71-CI-DR-1050, complete with reticulated water supplies and tanks.
- Construction of the drilling platform and temporary saline lagoon area for the groundwater reinjection well as shown in drawing 40-ARI-WS-71-CI-DR-1057.
- Establishment of construction welfare and security facilities - complete with hook-up of power, communications & water supplies and new waste water collection facilities as shown on drawing 40-ARI-WS-71-CI-DR-1050.

1.1.5 The Phase 3 Works are proposed to start in June 2017. Drawing 40-ARI-WS-71-CI-DR-1050 shows the details of these works.

1.1.6 This PSMP provides the necessary information relating to birds to guide working practices on site during the Phase 3 Works. This Plan, together with similar PSMPs for bats (a.), badger (b.) and reptiles (c. and e.), provides a suite of documents containing the information required to partially discharge Planning Condition 52 (as it relates to the scope of the Phase 3 works). A PSMP has not been provided for water vole (f.) as the ecological surveys undertaken to date have confirmed their absence. This approach has been discussed and agreed with NYMNPA and Natural England.

1.1.7 Survey findings to date confirm that no other protected species are present on site and further PSMPs are not necessary. This has been confirmed by the MPA. Should additional species subsequently be identified, the 'precautionary method of working' would apply and additional plans can be prepared as necessary.

1.1.8 Each PSMP has drawn on information available at the time of preparing this document, including that which informed the ES and SEI.

1.1.9 This PSMP follows the format of the document submitted for the Phase 2 Works. It will be updated if anything during that Phase requires it. Should the Phase 2 works demonstrate that amendments to the PSMP is required, an updated document will be produced and submitted to the NYMNPA

2 Legislation affording protection to birds

2.1.1 **Table 2-1** provides a summary of the relevant legislation which affords protection to birds.

Table 2-1 Summary of legislation which affords protection to birds

Species	Legislation (England)	Offences	Licensing procedures and guidance (England)
Birds	*Wildlife and Countryside Act 1981 (as amended) S.1*	Intentionally kill, injure or take any wild bird; intentionally take, damage or destroy the nest of any wild bird while that nest is in use or being built; intentionally take or destroy the nest or eggs of any wild bird Intentionally or recklessly disturb a Schedule 1 species while it is building a nest or is in, on or near a nest containing eggs or young; intentionally or recklessly disturb dependent young of such a species	No licences are available to disturb any birds in regard to development Licences are available in certain circumstances to damage or destroy nests, but these only apply to the list of licensable activities in the Act and do not cover development General licences are available in respect of 'pest species' but only for certain very specific purposes e.g. public health, public safety, air safety

3 Surveys undertaken to date

3.1 Baseline breeding bird surveys

3.1.1 Breeding bird surveys were undertaken from April – June in 2012 and 2013 by Paul Chester & Associates (PCA). Full details of these surveys are contained in the ES/SEI and these are summarised in **Section 4.1** of this document.

3.2 Goshawk, Crossbill and Nightjar Surveys

3.2.1 Targeted surveys for common crossbill, goshawk and nightjar were undertaken in 2014 and followed the standard survey methods for these species (i.e. recording of the 'churring' male crossbill, and the methodology recommended in *Raptors: A Field Guide for Surveys and Monitoring* (Hardey *et al.*, 2009) for goshawk). The survey area included Woodsmith Mine, Sneaton Low Moor and Ugglebarnby Moor. The full results of these surveys are presented in the ES/SEI and are summarised in **Section 4.1** of this document.

3.3 Baseline wintering bird survey

3.3.1 A wintering bird survey was undertaken between October 2011 and March 2012 by PCA. The full results of these surveys are presented in the ES/SEI and are summarised in **Section 4.2** of this document.

4 Key survey findings

4.1 Baseline breeding bird surveys

4.1.1 The land at Woodsmith Mine was assessed as providing poor breeding bird habitat, supporting rarely occurring skylark and occasional feeding of meadow pipit. The greatest numbers of breeding birds were recorded within the woodland habitats, specifically within Haxby Plantation. The rare or noteworthy species recorded during the breeding bird surveys to date are presented in **Table 4-1**.

Table 4-1 Rare/noteworthy species noted during the baseline breeding bird surveys

Species/ Conservation Status		**Territories/ Pairs**
Wildlife and Countryside Act Schedule 1 Species		
Common crossbill	*Loxia curvirostra*	5-10 pairs (estimated)
Goshawk	*Accipiter gentilis*	Non-breeding
Council Directive 2009/147/EC Annex 1 Species		
No such species		
BTO Red List Species		
House sparrow	*Passer domesticus*	5-10 pairs
Lesser redpoll	*Carduelis cabaret*	1 territory
Linnet	*Carduelis cannabina*	1 territory
Skylark	*Alauda arvensis*	1 territory
Song thrush	*Turdus philomelos*	1 territory
Starling	*Sturnus vulgaris*	6 territories

Species/ Conservation Status		Territories/ Pairs
Tree sparrow	*Passer montanus*	4-5 pairs
Yellowhammer	*Emberiza citronella*	1 territory
BTO Amber List Species		
Bullfinch	*Pyrrhula pyrrhula*	1 territory
Dunnock	*Prunella modularis*	8 territories
Swallow	*Hirundo rustica*	4-5 pairs
Whitethroat	*Sylvia communis*	1 territory
Willow warbler	*Phylloscopus trochilus*	6 territories
Woodcock	*Scolopax rusticola*	2 territories

4.2 Goshawk and crossbill survey

Goshawk

4.2.1 One record of a single male goshawk was observed in the vicinity of the Woodsmith Mine site during the 2012 survey. In addition, an individual bird was recorded in the vicinity of the farm during the 2014 wintering bird survey. No records of breeding goshawk have been noted within the vicinity of the Woodsmith Mine site and as such there was no evidence to suggest breeding goshawk was present.

4.2.2 The presence of several 'plucking posts' in 2013/2014 was noted; these are potentially indicative of goshawk being present, although no individual birds have been recorded.

Common crossbill

4.2.3 As reported in the submission documents, seven breeding crossbill were recorded in the vicinity of the Woodsmith Mine site during the 2012 survey. Presence of crossbill was confirmed in 2014, but no further breeding was observed.

4.2.4 All of the seven records of breeding common crossbill noted during the 2012 surveys were located within the 150m Maximum Common Crossbill Disturbance Zone of the Woodsmith Mine site. This includes two located within the boundary itself. Five of these records were located within the Haxby Plantation, while a further two were located within the strip of mixed woodland north of Whinny Wood. Common crossbill feeds on conifer seeds so it is likely that this species will be restricted to coniferous / mixed woodland areas and are unlikely to move into nearby semi-natural woodland areas to breed.

4.3 Wintering bird surveys

4.3.1 During the 2011 and 2012 surveys, the areas of arable and improved/semi-improved pasture fields were noted to provide occasional value as a wintering habitat for feeding birds. Species recorded included carrion crow, rook, black-headed gull, common gull, herring gull, fieldfare, stock dove, starling, and woodpigeon. Flocks of waders, particularly lapwing were also occasionally present in the survey area. Mixed flocks of passerines were also encountered during the survey period and within cropped arable fields. Key species included chaffinch, goldfinch, linnet, meadow pipit, skylark, tree sparrow and yellowhammer. Occasional pheasant and grey partridge were noted within the field boundaries.

4.3.2 Haxby Plantation supported a typical range of species, specifically coal tit and goldcrest. Other species included blackbird, blue tit, bullfinch, greenfinch, great-spotted woodpecker, woodcock and woodpigeon.

5 Mitigation

5.1 Nesting birds

5.1.1 Mitigation will be required to minimise the risk of harm to nesting birds as vegetation removal works will be undertaken in Q3 2017 (during the breeding/nesting season). A sensitive felling methodology will be followed for these works. This will involve the identification of specific areas to be cleared, followed by surveys for occupied nests (or nests being built) being carried out by an ecologist prior to any works being undertaken. The survey will be undertaken a maximum of 48 hours prior to the commencement of works. Any nest in use or being built during this survey will need to be left undamaged until the chicks have fledged and an alternative approach to the works proposed.

5.2 Specific mitigation for Schedule 1 birds

Defining disturbance zones

5.2.1 Bird tolerances to disturbance were derived from a 2008 study using expert opinion to identify reasonable disturbance zones for individual species (Whitfield, Ruddock and Bullman, 2008). The study used the opinions of a range of experts to identify the median distance at which individual species (i) respond to disturbance by becoming alert and (ii) respond to disturbance by taking flight. The outcome for common crossbill, goshawk and nightjar are shown in **Table 5-1**.

Table 5-1 Summary of expert opinion on selected Schedule 1 bird distance distances

Species	During Incubation				During chick-rearing				90% range
	Alert distance		Flight distance		Alert distance		Flight distance		
	Median	80% range	Median	80% range	Median	80% range	Median	80% range	
Common crossbill	5	<10-150	5	<10-50	5	<10-150	5	<10-50	100-150
Goshawk	125	10–500	30	<10–500	175	50-500	75	10-300	300-500
Nightjar	5	<10-150	5	<10	18	<10-150	5	<10-100	100-150
All distances are in metres									

Adapted from Whitfield, Ruddock and Bullman, 2008

5.2.2 For the purposes of this document, a precautionary approach to determining disturbance distances has been used. Therefore the upper limit of the 90% range (i.e. excluding the top 5% and lower 5% of expert opinions only) has been used. This gives a minimum disturbance distance for key selected species as follows:

- Common crossbill - **150m**
- Nightjar - **150m**
- Goshawk - **500m**

5.2.3 Common crossbill have a very protracted breeding season, which can run from January to December (although breeding is concentrated in the period January to May) thus making it difficult to time works outside of the breeding season. To avoid disturbing breeding common crossbill, where works are likely to take place within 150m of a common crossbill record pre-construction surveys are required to check whether breeding has commenced at this location. This is required at any time of year. The pre-construction check will involve an ecologist visiting the woodland areas where records have been identified and carrying out targeted common crossbill surveys following the standard methodology of seeking to record 'churring' males. The ecologist must carry a valid licence to disturb a Schedule 1 species which will cover crossbill species within Woodsmith Mine.

5.2.4 If breeding common crossbill are found during the pre-construction check, liaison with Natural England will be undertaken to agree the approach to working within 150m of the nest sites. Given the precautionary nature of the disturbance buffer used, and depending on location, timing and nature of the works, it may be possible to then agree a smaller buffer. If this is not possible then a disturbance buffer will need to be set up and no works will be able to take place within 150m of the nest site until the young have fledged. Combined nesting duration (incubation and fledging) for common crossbill is 34-40 days (Robinson, 2005), therefore if an active nest is found a disturbance buffer will remain in place for 40 days to ensure the young have fledged.

5.2.5 With respect to goshawk, although this species has not been recorded to date, a pre-construction check for this species will be undertaken as best practice. In the event that a nesting individual is recorded, further ecological advice would be sought and a way forward agreed prior to the works continuing within 500m.

6 Summary

6.1.1 Woodsmith Mine has been assessed as providing a poor breeding bird habitat, which supports a typical range of species but also including some notable species.

6.1.2 In terms of Schedule 1 species the following findings were made during the surveys:

- Common crossbill was recorded in 2011/2012 surveys but was not during the 2013/2014 surveys; and
- The presence of several 'plucking posts' in 2013/2014 was noted. These are potentially indicative of goshawk being present. None have been recorded on site.

6.1.3 The mitigation measures that will be employed at the site in relation to birds are summarised as follows:

- As the Phase 3 Works are targeted to commence in June 2017, which is within the breeding bird period, a sensitive felling methodology will be implemented. This will involve the identification of specific areas to be felled, followed by surveys for occupied nests (or nests being built) being carried out by an ecologist prior to any works being undertaken (undertaken a maximum of 48 hours prior to the commencement of works);
- Any nest in use or being built during this survey will be left undamaged until the chicks have fledged and an alternative approach to the works proposed; and
- Specific pre-construction surveys are required to check whether crossbills have commenced breeding within 150m of the proposed works (to be carried out at any time of year). If breeding common crossbill are found, liaison with Natural England will be undertaken to agree the approach to working within 150m of the nest sites.

6.1.4 It is considered that through implementation of the mitigation measures outlined in this document, the site will be managed to ensure their protection and in turn compliance with the legislation afforded to them.

7 References

Hardey, J et al. (2009) Raptors: A Field Guide for Surveys and Monitoring. Edinburgh, Scottish Natural Heritage.

Robinson, R.A. (2005) BirdFacts: profiles of birds occurring in Britain & Ireland (BTO Research Report 407). BTO, Thetford (http://www.bto.org/birdfacts, accessed on 20/08/2015)

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REPORT

Phase 3 - Woodsmith Mine Protected Species Management Plan - Bats

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1 Introduction

1.1.1 In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to North York Moors National Park Authority (NYMNPA) for permission to develop a polyhalite mine and underground Mineral Transport System (MTS). Planning consent was subsequently granted in 2015 subject to conditions.

1.1.2 This document has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) and details a Protected Species Management Plan (PSMP) for bats for the Phase 3 (see Paragraph 1.1.3 below) Works at Woodsmith Mine (formerly known as 'Dove's Nest Farm'). This document is required to partially satisfy the requirements of condition 52 of NYMNPA planning permission NYM/2014/0676/MEIA. It has been prepared in accordance with current good practice and in line with all relevant environmental legislation. This planning condition states that:

Table 1-1 Condition NYMNPA-52 Protected Species Management Plan - Bats

Condition	Compliance with Condition NYMNPA-52
Protected Species Management Plans (PSMPs) shall be submitted to the MPA [Mineral Planning Authority] prior to the commencement of Preparatory Works which shall not commence until the PSMPs have been agreed in writing by the MPA	This document for bats during the Phase 3 works and is ongoing throughout Phase 3.
The agreed details shall subsequently be followed unless modifications are agreed in writing with the MPA.	
The PSMPs may establish a programme of submissions to the MPA such that details are approved prior to works affecting different species and areas of the sites, shall concern protected species affected directly by works at the Dove's Nest Farm and Lady Cross Plantation sites, shall detail minimum requirements for mitigating or compensating for effects on protected species, shall require all licences that may be required in respect of effects on or re-location of protected species and their habitat to be obtained and complied with, and shall include but not be limited to consideration of the following a. Bats (all species) b. Badger c. Adder d. Common lizard particularly at western side of Lady Cross Plantation e. Other protected reptiles f. Water vole g. Common Crossbill h. Goshawk	This PSMP relates to bats only.

1.1.3 The Phase 3 Works comprise the following:

- General site clearance including demolition of all farm buildings and sheds, and localised tree and scrub clearance, as shown on drawing 40-ARI-WS-71-CI-DR-1051.
- Excavation and construction of the south western extension of the upper tiered working platform at around 203m AOD, as shown on drawing 40-ARI-WS-71-CI-DR-1053.
- Excavation and construction of the Platform for the Construction Welfare Facility, Parking Area and Concrete Batching Plant, as shown on drawing 40-ARI-WS-71-CI-DR-1053.

- Construction of temporary and permanent soil mounds, including the basal liner for a future storage facility in the northeast corner of the site for non-hazardous non-inert spoil and three topsoil, subsoil and inert material storage bunds in the southwestern area of the site, as shown on drawings 40-ARI-WS-71-CI-DR-1053 and 40-ARI-WS-71-CI-DR-1055, with earthworks volumes presented in 40-ARI-WS-71-CI-DR-1054.
- Construction of surface water drainage, a temporary surface water attenuation pond and temporary wetland in the southern area and two permanent attenuation ponds and two wetland areas in the north eastern area, as shown on Drawing 40-ARI-WS-71-CI-DR-1050;
- Construction of a spring and groundwater drainage layer in the north eastern area, discharging into a wetland area, as shown in drawing 40-ARI-WS-71-CI-DR-1080.
- Installation and commissioning of temporary dewatering as shown in drawing 40-ARI-WS-71-CI-DR-1058.
- Erection on site of the Concrete Batching Plant as shown in drawing 40-ARI-WS-71-CI-DR-1050, complete with reticulated water supplies and tanks.
- Construction of the drilling platform and temporary saline lagoon area for the groundwater reinjection well as shown in drawing 40-ARI-WS-71-CI-DR-1057.
- Establishment of construction welfare and security facilities - complete with hook-up of power, communications & water supplies and new waste water collection facilities as shown on drawing 40-ARI-WS-71-CI-DR-1050.

1.1.4 The Phase 3 Works are proposed to start in June 2017. Drawing 40-ARI-WS-71-CI-DR-1050 shows the details of these works.

1.1.5 This PSMP provides the necessary information relating to bats to guide working practices on site during the Phase 3 Works. This Plan, together with similar PSMPs for badger (b.), reptiles (c. and e.) and birds (g. and h.), provides a suite of documents containing the information required by Planning Condition 52 to partially discharge this condition as it relates to the scope of the Phase 3 works. A PSMP has not been provided for water vole (f.) as the ecological surveys undertaken to date have confirmed their absence. This approach has been discussed and agreed with the NYMNPA and Natural England.

1.1.6 Survey findings to date confirm that no other protected species are present on site and further PSMPs are not necessary. This has been confirmed by the NYMNPA. Should additional species subsequently be identified, the 'precautionary method of working' would apply and additional plans can be prepared as necessary.

1.1.7 This PSMP follows the format of the document submitted for the Phase 2 Works. It will be updated if anything during that Phase requires it.

2 Legislation afforded to bats

2.1.1 **Table 2-1** provides a summary of the relevant legislation afforded to bats.

Table 2-1 Summary of legislation afforded to bats

Species	Legislation (England)	Offences	Licensing procedures and guidance (England)
Bats **European protected species**	Conservation of Habitats and Species Regulations 2010 (as amended) Reg 41	Deliberately[1] capture, injure or kill a bat; deliberate disturbance[2] of bats; or damage or destruction of a breeding site or resting place used by a bat (The protection of bat roosts is considered to apply regardless of whether bats are present)	A Natural England (NE) licence in respect of development is required in England if a roost will be affected by the proposed works.
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection or disturb[3] a bat in such a place	Licence from NE is required for surveys (scientific purposes) that would involve disturbance of bats or entering a known or suspected roost site.

3 Surveys undertaken to date

3.1 Dusk (emergence), dawn (re-entry) and transect surveys

3.1.1 A preliminary daytime walkover survey of Woodsmith Mine was undertaken by Paul Chester & Associates (PCA) in 2014. Details of the findings of this survey are provided in the ES/SEI. In summary, this survey assessed the quality of the habitats for bats and included the identification of key potential foraging habitats, flight corridors and the potential for, or confirmed presence of, bat roosting sites. Further bat surveys (i.e. dusk and dawn surveys and monthly activity transect surveys) were carried out between May and September 2012 and 2014 in accordance with industry guidance at that time (i.e. Bat Conservation Trust, 2012, English Nature, 2004 and the Bat Mitigation Guidelines IN136, Natural England, 2006). Details are contained in the ES/SEI and are summarised in **Section 4.1** of this document.

1 Deliberate capture or killing is taken to include "accepting the possibility" of such capture or killing

2 Deliberate disturbance of animals includes in particular any disturbance which is likely a) to impair their ability (i) to survive, to breed or reproduce, or to rear or nurture their young, or (ii) in the case of animals of hibernating or migratory species, to hibernate or migrate; or b) to affect significantly the local distribution or abundance of the species to which they belong.

3 Lower levels of disturbance not covered by The Conservation of Habitats and Species Regulations 2010 remain an offence under the Wildlife and Countryside Act 1981 although a defence is available where such actions are the incidental result of a lawful activity that could not reasonably be avoided.

3.2 Static detector and evening capture survey

3.2.1 The 2012/2014 emergence/re-entry bat surveys identified bats emerging from a gap between the brickwork and boarding of the flat roofed sections of the dormer windows located on the western side of the main farmhouse building within the Woodsmith Mine site. The farmhouse was therefore confirmed as a summer roosting site, with the potential to also be a maternity roosting site due to the number of bats recorded during in the summer (i.e. peak numbers recorded in June and July). In order to confirm this conclusion, further bat surveys were undertaken using a combination of automated bat detectors (e.g. Anabat) and suitably positioned observers.

3.2.2 Further surveying failed to confirm whether it was a maternity roosting site, and therefore a mist netting survey was carried out (by a suitably qualified ecologist) in August 2015 to determine bat population age structure and correctly classify the roost. Full details of this survey and its findings are reported separately (EcoSurv, 2015) and summarised in **Section 4** of this document.

4 Key survey findings

4.1 Dusk (emergence) and dawn (re-entry) surveys

4.1.1 The 2014 preliminary daytime inspection of the Main Farmhouse at Woodsmith Mine noted the building to be in good condition and of traditional stone construction, with a pitched pan tile roof. The building was noted to originally be a single storey dwelling although it has since had the loft converted. No evidence of bats was recorded during the 2014 internal/external survey, however communication with the previous owners of the Mine site had reported a small number of bats (likely to be 1-3 individuals) as being present. Consequently a suite of dusk/dawn surveys were undertaken between April and September 2014. Bats were noted to emerge from a gap between the brickwork and boarding of the flat roofed section of the dormer window at the front of the main farmhouse. It was therefore confirmed that a bat roost was present within this structure, although the nature and status was yet to be determined but it was envisaged to be a common pipistrelle maternity roost.

4.2 Activity transect surveys

4.2.1 The suite of 2014 monthly activity transect surveys recorded bat activity at a number of locations within the Woodsmith Mine site, particularly along the boundaries where it connects within the wider area. The dominant species being common pipistrelle *Pipistrellus pipistrellus,* although occasional brown long-eared *Plecotus auritus* and Daubenton's *Myotis daubentonii* bats were also recorded.

4.3 Static detector and evening capture survey

4.3.1 The surveys undertaken at the beginning of the 2015 bat breeding season identified (by the field surveyor) a maximum occupancy of the confirmed roost of 16 individual bats. These were confirmed to be common pipistrelles by the recorded sonograms from the static detectors.

4.3.2 A single evening capture exercise (scope and methodology of which was agreed with NE and NYMNPA ecologist) utilising a static hand net was undertaken on 10th August 2015. Bats were observed exiting the roost site from 21:20, approximately 30 minutes after sunset. The first two bats were allowed to exit. The subsequent bat to emerge was captured in the net and identified as a juvenile male common pipistrelle bat. The presence of this young bat, along with the time of year of the survey and the surveyor's experience, is considered to provide conclusive proof that this structure is a maternity roost for common pipistrelle bats (EcoSurv Ltd, 2015).

5 Mitigation

5.1 Demolition of buildings and roost

5.1.1 The Phase 3 Works at Woodsmith Mine requires the demolition of all existing farm buildings, including the demolition of the main farmhouse. As the main farmhouse is a confirmed maternity roost used by common pipistrelle bats, the demolition of this building is subject to a Bat European Protected Species Licence (EPSL), issued by Natural England.

5.1.2 The works to the main farmhouse (i.e. the removal of the roof) to render it unsuitable for roosting bats will be undertaken at the beginning of October 2017 and will be completed by the end of that month. Once the roof has been removed, the building will be allowed to weather for a minimum of 48 hours, denying roosting opportunities for bats, before its final demolition.

5.1.3 To ensure no bats remain within the roost after the breeding (maternity) season, the roost site will be checked by a licensed bat ecologist (using an endoscope) prior to the roof strip. The roof strip will be undertaken by hand under the direct supervision of a licenced ecologist removing all tiles, areas of lead flashing, wall boards etc. Wall tops will be exposed and potential crevices for roosting bats will be fitted with one way valves that will allow bats to exit but deny return.

5.1.4 Although bat presence is highly unlikely, the Bat EPSL approved by Natural England permits the taking (capture) of up to 10 bats as a precaution. It should be noted that this document is written for commencement of the Phase 3 works, by which point the Bat EPSL will have been granted.

5.1.5 Any bats will be removed from the structure by hand and by the licenced ecologist. They will be taken to the nearest mitigation roost location (i.e. bat box, see below) and allowed to enter the roost. In the event that a bat is found during a period of inclement weather, the bat will be removed from the site, fed and cared for by the licenced ecologist, and released to one of the suitable bat boxes when the weather conditions are deemed suitable.

5.2 Mitigation and Good practice measures

5.2.1 As the demolition of the main farmhouse building will lead to the loss of a confirmed bat roost, new replacement roosting sites (i.e. bat boxes) of equivalent size and quality will be installed prior to works commencing. These bat boxes will be located outside of the area of works and within suitable trees in the adjacent woodland.

5.2.2 Nine bat boxes with 25-35mm crevices will be located within the semi-natural broadleaved woodland adjacent to the existing farm buildings. This woodland has been assessed as suitable in line with industry guidance, and provides an ecological corridor suitable for foraging habitats along Sneaton Thorpe Beck.

5.2.3 Annual maintenance inspections of these bat boxes will be undertaken for a period of 10 years. Where required, bat boxes identified as being of poor quality will be replaced. This programme of regular maintenance is required to ensure its operation, in accordance with the Bat Mitigation Guidelines (English Nature, 2004) and as secured by the Bat EPSL.

5.2.4 A five-year monitoring programme will also be implemented, commencing in the 2018 breeding season and for a total of five seasons following demolition of the main farmhouse. Monitoring will entail a programme of activity and passive surveys during the maternity season at the mitigation roost site/s. This will involve four visits per year between May – September and cover the major construction and disturbance phase within the site. Surveyors will use suitable bat detectors and recording equipment both at the roost location/s and around the perimeter of the works area. If it is found that a bat box is not being utilised, a replacement bat box will be installed around any areas of bat activity identified. This will ensure the existing bat population is supported and maintained.

5.2.5 The following measures will also be adhered to during all of the Phase 3 works within and around the main farmhouse area to safeguard the protection of bats using the wider area for foraging and/or commuting purposes. These are:

- All staff working on site will be required to attend a tool box talk about the potential presence of bats. Elements of this will include what constitutes signs of bat presence, the probable location of bats their legal status and the penalties should a contractor or his agents deliberately injure or kill a bat.
- All construction lighting will be directed away from the standalone roosts. All of the lighting requirements for the proposed works will be designed in accordance with guidance from the BCT's Interim Guidance Note on Artificial Lighting and Wildlife (BCT, 2014).

5.2.6 Mitigation and monitoring requirements described here are included in the Construction Environmental Management Plan (NYMNPA-93).

6 Summary

6.1.1 A suite of bat surveys were undertaken during 2014 and 2015. The findings of which have confirmed a common pipistrelle maternity roost within the main farmhouse at Woodsmith Mine. A daytime visit of the main farmhouse was also undertaken in 2017 to inform the bat mitigation licence.

6.1.2 The demolition of the buildings within Woodsmith Mine will be undertaken as part of the Phase 3 Works and the confirmed bat roost will be lost. Mitigation measures that will be employed at Woodsmith Mine as part of the Phase 3 Works (and as set out in the Bat EPSL) are summarised below.

- Tool box talks will be provided to all site personnel prior to the commencement of any works at or around the main farmhouse.
- The lighting requirements for the Phase 3 Works will be designed in accordance with guidance from the BCT's Interim Guidance Note on Artificial Lighting and Wildlife (BCT, 2014).
- The installation of new standalone roosting sites (i.e. bat boxes) within an area of semi-natural broadleaved woodland adjacent to the existing farm buildings, but outside of the working areas.

- Sensitive demolition of the main farmhouse building under ecological supervision during October 2017. This will be covered by the Bat EPSL.
- A five-year monitoring programme, commencing in the 2018 breeding season, for the five seasons following demolition.
- Annual maintenance inspections of all bat boxes for a 10 year period, following their installation.

6.1.3 It is considered that through the approved Bat EPSL and the implementation of the mitigation measures outlined in this document, the site will be managed to ensure the local bat population is supported and maintained.

7 References

Bat Conservation Trust (BCT), 2014. Artificial lighting and wildlife. Interim Guidance: Recommendations to help minimise the impact artificial lighting.

Bat Conservation Trust (2016). Bat Surveys good practice guidelines, 3rd Edition.

EcoSurv Ltd (2015) Bat Hand-netting at Dove's Nest Farm to Confirm Roost Status, August 2015

English Nature (2004) Bat mitigation guidelines.

Natural England (2006) IN136 Bat Mitigation Guidelines Advice Note.

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REPORT

Phase 3 - Woodsmith Mine Protected Species Management Plan - Reptiles

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1 Introduction

1.1.1 In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to North York Moors National Park Authority (NYMNPA) for permission to develop a polyhalite mine and underground Mineral Transport System (MTS). Planning consent was subsequently granted in 2015 subject to conditions.

1.1.2 This document has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) and details a Protected Species Management Plan (PSMP) for reptiles for the Phase 3 (see Paragraph 1.1.4 below) Works at Woodsmith Mine (formerly known as 'Dove's Nest Farm'). This document is required to partially satisfy the requirements of condition 52 of NYMNPA planning permission NYM/2014/0676/MEIA. It has been prepared in accordance with current good practice and in line with all relevant environmental legislation. This planning condition states that:

Table 1-1 Condition NYMNPA-52 Protected Species Management Plan - Reptiles

Condition	Compliance with Condition NYMNPA-52
Protected Species Management Plans (PSMPs) shall be submitted to the MPA [Mineral Planning Authority] prior to the commencement of Preparatory Works which shall not commence until the PSMPs have been agreed in writing by the MPA	This document for reptiles during the Phase 3 works and is ongoing throughout Phase 3.
The agreed details shall subsequently be followed unless modifications are agreed in writing with the MPA.	
The PSMPs may establish a programme of submissions to the MPA such that details are approved prior to works affecting different species and areas of the sites, shall concern protected species affected directly by works at the Dove's Nest Farm and Lady Cross Plantation sites, shall detail minimum requirements for mitigating or compensating for effects on protected species, shall require all licences that may be required in respect of effects on or re-location of protected species and their habitat to be obtained and complied with, and shall include but not be limited to consideration of the following a. Bats (all species) b. Badger c. Adder d. Common lizard particularly at western side of Lady Cross Plantation e. Other protected reptiles f. Water vole g. Common Crossbill h. Goshawk	This PSMP relates to reptiles only.

1.1.3 This document only details the works required for the Phase 3 Works at Woodsmith Mine. It does not include any activities at Lady Cross Plantation as these works have been deferred. Updates to this plan will be prepared for subsequent construction phases and following any design or method change. The NYMNPA has confirmed that it supports this approach.

1.1.4 The Phase 3 Works comprise the following:

- General site clearance including demolition of all farm buildings and sheds, and localised tree and scrub clearance, as shown on drawing 40-ARI-WS-71-CI-DR-1051.
- Excavation and construction of the south western extension of the upper tiered working platform at around 203m AOD, as shown on drawing 40-ARI-WS-71-CI-DR-1053.

- Excavation and construction of the Platform for the Construction Welfare Facility, Parking Area and Concrete Batching Plant, as shown on drawing 40-ARI-WS-71-CI-DR-1053.
- Construction of temporary and permanent soil mounds, including the basal liner for a future storage facility in the northeast corner of the site for non-hazardous non-inert spoil and three topsoil, subsoil and inert material storage bunds in the southwestern area of the site, as shown on drawings 40-ARI-WS-71-CI-DR-1053 and 40-ARI-WS-71-CI-DR-1055, with earthworks volumes presented in 40-ARI-WS-71-CI-DR-1054.
- Construction of surface water drainage, a temporary surface water attenuation pond and temporary wetland in the southern area and two permanent attenuation ponds and two wetland areas in the north eastern area, as shown on Drawing 40-ARI-WS-71-CI-DR-1050;
- Construction of a spring and groundwater drainage layer in the north eastern area, discharging into a wetland area, as shown in drawing 40-ARI-WS-71-CI-DR-1080.
- Installation and commissioning of temporary dewatering as shown in drawing 40-ARI-WS-71-CI-DR-1058.
- Erection on site of the Concrete Batching Plant as shown in drawing 40-ARI-WS-71-CI-DR-1050, complete with reticulated water supplies and tanks.
- Construction of the drilling platform and temporary saline lagoon area for the groundwater reinjection well as shown in drawing 40-ARI-WS-71-CI-DR-1057.
- Establishment of construction welfare and security facilities - complete with hook-up of power, communications & water supplies and new waste water collection facilities as shown on drawing 40-ARI-WS-71-CI-DR-1050.

1.1.5 The Phase 3 Works are proposed to start in June 2017. Drawing 40-ARI-WS-71-CI-DR-1050 shows the details of these works.

1.1.6 This PSMP provides the necessary information relating to reptiles to guide working practices on site during the Phase 3 Works. This Plan, together with similar PSMPs for bats (a.), badgers (b.) and birds (g. and h.), provides a suite of documents containing the information required by Planning Condition 52 to partially discharge this condition as it relates to the scope of the Phase 3 works. A PSMP has not been provided for water vole (f.) as the ecological surveys undertaken to date have confirmed their absence. This approach has been discussed and agreed with the NYMNPA and Natural England.

1.1.7 Survey findings to date confirm that no other protected species are present on site and further PSMPs are not necessary. This has been confirmed by the NYMNPA. Should additional species subsequently be identified, the 'precautionary method of working' would apply and additional plans can be prepared as necessary.

1.1.8 Each PSMP has drawn on information available at the time of preparing this document, including that which informed the ES and SEI.

1.1.9 This PSMP follows the format of the document submitted for the Phase 2 Works. It will be updated if anything during that Phase requires it. Should the Phase 2 works demonstrate that amendments to the PSMP is required, an updated document will be produced and submitted to the NYMNPA.

2 Legislation afforded to reptiles

2.1.1 Adder, grass snake, slow worm, and common lizard are protected under Schedule 5 (Section 9) of the Wildlife and Countryside Act 1981 (as amended) so that it is illegal to intentionally kill or injure these animals. Their habitats, however, are not protected under this Act. There are only two species of UK reptile (i.e. sand lizard and smooth snake) covered under The Conservation of Habitats & Species Regulations 2010, but neither of these species occurs in North Yorkshire or the North East of England.

2.1.2 **Table 2-1** provides a summary of the relevant legislation afforded to reptiles.

Table 2-1 Summary of legislation affording protection to reptiles

Species	Legislation (England)	Offences	Licensing procedures and guidance (England)
Adder **Lizard** **Grass snake** **Slow worm**	***Wildlife and Countryside Act 1981* S.9(1) (part); S.9(5)**	Intentionally kill, injure or take a protected reptile species Sell, offer or expose for sale, or have in possession or transport for the purpose of sale, a protected reptile species, or any part of, or anything derived from, such an animal. Publish or cause to be published any advertisement likely to be understood as conveying buying or selling, or intending to buy or sell, any of these.	No licence is required in England. However an assessment for the potential of a site to support reptiles should be undertaken prior to any development works which have potential to affect these animals.

3 Surveys undertaken to date

3.1 Baseline presence/absence reptile surveys

3.1.1 A reptile presence/absence survey was undertaken during April and May 2012 by Paul Chester & Associates (PCA) following the reptile survey methodology produced by Froglife (1999) and Gent & Gibson (1998), and the advice note produced by the Herpetofauna Groups of Britain and Ireland (HGBI) (HGBI, 1998). Details are contained in the ES/SEI and are summarised in **Section 4.1** of this document.

3.2 Updated presence/absence reptile surveys

3.2.1 Due to the time which had elapsed since the initial surveys in 2012, updated reptile presence/absence surveys were undertaken in 2015 by the Industry Nature Conservation Association (INCA), following the widely accepted methodology of placing artificial refuges, in this case 0.5m x 0.5m mats of roofing felt, in suitable habitat (Sewell *et al.*, 2013). These surveys focused on areas which had either not been covered by the 2012 baseline surveys or due to changes in the project scope and/or where future proposals presented the highest risk to reptiles in areas of highest suitability for reptiles. Details are contained in the ES/SEI and are summarised in **Section 4.1** of this document.

4 Key survey findings

4.1 Baseline presence/absence reptile surveys

4.1.1 Common lizards were the only species found during the 2012 surveys and near to the existing access of Woodsmith Mine. A maximum of four individuals were seen at any one time during the surveys. In the wider local area, occasional common lizard and more rarely occurring adder were recorded from the habitat to the east of Haxby Plantation.

4.1.2 Both adder and common lizard are species which are known to occur on both Sneaton Low Moor and Ugglebarnby Moor. Slow worm is likely to be present along the fringes of this moorland.

4.2 Updated presence/absence reptile surveys

4.2.1 The updated survey showed that the heathland in the previously felled area to the north of Haxby plantation supports a population of common lizard with the maximum of six animals being recorded at one any one time, in mid May 2015. It is considered that the common lizard found here are associated with the drier areas which contain tussocks of purple moor-grass. Given the isolated nature of this habitat it is considered that the common lizards here are a fragmented population that is separated from the main population which is likely to be on moorland which borders Woodsmith Mine to the south.

4.2.2 Only a small number of reptiles were recorded outside of this heathland location during the 2015 survey. A single common lizard was recorded at the proposed new site entrance and four separate observations of a single adder at the existing entrance to Woodsmith Mine in May and two common lizards at the same location in May were also made. Given the proximity of the two entrances to more suitable habitat within the moorland south-west of the B1416 it is considered feasible that reptiles may be regular vagrants from this nearby primary habitat.

4.2.3 The findings of the reptile surveys to date confirm that the Woodsmith Mine site contains suitable foraging, basking and hibernating opportunities for common species of reptiles. Suitable areas of refugia are also present throughout Woodsmith Mine. Therefore it is anticipated that common reptile species will be present within the proposed working areas and as such appropriate measures will be required to ensure compliance with the relevant legislation.

5 Mitigation

5.1 Precautionary method of working

5.1.1 The reptile surveys to date show that the site supports a low level of reptile activity which is attributed to individual animals moving in from the adjacent moorland. As such there is no justification for using reptile exclusion measures for Phase 3 Works. A more proportionate approach would be to carry out destructive searching (once a briefing has been provided) of the Phase 3 working areas and to relocate any reptiles found within the adjacent moorland. A cleared area without possibility of refuge would then be unattractive to reptiles.

Briefing

5.1.2 Information in respect of reptiles (i.e. legislation afforded to them, what they look like and what to do should one be encountered) will be provided to the Contractor (NMC) by a suitably qualified ecologist through a toolbox talk. The Contractor will then ensure that any required measures are undertaken and supervised as and where required by a suitably qualified ecologist.

Destructive hand searching

5.1.3 As the Phase 3 Works will be undertaken during the reptile active season, any potential refuges (piles of wood or rubble) within the Phase 3 Works area will be dismantled by hand by a suitably qualified ecologist, prior to the works commencing. Once checked all the potential refuge materials within the working area will be removed immediately to eliminate the potential for reptiles to occupy these features during works.

5.1.4 Immediately prior to works starting on site, all other suitable habitats (i.e. areas of scattered scrub, hedgerow bases) within the Phase 3 Works site will be checked by an ecologist, by hand, for the presence of reptiles. Work will not be permitted to start at the site until hand searching of the working areas has been completed. Vegetation will be strimmed by the Contractor (NMC), under supervision by the ecologist if necessary, and all debris arising from the removal of vegetation removed from working area(s).

What to do if a reptile is found on site

5.1.5 As the Phase 3 Works will be within the reptile active season, should a reptile be uncovered it will be allowed to move away from the area of its own accord. Work will stop in that particular area until the reptile(s) have moved away. Alternatively, or if the reptile does not move away naturally, they will be carefully lifted and placed away from the working area under vegetation by the supervising ecologist. It must be noted that adders are venomous and must only be handled by an ecologist. If adders are identified (or Contractors are uncertain of the species present) works in the vicinity of the reptile should halt and an ecologist should be contacted.

5.1.6 The storage of materials and plant in the works area overnight will be minimised where possible, and they will be contained within designated areas. All excavations left overnight will be covered up or if left open, egress points/ramps will be in place from any deep excavations to enable any animals to escape. Anything left on site overnight will be carefully checked by hand before being moved and if a reptile is found advice is to be sought from an ecologist about the best way to proceed.

6 Summary

6.1.1 Common lizard was the only species recorded during 2012 surveys. Further surveys were undertaken in 2015. Common lizard and a single adder (dead) were also recorded during the 2015 survey.

6.1.2 The Phase 3 Works will take place within terrestrial habitat that is considered to have potential to support common reptile species (e.g. common lizard, adder, grass snake and slow worm), all of which are legally protected species.

6.1.3 The Phase 3 works will take place during the reptile active period. Therefore the following mitigation measures will be employed during the Phase 3 Works in relation to the protection of reptiles:

- Adherence to a Precautionary Method of Working (PMoW) which will involve:
- All staff working on site will be required to attend a tool box talk about the potential presence of reptiles. Elements of this will include what constitutes signs of reptile presence, the probable location of reptiles if present, their legal status and the penalties should a contractor or his agent deliberately injure or kill a reptile;
- Immediately prior to works starting on site, all areas of suitable habitats (i.e. areas of scattered scrub, hedgerow bases) within the works site will be checked by an ecologist, by hand, for the presence of reptiles; and
- Habitat manipulation works will be supervised by a suitably qualified ecologist.
- Should any animals not move of their own accord and therefore require moving, they will be moved by a suitably qualified ecologist.

6.1.4 It is considered that through implementation of the mitigation measures outlined in this document, the site will be managed to ensure reptile population protection and in turn compliance with the legislation afforded to them.

7 References

Gent & Gibson (1998) Herpetofauna Workers' Manual. Peterborough, UK. Joint Nature Conservation Committee

Froglife (1999). Reptile survey, An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife advice sheet 10,

Herpetofauna Groups of Britain and Ireland (1998) Evaluating local mitigation/translocation programmes: Maintaining Best Practice and lawful standards. HGBI advisory notes for Amphibian and Reptile Groups (ARGs)

INCA (2015) The results of a reptile survey at Lady Cross MTS, Lockwood MTS and the Minehead site in 2015

Paul Chester & Associates (2014a) York Potash Project Proposed Minehead Baseline Ecological Surveys, Version 3 09/14

Paul Chester & Associates York (2014b) Potash Project Mineral Transport System (MTS) Baseline Ecological Surveys, Version 2 09/14

Paul Chester & Associates (2015) York Potash Project Supplementary Information (Bats & Reptile Surveys)

Royal HaskoningDHV (2014) York Potash Project Mine, MTS and MHF Environmental Statement, September 2014

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Royal HaskoningDHV (2014) Precautionary Method of Working in Respect of Reptiles (October 2014)

Sewell. D., Griffiths. R.A., Beebee. T.J.C., Foster. J., and Wilkinson. J.W (2013), Survey protocols for the British herpetofauna, Version 1.0.