

Sirius Minerals Plc

Woodsmith Mine - Phase 4 Works

**NYMNPA 60 and 79 Surface Water
Drainage Scheme**

40-ARI-WS-71-PA-RP-1053

Issue Rev 0 | 26 May 2017

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 253285-00

Ove Arup & Partners Ltd
Admiral House Rose Wharf
78 East Street
Leeds LS9 8EE
United Kingdom
www.arup.com

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		Name	C. Williams	D. Ainger	A. Hornung
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Appendix A

Phase 4 Drainage Layout

1 Introduction

1.1 Overview

This document has been prepared on behalf of Sirius Minerals PLC and details the surface water drainage design for the Phase 4 construction activity at Woodsmith Mine (Phase 4 Works). This is required to discharge conditions 60 and 79 of the North York Moors National Park Authority (NYMNPA) planning permission NYM/2014/0676/MEIA [1].

This report only details the works required at the Woodsmith Mine site.

The Phase 4 Works comprise:

- Operation of the concrete batch plant;
- Installation, commissioning and operation of the bentonite plant and associated temporary structures;
- Installation of concrete guide walls (excavate to -3.5m and concrete wall down to -1.5 to -1.75 m);
- Mobilisation to site of diaphragm walling equipment (cutters, cranes, workshops etc.);
- Diaphragm wall construction to -60m below ground level at the Production, Service and Mineral Transport System shafts;
- Limited continuation of earthworks to create an area for future storage of spoil.

1.2 Compliance with Conditions

The drainage strategy, calculations and surface water management plan described in the Phase 3 Surface Water Drainage Scheme [2] are still applicable during the Phase 4 works. The changes between Phase 3 and 4 do not have a significant impact on the surface water drainage design.

- The addition of the operation of the concrete batching plant in Phase 4 does have an interaction with the surface water drainage and is described in Section 2.1 of this report.
- The installation and operation of the bentonite plant and associated structures in Phase 4 does have an interaction with the surface water drainage scheme and is described in Section 2.2 of this report.
- The continuation of earthworks to the north of the platform requires the extension of a land swale to intercept the runoff from the extended bund. The runoff from that area was accounted for in the Phase 3 drainage design due to the natural slope of the site. Hence the extension of the swale has no impact on the drainage strategy in Phase 4, and does not affect the strategy's compliance with the planning conditions.

No other changes between Phases 3 and 4 impact on compliance with conditions that were described in the Phase 3 report. The revised surface water general arrangement drawing 40-ARI-WS-71-CI-DR-1084 is shown in Appendix A.

2 Phase 4 Design Amendments

2.1 Concrete Batching Plant

A surface water management plan has been prepared for the operation of this area and is included within Appendix E of AMC's document titled 'Phase 4 – Concrete Batch Plant Operation and Maintenance' (document number 40-AMC-WS-72-SW-RA-002), and includes the following principles:

- In a rainfall event the first flush of runoff (less than 1 in 20 year storm event) will be captured by the batching plant drainage network, treated and fed back into the process water tanks for storage and re-use within the batching operation.
- Treatment of surface water runoff will be provided in the batching plant area which will include pH treatment, settlement, desilting and oil separation.
- Surface water storage in the batching plant area will be provided to capture rainfall events up to the 1 in 100 year storm event. This surface water runoff will then be treated and reused within the batching operation. Therefore, for a rainfall event less than the 1 in 100 year storm event no surface water overflow into the site wide surface water drainage network will occur.
- For events above the 1 in 100 year storm event, residual surface water will enter the site wide drainage system via the overflow point. The overflow discharge will pass through the site wide oil separators, silt removal facility, attenuation ponds and wetland.

The batching plant provides a benefit to the site wide drainage strategy by storing surface water runoff at source up to the 1 in 100 year storm event. As this runoff does not discharge into the site wide drainage network the risk of flooding across the site and in the attenuation ponds is reduced.

2.2 Bentonite Plant

Surface water runoff from areas where there is a higher risk of pollution from the bentonite process will be kept separate from the site-wide surface water drainage system as follows and as detailed in Bauer's document titled 'Operation of Slurry Plant' (document number YPM-BAU-MS-03):

- Processes where there is a higher risk of pollution will be located on a bunded concrete containment slab and wedge pit sloping towards the desanding spoils area.
- Any rainwater collected within the bunded slab will either be pumped to the waste bentonite tank to be tankered off-site or re-used after treatment

in the bentonite process if suitable for re-use. No rainwater from this area will enter the site wide surface water drainage system.

3 Conclusions

There are no changes between Phases 3 and 4 that adversely impact the surface water drainage design. The Phase 3 Surface Water Drainage Scheme [2] is still applicable during Phase 4.

The additions of the operation of the concrete batching plant and bentonite plant in Phase 4 do have an interaction with the surface water drainage, but the mitigation proposed minimises the risk to an acceptable level. The extension of the swale in the northern edge of the site has no impact on drainage strategy and does not increase the risk of flooding on site.

This report demonstrates that the Surface Water Drainage design and management during the Phase 4 Works meets the requirements of conditions 60 and 79 of the North York Moors National Park Authority (NYMNPA) planning permission NYM/2014/0676/MEIA.

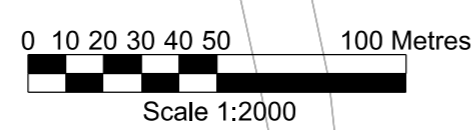
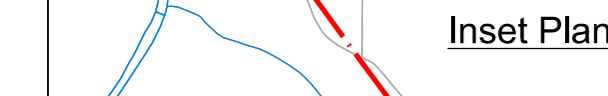
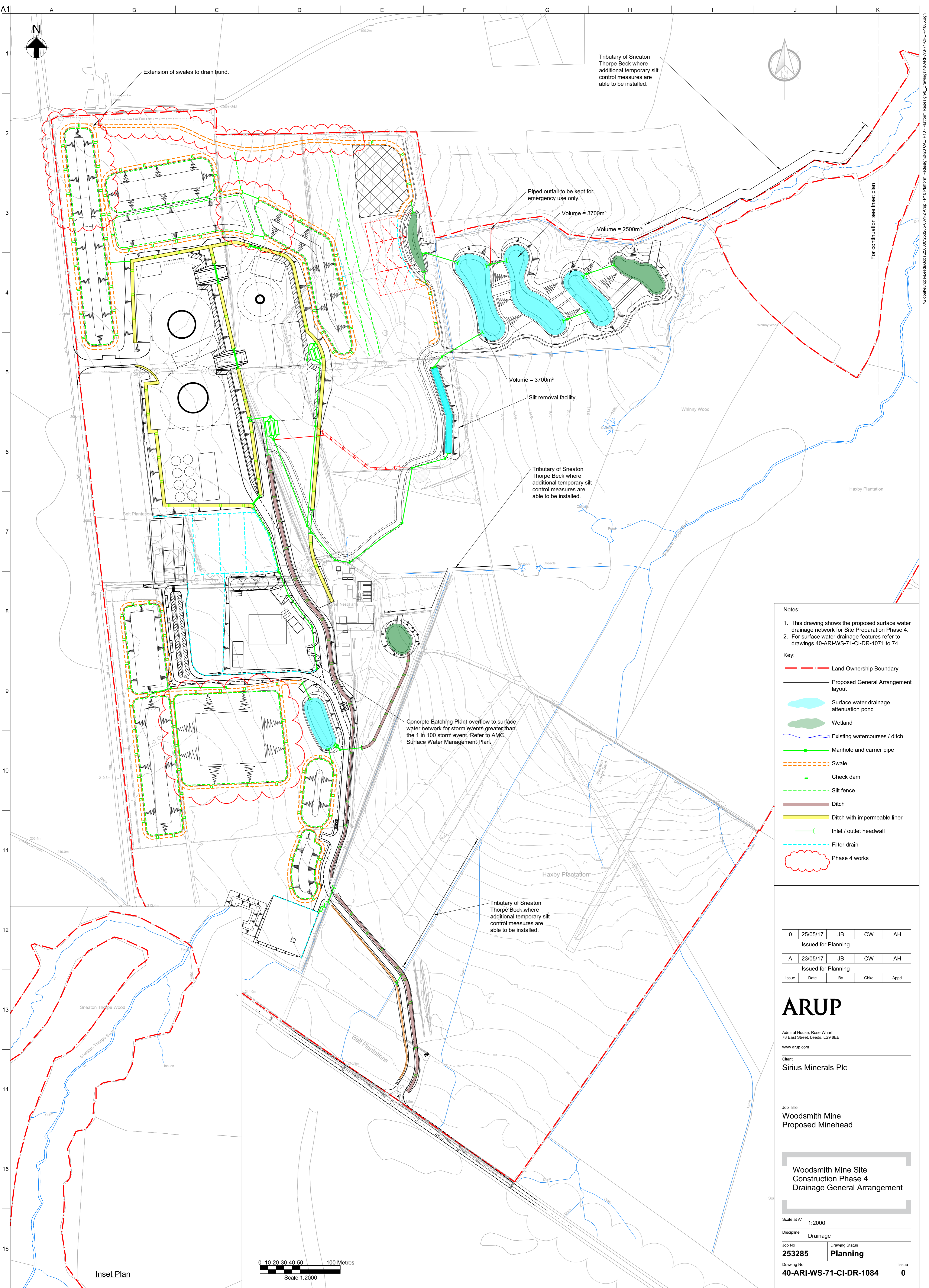
No new land drainage consents are required for the Phase 4 works because there are no new outfalls or works near watercourses proposed.

References

- [1] North York Moors National Park Authority planning permission
NYM/2014/0676/MEIA.
- [2] NYMNPA 60 and 79 Surface Water Drainage Scheme, 40-ARI-WS-71-PA-RP-
1050_0_IFU_20170403 SWD DoC 60_79, Rev 0, Arup, April 2017.

Appendix A

Phase 4 Drainage Layout



- Notes:**
- This drawing shows the proposed surface water drainage network for Site Preparation Phase 4.
 - For surface water drainage features refer to drawings 40-ARI-WS-71-CI-DR-1071 to 74.
- Key:**
- Land Ownership Boundary
 - Proposed General Arrangement layout
 - Surface water drainage attenuation pond
 - Wetland
 - Existing watercourses / ditch
 - Manhole and carrier pipe
 - Swale
 - Check dam
 - Silt fence
 - Ditch
 - Ditch with impermeable liner
 - Inlet / outlet headwall
 - Filter drain
 - Phase 4 works

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ARUP

Admiral House, Rose Wharf,
78 East Street, Leeds, LS9 8EE
www.arup.com

Client
Sirius Minerals Plc

Job Title
**Woodsmith Mine
Proposed Minehead**

**Woodsmith Mine Site
Construction Phase 4
Drainage General Arrangement**

Scale at A1 1:2000

Discipline **Drainage**

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