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NYMNPA

23/01/2019

**Date:** 23 January 2019  
**Our ref:** 50303/04/HS/JCx/17023706v1  
**Your ref:** NYM/2017/0505/MEIA

Dear Rob

**North York Moors: Woodsmith Mine - Application to Partially Discharge Conditions 4, 18, 34, 46, 47, 52, 57, 60, 64, 68, 70, 71, 73, 76, 79, 81, 91, 92, 93, 94 & 95 of Planning Permission NYM/2017/0505/MEIA**

On behalf of our client, Sirius Minerals plc ("Sirius Minerals"), we are pleased to submit this application for limited and partial approval of Planning Conditions 4, 18, 34, 46, 47, 52, 57, 60, 64, 68, 70, 71, 73, 76, 79, 81, 91, 92, 93, 94 & 95 of Planning Permission NYM/2017/0505/MEIA.

The Project will be delivered in a series of Phases. This application relates solely to the Phase 9 works at the Woodsmith Mine.

## Background

*On 19 October 2015, the NYMNPA granted planning permission for the "Winning and working of polyhalite by underground methods including the construction of a minehead at Dove's Nest Farm involving access, maintenance and ventilation shafts, the landforming of associated spoil, the construction of buildings, access roads, car parking and helicopter landing site, attenuation ponds, landscaping, restoration and aftercare and associated works. In addition, the construction of an underground tunnel between Doves Nest Farm and land at Wilton that links to the mine below ground, comprising 1 no. shaft at Doves Nest Farm, 3 no. intermediate access shaft sites, each with associated landforming of associated spoil, the construction of buildings, access roads and car parking, landscaping, restoration and aftercare, and the construction of a tunnel portal at Wilton comprising buildings, landforming of spoil and associated works" (Council Reference NYM/2014/0676/MEIA).*

NYM/2014/0676/MEIA was approved subject to 95 planning conditions and a Section 106 Agreement.

On 6 February 2017, the NYMNPA granted planning permission for the "Variation of Condition 5 of planning permission NYM/2014/0676/MEIA to allow minor material amendments relating to that part of the development at the Woodsmith Mine site (formerly known as Doves Nest Farm and Haxby Plantation), including; re-design of foreshafts and shaft construction methodology, changes to building layout and shaft access arrangements, revisions to construction and operational shaft platform levels, revisions to location and layout of surface water attenuation ponds, revisions to groundwater management

*arrangements and amendments to internal access arrangements” (Council Reference NYM/2017/0505/MEIA).*

The amended scheme (NYM/2017/0505/MEIA) was approved subject to 98 planning conditions and a deed of variation to the originally approved Section 106 Agreement.

### **Phase 9 Works**

Phase 9 covers off the following proposed works at the Woodsmith Mine:

- Installation and operation of temporary Secure Storage Unit (“SSU”);
- Installation and operation of first stage of non-domestic waste water treatment plant;
- Installation and commissioning of compressors;
- Assembly and fit-out of Galloway;
- Extension of internal access road; and
- Installation of environmental fence to facilitate use of reinjection pad for temporary HGV parking.

### **Planning Conditions 52, 57, 70, 73 and 95**

Sirius Minerals is committed to implementing the mitigation, monitoring and reporting measures developed in previous phases, throughout Phase 9 for the following conditions:

- NYM-52 Protected Species Management Plans;
- NYM-57 Landscape and Ecological Management Plan;
- NYM-70 Arboricultural Method Statement;
- NYM-73 Woodland Management Plan; and
- NYM-95 Archaeological Written Scheme of Investigation;

Sirius Minerals is not intending to re-submit the documentation for the above conditions as they have already been approved and implemented in full for the duration of previous phases and will continue to be implemented insofar as they relate to Phase 9.

### **Partial Discharge**

Sirius Minerals acknowledges that limited and partial approval of Planning Conditions 4, 18, 34, 46, 47, 52, 57, 60, 64, 68, 70, 71, 73, 76, 79, 81, 91, 92, 93, 94 & 95 when given, does not constitute permission to undertake works other than those described, including any works at Lady Cross Plantation, and that such works remain subject to the approval of other conditions.

This approach has been discussed and agreed with your Planning Team and is consistent with the approach taken on previous phases of the Project.

### **Application Submission**

The application was submitted via the planning portal on 23 January 2019 (reference PP-07566999) and comprises the following documentation:

- Completed application form;
- Application drawings – Please see Appendix 1;
- Supporting Documents – Please see Appendix 1.



The requisite planning application fee of £116 has been paid online by credit card.

**Conclusion**

We trust that this application provides you with the necessary information to be able to partially discharge the above conditions to cover Phase 9 works at Woodsmith Mine. However, should you require any further information, please do not hesitate to contact me.

Yours sincerely

**James Cox**  
Senior Planner



**Appendix 1 : Supporting Documents**

**Table 1: List of Supporting Documents**

<b>Condition No</b>	<b>Description</b>	<b>Document Name / Number</b>	<b>Further Details</b>
N/A	N/A	Listed Plans	<p>40-ARI-WS-7100-CI-18-01050 - Woodsmith Mine Construction Phase 9 Masterplan</p> <p>40-ARI-WS-7100-CI-18-01051 - Woodsmith Mine Construction Phase 9 Planning Phases Comparison General Arrangement</p> <p>40-ARI-WS-7100-CI-18-01052 – Woodsmith Mine Construction Phase 9 Surface Water Drainage General Arrangement</p> <p>40-ARI-WS-7100-CI-22-01054 – Non-Domestic Waste Water Treatment Plant</p> <p>40-ARI-WS-7240-CI-41-01000 – Temporary Platform Visibility</p>
<b>4</b>	Phasing Plan	40-ARI-WS-7100-CI-18-01051 - Woodsmith Mine Construction Phase 9 Planning Phases Comparison General Arrangement	40-ARI-WS-7100-CI-18-01050 - Woodsmith Mine Construction Phase 9 Masterplan
<b>18</b>	Noise & Vibration	Phase 9 Woodsmith Mine Noise and Vibration Management Plan 40-RHD-WS-70-EN-PL-0037	<p>Phase 8 Woodsmith Mine Noise and Vibration Management Plan 40-RHD-WS-70-EN-PL-0034</p> <p>Phase 4 Woodsmith Mine Noise and Vibration Management Plan – 40-RHD-WS-70-EN-PL-0017</p> <p>Phase 9 Woodsmith Mine Construction Method Statement - 40-SMP-WS-7100-PA-MS-00007</p> <p>Phase 9 Woodsmith Mine Construction Environmental Management Plan – 40-RHD-WS-70-EN-PL-0038</p>
<b>34</b>	Construction Traffic Management	Phase 8 Woodsmith Mine Construction Traffic Management	To manage the potential impacts of construction traffic associated with the Phase 8 works at Woodsmith Mine a

	Plan	Plan 40-RHD-WS-70-CI-PL-0013	<p>Construction Traffic Management Plan (CTMP; Reference 40-RHD-WS-70-CI-PL-0013) was submitted to North York Moors National Park Authority and North Yorkshire County Council (local highway authority).</p> <p>The Contractors have confirmed that the total numbers of employees working out of Woodsmith Mine during the Phase 9 works would not exceed those peak levels assessed within the Phase 8 CTMP. Whilst the Phase 9 works will require HGV deliveries, the Contractors have confirmed that the demand for deliveries can be accommodated within the daily targets set out in the Phase 8 CTMP.</p> <p>The Phase 9 works are not expected to require any abnormal indivisible load (AIL) deliveries. Should the requirement for AIL deliveries arise however, the routing and timing of these deliveries will be subject to separate agreement with the local highway authorities and police through the established Electronic Service Delivery for Abnormal Loads system (ESDAL) process.</p> <p>It is therefore considered that the targets, measures and monitoring processes contained within the Phase 8 CTMP would be appropriate to manage the additional construction activities proposed as part of Phase 9.</p>
46	GW / SW Monitoring Scheme	Phase 9 Works at Woodsmith Mine, North Yorkshire Construction & Operation Phase Ground and Surface Water Monitoring Scheme – 40-FWS-WS-70-WM-PL-0020	<p>Woodsmith Mine – Phase 9 Works NYMNP 60 and 79 Surface Water Drainage Scheme – 40-ARI-WS-7100-CI-RP-01004</p> <p>Phase 9 Woodsmith Mine Construction Method Statement - 40-SMP-WS-7100-PAMS-00007</p>
46	Hydrogeological Risk Assessment	Phase 8 Works at Woodsmith Mine, North Yorkshire Hydrogeological	The scope of works to be carried out as part of Phase 9 comprises surface works only that will have no significant chemical or physical impacts on the hydrogeology or

		Risk Assessment – 40-FWS-WS-70-WM-RA-0009	receptors on or adjacent to the site. As such, it is considered that no site-specific hydrogeological risk assessment is warranted for this phase of the works. As no hydrogeological risks have been identified associated with the Phase 9 Works, there will be no additional requirements for a revised construction and operational environmental monitoring and remedial actions above those previously documented for Phase 8.
<b>46</b>	Remedial Action Plan	Phase 9 Works at Woodsmith Mine, North Yorkshire Remedial Action Plan – 40-FWS-WS-70-WM-PL-0021	N/A
<b>47</b>	Groundwater Management Scheme	N/A	The groundwater management measures that have been approved as part of previous phases remain valid for Phase 9. Once the non-domestic waste water treatment plant (“NDWWTP”) is operational, however, the groundwaters extracted from the shaft excavations as part of the concurrent Phases 5 to 9 works will be discharged through the NDWWTP rather than through the surface water drainage system, Siltbuster and attenuation ponds in to Sneaton Thorpe Beck.
<b>52</b>	Protected Species Management Plan	Phase 9 Woodsmith Mine Protected Species Management Plan – Bats – 40-RHD-WS-70-EN-PL-0039	Phase 3 Woodsmith Mine Protected Species Management Plan – 40-RHD-WS-70-EN-PL-0013  Please also refer to CEMP (Condition 93)
<b>57</b>	Landscape & Ecological Management Plan	Refer to CEMP (Condition 93)	Phase 3 Landscape and Ecological Management Plan (40-RHD-WS-70-EN-PL-0008)
<b>60</b>	Surface Water Drainage	Woodsmith Mine – Phase 9 Works NYMNPAs 60 and 79 Surface Water Drainage Scheme – 40-ARI-WS-7100-CI-RP-01004	Listed plans.  Woodsmith Mine – Phase 7 Works – NYMNPAs 81 Non-Domestic Wastewater Management Scheme – 40-ARI-WS-7100-CI-RP-01002  Woodsmith Mine- Phase 3 Works

			NYMNPAs 60 and 79 Surface Water Drainage Scheme (40-ARI-WS-71-PA-RP-1050)
<b>64</b>	Temporary Fencing	Refer to Construction Method Statement (Condition 94)	<p>Plan ref. 40-ARI-WS-7240-CI-41-01000 provides details of the 3m high environmental fence that is proposed to be installed to the south of the reinjection pad, to facilitate its use for the temporary parking of HGV vehicles. The fence will be timber, with a brown finish.</p> <p>In addition to the CMS, the Phase 9 masterplan drawing shows the extent of temporary security fencing that is proposed to be installed in relation to the SSU.</p>
<b>68</b>	Temporary Structures	Refer to Construction Method Statement (Condition 94)	<p>The Phase 9 Masterplan drawing shows the latest position of the electrical substations that were permitted as part of Phase 6. In certain cases, these have been relocated slightly in order to accommodate current construction activity. Whilst this is not considered to be material in planning terms, the revised locations are included for information purposes.</p> <p>In addition to the CMS, please also refer to the listed plans for details of the proposed SSU, non-domestic waste water treatment plant and air compressor unit.</p>
<b>70</b>	Arboricultural Method Statement	Refer to CEMP (Condition 93)	N/A
<b>71</b>	Hard & Soft Landscaping	40-ARI-WS-7100-CI-18-01053 - Woodsmith Mine Construction Phase 9 Hard and Soft Landscaping Plan	N/A
<b>73</b>	Woodland Management Plan	N/A	<p>No additional tree removal is proposed as part of Phase 9 and therefore no specific management measures are included within this phase. Notwithstanding this, a Scheme for Maintaining and Managing the Haxby &amp; Belt Plantations (ref. 40-SMP-WS-8323-PA-PL-00001) was recently approved under application ref. NYM/2018/0754/CVC and will be implemented in accordance with the</p>



			timescales contained within that document.
<b>76</b>	Soil Management Plan	Refer to CEMP (Condition 93)	N/A
<b>79</b>	Surface Water Drainage	Woodsmith Mine – Phase 9 Works NYMNPAs 60 and 79 Surface Water Drainage Scheme – 40-ARI-WS-7100-CI-RP-01004	Listed plans.  Woodsmith Mine – Phase 7 Works – NYMNPAs 81 Non-Domestic Wastewater Management Scheme – 40-ARI-WS-7100-CI-RP-01002  Woodsmith Mine- Phase 3 Works NYMNPAs 60 and 79 Surface Water Drainage Scheme (40-ARI-WS-71-PA-RP-1050)
<b>81</b>	Waste Water Management Scheme	Woodsmith Mine – Phase 9 Works – NYMNPAs 81 Non-Domestic Management Scheme – 40-ARI-WS-7100-CI-RP-01005	40-ARI-WS-7100-CI-22-01054 – Non-Domestic Waste Water Treatment Plant
<b>91</b>	Emissions	Phase 6a– Woodsmith Mine Emissions to Atmosphere – NYMNPAs - 91: 40-RHD-WS-70-EN-RP-0006	To consider the potential impact of emissions from on-site generators at designated ecological sites, a generator emissions assessment (reference 40-RHD-WS-70-EN-RP-0006) was submitted to discharge Condition 91 for Phase 6a at Woodsmith Mine. It is expected that, during Phase 9, there will be no significant additional generators required above those considered in Phase 6a, which were predicted to lead to nutrient nitrogen and acid deposition levels considerably lower than presented in the ES/SEI. Most equipment on site will be powered using the 11kV electrical supply, supplemented by the electrical power provided by the LNG facility. This facility will be operated under the requirements of an Environmental Permit which has been issued by the Environment Agency, and will comply with strict emission limits.  Additionally, during periods of peak power demand in the UK (typically early evening peaks in the winter months, November to

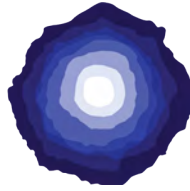
			<p>February), on short-term notice these generators may be fired. Currently, there are 4 standby diesel generator units available on site which may be used for this purpose. In a 7-week period from late November 2018 to early January 2019, these generators were used to provide site construction power for a total of 13.5 hours, comprising 1 or 1.5 hour periods on 12 different days. The Phase 9 works will commence after the 2018/19 winter period, and no such additional generator usage for this purpose is expected.</p> <p>Therefore, the conclusions of the Phase 6a generator emissions assessment, that generator emissions will be much reduced compared to the consented scenario, remain valid.</p>
92	CVPMP	Phase 7 – Woodsmith Mine Construction Vehicle and Plant Management Plan – 40-RHD-WS-70-CI-PL-0012	<p>A Construction Vehicle and Plant Management Plan (CVPMP) (reference 40-RHD-WS-70-CI-PL-0012) was submitted to discharge condition NYMNPA-92 as part of the Phase 7 Works.</p> <p>The plant required for the Phase 9 Works will be similar in both number and nature to that considered during Phase 7, therefore particulate emissions from plant used during Phase 9 are expected to be of a similar magnitude to that presented in the Phase 7 CVPMP.</p> <p>Emissions from vehicle movements were considered in the Phase 7 CVPMP, and were based on the maximum permissible light and heavy goods vehicle movements that can travel to and from Woodsmith Mine. Traffic movements associated with the Phase 9 Works will be accommodated within these limits and therefore consideration of additional traffic movements is not required.</p> <p>The Phase 7 CVPMP is therefore considered to remain applicable for Phase 9.</p>
93	CEMP	Phase 9 – Woodsmith Mine	Phase 9 Construction Method Statement - 40-SMP-WS-7100-PA-MS-00007



		<p>Construction Environmental Management Plan – 40-RHD-WS-70-EN-PL-0038</p>	<p>Phase 8 Construction Traffic Management Plan – 40-RHD-WS-70-CI-PL-0013</p> <p>Phase 9 Noise &amp; Vibration Management Plan – 40-RHD-WS-70-EN-PL-0037</p> <p>Phase 7 Construction Vehicle and Plant Management Plan – 40-RHD-WS-70-CI-PL-0012</p> <p>Phase 8 Hydrogeological Risk Assessment – 40-FWS-70-WM-RA-0009</p> <p>Phase 3 Surface Water Management Plan (reference 40-FWS-WS-70-EN-PL-0002)</p> <p>Phase 8 CEMP (reference 40-RHD-WS-EN-PL0033)</p> <p>Phase 7 CEMP (reference 40-RHD-WS-EN-PL-0029)</p> <p>Phase 6 CEMP (reference 40-RHD-WS-70-EN-PL-0028)</p> <p>Phase 5 CEMP (reference 40-CAR-WS-8300-PA-MS-00001)</p> <p>Phase 4a CEMP (reference 40-RHD-WS-70-EN-PL-0026)</p> <p>Phase 4 CEMP (reference 40-RHD-WS-70-EN-PL-0023)</p> <p>Phase 3 CEMP (reference 40-RHD-WS-70-EN-PL-0014)</p> <p>Protected Species Management Plans:</p> <p>40-RHD-WS-70-EN-PL-0010 Ph3 PSMP for Reptiles;</p> <p>40-RHD-WS-70-EN-PL-0011 Ph3 PSMP for Badgers;</p> <p>40-RHD-WS-70-EN-PL-0012 Ph3 PSMP for Birds; and</p> <p>40-RHD-WS-70-EN-PL-0039 Ph9 PSMP for Bats.</p>
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			<p>Phase 3 Landscape and Ecological Management Plan (LEMP) (40-RHD-WS-70-EN-PL-0008)</p> <p>Phase 4 Soil Management Plan (40-FWS-WS-70-CI-PL-003)</p> <p>Phase 4 Written Scheme of Investigation (40-COT-WS-70-EN-PL-0002)</p> <p>Listed plans.</p>
94	Construction Method Statement	Phase 9 Construction Method Statement - 40-SMP-WS-7100-PA-MS-00007	<p>Phase 9 Woodsmith Mine Construction Environmental Management Plan – 40-RHD-WS-70-EN-PL-0038</p> <p>Phase 8 Construction Traffic Management Plan – 40-RHD-WS-70-CI-PL-0013</p> <p>Phase 5 Construction Method Statement – 40-CAR-WS-1000-PA-MS-00001</p> <p>Listed plans.</p>
95	Written Scheme of Investigation	Refer to CEMP (Condition 93)	N/A

**\* As agreed, documents from previous phases (where they remain unchanged in relation to Phase 9) have not been resubmitted with this application**



Project Title / Facility Name:  
**North Yorkshire Polyhalite Project**

Document Title:  
**Woodsmith Mine Phase 9 Works NYMNP 60 and 79 Surface Water Drainage Scheme**

NYMNP  
23/01/2019

**Document Review Status**

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**40-ARI-WS-7100-CI-RP-01004**

Sirius Minerals Plc

**Woodsmith Mine - Phase 9 Works**

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

40-ARI-WS-7100-CI-RP-01004

Rev 0 | 22 January 2019

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

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**ARUP**

# Document Verification

<b>Job title</b>		Woodsmith Mine - Phase 9 Works		<b>Job number</b>	
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<b>Document title</b>		NYMNP 60 and 79 Surface Water Drainage Schemes		<b>File reference</b>	
<b>Document ref</b>		40-ARI-WS-7100-CI-RP-01004			
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			Prepared by	Checked by	Approved by
		Name	Julia Beaumont	Chris Williams	Andrew Hornung
		Signature			
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		<b>Description</b>	Comments implemented		
			Prepared by	Checked by	Approved by
		Name	Julia Beaumont	Chris Williams	Andrew Hornung
		Signature			
Rev 0	22 Jan 2019	<b>Filename</b>	40-ARI-WS-7100-CI-RP-01004_0_IFU_20190122_Ph 9 NYM 60 79 SWD Strategy.docx		
		<b>Description</b>	Issue		
			Prepared by	Checked by	Approved by
		Name	Julia Beaumont	Chris Williams	Andrew Hornung
		Signature			
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		Name			
		Signature			
<b>Issue Document Verification with Document</b>					
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## References

## Appendices

### Appendix A

#### Phase 9 - Surface Water Drainage Layout



# 1 Introduction

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## 1.1 Overview

This document has been prepared on behalf of Sirius Minerals PLC and details the surface water drainage schemes for the Phase 9 construction activity at Woodsmith Mine (Phase 9 Works). This is required to discharge conditions 60 and 79 of the North York Moors National Park Authority (NYMNP) planning permission NYM/2014/0676/MEIA, as subsequently varied by NYM/2017/0505/MEIA [1].

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

The Phase 9 Works comprise:

- Installation and operation of the temporary Secure Storage Unit (SSU);
- Installation and operation of the first stage of the non-domestic waste water treatment plant;
- Installation and commissioning of compressors;
- Assembly and fit-out of the Galloway;
- Extension of internal access road;
- Installation of an environmental fence to facilitate the use of the reinjection pad for temporary HGV parking.

## 1.2 Surface Water Drainage Strategy - Compliance with Conditions

The drainage strategy, calculations and surface water management plan described in the Phase 3 Surface Water Drainage Scheme [2] and updated in the Phase 7 Surface Water Drainage Scheme [3] are still applicable during the Phase 9 works. The surface water system that will be in use during Phase 9 is shown on the general arrangement drawing 40-ARI-WS-7100-CI-18-01052 in Appendix A. The changes between Phases 3 and 9 do not have a significant impact on the surface water drainage design.

- The installation and operation of the temporary Secure Storage Unit (SSU) has an interaction with the surface water drainage scheme and this is described in Section 2.1 of this report.
- The installation and operation of the non-domestic wastewater treatment plant has an interaction with the surface water drainage scheme and this is described in Section 2.2 of this report.
- The installation and commissioning of the compressors does not have an impact on the surface water drainage system.

- The assembly of the galloway does not have an impact on the surface water drainage system.
- The extension of the internal access road has an interaction with the surface water drainage system and this is described in Section 2.3 of this report.
- The installation of an environmental fence to facilitate use of the reinjection pad for temporary HGV parking has no impact on the surface water drainage system.

No other changes between Phases 3, and 9 impact on compliance with the conditions that were described in the Phase 3 and 7 reports.

## 2 Phase 9 Works

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### 2.1 Installation and Operation of the Temporary SSU

The provision of the temporary SSU mainly consists of permeable barriers with the addition of small hardstanding concrete pavements in front of the proposed storage units. The concrete pads will be drained by filter drains which will discharge into the surface water drainage system which was installed to drain the external concrete pavements surrounding the surface water treatment facility (“Siltbuster”), previously approved in Phase 7. This can be accommodated within the existing drainage network without any modifications, whilst still achieving the permitted discharge rates and design basis.

### 2.2 Installation and Operation of the Non-Domestic Wastewater Treatment Plant

The minor platform widening required to accommodate the installation works for the non-domestic wastewater treatment plant and the realignment of the platform perimeter ditch increase the drained platform area by approximately 0.12ha. This is a relatively small increase in the overall site area that is positively drained. This can be accommodated within the existing drainage network without any modifications, whilst still achieving the permitted discharge rates and design basis.

Where required the non-domestic wastewater treatment plant will be installed on bunded concrete slabs to reduce the risk of pollution to the surface water drainage system.

The outfall from the non-domestic wastewater treatment plant will be kept separate from the surface water drainage system, enabling the outfall quality to be monitored separately.

## 2.3 Extension of the Internal Access Road

The extended internal road system on the eastern edge of the working platform will drain towards the existing concrete canvas lined platform surface water drainage ditch. This increases the drained platform area by approximately 0.43ha. This is a relatively small increase in the overall site area that is positively drained. This can be accommodated within the existing drainage network without any modifications, whilst still achieving the permitted discharge rates and design basis.

This additional area will drain through the existing eastern platform oil interceptors. These interceptors have sufficient capacity for the increase in area and therefore no modifications are required to the provision made.

## 3 Conclusions

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### 3.1 Surface Water Management Scheme

There are no changes between Phases 3 and 9 that adversely impact the surface water drainage design. The Phase 3 Surface Water Drainage Scheme [2] and as updated by the Phase 7 Surface Water Drainage Scheme [3] is still applicable during Phase 9.

The additions of the installation of the secure store unit, the non-domestic wastewater treatment plant and the provision of an extended internal access road in Phase 9 do have an interaction with the surface water drainage, but the mitigation proposed minimises the risk to an acceptable level.

This report demonstrates that the Surface Water Drainage design and management during the Phase 9 Works meets the requirements of conditions 60 and 79 of the North York Moors National Park Authority (NYMNPA) planning permission NYM/2014/0676/MEIA, as subsequently varied by NYM/2017/0505/MEIA.

As a result of the Phase 9 works, Land Drainage Consent will be required for the new outfall from the non-domestic wastewater treatment plant.

## References

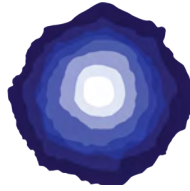
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- [1] North York Moors National Park Authority planning permission NYM/2014/0676/MEIA and as subsequently varied by NYM/2017/0505/MEIA.
- [2] NYMNP 60 and 79 Surface Water Drainage Scheme, 40-ARI-WS-71-PA-RP-1050\_0\_IFU\_20170403 SWD DoC 60\_79, Rev 0, Arup, April 2017.
- [3] NYMNP 60 and 79 Surface Water Drainage Scheme, 40-ARI-WS-7100-CI-RP-01001\_0\_IFU\_20180831 SWD DoC 60\_79, Rev 0, Arup, August 2018.

## **Appendix A**

### **Phase 9 - Surface Water Drainage Layout**





Project Title / Facility Name:  
**North Yorkshire Polyhalite Project**

Document Title:  
**CONSTRUCTION AND OPERATIONS PHASE GROUND AND SURFACE WATER MONITORING SCHEME (NYMNP 46- PHASE 9)**

NYMNP  
23/01/2019

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**40-FWS-WS-70-WM-PL-0020**



**SIRIUS MINERALS PLC - DISCHARGE OF PLANNING CONDITIONS FOR PLANNING PERMISSION NYM/2014/0676/MEIA (AS VARIED BY NYM/2017/0505/MEIA), NORTH YORKSHIRE POLYHALITE PROJECT**

<b>CONDITION</b>	<b>NYMNPA 46</b>
<b>REPORT</b>	<b>CONSTRUCTION AND OPERATION PHASE GROUND AND SURFACE WATER MONITORING SCHEME (NYMNPA 46 – Phase 9)</b>
<b>SITE</b>	<b>PHASE 9 WORKS AT WOODSMITH MINE, NORTH YORKSHIRE</b>
<b>DOCUMENT NUMBER</b>	<b>40-FWS-WS-70-WM-PL-0020</b>

1433DevOR427 Rev02/January 2019

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 Company Registration No. 3944252



<b>PROJECT NUMBER</b>	1433Dev	
<b>PROJECT TITLE</b>	NORTH YORKSHIRE POLYHALITE PROJECT	
<b>CLIENT</b>	Sirius Minerals Plc Resolution House Lake View Scarborough YO11 3ZB	
<b>REPORT TITLE</b>	Construction and Operation Phase Ground and Surface Water Monitoring Scheme (NYMNP 46 – Phase 9)	
<b>REPORT REFERENCE</b>	1433DevOR427	
<b>DOCUMENT NUMBER</b>	40-FWS-WS-70-WM-PL-0020	
<b>REVISION</b>	<b>Date</b>	<b>Checked</b>
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## CONSTRUCTION AND OPERATION PHASE GROUND AND SURFACE WATER MONITORING SCHEME (NYMNP 46 – PHASE 9)

### 1 INTRODUCTION

#### 1.1 General Background

This document has been prepared on behalf of Sirius Minerals Plc and provides the Construction and Operation Phase Groundwater and Surface Water Monitoring Scheme for the Phase 9 Works at Woodsmith Mine. This is required to discharge Condition 46 of the North York Moors National Park (NYMNP) planning permission NYM/2014/0676/MEIA (as varied by NYM/2017/0505/MEIA).

This document details the hydrological, hydrogeological and ecological monitoring to be undertaken from commencement of the Phase 9 Works, as defined in Section 1.2 below.

#### 1.2 Phase 9 Works

Provided below are details of the proposed Phase 9 Works, which will be undertaken concurrently with the Phase 4a to 8 works.

- installation of the temporary secure storage unit;
- installation and operation of first stage of non-domestic waste water treatment plant (NDWWTP);
- installation and commissioning of compressors and ventilation;
- assembly and installation of the Galloway;
- extension of internal access road; and,
- installation of environmental fence to facilitate use of rejection pad for temporary HGV parking.

#### 1.3 Compliance with Conditions

Table 1 sets out the wording of Planning Condition 46 to Planning permission Ref No. NYM/2014/0676/MEIA (as varied by NYM/2017/0505/MEIA) and details where the relevant material, to comply with this condition, has been provided within this report:-

**Table 1 - Summary of Planning Condition 46 and where Relevant Details are provided in this Report**

NYMNP 46	Compliance with Condition 46
The scheme shall include: -	
Details of the number, type and location of monitoring points;	Section 2 of this document and Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
A protocol for the removal and replacement of any existing monitoring points;	Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
Details of the frequency of monitoring during construction and operation;	Section 2 of this document and Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
A list of the ground and surface water determinands to be tested for;	Section 2 of this document and Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
Monitoring of ground water levels and spring flows;	Phase 4 & 4A GW&SWMS (Ref. 1 & 2)

<b>NYMNP 46</b>	<b>Compliance with Condition 46</b>
Monitoring of surface water quality including sediment, BOD, ammonia, pH;	Section 2 of this document and Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
Geomorphology in Sneaton Thorpe Beck	Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
A list of SAC/SSSI habitat measures to be tested for;	Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
Groundwater quality and level triggers;	Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
Surface water quality triggers;	Section 2 of this document and Phase 4 GW&SWMS (Ref. 1)
Surface water geomorphology triggers;	Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
SAC/SSSI habitat triggers	Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
Monitoring of groundwater quality against groundwater triggers;	Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
A scheme for periodic review and refinement of the monitoring regime to take account of any approved changes to site layout/design, construction methods and monitoring data;	Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
A protocol for notifying the MPA of any breach of the Trigger Values, including the timing of any such notification;	Section 2 of this document and Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
Details of the method and frequency with which monitoring results will be shared with the MPA, Natural England and the Environment Agency;	Section 2 of this document and Phase 4 & 4A GW&SWMS (Ref. 1 & 2)
The approved scheme shall thereafter be implemented in full, with monitoring continuing in accordance with the approved scheme until such time that it is agreed in writing by the MPA in consultation with Natural England and the Environment Agency that monitoring may cease.	Section 2 of this document and Phase 4 & 4A GW&SWMS (Ref. 1 & 2)

## 2 MONITORING

### 2.1 General

In the following sections, the requirements for undertaking additional monitoring for the Phase 9 Works are presented to supplement the concurrent ongoing Phase 4 to 8 monitoring regimes. This includes details of the monitoring locations, frequency of monitoring, determinants to be analysed for, Control and Compliance Trigger Values and reporting procedures.

The scope has been determined specifically to enable monitoring of the Phase 9 Works, as outlined in the Phase 9 Surface Water Drainage Scheme (Ref. 12). The changes from the existing and ongoing Phase 4a to 8 monitoring schemes (Refs. 8 and 9) are summarised as follows:-

**Table 2 - Summary of Changes to the Scope of Existing Monitoring**

Meteorology	No changes.
Groundwater levels	No changes - the existing Phase 4A to 8 monitoring schemes are sufficient to monitor changes in groundwater levels from the Phase 9 Works that may affect the receptors.
Groundwater Quality	No changes - the existing Phase 4A to 8 monitoring schemes are sufficient to monitor changes in groundwater quality from the Phase 9 Works that may affect the receptors.
Springs	No changes - the existing Phase 4A to 8 monitoring schemes are sufficient to monitor flow rates and spring quality from the Phase 9 Works that may affect the receptors.
Surface Water	In addition to surface water quality monitoring ongoing from previous phases, supplementary surface water monitoring will be undertaken of the discharge from the first stage of the non-domestic waste water treatment plant and surface water monitoring upstream and downstream of the outflow as described in Section 2.3. Additional chemical analysis will be undertaken for potential contaminants of concern associated with the groundwater processed through the NDWWTP, as described in Section 2.3.
Ecology	No changes - the existing Phase 4A to 8 monitoring schemes are sufficient to monitor the ecological receptors.

## 2.2 Surface Water Quality Monitoring

### 2.2.1 Objectives

The requirements for undertaking additional monitoring for the Phase 9 works are presented in terms of the monitoring locations, frequency of monitoring, determinants to be analysed for, Control and Compliance Trigger Values and reporting procedures. Monitoring of the previous stages 5 to 8 remains unchanged.

The purpose of the surface water monitoring strategy is to detect chemical and physical impact on surface waters within Sneaton Thorpe Beck caused by the Phase 5 to 9 Works, so that appropriate remedial measures can be adopted should potentially detrimental impacts arise.

From the results of the Revised Hydrogeological Risk Assessments (Ref. 1 to 7) and the Surface Water Drainage Scheme (Ref. 12), potential impacts on Sneaton Thorpe Beck that could arise from the Phase 9 Works, and therefore require evaluation by the surface water monitoring strategy include:-

- Chemical pollution in the form of pH, heavy metals, hydrocarbon (fuel, hydraulic oil, lubricant oil) spillage or leakage from construction plant, silt/particulate suspended solids and slurry materials from the NDWWTP discharging into controlled waters.
- Physical impacts of the groundwater and surface water discharges to the surface water outfall on Sneaton Thorpe Beck by causing siltation, scour or erosion of the stream bed.

### 2.2.2 Monitoring Locations

To meet the above objectives, two locations (STB 6 and OF9), as detailed in Table 8 and shown on Drawing 1433DevOD388, will be sampled for insitu testing, as detailed in Section 2.3.4.

**Table 8 – Additional Surface Water Monitoring Location – Sneaton Thorpe Beck**

Monitoring Location	Coordinates	Monitoring
STB6	489882 E, 505112 N To be confirmed on site to arrange safe access	Monitoring of Sneaton Thorpe Beck upstream of the outflow point from the NDWWTP.
STB1	499621, 505388	Monitoring of Sneaton Thorpe Beck downstream of the outflow point from the NDWWTP.
OF9	Outfall from the NDWWTP 489881 E, 505130 N	Monitoring of the outflow discharge pipe of the treated groundwater from the shaft excavations through the NDWWTP prior to entering in to Sneaton Thorpe Beck.

### 2.2.3 Monitoring Frequency

Sampling for laboratory surface water quality analysis will be undertaken at the following intervals.

**Table 9 - Surface Water Quality Monitoring Frequency**

Monitoring Phase	Duration	Frequency
Pre commencement operation of the NDWWTP at STB6 and STB1	3 months prior to commencement of operation of the NDWWTP	Fortnightly
Phase 9 Works operation of the NDWWTP at OF9, STB6 and STB1	Ongoing throughout the operational lifetime of the NDWWTP.	Weekly

Monitoring of surface water quality will continue throughout the operational lifetime of the NDWWTP following completion of the Phase 9 works and until it has been demonstrated that no significant variance from the Control Trigger Value has occurred and no exceedance above the Compliance Limits detailed below has been detected.

Phase 9 Works are scheduled to be concurrent with the ongoing Phase 5 to 8 Works. Consequently an assessment of any Control and Compliance Trigger Value breaches will evaluate the cumulative impact of Phases 4A to 8 to determine the cause and appropriate remedial actions.

### 2.2.4 Surface Water Data

#### **Surface Water Quality Analysis**

To meet with the surface water monitoring objectives, the minimum baseline suite of analysis will include both onsite water analysis and laboratory testing, as detailed below. The suite of determinands will include the specific Contaminants of Concern (CoC) identified by the Hydrogeological Risk Assessment within the Environmental Permit (Ref 13). In addition, NYMNPA have advised within Condition 46 that they also require the surface water quality analysis to include pH, sediment (suspended solids), Biological Oxygen Demand (BOD) and ammonia (Section 1.3).

Presented below are details of the onsite monitoring and of the sampling and laboratory testing that will be undertaken to obtain the surface water data for the Phase 9 construction and operational works. All chemical analysis will be undertaken by an MCERTS accredited laboratory.

## Sampling

During the sampling visits, surface water from the outflow point to the NDWWTP, monitoring point (OP9), and surface water upstream (STB6) and downstream (STB1) of the outflow point will be sampled.

## Onsite Monitoring

Visual inspection will be undertaken of the outflow and surface water to observe for evidence of high suspended solids, discolouration or hydrocarbon pollution.

On site monitoring using calibrated equipment will be undertaken for the following determinants:-

- Temperature;
- pH;
- Electrical Conductivity;
- Total Dissolved Solids; and
- Turbidity.

## Laboratory Analysis

The chemical analysis will be undertaken for the following suite of determinants:-

**Table 10 – Surface Water Quality Determinants to be Analysed**

Determinant	Units	Detection Limit
pH	-	1
Chloride	mg/l	0.1
Conductivity	uS/cm	1
Suspended Solids	mg/l	5
Biological Oxygen Demand (BOD)	mg/l	1
Sulphate	mg/l	0.1
Alkalinity as CaCO <sub>3</sub>	mg/l	10
Ammoniacal Nitrogen	mg/l	0.00015
Arsenic	mg/l	0.00016
Cadmium	mg/l	0.00003
Chromium III	mg/l	0.0001
Chromium VI	mg/l	0.0001
Cobalt	mg/l	0.0002
Copper	mg/l	0.0004
Iron (Dissolved)	mg/l	0.00055
Lead	mg/l	0.00009
Mercury	mg/l	0.00005
Nickel	mg/l	0.0005
Zinc	mg/l	0.00125
EPH	mg/l	0.01

### 2.2.5 Assessment Control and Compliance Trigger Values

#### Surface Water Quality Control and Compliance Trigger Values

Surface Water Quality (SWQ) Control Trigger Values have been set from baseline surface water data. The SWQ Control Trigger Value has been set at a value equivalent to the mean baseline value plus 2 x the Standard Deviation for that dataset (unless otherwise stated in the table below. As only limited baseline data is available for some determinands, the following Control and



Compliance trigger values should be reviewed prior operation of the NDWWTP, and where necessary, revised prior to commencement of the Environmental Permit Application activities to reflect the full baseline quality data available.

The Compliance Value has been set at the appropriate Environmental Quality Standard (EQS) or the minimum baseline value where this exceeds the EQS value. Where the analytical detection limit (MRV) has been adopted as the Compliance Trigger Value, then no Control Trigger Value is included, as presented below.

**Table 11 - Control and Compliance Trigger Values for Surface Waters**

Contaminant of Concern	Units	Surface Water Quality Control Trigger Value	Surface Water Quality Compliance Trigger	Source of Compliance Value
Turbidity	ftu	25	50	Max Baseline Value
pH		4.3 – 8.0	4.2 – 8.3	Max Baseline Range
Chloride	mg/l	122	250	EQS
Conductivity	uS/cm	1,180	2,500	EQS
Suspended Solids	mg/l	25	50	EQS
Biological Oxygen Demand	mg/l	4.7	6.4	Max Baseline Value
Sulphate	mg/l	34.4	400	EQS
Alkalinity as CaCO <sub>3</sub>	mg/l	NA	NA	NA
Ammoniacal Nitrogen as NH <sub>3</sub>	mg/l	0.73	1.80	Max Baseline Value
Arsenic	ug/l	0.82	50	EQS
Cadmium	ug/l	0.18	0.45	EQS
Chromium III	ug/l	17.6	32	EQS
Chromium VI	ug/l	<3	3.4	EQS
Cobalt	ug/l	0.0015	0.1	EQS
Copper	ug/l	1.2*	1.8	Max Baseline Value
Iron (Dissolved)	ug/l	683	1,000	EQS
Lead	ug/l	7.9	14	EQS
Mercury	ug/l	0.01	0.07	EQS
Nickel	ug/l	2.5	34	EQS
Zinc	ug/l	27.23	35.7	Max Baseline Value
EPH*	ug/l	14	18	Max Baseline Value
naphthalene	ug/l	0.000007	0.13	EQS
fluoranthene	ug/l	0.000012	0.00012	EQS
benzo(b)fluoranthene	ug/l	0.000012	0.00002	Max Baseline Value
benzo(k)fluoranthene	ug/l	0.000007	0.000017	EQS
benzo(a)pyrene	ug/l	0.000007	0.00027	EQS
benzo(g,h,i)perylene	ug/l	0.000007	0.00001	Max Baseline Value

NB:- \* +1 SD

### 3 MONITORING REPORTING

Reporting of the Phase 9 monitoring will be undertaken as set out in the Phase 4 Construction and Operation Groundwater and Surface Water Monitoring Scheme (Ref. 8).

C MILLER  
ASSOCIATE DIRECTOR

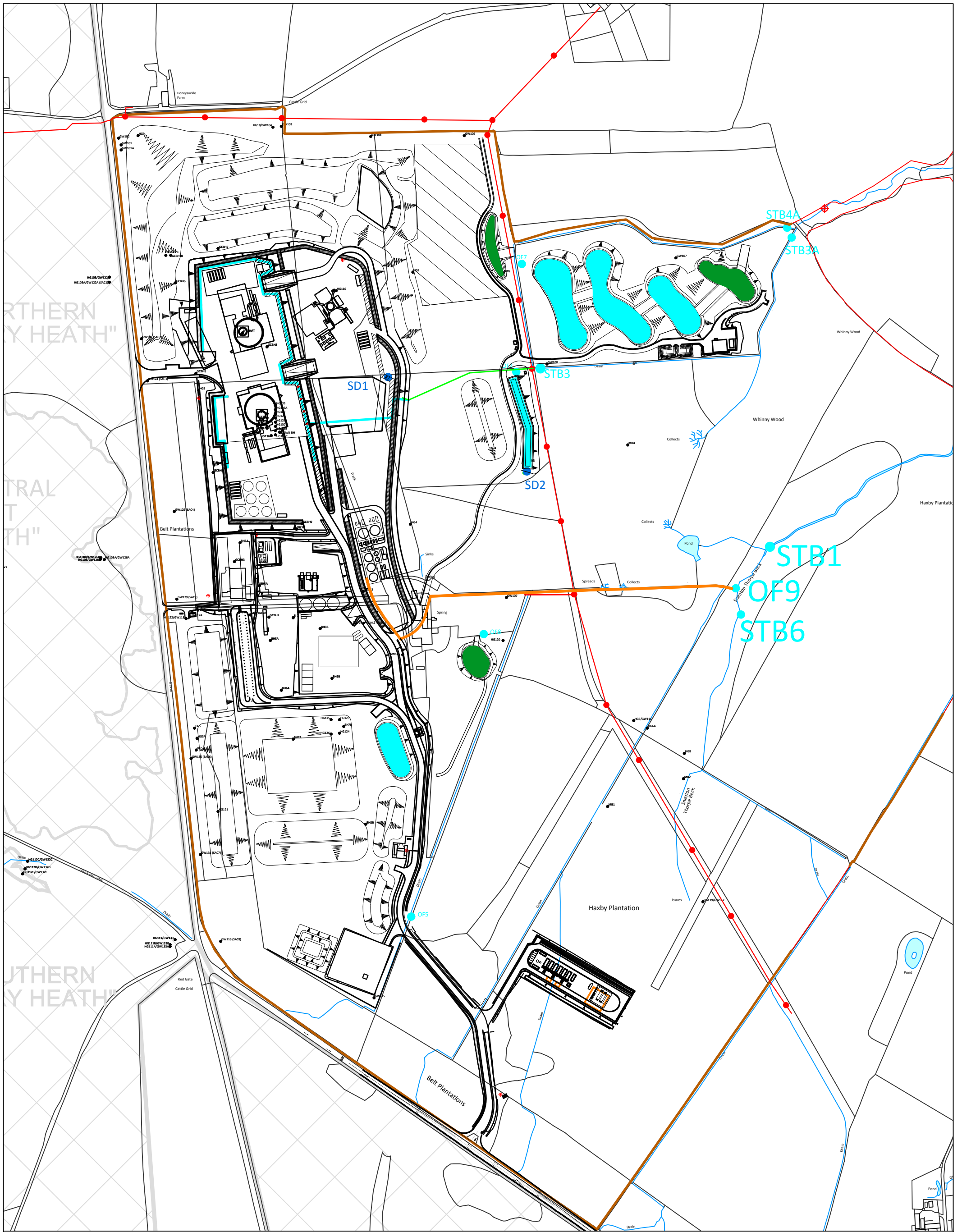
R IZATT-LOWRY  
DIRECTOR

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- 4 FWS Consultants Ltd, 2018. Hydrogeological Risk Assessment for Phase 6 Works at Woodsmith Mine, North Yorkshire. Doc. Ref. No. 1433DevOR396.
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- 11 FWS Consultants Ltd, 2018. Groundwater Management Scheme for Woodsmith Mine Phase 7 Works. Doc. Ref. No. 1433DevOR400.
- 12 Arup, January 2019. NYMNPA 60 & 79 Surface Water Drainage Scheme. Ref. 40-ARI-WS-7100-CI-RP-01004.
- 13 Arup, October 2018, Shallow groundwater environmental permit supporting information and non-technical summary. Ref. 40-ARI-WS-1000-PE-EN-00001

# **APPENDIX 1**

## **DRAWING**



**NOTES / KEY**

**DRAWING TITLE**

PHASE 9 SUPPLEMENTARY  
SURFACE WATER  
MONITORING LOCATIONS

**PROJECT TITLE**

YORK POTASH PROJECT

**CLIENT**  
SIRIUS MINERALS PLC

**STATUS**  
FINAL

**DRAWN BY**  
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**SCALE**  
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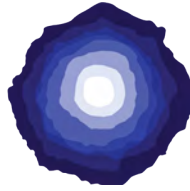
**PROJECT NUMBER**  
1433Dev

**DATE**  
January 2019

**DRG. No.**  
1433DevOD388

**FWS** Geological & Geo-Environmental Consultants

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Project Title / Facility Name:  
**North Yorkshire Polyhalite Project**

Document Title:  
**REMEDIAL ACTION PLAN - RAP - (NYMNP 46 - PHASE 9)**

NYMNP 46  
23/01/2019

**Document Review Status**

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| <input checked="" type="checkbox"/> | 1. Reviewed – Accepted – Work May Proceed                            | By: Robert Staniland  |
| <input type="checkbox"/>            | 2. Reviewed – Accepted As Noted, Work May Proceed, Revise & Resubmit | On: 23 Jan 2019 15:41 |
| <input type="checkbox"/>            | 3. Reviewed – Work May Not Proceed, Revise & Resubmit                |                       |
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**40-FWS-WS-70-WM-PL-0021**

**SIRIUS MINERALS PLC - DISCHARGE OF PLANNING CONDITIONS FOR  
PLANNING PERMISSION NYM/2014/0676/MEIA (AS VARIED BY  
NYM/2017/0505/MEIA),  
NORTH YORKSHIRE POLYHALITE PROJECT**

<b>CONDITION</b>	<b>NYMNPA 46</b>
<b>REPORT</b>	<b>REMEDIAL ACTION PLAN (NYMNPA 46 – PHASE 9)</b>
<b>SITE</b>	<b>PHASE 9 WORKS AT WOODSMITH MINE, NORTH YORKSHIRE</b>
<b>DOCUMENT NUMBER</b>	<b>40-FWS-WS-70-WM-PL-0021</b>

1433DevOR428 Rev01/January 2019

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<b>PROJECT NUMBER</b>	1433	
<b>PROJECT TITLE</b>	NORTH YORKSHIRE POLYHALITE PROJECT	
<b>CLIENT</b>	Sirius Minerals plc Resolution House Lake View Scarborough YO11 3ZB	
<b>REPORT TITLE</b>	Remedial Action Plan (NYMNPA 46 – Phase 9)	
<b>REPORT REFERENCE</b>	1433DevOR428	
<b>DOCUMENT NUMBER</b>	40-FWS-WS-70-WM-PL-0021	
<b>REVISION</b>	<b>Date</b>	<b>Approved</b>
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## REMEDIAL ACTION PLAN (NYMNPA PHASE 46 - PHASE 9)

### 1 INTRODUCTION

#### 1.1 General Background

This document has been prepared on behalf of Sirius Minerals Plc and provides an addendum to the Remedial Action Plan for the Phase 4a Works at Woodsmith Mine (Ref. 1) to include the additional remedial actions required to accommodate for the Phase 9 Works that will run concurrently with the Phase 5 to 8 works. The scope of the Phase 9 Works is detailed in Section 1.3. This is required to satisfy Condition 46 of the North York Moors National Park Authority (NYMNPA) planning permission NYM/2014/0676/MEIA (as varied by NYM/2017/0505/MEIA).

This document details the remedial actions required should monitoring, undertaken in accordance the Ground and Surface Water Monitoring Scheme for the Phase 9 Works (Ref. 2), identify breaches of the defined Control Trigger Values.

#### 1.2 Objectives

The purpose of this document is to:-

- Provide a list of individuals (and their contact details) who are responsible for identifying and investigating a Trigger Value breach.
- Provide a procedure for investigating and escalating a Trigger Value breach, and for informing the appropriate regulator (the Environment Agency).
- Provide a list of individuals and organisations to be informed in the event of a breach or a confirmed departure from the established baseline.
- Detail actions to protect the environment in the event of a suspected or confirmed environmental incident or departure from the established baseline.

#### 1.3 Phase 9 Works

The Phase 9 Works will be undertaken concurrently with the Phase 5 to 8 works and the element that may require additional remedial action includes the following:-

- installation and operation of first stage of non-domestic waste water treatment plant (NDWWTP).

#### 1.4 Compliance with Conditions

Table 1 sets out the wording of Planning Condition 46 to Planning Consent Ref. No. NYM/2014/0676/MEIA (as varied by NYM/2017/0505/MEIA) and details where the relevant material, to comply with this condition, has been provided within this report:-

**Table 1 - Summary of Planning Condition 46 and where Relevant Details are provided in the Report**

<b>NYMNP 46</b>	<b>Compliance with Condition 46</b>
The scheme shall include: -	
Prior to commencement of each Phase of Construction at Doves Nest Farm a Remedial Action Plan, setting out the remedial actions to be taken in the event that any monitoring triggers of the approved Construction and operation Phase Ground and Surface Water Monitoring Scheme are exceeded, shall be submitted to and approved in writing by the MPA in consultation with the Environment Agency.	Sections 1 to 6
Should any monitoring results exceed those triggers set out in the approved Construction and Operation Phase Ground and Surface Water Monitoring Scheme, the MPA, the Environment Agency and Natural England shall be informed as soon as possible, and the approved Remedial Action Plan shall thereafter be implemented as soon as possible and within one month of the relevant monitoring trigger having been exceeded. Following remedial action, monitoring in accordance with the Construction and Operation Phase Ground and Surface Water Monitoring Scheme will be undertaken in accordance with the timescale to be submitted to and approved by the MPA in consultation with the Environment Agency, the results of which shall be reported to the MPA within four weeks of the monitoring date.	Sections 2 to 5

## 2 RESPONSIBILITIES AND CONTACTS

### 2.1 Parties Responsible for Identifying and Investigating a Trigger Value Breach

Table 2 presents the details of the individuals and their contact information for the parties responsible for identifying and investigating a Trigger Value breach.

**Table 2 - Parties Responsible for Identifying and Investigating a Trigger Value Breach**

Contact Name	Position	Company	Contact Details	Responsibility
Robert Staniland	Environment Manager	Sirius Minerals	Resolution House Lake View	Coordination of Environmental Activities within the Development
Robert Staniland	Environment Manager	Sirius Minerals	Scarborough YO11 3ZB +44 7775585456	Monitoring of ground and surface water in accordance with the Ground Water Management Scheme.
Grahame Clarke	Project Manager	Sirius Minerals		Operation of the NDWWTP

### 2.2 Parties to be informed in the Event of a Breach/Departure from Baseline Conditions

In accordance with Condition 46, Table 3 presents those individuals and organisations who are to be informed in the event of a breach:-

**Table 3 Parties to be informed in the Event of a Breach/Departure from Baseline Conditions**

Contact Name	Position	Company/ Regulatory Body	Contact Details
Robert Staniland	Environment Manager	Sirius Minerals	Resolution House Lake View Scarborough YO11 3ZB +44 7775585456
Grahame Clarke	Project Manager	Sirius Minerals	
Fraser Thomlinson / Ruth Buckley	Planning Liaison Officer / Yorkshire Area Groundwater and Contaminated Land Team	Environment Agency	Lateral 8 City Walk Leeds LS11 9AT

### 3 PROCEDURE FOR EVALUATING BREACHES IN TRIGGER VALUES

#### 3.1 General

A Phase 9 Groundwater and Surface Water Monitoring Scheme (Ref. 2) has been prepared that details the requirements for monitoring the surface water discharge from operation of the NDWWTP, which is treating construction waters generated from the shaft sinking works at the Service, Production and MTS shafts, prior to its discharge into the Sneaton Thorpe Beck surface water. This monitoring is to be undertaken in addition to the monitoring strategy already specified for groundwaters, spring waters and surface waters for the Phase 4a to 8 Works, as detailed in the Ground and Surface Water Monitoring Scheme for the Phase 4a to 8 Works (Refs. 3 and 4).

The Ground and Surface Water Monitoring Scheme (Ref. 2) details the Control and Compliance Trigger Values that the monitoring data will be assessed against.

Where breaches of the Control Trigger Values occur, the procedure to evaluate and record the remedial actions required, will be as set out in Section 3.1 of the Remedial Action Plan.

#### 3.2 Surface Water Quality

##### 3.2.1 Surface Water Quality Assessment Procedures

Appendix 1.1 presents the procedure for assessing breaches of surface water quality (SWQ) Control Trigger Values during the Phase 9 Works. It presents a summary of the sequence of activities and respective timescales for each stage, for which details are provided below.

##### 3.2.2 Monitoring Appraisal

The purpose of the monitoring strategy of the discharge from the NDWWTP drainage system and the receiving surface water course, is to detect potential chemical and physical impacts of the discharge on Sneaton Thorpe Beck. In the event of an adverse impact being detected, the objective of the appraisal is to determine the cause, so that appropriate remedial measures can be adopted in the construction water pre-treatment system prior to discharge to the Shaft Platform surface water drainage system.

Monitoring will be undertaken, as detailed in Ref. 2, (Drawing 1433DevOD388, Appendix 1) including:-

- At the discharge point (OP9) to monitor the water quality from the NDWWTP.
- Upstream of the outflow point (STB6) to monitor the background water quality of Sneaton Thorpe Beck.
- Downstream of the outflow point, (STB1) to monitor the water quality entering and combining with Sneaton Thorpe Beck

Analytical testing in the field will consist of pH, temperature, electrical conductivity, total dissolved solids, turbidity and visual inspection of the monitoring locations. Samples will be analysed at a laboratory for:-

- pH,
- Conductivity,
- Suspended Solids,
- Chloride,
- Biological Oxygen Demand,
- Sulphate,
- Alkalinity as CaCO<sub>3</sub>,
- Ammoniacal Nitrogen as NH<sub>3</sub>,
- Arsenic,
- Cadmium, Chromium III,
- Chromium VI,
- Cobalt,
- Copper,
- Iron (dissolved),
- Lead,
- Mercury,
- Nickel,
- Zinc,
- EPH,
- Speciated Polycyclic Aromatic Hydrocarbons (including, Benzo(a)pyrene, fluoranthene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, and Naphthalene),

SWQ Control and Compliance Trigger Values are presented in Ref. 2. The NDWWTP will be inspected on a daily basis to ensure that it is in good working order. This will include as a minimum oil interceptors, filters and associated tanks. Any visible impact on the surface water courses will be identified and considered in conjunction with the field turbidity readings and their respective background concentrations, such as cloudy discharge due to suspended solids.

The monitoring will be assessed by consideration of the construction/operation activities, as determined from a visual site inspection of the operations, and the meteorological conditions, to identify the cause of a specific breach.

### 3.2.3 Consultation with Project Manager and Planning Remedial Actions

The recorded breach of any SWQ Control Trigger Value and the findings of the inspection will be evaluated by the Environment Manager in consultation with the Project Manager to determine the cause of the breach and what appropriate course of remedial action will be taken.

The remedial actions will be designed specific to the cause and form of the breach in terms of pollution, erosion, siltation or adverse impact where the breach has been recorded.

### 3.2.4 Implementing Remedial Actions

Where remedial actions are specified, related to a breach in SWQ Control Trigger Values, they will be advised to the Director of Operations and the Environment Manager (as detailed in Section 2.2), and implemented by the Project Manager.

A natural (non-site related) breach of the SWQ Control Trigger Value may require an adjustment of the SWQ Control Trigger value, in line with the revised baseline conditions, as described in the Ground and Surface Water Management Scheme (Ref. 2).

Remedial actions for a breach of SWQ Control Trigger Values may include, but not be limited to, changes to the pre-treatment methodology for the construction waters generated from the shaft excavation works and maintenance of the NDWWTP.

## 4 REPORTING

All breaches in Surface Water Quality Control Trigger Values or visually identified impacts observed and remedial actions implemented will be reported on a weekly basis during the Phase 9 Works. That report will detail the breach that occurred, the weekly construction/operation activities and meteorological conditions preceding the breach, the results of the site inspection/monitoring, the established cause of the breach in Trigger Values and the remedial action specified together with the timescale for it to be implemented.

Where Control Trigger Value breaches are identified associated with the Phase 9 Works which run concurrently with Phases 5 to 8, a record of the insitu test results and site observations will be issued to those identified in Section 2.2 within 24 hours of the breach. Where visual evidence of adverse impacts associated with the Phase 9 Works are identified, the inspection report and remedial action specified and taken will be issued to those identified in Section 2.2 within 24 hours of that breach.

## 5 TIMESCALES

A cumulative report detailing the assessment of monitoring and inspection results for surface water quality, recording any breaches in Control Trigger Values or visually identified impacts observed and remedial actions to be implemented will be prepared on a weekly basis. The reports will be issued to the relevant regulators listed in Section 2.2 where a breach in Trigger Value or an impact is visually observed.

Control Trigger Value breaches will be investigated within one day and the remedial action required implemented within two days of receipt of the monitoring results reporting the breach.

C MILLER  
ASSOCIATE DIRECTOR

R IZATT-LOWRY  
DIRECTOR

## 6 REFERENCES

- 1 FWS Consultants Ltd. 2017. Remedial Action Plan for Woodsmith Mine Phase 4a Works (1433DevOR380).
- 2 FWS Consultants Ltd. 2019. Ground and Surface Water Monitoring Scheme for Woodsmith Mine Phase 9 Works (1433DevOR427).
- 3 FWS Consultants Ltd. 2018. Ground and Surface Water Monitoring Scheme for Woodsmith Mine Phase 4a Works (1433DevOR379).
- 4 FWS Consultants Ltd. 2018. Hydrological Risk Assessment for Woodsmith Mine Phase 7 Works (1433DevOR398).

## APPENDIX 1

### PROCEDURE FOR ADDRESSING TRIGGER VALUE BREACH FOR SURFACE WATER QUALITY

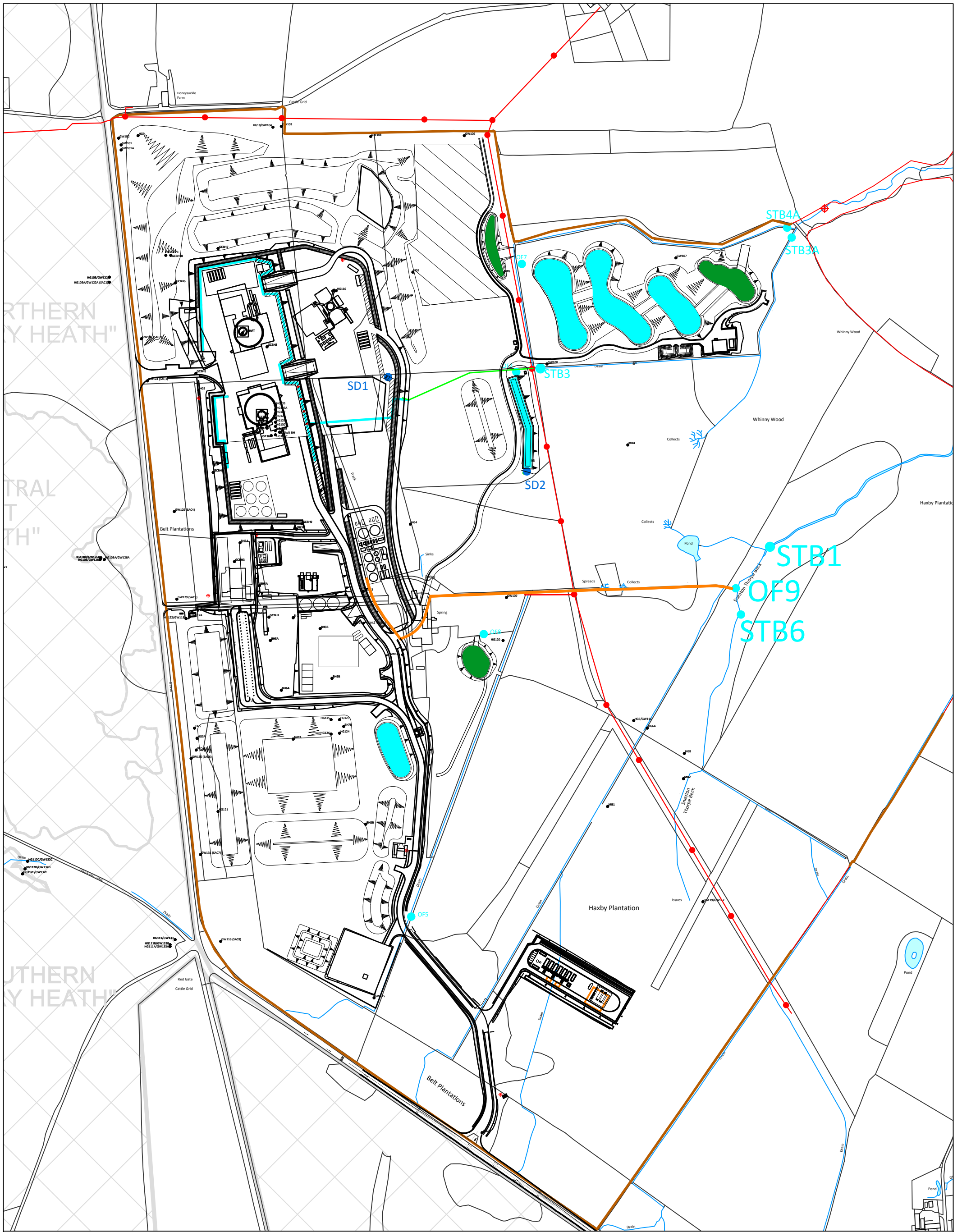


**PROCEDURE FOR ADDRESSING TRIGGER VALUE BREACH FOR SURFACE WATER QUALITY**

Procedure	Responsibility	Control Trigger Value Breach
		Surface Water Quality
Inspection	Environment Manager	<p>A review will be undertaken of the NDWWTP operations, plant maintenance records and construction water treatment prior to discharge of the construction waters to Sneaton Thorpe Beck, up to and during the period of breach.</p> <p>The visual inspection of the ongoing works will include inspection of the NDWWTP, oil separators for evidence of hydrocarbon breaches, inspection of filters, coagulant, flocculant and pH correction, tanks, flow meters, pipes work for breaches and outfall for evidence of cloudy discharges and to provide a record of the turbidity value recorded.</p>
Consultation with Project Manager and Planning Remedial Actions	Environment Manager/ Project Manager	Evaluate the findings of the plant maintenance record review and review of the monitoring and visual observations to determine the cause of the physical or chemical change in surface water conditions and design the appropriate course of remedial action, if required.
Implementing Remedial Actions	Project Manager/ Environmental Manager/ Environment Manager	<p>Maintenance clearance of oil separators.</p> <p>Maintenance of all filters.</p> <p>Maintenance of silt management and pH augmentation.</p> <p>Maintenance to the NDWWTP.</p> <p>Changes to the treatment methodology for the construction waters generated from the excavation works.</p> <p>Use absorbent spill pads and booms where necessary</p> <p>Changes to working practices (CEMP).</p>
Reporting	Environment Manager	Report to include details of breach, inspection, and remedial actions
Timescale		One day to identify the cause, design and implement remedial actions required.

## APPENDIX 2

### DRAWINGS



**NOTES / KEY**

**DRAWING TITLE**

PHASE 9 SUPPLEMENTARY  
SURFACE WATER  
MONITORING LOCATIONS

**PROJECT TITLE**

YORK POTASH PROJECT

**CLIENT**  
SIRIUS MINERALS PLC

**STATUS**  
FINAL

**DRAWN BY**  
CM

**SCALE**  
1:4,000@A3/1:2,000@A1

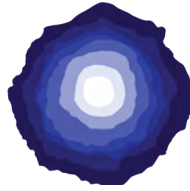
**PROJECT NUMBER**  
1433Dev

**DATE**  
January 2019

**DRG. No.**  
1433DevOD388

**FWS** Geological & Geo-Environmental Consultants

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Project Title / Facility Name:  
**North Yorkshire Polyhalite Project**

Document Title:  
**PHASE 9 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)**

<p style="text-align: center;">NYMNPA</p> <p style="text-align: center;">23/01/2019</p>
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**Document Review Status**

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| <input type="checkbox"/>            | 2. Reviewed – Accepted As Noted, Work May Proceed, Revise & Resubmit | On: 22 Jan 2019 15:57 |
| <input type="checkbox"/>            | 3. Reviewed – Work May Not Proceed, Revise & Resubmit                |                       |
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**40-RHD-WS-70-EN-PL-0038**

# REPORT

## **Phase 9 - Woodsmith Mine Construction Environmental Management Plan**

Woodsmith Mine Phase 9 - CEMP

Client: Sirius Minerals PLC

Reference: 40-RHD-WS-70-EN-PL-0038 REV 0

Revision: 01/Final

Date: 22 January 2019

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Document title: Phase 9 - Woodsmith Mine Construction Environmental Management Plan

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Project name: Sirius North Yorkshire Polyhalite Project  
Project number: PB1110  
Author(s): Charlotte Goodman

Drafted by: Charlotte Goodman

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Checked by: Alasdair Baxter

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Date / initials: 22/01/19 AB

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Approved by: Alasdair Baxter

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Date / initials: 22/01/19 AB

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Classification

Project related



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## 1 Introduction

### 1.1 Purpose of Document

- 1.1.1 In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to the North York Moors National Park Authority (NYMNPA) for permission to develop a polyhalite mine and underground Mineral Transport System (MTS). Planning permission was subsequently granted in 2015 subject to conditions, as varied in February 2018 by NYM/2017/0505/MEIA.
- 1.1.2 This Construction Environmental Management Plan (CEMP) has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) for the Phase 9 Works at Woodsmith Mine (as described in paragraph 1.2.1 below).
- 1.1.3 This document is required to partially discharge condition NYMNPA-93. This planning condition states that:

Table 1-1 Condition NYMNPA-93: Construction Environmental Management Plan

NYMNPA-93	Compliance with Condition NYMNPA 93
Prior to the commencement of each Phase of Construction in accordance with the approved Phasing Plan at either Dove's Nest Farm or Lady Cross Plantation, an updated CEMP shall be based on the approved Construction Method Statement (CMS) and shall be submitted to and approved in writing by the MPA in consultation with the Environment Agency in respect of the area concerned. The CEMP shall include details of:	This version of the CEMP is for Phase 9 as defined in Section 1.2 below.  Earlier versions of the CEMP have been produced for preceding works.
The size, location and design of any site compounds, including how any potentially polluting materials will be stored to minimise the risk of pollution;	Section 3.2, 3.3, Section 3.6 and Section 11.2 Phase 9 Construction Method Statement 40-SMP-WS-7100-PA-MS-00007
An Incident Response Plan to deal with any pollution that may occur during the course of construction;	Section 12
A scheme for the recycling/disposing of waste resulting from demolition and construction works;	Section 11
Storage of waste not covered by the Mine Waste Directive;	Section 11
Measures to control the glare from on-site lighting;	Section 3.4
Measures to manage deliveries by HGV including routing and timing for deliveries and details of the penalty system for breaches of the agreed control;	Section 4
Temporary traffic management;	Not applicable to this Phase

NYMNP-93	Compliance with Condition NYMNP 93
<p>The provision of a Dust Management Plan relating to Phase 1 of the construction period (earth works and bund formation) and Polyhalite handling and stockpiling to include dust generation modelling so as to identify sensitive receptors; likely dust generation and its disposition during the construction Phases and operation over time and under different weather conditions; the avoidance and mitigation measures required to ensure dust deposition levels at the sensitive receptors are maintained at the residual levels identified in the approved EIA, and monitoring arrangements. The Dust Management Plan must comply with the criteria set out in the 'Dust and Air Emission Mitigation Measures' best practice guidance for control of dust on construction sites from the Institute of Air Quality Management 2012. The monitoring arrangements will include dust deposition or dust flux or real-time PM<sub>10</sub> continuous monitoring locations; baseline dust monitoring at least three months before construction commences; daily on-site and off-site inspections at monitoring locations with results recorded in a log to be made available to the MPA on request, and more frequent monitoring during periods of high dust generation;</p>	Section 6
<p>In the event that there is insufficient clay within the Lady Cross Plantation site to form the 1m deep basal layer beneath the spoil storage area, a contingency plan to address the importation of clay, including the source, quantity and quality of such material, and how adverse effects on the water environment would be avoided;</p>	Lady Cross Plantation is not covered in this CEMP as works at that site have been deferred.
<p>How the requirements of the approved CEMP will be disseminated to all relevant staff/ Contractor's throughout the construction period;</p>	Section 2.2
<p>The location of the site notice board;</p>	Section 2.2.7
<p>A scheme for parking, loading, unloading during construction;</p>	Section 4.1.2
<p>A scheme for security and lighting during construction;</p>	Section 3.1 and 3.4

NYMNP-93	Compliance with Condition NYMNP 93
A protocol for the replenishment of tanks and containers including that all refuelling of vehicles, generators, plant and equipment shall be supervised and shall take place within a suitable bunded, impervious hardstanding;	Section 11.2
Contingency proposals for if fuel cannot be delivered for the generators, e.g. due to adverse weather;	40-RHD-WS-70-EN-PL-0014 - Phase 3 CEMP
How those artificial or historically straightened ephemeral surface water channels referenced in sections 15.7.22-15.7.24 of chapter 15 of part 2 of the ES are to be retained wherever possible, and enhanced to increase their capacity (e.g. through the introduction of meanders) and to increase their ability to capture sediment (e.g. through suitable planting);	40-FWS-WS-70-CI-PL-0002 – Phase 3 Surface Water Management Plan Phase 3 CEMP
Proposals / contingency plans for waste not managed as part of the Mine Waste Permit comprising the storage and management of temporary mining waste stored on-site for less than three years (e.g. Pyritic Mudstone); non-inert and non-hazardous materials stored for less than one year, and unexpected hazardous waste stored for less than six months, including measures to prevent the dispersal of dust, leachate and surface water runoff;	Section 11
A Precautionary Method of Working for Site Clearance (PMWSP) which shall be submitted to and agreed in writing by the MPA prior to commencement of Preparatory Works and shall be adhered to thereafter. The PMSWP shall set out proposals for tree clearance and the demolition of structures and shall include that between March and September each year surveys of areas to be cleared should occur no less than 48 hours before clearance occurs so that occupied wild bird nests can be identified and prevented from being destroyed;	Section 7
Alarms fitted to mobile plant and vehicles for the purposes of warning pedestrians of their movements.	Phase 3 CEMP

1.1.4 Additional conditions addressed in this CEMP are detailed in **Table 1-2**.

Table 1-2 Additional Planning Conditions Addressed in the CEMP

Condition	Topic	Compliance with Condition
NYMNPA-52	Protected species	Section 7 Refer to Protected Species Management Plans: 40-RHD-WS-70-EN-PL-0010 Ph3 PSMP for Reptiles; 40-RHD-WS-70-EN-PL-0011 Ph3 PSMP for Badgers; and 40-RHD-WS-70-EN-PL-0012 Ph3 PSMP for Birds. These remain applicable for Phase 9  40-RHD-WS-70-EN-PL-0039 Ph9 PSMP for Bats.
NYMNPA-57	Landscape and ecological management	No works of landscape or ecological management relating to the long-term environment of the mine site will be undertaken during Phase 9. See Section 7.3.  Refer to the Phase 3 Landscape and Ecological Management Plan (LEMP) (40-RHD-WS-70-EN-PL-0008) as this remains applicable for Phase 9
NYMNPA-70	Trees and vegetation	Section 7
NYMNPA-76	Soil management	Section 10
NYMNPA-95	Archaeological written scheme of investigation	Section 8

1.1.5 This document details only the additional activities required for Phase 9 at Woodsmith Mine associated with the Sirius Minerals North Yorkshire Polyhalite Project ('the project'). 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, as well as the Environment Agency and Natural England, agreed that they support this approach in meetings held in April 2016.

## 1.2 Phase 9

1.2.1 The scope of Phase 9 described by this document is as follows:

- Installation and operation of a temporary Secure Storage Unit (SSU);
- Installation and operation of the first stage of a Non-Domestic Waste Water Treatment Plant (NDWWTP);
- Installation and commissioning of compressors;
- Assembly and fit-out of Galloway;
- Extension of internal access road; and
- Installation of environmental fence to facilitate use of the reinjection pad for temporary Heavy Goods Vehicle (HGV) parking.

## 1.3 Scope of this Document

1.3.1 This CEMP details how the Phase 9 Works will be planned, monitored and managed in an environmentally responsible manner. It outlines the management framework for the environmental requirements, commitments, and performance targets associated with the planning and implementation of Phase 9 of the project.

- 1.3.2 This CEMP refers to several management plans, which have been prepared to partially discharge a number of planning conditions. Collectively these plans incorporate all mitigation measures relevant to Phase 9 (condition NYMNPA-06 refers).
- 1.3.3 This CEMP should be read in conjunction with the following previous CEMPs, as information within these previous documents remain relevant to Phase 9:
- Phase 3 CEMP 40-RHD-WS-70-EN-PL-0014;
  - Phase 4 CEMP 40-RHD-WS-70-EN-PL-0023;
  - Phase 4a CEMP 40-RHD-WS-70-EN-PL-0026;
  - Phase 5 CEMP 40-CAR-WS-8300-PA-MS-00001;
  - Phase 6 CEMP 40-RHD-WS-EN-PL-0028;
  - Phase 7 CEMP 40-RHD-WS-EN-PL-0029; and
  - Phase 8 CEMP 40-RHD-WS-EN-PL-0033.
- 1.3.4 The Phase 9 CEMP should also be read together with the documentation submitted to partially discharge the following conditions. Information provided in these documents is summarised in this CEMP where appropriate:
- Condition NYMNPA-18: *Noise and Vibration Management Plan* (40-RHD-WS-70-EN-PL-0037 (Phase 9));
  - Condition NYMNPA-34: *Construction Traffic Management Plan* (40-RHD-WS-70-CI-PL-0013 (Phase 8));
  - Condition NYMNPA-46: *Hydrogeological Risk Assessment* (40-FWS-WS-70-WM-RA-0009) (Phase 8);
  - Condition NYMNPA-52: *Protected Species Management Plans* (400-RHD-WS-70-EN-PL-0010 Ph3 PSMP Reptiles; 40-RHD-WS-70-EN-PL-0011 Ph3 PSMP Badger; 40-RHD-WS-70-EN-PL-0012 Ph3 PSMP Birds; 40-RHD-WS-70-EN-PL-0039 Ph9 PSMP Bats);
  - Condition NYMNPA-46: *Ground and Surface Water Monitoring Scheme* (40-FWS-WS-70-WM-PL-0020) (Phase 9);
  - Condition-NYMNPA-60 and 79: *Surface Water Management Plan Woodsmith Mine – Phase 9 Works – NYMNPA 60 and 79 Surface Water Drainage Scheme* (40-ARI-WS-7100-CI-RP-01004);
  - Condition NYMNPA-70: *Tree Protection and Clearance* (40-RHD-WS-70-EN-MS-0002 (Phase 3));
  - Condition NYMNPA-76: *Soil Management Plan* (40-AMC-W-71-EN-PL-0006 (Phase 4));
  - Condition NYMNPA-91: *Emissions to Atmosphere* (40-RHD-WS-70-EN-RP-0006 (Phase 6a));
  - Condition NYMNPA-92: *Construction Vehicle and Plant Management Plan* (40-RHD-WS-70-CI-PL-0012 (Phase 7));
  - Condition NYMNPA-94: *Construction Method Statement* (40-SMP-WS-7100-PA-MS-00007) (Phase 9); and
  - Condition NYMNPA-95: *Written Scheme of Investigation* (40-COT-WS-70-EN-PL-0002 (Phase 3)).
- 1.3.5 The CEMP will remain a live document, being reviewed and updated in consultation with the appointed Contractors or sub-Contractor(s) as required. Each of these updated CEMPs will be submitted to NYMNPA for approval prior to the start of each Phase of construction.

## 2 Environmental Management Framework

### 2.1 Structure and Responsibilities

- 2.1.1 This CEMP addresses those environmental matters within the responsibility of Sirius Minerals and the Contractors engaged on its behalf to deliver the Phase 9 Works. While overall responsibility for compliance with environmental and approvals requirements will remain with Sirius Minerals, the Contractors working on site are accountable for undertaking the construction activities in line with the requirements of this CEMP as well as all legal and other requirements imposed via permits and licences. All Contractors delivering this Phase confirm that this is the case.

### 2.2 Training, Awareness and Competence

#### Internal Communication

- 2.2.1 All staff and sub-contractors working on Site will be required to attend a Site Induction prior to commencing work. This will cover the key environmental aspects relating to the project and the roles and responsibilities of individuals.
- 2.2.2 Toolbox talks will be undertaken by the Environmental Manager or other nominated personnel throughout the project. The aim will be to communicate information to all staff and serve to educate, prompt and remind them of their responsibility to protect the environment during construction activities.
- 2.2.3 Additional details on staff training and awareness are provided in the Phase 4 CEMP (40-RHD-WS-70-EN-PL-0023).
- 2.2.4 Monthly progress meetings will be used to disseminate the results of monitoring and audit reports. At these meetings, a review of the environmental performance throughout the site to date will be undertaken and any improvements required during the construction phase will be identified. Details of where sustainable approaches to construction have been implemented or developed as the work proceeds will also be discussed and recorded. Their suitability for implementation at other areas of the site will be considered and applied where appropriate. Decisions about amendments required to the processes and procedures will also be agreed.

#### External Communication

- 2.2.5 Sirius Minerals will lead communication with members of the public, including adjacent landowners, local residents and businesses in line with the Community Stakeholder and Engagement Framework (CSEF) (refer to **Appendix A**).
- 2.2.6 The CSEF includes provision for a quarterly Liaison Group Forum meeting, which are open to members of the public to attend. These Liaison Group Forum meetings provide a mechanism to provide project updates and to exchange feedback on all project matters, including environmental ones.

### Site Notice Boards

- 2.2.7 A display board (i.e. a site information board) will be erected at the entrance to the Woodsmith Mine site, to keep local residents and stakeholders informed of the Works and their schedule. The site information board will identify key personnel, contact addresses, and telephone numbers, as well as showing visually the progress of Works.

### Traffic Management Liaison Group

- 2.2.8 A Traffic Management Liaison Group (TMLG) has been convened to oversee the implementation of the Construction Traffic Management Plan (CTMP), monitoring and enforcement of construction traffic movements. The TMLG will facilitate liaison between Sirius Minerals, planning authorities, highways authorities, and other key stakeholders in relation to the transportation aspects of the construction and operation of the project.
- 2.2.9 Full details of the remit of the TMLG, its membership and its operation can be found in the Phase 8 CTMP (40-RHD-WS-70-CI-PL-0013).

## 2.3 Monitoring of Compliance

- 2.3.1 All construction and installation activities for Phase 9 Works will be supervised by the Contractors' Project Managers with the support of members of their teams on a daily basis using the same procedures as detailed in the Phase 4 CEMP.

## 2.4 Complaints Procedure

- 2.4.1 The implementation of the systems and procedures to protect the environment will, if implemented, fully prevent environmental breaches. However, complaints may still be received, and in this event the Complaints Procedure, which remains unchanged from that outlined in Appendix 6 of the Phase 3 CEMP (40-RHD-WS-70-EN-PL-0014), will be implemented.

## 3 Description of Site

### 3.1 Fencing and Security of the Site

- 3.1.1 Site fencing and security measures remain as per the Phase 6 CEMP.
- 3.1.2 Additional fencing will be installed in Phase 9 around the reinjection pad which will be used for temporary HGV parking. Details of the additional fencing to be installed are shown on drawing 40-ARI-WS-7240-CI-41-01000.

### 3.2 Site Layout and Compounds

- 3.2.1 The Phase 9 site layout and compounds are detailed in drawing 40-ARI-WS-7100-CI-18-01052 Woodsmith Mine Phase 9 General Arrangement and the Phase 9 Construction Method Statement (40-SMP-WS-7100-PA-MS-00007).

### 3.3 Welfare Facilities

3.3.1 The welfare facilities detailed in the Phase 6 CEMP (40-RHD-WS-EN-PL-0028) remain valid for Phase 9.

### 3.4 Lighting

3.4.1 The Phase 9 Works will be illuminated when necessary through temporary, task-specific directional lighting. The Phase 9 Construction Method Statement (40-SMP-WS-7100-PA-MS-00007) provides details of the low-level lighting bollards to be installed on the existing pavement area between the reinjection pad and security hut.

3.4.2 All on-site lighting will apply the following principles:

- Directional tower lighting with directional lanterns will be used, with lights directed down towards the area required to be lit and away from any areas of concern (e.g. roads);
- Task lighting will be used where appropriate to light up local areas of small works instead of mast illumination affecting a large radius. Where required for safety reasons, lighting may be required from crane or rig masts;
- All open excavations will be fenced off and have adequate general and task lighting in order to ensure that all open excavations are clearly visible;
- The lighting will comply with the lowest recommended criteria within the relevant British Standards and relevant Chartered Institution of Building Services Engineers Lighting Guides (BS EN 12464-2 Lighting of work places – Outdoor work place, CIBSE Lighting Guide 6 – Lighting of the outdoor environment and CIBSE Lighting Guide 1 – Lighting of the industrial environment);
- Where safe and practicable, British Standards and guidance from the Institute of Lighting Professionals in the document 'Bats and Artificial Lighting in the UK' (September 2018) (<https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>) will be followed where relevant. The updated requirements of this new guidance will be implemented, where possible, for new lighting installation (refer also to 40-RHD-WS-70-EN-PL-0039 Phase 9 Protected Species Management Plan (Bats)); and
- Lights will be switched off when not in use, or will be sensor-controlled.

### 3.5 Materials Storage

3.5.1 Details of the locations for storage of plant and materials remain unchanged from Phase 5; storage areas are shown in drawing 40-ARI-WS-7100-CI-18-01030 Woodsmith Mine Phase 8 Masterplan. Materials will be stored appropriately in accordance with the approach detailed in the Phase 4 (40-RHD-WS-70-EN-PL-0023) and Phase 5 CEMP (40-CAR-WS-8300-PA-MS-00001).

### 3.6 Wheel Washing Facilities

3.6.1 Wheel washing facilities are provided on the site access road. Spent water will be managed as described in the Phase 5 CEMP (40-CAR-WS-8300-PA-MS-00001).

### 3.7 Site Housekeeping

3.7.1 The implementation of a good site housekeeping policy is key to reducing the likelihood of



accidents and environmental pollution incidents. Good housekeeping measures that will be implemented on site remain as for Phase 4 (40-RHD-WS-70-EN-PL-0023) and Phase 5 (40-CAR-WS-8300-PA-MS-00001).

## **4 Traffic**

### **4.1 Construction Traffic Management Plan (CTMP)**

4.1.1 A Phase 8 Construction Traffic Management Plan (CTMP; 40-RHD-WS-70-CI-PL-0013) was prepared and submitted to partially discharge condition NYMNPA-34. The CTMP contains a range of measures for the management of transport during Phase 8, which remain applicable to Phase 9.

#### **Parking and Deliveries to Site**

4.1.2 Deliveries and unloading arrangements at Woodsmith Mine remain unchanged from Phase 5 (40-CAR-WS-8300-PA-MS-00001).

4.1.3 Employees will use the North Yorkshire County Council Park and Ride facility at Cross Butts, Whitby during Phase 9. There will be no parking on site with the exception of limited designated spaces for exceptional use.

#### **Pedestrians and cyclists**

4.1.4 The procedures set out in the Phase 5 CEMP (40-CAR-WS-8300-PA-MS-00001) are applicable to Phase 9.

### **4.2 Enforcement Systems for Breaches of Traffic Management Requirements**

4.2.1 These remain unchanged from Phase 5 (see 40-CAR-WS-8300-PA-MS-00001).

## **5 Noise and Vibration**

### **5.1 Noise and Vibration Management Plan**

5.1.1 A Phase 9 Noise and Vibration Management Plan (40-RHD-WS-70-EN-PL-0037) has been prepared and submitted to the NYMNPA to partially discharge condition NYMNPA-18. It includes details of the noise sensitive receptors, agreed noise limits, monitoring to be undertaken and the mitigation measures to be implemented.

## **6 Air Quality and Dust Management**

6.1.1 Measures developed to reduce the impact of construction on air quality and, as part of this, to manage dust, remain unchanged from Phase 5. They are set out in the Phase 5 CEMP (40-CAR-WS-8300-PA-MS-00001).

6.1.2 A mobile crusher will be used on site to break up concrete and excavated rock. The crusher

will be operated in accordance with an Environmental Permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended), which will ensure that emissions of dust and particulate matter are minimised.

## 6.2 Construction Vehicle and Plant Management Plan

- 6.2.1 A Phase 7 Construction Vehicle and Plant Management Plan (40-RHD-WS-70-CI-PL-0012), was prepared to enable the partial discharge of planning condition NYMNPA-92, which remains applicable for Phase 9.
- 6.2.2 Mitigation measures identified in the Phase 7 CVPMP will be employed to minimise particulate emissions.

## 7 Nature Conservation

### 7.1 Protected Species and Precautionary Method of Working for Site Clearance

- 7.1.1 Protected Species Management Plans (PSMP) were produced for reptiles, badgers and birds to partially discharge planning condition NYMNPA-52 for Phase 3. These remain applicable for the Phase 9 Works, and the Precautionary Methods of Working will be applied.
- 7.1.2 The PSMP for Bats (40-RHD-WS-70-EN-PL-0039) was updated for Phase 9 to address the latest guidance and mitigation requirements relating to the impact of lighting on bats. The measures detailed in the PSMP will be implemented in Phase 9.

### 7.2 Vegetation Clearance

- 7.2.1 There are no areas of tree or vegetation clearance associated with the Phase 9 Works. Limited grass and topsoil stripping will be carried out as detailed in **Section 10**.

### 7.3 Environmental Enhancement

- 7.3.1 The Phase 3 Landscape and Ecological Management Plan (LEMP; 40-RHD-WS-70-EN-PL-0008) was prepared to partially discharge condition NYMNPA-57 and remains applicable for Phase 9.

## 8 Archaeology

- 8.1.1 Earthworks required during Phase 9 will be limited and will be carried out in areas previously surveyed; therefore, the potential for interaction with archaeology is low. However, should any archaeology be encountered, the principles outlined in the Phase 4 Written Scheme of Investigation (WSI) (40-COT-WS-70-EN-PL-0002) will be applied.

## **9 Hydrogeology, Water Quality and Drainage**

### **9.1 Introduction and Generic Water Protection Issues**

9.1.1 A range of watercourses run through the site. In addition, there are three different groundwater tables. In order to prevent pollution of the water environment the construction works will be undertaken in accordance with industry guidance set out in the withdrawn Pollution Prevention Guidance (PPG5) which was produced by the Environment Agency.

### **9.2 Groundwater Management**

9.2.1 Groundwater will be monitored and managed in accordance with the Phase 8 Hydrogeological Risk Assessment (40-FWS-WS-70-WM-RA-0009).

### **9.3 Surface Water Management**

9.3.1 The Phase 9 Surface Water Drainage Scheme (40-ARI-WS-7100-CI-RP-01004) contains details of how surface water will be managed on site.

### **9.4 Silt and Pollutant Management**

9.4.1 Silt and pollutant management measures remain as per the Phase 4 CEMP (40-RHD-WS-70-EN-PL-0023).

## **10 Soils and Contaminated Land**

10.1.1 As part of Phase 9, topsoil will be stripped in the area of the extension to the access road and the temporary SSU and this material will be added to the existing topsoil stockpiles on site. The Phase 4 Soil Management Plan (40-FWS-WS-70-CI-PL-0003) outlines the methodologies for this work, which will be adhered to for Phase 7.

10.1.2 The approach for dealing with unexpected contamination found on site is described in the Phase 3 CEMP (40-RHD-WS-70-EN-PL-0014), which remains applicable for Phase 9.

## **11 Materials and Waste**

11.1.1 Details of the materials and waste materials stored on site are provided in the Phase 4 (40-RHD-WS-70-EN-PL-0023), 4a (40-RHD-WS-70-EN-PL-0026) and 5 (40-CAR-WS-8300-PAMS-00001) CEMPs and remain applicable for Phase 9.

- 11.1.2 Details of the volumes and types of waste produced in the NDWWTP are provided in the Phase 9 Construction Method Statement (40-SMP-WS-7100-PA-MS-00007). Solid waste will be tested against the chemical and geotechnical specification for the landscape screening earthworks and used within the construction of these features where acceptable. Any material failing suitability testing will be removed by a licensed waste carrier.
- 11.1.3 Other wastes from the NDWWTP will be stored appropriately for regular disposal off-site.
- 11.1.4 Condensate from the air compressors will be captured and either processed through the NDWWTP or tankered off-site for disposal.

## 11.2 Fuel Oil Storage and Refuelling on Site

- 11.2.1 Delivery and refuelling will be supervised at all times and checks will be made to ensure that the correct type and volume is being delivered. Appropriate pollution mitigation measures (including drip trays and spill kits) will be employed. Refuelling will occur across the site with appropriate control measures in place, as detailed in the Phase 5 CEMP (40-CAR-WS-8300-PA-MS-00001).
- 11.2.2 Fuel will be stored in accordance with The Control of Pollution (Oil Storage) (England) Regulations 2001. All static fuel tanks and bowsers will be integrated bunded tanks. These will have a primary container manufactured with integral secondary containment that holds a minimum of 110% of the volume of the inner tank. The locations of storage areas are shown in drawing 40-ARI-WS-7100-CI-18-01052 Woodsmith Mine Phase 9 General Arrangement .
- 11.2.3 Bund dewatering systems for the 11kV transformers will have their own oil retention system. As a secondary containment safeguard, the bund dewatering systems will be supported by a pumped water filtering system. The filtered water will be discharged to the site surface water drainage system.

## 11.3 General Management of Non-Extractive Waste

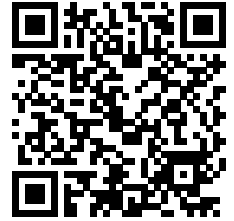
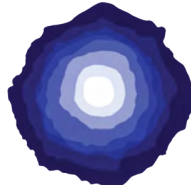
- 11.3.1 The management of non-extractive wastes will remain as set out in the Phase 4 CEMP (40-RHD-WS-70-EN-PL-0023).

## 12 Incident and Emergency Planning

- 12.1.1 The Phase 3 CEMP (40-RHD-WS-70-EN-PL-0014) and the associated appendices detailed actions that will be taken to minimise the risk of pollution incidents occurring on site and identifies the actions to be taken in the event of a pollution incident. These procedures remain applicable to Phase 9.



## **Appendix A Sirius Minerals Community and Stakeholder Engagement Framework**



Project Title / Facility Name:  
**North Yorkshire Polyhalite Project**

Document Title:  
**PROTECTED SPECIES MANAGEMENT PLAN - BATS (NYMNPA 52 - PHASE 9)**

NYMNPA  
23/01/2019

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**40-RHD-WS-70-EN-PL-0039**

# REPORT

## **Phase 9 - Woodsmith Mine Protected Species Management Plan - Bats**

Woodsmith Mine Phase 9 - PSMP Bats

Client: Sirius Minerals PLC

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Status: 03/Final

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Checked by: Charlotte Goodman

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## 1 Introduction

### 1.1 Purpose of Document

- 1.1.1 In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to the North York Moors National Park Authority (NYMNPA) for permission to develop a polyhalite mine and underground Mineral Transport System (MTS). Planning permission was subsequently granted in 2015 subject to conditions, as varied in February 2018 by NYM/2017/0505/MEIA.
- 1.1.2 This document has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) and applies to the Phase 9 works at Woodsmith Mine, as described in **paragraph 1.2** below.
- 1.1.3 This document has been prepared following the publishing of updated Bat Conservation Trust (BCT) and Institute of Lighting Professionals (ILP) guidance in respect to bats and artificial lighting in the UK. This document should be read in conjunction with the Phase 3 Protected Species Management Plan (PSMP) for bats (40-RHD-WS-70-EN-PL-0013), and the information herein supersedes the Phase 3 documentation only where specified.
- 1.1.4 The works at Woodsmith Mine, as outlined in the Phase 3 PSMP for bats, have been subject to a Bat European Protected Species Licence (EPSL). Consequently, this document provides only the information relating to the mitigation requirements considering the updated BCT and ILP guidance. The Phase 3 PSMP for bats should be read for information in respect to the survey work that has been undertaken.
- 1.1.5 This document is required to partially satisfy the requirements of NYMNPA-52. 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 version of the PSMP for bats is for Phase 9 as defined in Section 1.2 below.  Earlier Works were covered by a previous version of this PSMP (40-RHD-WS-70-EN-PL-0013).
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 <ul style="list-style-type: none"> <li>a. Bats (all species)</li> <li>b. Badger</li> <li>c. Adder</li> <li>d. Common lizard particularly at western side of Lady Cross Plantation</li> </ul>	This PSMP relates to bats only.

Condition	Compliance with Condition NYMNP-52
e. Other protected reptiles f. Water vole g. Common Crossbill h. Goshawk	

- 1.1.6 This document details measures that are required for the Phase 9 Works at Woodsmith Mine for the protection of bats. 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 NYMNP, as well as the Environment Agency and Natural England, agreed that they support this approach in meetings held in April 2016.

## 1.2 Phase 9 Works

- 1.2.1 The Phase 9 Works comprise the following:
- Installation and operation of a temporary Secure Storage Unit (SSU);
  - Installation and operation of the first stage of a Non-Domestic Waste Water Treatment Plant (NDWWTP);
  - Installation and commissioning of compressors;
  - Assembly and fit-out of Galloway;
  - Extension of internal access road; and
  - Installation of environmental fence to facilitate use of the reinjection pad for temporary Heavy Goods Vehicle (HGV) parking.

## 2 Relevant legislation and guidance

- 2.1.1 There have been no changes in the relevant legislation afforded to bats since the Phase 3 PSMP (reference 40-RHD-WS-70-EN-PL-0013) and therefore the information contained in the Phase 3 PSMP remains valid.
- 2.1.2 The updated Bat Conservation Trust (BCT) and Institute of Lighting Professionals (ILP) guidance<sup>1</sup> in respect of artificial lighting and bats within the UK was published in 2018. This updated guidance provides more detail about lighting levels and colour temperature impacts on different bat species. The main aim of the updated guidance is to raise awareness of the impacts of artificial lighting on bats but also the potential solutions to prevent and reduce any impact.

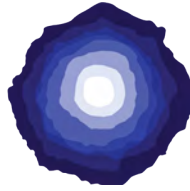
<sup>1</sup> Bat Conservation Trust (BCT), 2018. Bat and Artificial Lighting in the UK.

### 3 Mitigation

#### 3.1 Mitigation and Good Practice Measures

3.1.1 The following measures will be adhered to, where safe and practicable, during the Phase 9 works to safeguard bats. The measures detailed below include those which were presented in the Phase 3 PSMP; the additional measures provided in the updated guidance document are denoted in bold text. 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;
- **Dark habitat buffers will be identified by a suitably qualified bat ecologist. The Contractor or their agents will ensure that any artificial lighting is not used in or adjacent to these areas;**
- The lighting requirements for the Phase 9 works will be designed in accordance with guidance from BCT Bats and Artificial Lighting in the UK (2018) and reviewed by a suitably qualified bat ecologist. The key design parameters will consider, but are not limited to, the following:
  - No luminaires will contain metal halide or fluorescent sources;
  - LED luminaires will be used where possible;
  - **For any new lighting, a warm white spectrum (<2700Kelvin) will be adopted wherever possible or practical to reduce blue light component;**
  - **For any new lighting, luminaires will have peak wavelengths of no more than 550nm where possible;**
  - Column heights will be appropriate to what is required to minimise light spill;
  - Luminaires will, where possible and feasible, be mounted on the horizontal, with no upward tilt; and
  - Any external security lighting, if required, will be set on motion sensors and with timers set to a short period (acknowledging health and safety requirements).



Project Title / Facility Name:  
**North Yorkshire Polyhalite Project**

Document Title:  
**CONSTRUCTION METHOD STATEMENT (NYMNP 94 - PHASE 9) (CMS)**

NYMNP 94

23/01/2019

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**40-SMP-WS-7100-PA-MS-00007**

# Woodsmith Mine Phase 9 Construction Method Statement (CMS)

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# Woodsmith Mine Phase 9 Construction Method Statement

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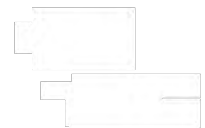
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## Woodsmith Mine Phase 9 Construction Method Statement

### 1 Introduction

#### 1.1 The Purpose of this document

This document details the Construction Method Statement (CMS) for Phase 9 Site Works at Woodsmith Mine. This CMS is required to partially discharge condition 94 of the North York Moors National Park Authority (NYMNPA) planning permission NYM/2014/0676/MEIA (as subsequently varied by NYM/2017/0505/MEIA) and has been prepared in accordance with good practice.

This CMS details the works to be undertaken during the Phase 9 Site Works at Woodsmith Mine only. Further construction methods statements will be submitted to discharge condition NYMNPA 94 for subsequent phases. The CMS will remain a live document, being reviewed, and updated as required.

#### 1.2 Compliance with Condition NYMNPA 94

The wording of planning condition 94, and where the necessary material has been provided within the report, is set out in Table 1.1.

**Table 1.1 : Details of NYMNPA Planning Condition 94**

NYMNPA Condition 94	Compliance with Condition 94
Prior to the commencement of each phase of the development at Dove's Nest Farm or Lady Cross Plantation in accordance with the approved Phasing Plan, a Construction Method Statement will be submitted for that phase, and approved in writing by the MPA, in consultation with the appropriate Highways Authority. Each approved Statement will be adhered to throughout the construction period. The Statements will provide for:	This CMS is provided for Phase 9 Works at Woodsmith Mine only. Other phases will have bespoke CMS documents.
(i) The parking of vehicles of site operatives and visitors clear of the highways;	Section 2.5
(ii) Loading and unloading of plant and materials;	Section 2.7
(iii) Storage of plant and materials used in constructing the development;	Section 2.8
(iv) Erection and maintenance of security fencing;	This type of work is not required in Phase 9.
(v) Wheel washing facilities;	Section 2.9
(vi) An outline construction method for sub-surface works including adherence to the 'rack and pillar' method of mining described in the SEI (14 <sup>th</sup> February 2015) and the SRK Subsidence Memorandum (15 <sup>th</sup> May 2013);	This type of work is not required in Phase 9.
(vii) Buildings and structures associated with the mine and tunnel shafts;	Section 3
(viii) Welfare/office building and security gatehouse;	This type of work is not required in Phase 9.
(ix) Screening bunds;	This type of work is not required in Phase 9.

NYMNPA Condition 94	Compliance with Condition 94
(x) Hardstanding's;	This type of work is not required in Phase 9.
(xi) Shuttle Bus terminal;	Section 2.5
(xii) Park-and-Ride layby;	Section 2.5
(xiii) Emergency helipad;	This type of work is not required in Phase 9.
(xiv) Lighting columns;	N/A
(xv) Internal access and haul roads;	Section 3
(xvi) Domestic wastewater (foul sewage) treatment plant;	This type of work is not required in Phase 9.
(xvii) Non-domestic wastewater treatment plant and settlement tanks;	Section 3
(xviii) Surface water attenuation ponds, settlement ponds, swales and wetland areas;	This type of work is not required in Phase 9.
(xix) Temporary spoil and Polyhalite storage areas;	This type of work is not required in Phase 9.
(xx) Road widening and provision of right hand turn areas;	This type of work is not required in Phase 9.
(xxi) Removal of any temporary structures; and	This type of work is not required in Phase 9.
(xxii) Formation spoil mounds and the establishment of vegetation on them	This type of work is not required in Phase 9.
The CMS will contain a construction timetable and order of works noting any construction dependencies, refer to any inherent mitigation measures required to address adverse impacts identified in the EIA and cross refer to the CEMP in relation to any additional avoidance or mitigation measures	The CMS relates to the Phase 9 Works at Woodsmith Mine only and all required mitigation has been included in a Construction Environmental Management Plan (CEMP) submitted for Phase 9 (40-RHD-WS-70-EN-PL-0038), which is required to discharge condition 93.

## 2 Project Overview and Description of the Works

### 2.1 Project overview

Sirius Minerals Plc is developing a new mine surface development south of Whitby in North Yorkshire to extract polyhalite and transfer it to a processing and port facility on Teesside (the port facility is covered by a separate consenting regime). A full and detailed description of the project can be found in the Environmental Statement. This CMS relates to the Phase 9 Works at Woodsmith Mine only. This document builds on the CMS documents produced for Phases 1-8 and further versions of this live CMS will be produced for subsequent phases as outlined in Section 1.1.

## 2.2 CMS overview

The CMS provides an overview of the resource requirements and the plant and materials that are anticipated to be used during the Phase 9 Works. It includes the measures to be taken to ensure that the works are carried out in accordance with the requirements of both the planning permission and of Sirius Minerals Plc and, above all, are carried out safely and in compliance with all statutory obligations. The works described in the method statement will be executed by the main contractors for each package.

## 2.3 Description of the works

The Phase 9 works comprise:

1. Installation and operation of temporary Secure Storage Unit (SSU)
2. Extension of internal access road
3. Installation of environmental fence to facilitate use of reinjection pad for temporary HGV parking
4. Installation and operation of the first stages (1 & 2) of the non-domestic waste water treatment plant
5. Assembly and fit-out of Galloway
6. Installation and commissioning of compressors

These works are further detailed in section 3.

## 2.4 Contractor's offices/compounds

All contractors will continue to use the facilities already established in earlier phases, namely the main site welfare facility established in Phase 3 and extended in Phase 6. Some smaller self-contained facilities may need to be established closer to certain work areas as the site develops in order to provide facilities at a suitable distance of work areas.

## 2.5 Parking of cars

There are 187 parking spaces at Cross Butts Park and Ride that came into use in October 2018 and will continue to be used, as agreed with the NYMNP and North Yorkshire County Council Highways department.

There will be no parking on site, with the exception of limited designated spaces for exceptional permitted use.

As part of the parking management strategy - a shuttle bus is now operational and runs between the Cross Butts P&R facility to a drop-off point adjacent to the welfare facility at Woodsmith mine, as detailed in the Phase 8 Construction Traffic Management Plan (40-RHD-WS-70-CI-PL-0013).

## 2.6 Mobilisation

All equipment, plant and materials will be delivered to site using the approved traffic routes & strategy as per the Phase 8 Construction Traffic Management Plan (40-RHD-WS-70-CI-PL-0013).

All HGVs and abnormal loads will drive directly to site and will not stop / wait on the public highway.

The Phase 9 Masterplan drawing (40-ARI-WS-7100-CI-18-01050) shows access roads that can be used by heavy goods vehicle during project delivery.

The Subcontractors will be responsible for obtaining any permissions required for abnormal loads, as necessary. None are currently envisaged.

The site operational hours are 24 hours a day, 365 days a year, however construction delivery activities will be limited to Monday to Saturday (excluding bank holidays), 7am to 7pm. Any deviation from these working hours will be subject to the approval of the Project Manager.

All HGV access to the site will be in accordance with a permitting system and the approved site delivery routes.

## 2.7 Unloading and loading of deliveries / materials

The areas for storage have been planned to prevent excessive handling of material and to facilitate loading and unloading. The principle materials to be delivered and unloaded during Phase 9 comprise:

- Hesco baskets and infill material for construction of the SSU
- Pre-modular units and tanks for the waste water treatment plant & pipe work
- Air compressors units and associated piping
- Galloway sections
- Road construction material using off-site haulage vehicle, including Type 1 aggregate and bituminous surfacing material
- Steel & wood for re-injection pad fence construction

Equipment will be offloaded & laydown using the contractor cranes in each works area & lifted into place as indicated in the specific method statements. It should also be noted that the mobile crane used to service the Service Shaft Head Chamber (SSHC) excavation (Phase 5 CMS) is proposed to be replaced with a Tower Crane as detailed in **Appendix B**.

Other materials requiring loading onto site transport will generally be handled using mobile cranes, all terrain fork-lifts, Hi-Ab or telehandlers. Loading will only take place on level stable ground to minimise the risk of loads becoming unstable and spilling. The handling of materials on site will be controlled to protect land and water in accordance with the appropriate section of the Construction Environmental Management Plan (CEMP) submitted for Phase 9 (40-RHD-WS-70-EN-PL-0038).

## 2.8 Storage of plant and materials

Materials will be stored in accordance with the approach established for Phase 2 and implemented throughout all subsequent phases.

Plant and materials will be stored in designated areas as close to the works as possible. All storage areas will be on hardstanding appropriate to the plant and materials and away from sensitive receptors. Any hazardous substances subject to COSHH and fuel storage will be as per Pollution Prevention Best Practice measures and the Construction Environmental Management Plan (CEMP) submitted for Phase 9 (40-RHD-WS-70-EN-PL-0038).

## 2.9 Wheel wash

Vehicles entering site will stay on hardstanding already installed in previous phases. No plant will travel off site other than by specialised plant moving transport.

Vehicles exiting the site and on-site plant will use the wheel wash as described in the approved documents for Phase 3.

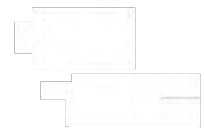
## 2.10 Internal access routes

Haul roads and internal access routes within the Phase 9 working area will be demarcated and separated from pedestrians as per previous phases. Speed limits will be enforced as per the site limits.

## 2.11 Lighting columns

No permanent lighting columns will be installed in this Phase of Works. Temporary task lighting will be used for construction purposes, as described in the CEMP (40-RHD-WS-70-EN-PL-0038). In addition to this, low level bollards will be installed between the re-injection pad and the security booth so as to facilitate its use for the temporary parking of HGV's. The specification details of the bollards are as per those installed at the LNG plant, reference **Appendix A**. These will be sensor controlled so that they are lit only when needed.

Construction Light Towers, for general construction lighting, will be placed on site and kept at a reasonable height to illuminate the work areas for evening and night-time construction activities. Task lighting will be utilized in the shaft, supporting safe excavation and worker visibility. Tower lights will not be directed down the shaft given the movement of craft labour, equipment, and material due to unsafe conditions created by glare; however, the immediate surrounding work area will be kept sufficiently illuminated and visible so that crane operators can visually see signal persons.

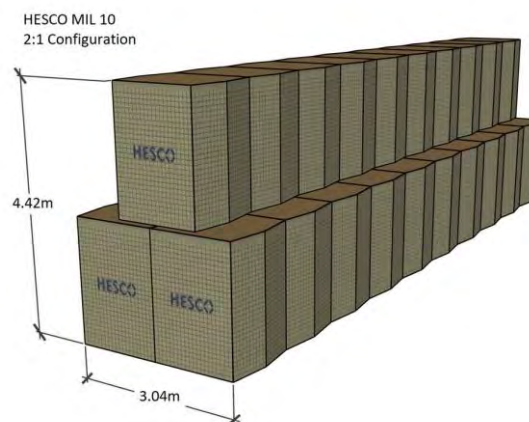


### 3 Construction Method Statements

#### 3.1 Construction and operation of temporary Secure Storage Unit (SSU)

A series of MIL10 units sized 2.21m, 1.52m, 30.50m, Certified to ISO 9001:2008 will be used to create the perimeter of the SSU.

These Earth-filled defensive barriers, MIL units, are a multi-cellular barrier system manufactured from welded zinc-aluminium coated steel wire mesh and joined with vertical, helical-coil joints. The units are lined with a heavy-duty non-woven polypropylene geotextile. When joined and filled, the system can be used to create barriers of exceptional strength and structural integrity.



The Secure Storage Unit (SSU) will be constructed in line with the layout shown on the Phase 9 masterplan drawing (40-ARI-WS-7100-CI-18-01050). The following method statement outlines the principal construction activities:

- The footprint of the SSU will initially be excavated to a depth of approximately 0.5m below existing ground level using a 360° excavator to remove existing top and sub soil, following the existing and approved requirements for ecological and archaeological clearance and in accordance with the soil management plan;
- Within proposed hardstanding areas, acceptable 'site won' material will then be placed and compacted to the agreed formation level to form the foundation to the pavement construction above;
- The concrete support base for the SSU will then be cast, following fixing of formwork and placement of reinforcement mesh to the correct levels. The concrete slab will then be cast using concrete supplied from the on-site batching plant.
- Ducting and a filter drain will then be constructed around the perimeter of the internal concrete slab and access road. The filter drain will outfall adjacent to the SSU into the existing site drainage network constructed during previous construction phases.
- Site infrastructure will then be provided to connect the SSU to an existing Mains Distribution Unit (MDU) and to the Main Gate Security Office. This will include the provision of underground ducts, including duct trenching and backfilling;
- Complete construction of the bituminous access road within the SSU compound to final level;
- The surrounding MIL unit bunding will be filled using site won material. This includes placing and compacting granular site won using a 360° excavator and dumper. On completion of the base layer, the upper layer of units will be fitted and filled.

- Install SSU container using a loader crane arm on the delivery vehicle (Hi-Ab)
- Install chain link security fence (1.8m high) and gate using telehandler off-loading from delivery vehicle.
- Install 240V power cable and equipment cabling for CCTV, alarm, communications and low-level lighting systems.
- Install, test and commission low level lighting, ensuring sensor controls are active;
- Connect CCTV, alarm signal cabling and communications to Main Security Gate Office;
- Test and commission CCTV and alarm systems.

### 3.2 Construction of extended internal access road

The construction of the site road will be in accordance with the previous phase CMS submissions. See drawing (40-ARI-WS-7100-CI-18-01050) for general reference. This shows the revised layout of the access road and extension. These works take place on pre-worked ground and will be completed in accordance with the necessary conditions of the Phase 9 CEMP.

The following method statement outlines the principal construction activities:

- Initial excavation of soft material to a depth of approximately 1.0m below existing ground level using a 360° site excavator. This includes removal of any existing debris. Excavated material is to be placed within existing temporary storage mounds.
- Place and compact acceptable 'site won' fill to road construction area to agreed formation level using a 360° excavator off-loading from site articulated hauler vehicle.
- Existing drainage that runs under the proposed access road will be diverted to ensure the water course runs parallel to the road. This will consist of an open ditch with a culverted section under the access road.
- Fix service ducts as necessary.
- Grade with specified stone material to the configuration of the existing site main access road using a 360° site excavator and dumper.
- Complete construction of the bituminous access road to final level using 360° excavator offloading from site articulated hauler vehicle.

### 3.3 Installation of environmental fence to facilitate use of reinjection pad for temporary HGV parking

- Install security fence around platform to match existing perimeter fence.
- Using telehandler, off-load materials from 7.5 Tonne flatbed delivery vehicle.

- Using 360° site excavator, pits will be excavated to cast in place the upright support.
- Cast in site upright steel support using concrete from the on-site batching plant.
- A team of fencing contractors will fit the panels to support uprights.
- Grade pedestrian access path to the security hut / welfare to the configuration of the existing pathways using a 360° site excavator and dumper with construction grade stone.
- Complete construction of the bituminous access path to final level using 360o excavator offloading from site articulated hauler vehicle.
- The pathway lighting will be supplied by a power service duct, installed 750mm below ground level, from the security hut to light the access with sensor-controlled bollard, fitted at intermediate spacings, as used on the LNG plant in Phase 6A, see **Appendix A**.

### 3.4 Construction and operation of non-domestic waste water treatment plant

The process of shaft sinking and tunnel development will result in the generation of Non-Domestic Waste Water (NDWw), which will be transferred to the surface for treatment. To prevent tankering off site, this NDWw will be treated on site to a quality suitable for discharge into Sneaton Thorpe Beck.

Treatment will require the installation, commissioning and operation of a Non-Domestic Waste Water Treatment Plant (NDWwTP), complete with automatic control systems. The equipment will be modular as far as practicable, as detailed in NDWwTP document (40-ARI-WS-7100-CI-22-01054), and installed as per the construction process described below. The plant will be installed in two stages;

- Stage 1: short-term solution to handle the smaller water volumes of non-saline water expected from the start of April 2019 to the end of August 2019.
- Stage 2: long-term solution to handle the maximum anticipated water volumes of non-saline water.

#### 3.4.1 Civil Construction

The Civil works will consist of Site clearance and establishment of low-permeability foundations for the plant, concrete construction with steel mesh re-informant. These will be constructed to meet the Loads and layout developed by the contractor and fitted with a 300mm high external bund wall including suitable drainage/sump for processing into the return system of the plant.

The civil works also include the fitting of pipework from the shaft to the inlet of the NDWwTP and from the NDWwTP to the river discharge, concrete bases for and installation of balance Storage Tanks and the Slab and Services for the inter-connecting pipework between the treatment processes plant.

All trenches, cable ducts, access pits will be excavated using a 360° site excavator.

Craneage of equipment into place on site will be provided by a mobile 90T crane working on the platform for the installation works.



The construction team of will comprise up to 10no. fit out operatives.

A small on-site Laboratory Testing lab unit (containerised) will located downstream of NDWwTP.

Where possible, all Plant will be containerised and where not it will be suited for all weather working. Containers & exposed plant will be coloured in RAL 6008, where it is practicable to do so.

### 3.4.2 Scope of Supply

Sirius Minerals will install the following supply network;

- Power Supplies, (including any required isolations / protections, Earthing, UPS, etc.) from the site mains power to avoid the need for generation plant.
- Relocation, installation and modification of water storage tank 8 to the NDWwTP platform and pipework & pumping to connectivity of the 7No. cleaned out Bentonite Tanks for use as emergency flow water storage (Capacity 3500m<sup>3</sup>).
- Delivery of Shaft Water to the shaft head via a controllable pumping system as specified by the shaft sinking contractor.
- Treatment Plant Area and Discharge Point, including main pipe runs to the beck.

The Subcontractor is responsible for delivery to site, assembly, installation, commissioning and operation. They will provide all necessary tools, first fill of chemicals, fixtures / fittings and commissioning spares for the included site works.

### 3.4.3 Operation

Operation of the wastewater treatment plant is comprised as follows;

1. A reception system for removal of gross solids, intermediate pumping stations and associated ancillaries required to achieve the specified water quality requirements and provide a source of re-use water.
2. Solids dewatering, to provide a cake suitable for treatment in the existing lime plant and segregation of any solids unsuitable for disposal on site.
3. Particulate filtration (using Turbidex media), activated carbon filtration and re-generable ion-exchange to first ensure that all particulates and organic contaminants have been removed prior to facilitating the reduction of metals and, where necessary, key anions i.e. chloride, from the abstracted waters.
4. Process to include primary settlement for solids removal, free and emulsified oil removal, dissolved hydrocarbon removal, chemical offloading, storage and dosing systems, dissolved metal and ions removal and ammonia and nitrate removal.
5. Integration of the Stage 1 plant, if practicable, into the Stage 2 plant to reduce vehicle movements to and from site and overall project cost.

In summary, the process plant comprises;

- Pre-treatment screening and gross solids removal
- Balance tank (with mixing if required)
- Primary settlement with transfer of sludges to sludge holding tank
- pH correction and chemical dosing for solids removal and oil separation
- Dissolved air flotation (DAF)
- Sand and granular activated carbon (GAC) filtration
- Ion exchange
- Sludge handling and dewatering
- Treatment works interconnecting pipework, pumping systems, instrumentation and control systems.

The Maximum Noise generation is expected from the DAF unit at the NDWwTP treatment plant at a level of 78dB(a) +/- 7dB(a). Noise levels for the Shaft Head Shaker units on the vibrating screens represent the most significant Noise source at the Shaft at a level of 80dB(a) +/- 10dB(a).

The operation of these units will be required 24/7.

### 3.4.4 Product Water Quality

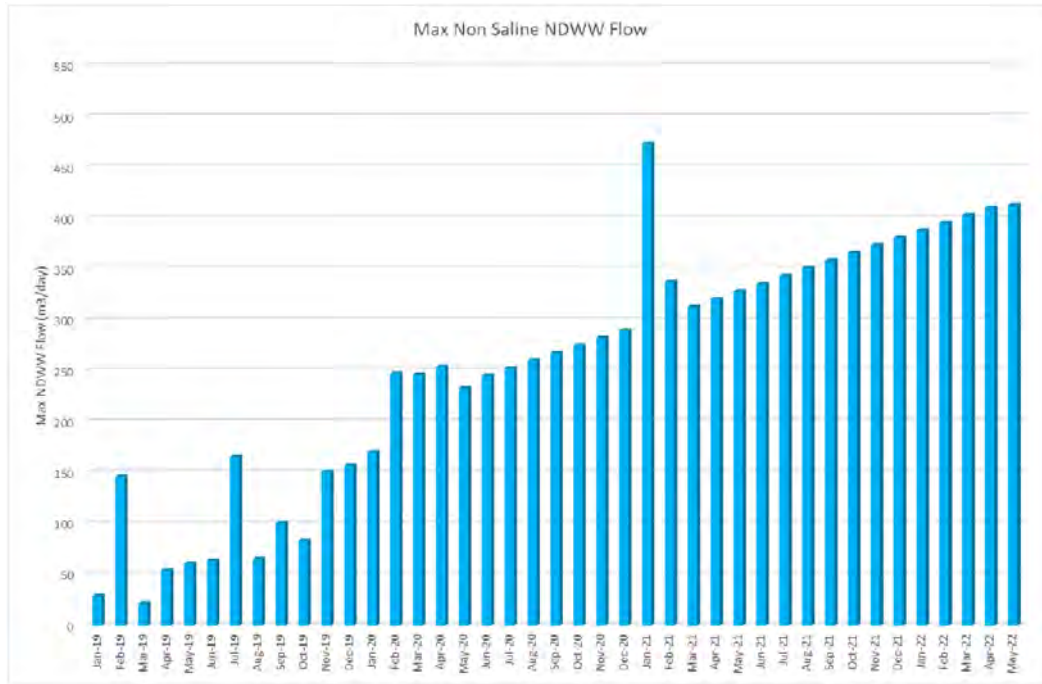
This NDWWTP will be treated to a quality suitable for discharge into Sneaton Thorpe Beck.

**Table 1: Summary of Expected Influent Quality**

Parameter	Minimum	Average	Maximum	Expected	Consent (1)
Suspended solids mg/l		50,000			5
Arsenic µg/l		6.74		6.7	4.50
Chromium VI µg/l	3	7	10	10.0	0.30
Manganese µg/l	4	3,150	23,000	3,150	145
Zinc µg/l	1.2	80	470	80	4.0
Nitrate µg/l	40	3,800	39,000	3,155	735
TPH µg/l				105	10
EPH µg/l				1,080	20
pH units	4.8	6.4	8.5	6.5 - 8.5	6 - 9

**3.4.5 Shaft Outlet Flows**

Details of the anticipated volumes that will require treatment throughout the construction of the mine, along with the assumptions used, are summarised in the report ‘Woodsmith Mine Non-Domestic Wastewater Management Strategy’ (40-ARI-WS-071-CI-RP-1102), which has been submitted in relation to Condition 81. The highlights are summarised below;



**Stage 1 – Initial inflows of non-saline water**

Stage 1 considers the period up to August 2019, to correspond with the lower volumes of water requiring treatment during the early phases of construction activities. The water from the shafts will be pumped to the NDWwTP for centralised bulk solids removal. These flows are not balanced and therefore represent the maximum flows received;

Parameter	Units	Value
Maximum Flow	m <sup>3</sup> /day	200

Following removal of solids, water will be pumped to a balance tank for subsequent treatment in the NDWwTP. The Stage 1 plant will be capable of treating a balanced peak flow of 1.9L/sec, with an average total wastewater volume of 65m<sup>3</sup>/day. The maximum anticipated quantity of wastewater requiring treatment is 165m<sup>3</sup>/day; this includes an allowance for VSM water that will be periodically drip fed from storage tanks.

Parameter	Units	Value
Maximum Flow	m <sup>3</sup> /day	200
Instantaneous	L/sec	1.9
Average Flow	m <sup>3</sup> /day	65.0

**Stage 2**

The Stage 2 maximum peak flow, unbalanced, is presented in the following table;

Parameter	Units	Value
Maximum Flow	m <sup>3</sup> /day	480
Instantaneous Flow	L/sec	9.3

Once balanced, the plant will be capable of treating a peak flow of 5.5L/sec from the balance tank, with the maximum anticipated quantity of wastewater produced by the shafts of 480m<sup>3</sup>/day. The following table presents a summary of the Stage 2 water flows.

Parameter	Units	Value
Maximum Flow	m <sup>3</sup> /day	480
Instantaneous Flow	L/sec	5.5

**Screening, Hydrocyclone and Gross Solids Removal**

For Stage 1, an assumed maximum instantaneous flowrate of 2.3L/sec is to be used for design purposes. For Stage 2, this increases to 9.3L/sec.

After reaching the surface at each shaft, the NDWwTP will pass over a vibrating deck screen and through a hydrocyclone, to remove the bulk solids, delivering the dewatered screening to a cake bay for collection by the earthworks contractor.

A sump and forward pumping station are required to collect the NDWwTP passing through the screen. A means of removing bulk solids that could accumulate in the sump will be provided.

**Balance Tank**

A duty balance tank will be installed to receive flows from the NDWwTP reception system. The tank will be sized for a working capacity of 400m<sup>3</sup>.

**Primary Sedimentation**

From the sedimentation tank, the collected solids will be pumped to a sludge holding tank for subsequent dewatering.

**pH Correction and Chemical Dosing**

A duty mixing tank will be installed downstream of primary sedimentation with chemical dosing for pH correction, coagulation and flocculation as required for the downstream processes. Chemicals will be stored in IBCs.

**Dissolved Air Flotation (DAF)**

A duty DAF unit will be provided to remove solids, oils and metals that will have precipitated in the balance tank. The speed of the DAF sludge scraper will be adjustable, with programmable start and stop times.

Due to the risk of oil contamination, DAF sludge will be pumped to a duty DAF sludge holding tank, before being tankered off-site for disposal.

### **Sand and Granular Activated Carbon (GAC) Filters**

Duty sand and GAC filters will be provided to ensure the remaining solids and hydrocarbons are removed before the ion exchange process. A continuous backwash system is to be included, delivering backwash water to the balance tank.

The backwash water flow must be included in the design of all upstream plant.

The treated water from the sand and GAC filters will be pumped to the re-use tank and will contain less than 150mg/L total suspended solids, with a particle size of less than 50 microns. The quality will be sufficient for the requirements of the downstream processes.

### **Re-use Tank**

NDWWTP can be re-used for drilling and other purposes on site, to reduce the demand for potable water and the quantity of water discharged to the environment. A re-use tank will be provided to balance flows prior to transfer to the ion exchange process. The tank will be sized for a working capacity of 250m<sup>3</sup>.

### **Ion Exchange**

A lead and lag ion exchange with interphase sample facilities will be provided to remove soluble species such as metals, ammonia and nitrate in accordance with the water quality requirements of this specification. The lead and lag units, each sized to treat 100% of the flow, will be installed in series, and will be configured to enable 100% bypass of either lead or lag unit, to facilitate regeneration without compromising the ability to treat all the flows to the required quality. A recovery of 90% or above is required.

A tank to store ion exchange regeneration water is to be provided with at least five days of storage.

Treated water will be pumped to the treated water storage tank.

### **Treated Water Storage Tank and Monitoring**

A treated storage and water tank will be provided to buffer flows prior to discharge to river. The tank will be sized to achieve a working capacity of 100m<sup>3</sup>.

There will be a facility to return water that doesn't meet the discharge quality requirements to the start of the NDWWTP treatment process.

An Environmental Permit to discharge treated water to surface water will be obtained.

Turbidity monitoring will be provided in the following locations:

- Outlet of re-use storage tank
- Outlet of ion exchange equipment

### **Solid Waste Management**

Solids removed from the NDWwTP downstream of the balance tank, that are free from oil contamination, will be dewatered and discharged to a skip for off-site disposal. A sludge storage tank will provide balancing prior to dewatering.

A dedicated sludge tank will be provided to store sludges from the DAF that are anticipated to be contaminated with oil. This tank will be sized for 5 days of sludge at maximum production and will be emptied and disposed of by a specialist contractor, off-site.

#### **3.4.6 Summary of Waste Streams**

As taken from the Mass Balance Flow Diagrams, the maximum anticipated Bulk Material produced by the NDWwTP are as follows;

- Cyclone & Screen process - 20 tonne per day
- Screw Press Filter Cake - 34.38 tonne per day

This will be tested against the chemical and geotechnical specification for the landscape screening earthworks. Subject to confirmation, the material will be used within the construction of the screening earthworks. Any material failing suitability testing will be removed by a licensed waste carrier.

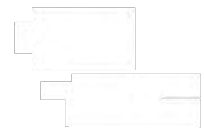
Waste from the DAF sludge tank, Sand & GAC filter are nominal (<1 tonne per day) and will be stored within the process system for monthly off-site disposal.

Ion Exchange units waste (Reject Tank) will be stored in tanks as part of the plant for off-site disposal.

### **3.5 Assembly and fit-out of Galloway**

DMC will be the contractor responsible for this part of the project. They will commence by setting up access/safety controls to the footprint of the shaft, laydown areas, crane pads, etc. using signage, fencing, and concrete barricades (Jersey Barriers) to clearly delineate work zones and associated hazards. DMC will then survey and confirm (utilizing previously established site survey control monuments) as-built site topography elevations in support of excavation controls for the Shaft.

- During the surveying and acceptance of handover, site equipment will be mobilised:
- cranes,
- excavators,
- Aerial Work Platforms (AWPs),
- Venting equipment,
- Water discharge pumps and hosing,
- welding machines, hand tools, support equipment, etc., and



- manpower;
  - Galloway assembly: 8-10 cross-discipline operatives including cranes driver.
  - shifts (day & night) working on Hot Changeover.

### 3.5.1 Deliveries

Regular planned deliveries will also be required for the Galloway components (max of 2-3 truckloads), and support equipment such as large excavator (CAT 350+ style) c/w long boom, 4-tonne Kubota Mini-Excavator, muck buckets, etc.

Upon arrival, steel components will be received at the footprint within the radius of the crane and sorted prior to installation. Final assembly of these items (bolting/welding) will be done in an adjacent laydown area accessible to the 175-tonne installation crane, if available, and the footprint is free of encumbrances or constraints from other contractors.

### 3.5.2 Overhead Crane

There will be need for a temporary crane positioned adjacent to the shaft during the Galloway assembly process for fit out and electrical/mechanical installation activities.

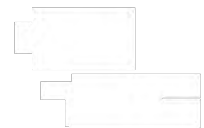
Cranes will be located at the Workfront for the purpose of lowering and lifting manpower, equipment, and material in and out of the MTS Shaft during this execution phase. A secondary crane will always also be available for emergency access and egress if required – refer to Pre-Shaft Sequence drawings (**Appendix C**).

Separate cranes will also be required for the assembly of the Galloway modules (i.e. decks). There will be a smaller set-up crane for the purpose of moving one modular deck to another so that the larger can stack each deck level accordingly, eventually lowering the entirely assembled Galloway into the MTS Shaft and lowering it fully supported off the sub-collar steel deck which has also been used as the lifting frame – refer to Galloway Assembly Sequence drawing (**Appendix C**).

Galloway decks are to be pre-assembled and laid out as shown prior to arrival and setup of the 500t crane. Decks will have a single set of splices for each hanger set (6) between decks.

### 3.5.3 Equipment

- 500t Crane: Liebherr LR 1500
- 90t Crane: Liebherr LTM 1090-4.2
- Elevated Work Platform: Genie S-80 HF



### 3.5.4 Construction / Assembly

The Galloway will be delivered and assembled on site near the collar area, in reach of the crane that is required to lower the assembly into the Shaft – refer to Galloway Assembly Sequence drawings. Once the collar and sub-collar have been completed, the entire structure will be lifted into the shaft and suspended from the sub-collar steel for later use. By pre-assembling the Galloway on surface utilizing a sub-modular stacking execution plan, DMC will save time by avoiding assembly of the

Galloway through the collar and sub-collar doors in various smaller pieces. The schedule for this extends from early April 2019 to the end of May 2019.

The Galloway will be tailored to complete the shaft excavations as efficiently as possible, and once placed in the MTS Shaft, it will be fully assembled to support excavation activities following the commissioning requirements for use. DMC's calculations have determined that the Galloway will have two Pneumatic VSM muckers that will be nested in the phase but connected to the winch on surface which will provide the versatility to maintain or switch out the units in the event of a catastrophic failure. Drilling will be completed by a three-boom electric over hydraulic jumbo drill that will be nested in the headframe and will be brought down to the face through the bucket well. The bottom deck on the Galloway will be designed to install ground support. It will be designed to extend and retract so that the Galloway movements are significantly reduced. The deck above the ground supporting deck will be designed to accommodate the pouring cycle and the deck above that will be designed to accommodate the services install.

### 3.5.5 Work Shifts

It is anticipated that this scope of work will be completed utilising two shifts, day and night working 07:00-19:00 & 19:00-07:00 respectively, to advance the work front as safely and expediently as possible. Deliveries will only be permissible in the day shift working hours.

## 3.6 Compressed air system installation

The compressed air systems will be installed to support the shaft sinking operations at Woodsmith site at all three shafts (MTS, Production and Service Shafts). The compressed air equipment will be installed as shown on the Phase 9 masterplan drawing (40-ARI-WS-7100-CI-18-01050). This will feed the supply required for all three shafts (Production, Service & MTS). Existing service ducts will be used to make the necessary connections.

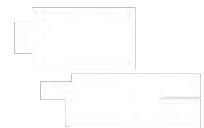
### 3.6.1 Civil

Civil preparation will consist of preparing a 17.6 m x 19 m reinforced concrete pad designed to support the air compression equipment, ventilation equipment and E-houses.

### 3.6.2 Mechanical

The order of the equipment starting from outside the wall of the Hoist Building and continuing to the pad edge is:

- a) Supply Air Fan Assembly
- b) Supply Air and Compressor E-Houses
- c) Air Receiver/Filters/Dryer/Condensate Pump skid train
- d) Air Compressors bank





Each compressor comes as a self-contained unit and are fastened to the pad independently. The air receiver, dryer and condensate pump package are skidded units and also mounted as independent units. The air filters are all installed in the piping and supported as necessary.

The heaviest piece of equipment in the air compression package is the dryer (9,750 kg), followed by the compressors (4,650 kg each) and the receiver (1,876 kg). Therefore, a mobile crane will be required with the capacity and reach to make these lifts to place the equipment on the concrete pad.

### 3.6.3 Piping

Piping installation of the air compression equipment will involve interconnection of the receiver, dryer and filters to a common header connected to the compressor bank. The supply line (DN200) will be run to the MTS shaft, Production and Service shafts.

Coordination with other site piping will be required as well as with the teams working on the shaft supply piping.

### 3.6.4 Electrical & Instrumentation

Power/communication cables will be run to each piece of equipment from the Compressor E-House utilizing cable tray and Unistrut stanchions.

Instrumentation for the air compression equipment will be shipped loose so installation of various items such as pressure switches, gauges, etc will be required prior to start-up and commissioning.

### 3.6.5 Operation

The system is composed of five compressors in parallel for a peak capacity of 207.65 m<sup>3</sup>/min at 10 bar. The normal operation will require 133 m<sup>3</sup>/min at 10 bar, which requires 4 compressors and one standby unit.

Noise pressure level (free-field measurement in distance of 1m) = 85 to 95dB (A).

### 3.6.6 Air Treatment Equipment

The air will fed to a 10,000 litre receiver and then cleaned and dried. Air Quality produced by the compressed air system will be Class 1.2.1 as defined by ISO 8573-1.

The dryer is a FST model DTS 1470 V regenerative desiccant dryer with a capacity of 11,000 m<sup>3</sup>/hr.

Waste processed (via condensation) will be captured and assessed for off-site disposal or through the NDWwTP.



## Appendix A – Lighting Detail

### Specification Text

The luminaire shall be manufactured from high pressure die-cast aluminium. The LED version shall have a luminous efficacy up to 86.7 lm/W and will be capable of producing up to 1,322 luminaire lumens at 4000K with a CRI>70. The luminaire will be rated at IP65.

### Dimensions



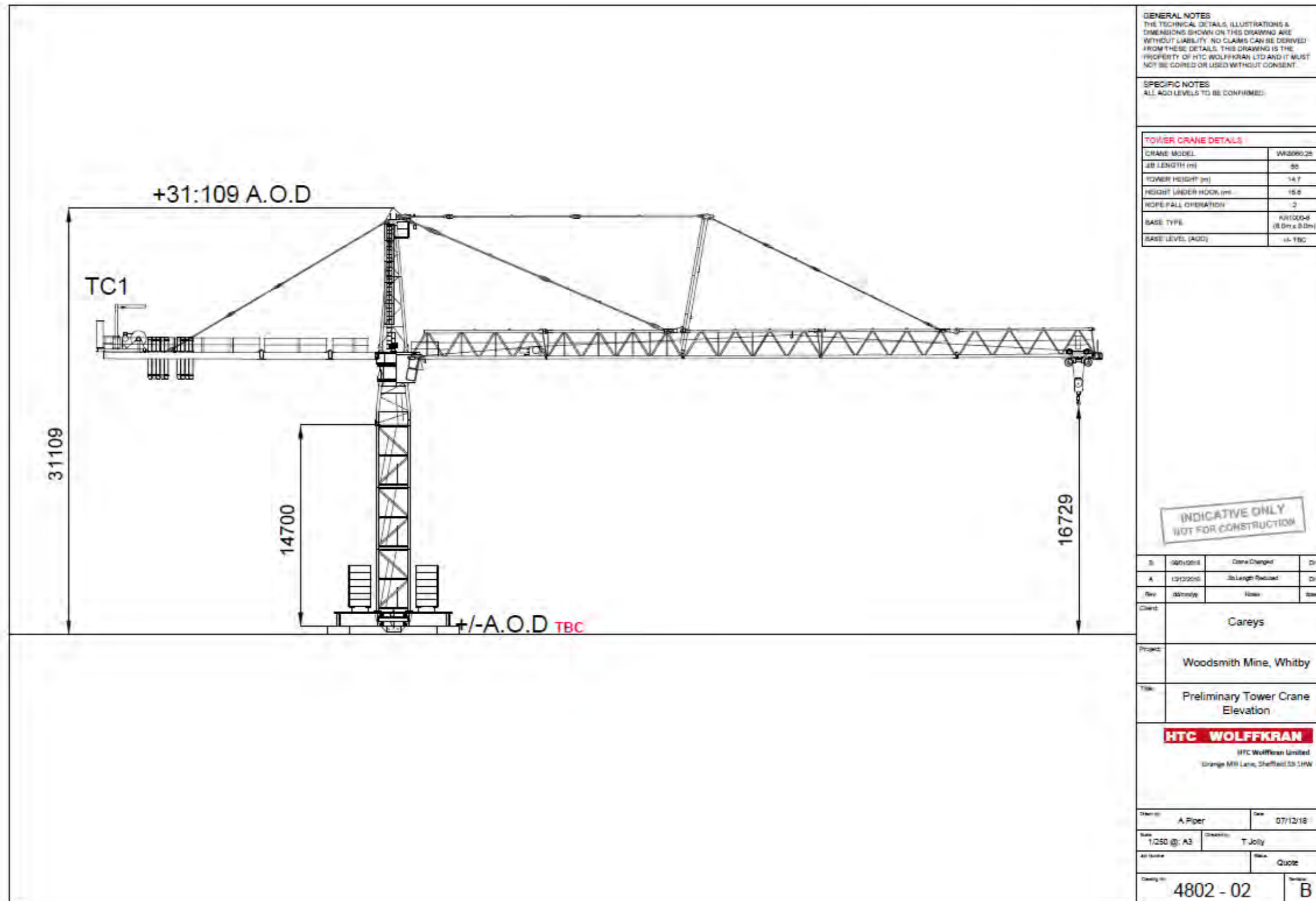
### Specifications

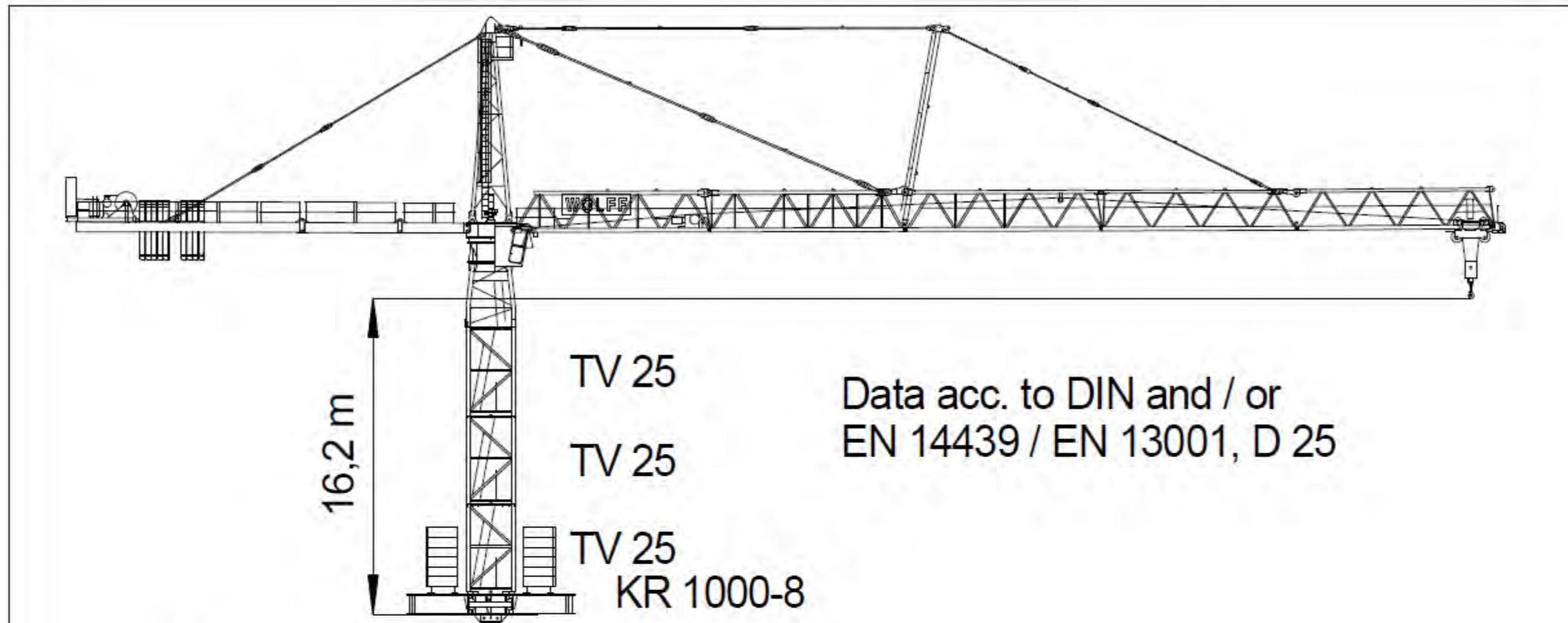
Weight	7.36-12.5 kg
Material	Die-cast aluminium
Paint Finish	Anthracite grey (RAL 7016)

All units of measurement in mm.

Code	Power	Light Source	Luminaire Lumens	Optic	CCT(K)	IP	IK	Weight (kg)	Paint Finish	Product Type
<b>LED</b>										
BDE1020LEDFKG	20W	LED	1322	Symmetrical polycarbonate lens	4000	IP65	IK08	7.36	Anthracite grey (RAL 7016)	Standard 20W flanged
BDE1020LEDFKGPEC	20W	LED	1322		4000	IP65	IK08	7.89	Anthracite grey (RAL 7016)	With photocell flanged
BDE1020LEDFKGEM	20W	LED	1322		4000	IP65	IK08	7.70	Anthracite grey (RAL 7016)	Emergency option flanged
<b>Ceramic Metal Halide</b>										
BDE1035CHFKG	35W	Ceramic Metal Halide	3300	Symmetrical polycarbonate lens	4000	IP55	IK08	12.50	Anthracite grey (RAL 7016)	Standard 35W flanged
<b>Cosmopolis</b>										
BDE1045COSFKG	45W	Cosmopolis	-	Symmetrical polycarbonate lens	4000	IP55	IK08	10.00	Anthracite grey (RAL 7016)	Standard 45W flanged
<b>Compact Fluorescent</b>										
BDE1042FFKG	42W	Fluorescent	3200	Symmetrical polycarbonate lens	4000	IP55	IK08	7.80	Anthracite grey (RAL 7016)	Standard 42W flanged
BDE1042FFKGPEC	42W	Fluorescent	3200		4000	IP55	IK08	7.90	Anthracite grey (RAL 7016)	With photocell flanged
BDE1042FFKGEM	42W	Fluorescent	3200		4000	IP55	IK08	9.41	Anthracite grey (RAL 7016)	Emergency option flanged
BDE1042FFKGEMPEC	42W	Fluorescent	3200		4000	IP55	IK08	9.51	Anthracite grey (RAL 7016)	Emergency option with photocell

Appendix B – Tower Crane Detail



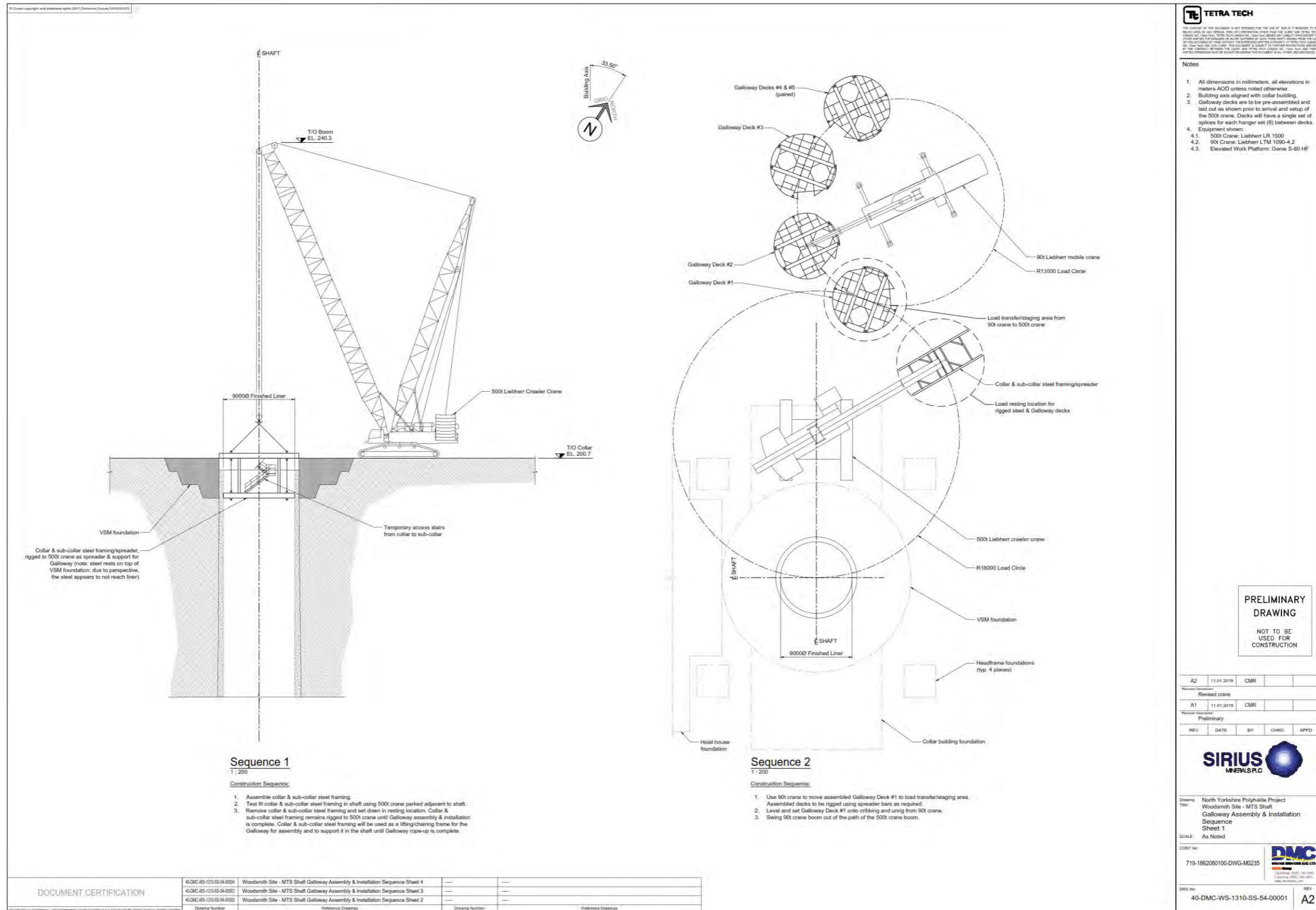


Corner Loads and Central Ballast (Characteristic Loads)

HuH [m]	C.B. [t]	Position	Crane in service Mt = 490 kNm Corner loads					F <sub>H</sub> [kN]	Position	Crane out of service Corner loads					F <sub>H</sub> [kN]	Position	Assembly Corner loads				
			A [kN]	B [kN]	C [kN]	D [kN]	F <sub>H</sub> [kN]			A [kN]	B [kN]	C [kN]	D [kN]	F <sub>H</sub> [kN]			A [kN]	B [kN]	C [kN]	D [kN]	F <sub>H</sub> [kN]
16,2	80	1	549	989	549	109	52	1	486	578	486	394	124	1	358	686	358	31	28		
		2	860	860	238	238			2	551	551	421			421	2	590	590		127	127

<b>WOLFFKRAN</b>		Benennung/Description		Bl.
		WOLFF 8060.25, 50 m jib, 16.2 m HuH on KR 1000-8 (8 m x 8 m base)		
Ersteller/Drawn by	Datum/Date	Name/Name	Zeichnungsnummer/Drawingnumber	
Prüfer/Checked by	03.01.2019	Peter Hegenbart	SPE2019_1_3_W8060_25_50_16_KR1000_8_D25.SKF	
Diese Zeichnung ist Eigentum der Fa. WOLFFKRAN GmbH Deutschland und nur mit ihrem Einverständnis zu verwenden./This drawing is property of WOLFFKRAN GmbH Germany and can only be used with their agreement.				

Appendix C – DMC Galloway Assembly & Installation Sequence



**TETRA TECH**

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- Notes**
1. All dimensions in millimeters, all elevations in meters AOD unless noted otherwise.
  2. Building axis aligned with collar building.
  3. Galloway decks are to be pre-assembled and laid out as shown prior to arrival and setup of the 500t crane. Decks will have a single set of splices for each hanger set (6) between decks.
  4. Equipment shown:
    - 4.1. 500t Crane: Liebherr LR 1500
    - 4.2. 90t Crane: Liebherr LTM 1090-4.2
    - 4.3. Elevated Work Platform: Genie S-80 HF

**PRELIMINARY DRAWING**

NOT TO BE USED FOR CONSTRUCTION

REV	DATE	BY	CHKD	APPD
A2	11.01.2019	CMR		
A1	11.01.2019	CMR		



North Yorkshire Polyhalite Project  
Woodsmith Site - MTS Shaft  
Galloway Assembly & Installation  
Sheet 1

SCALE: As Noted

CURT NO: 718-1862080100-DWG-M0235



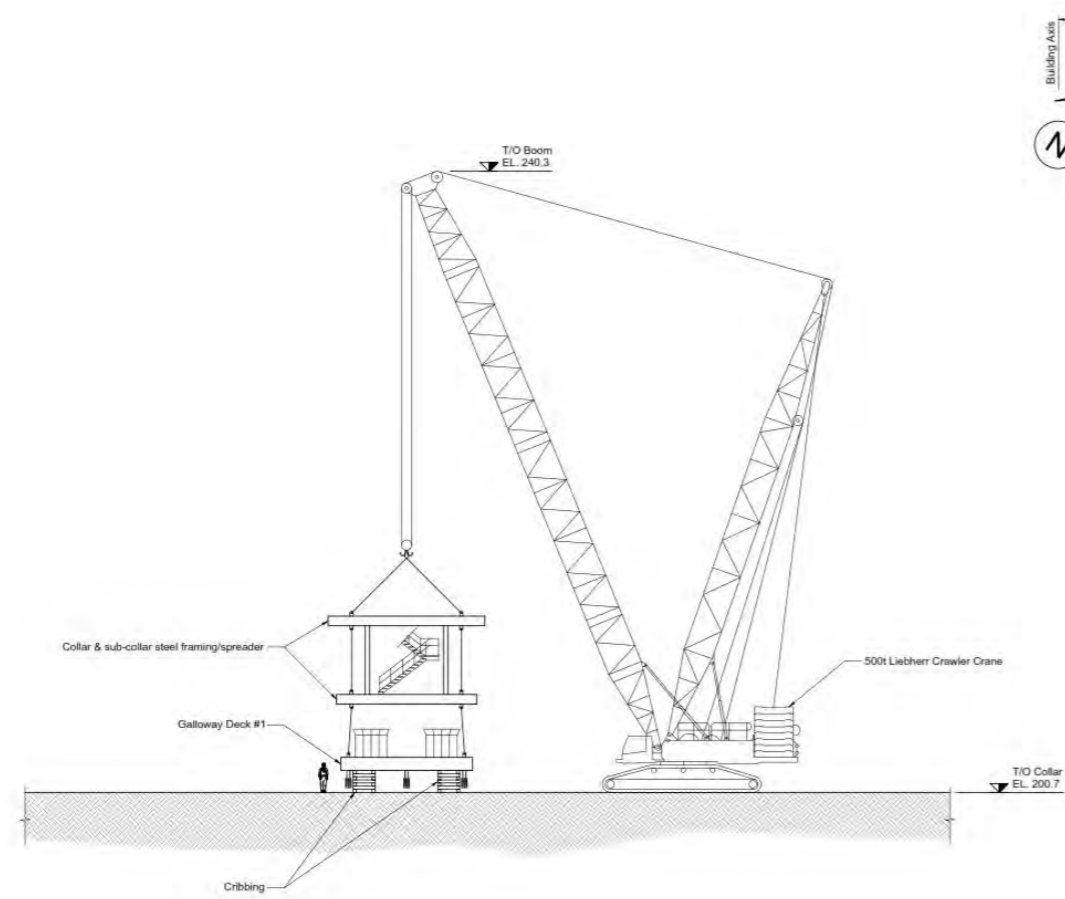
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40-DMC-WS-1310-SS-54-0002	Woodsmith Site - MTS Shaft Galloway Assembly & Installation Sequence Sheet 3	---	---
40-DMC-WS-1310-SS-54-0003	Woodsmith Site - MTS Shaft Galloway Assembly & Installation Sequence Sheet 2	---	---



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**Notes**

1. All dimensions in millimeters, all elevations in meters ADD unless noted otherwise.
2. Building axis aligned with collar building.
3. Equipment shown:
  - 3.1. 500t Crane: Liebherr LR 1500
  - 3.2. 90t Crane: Liebherr LTM 1000-4.2
  - 3.3. Elevated Work Platform: Gene S-80 HF

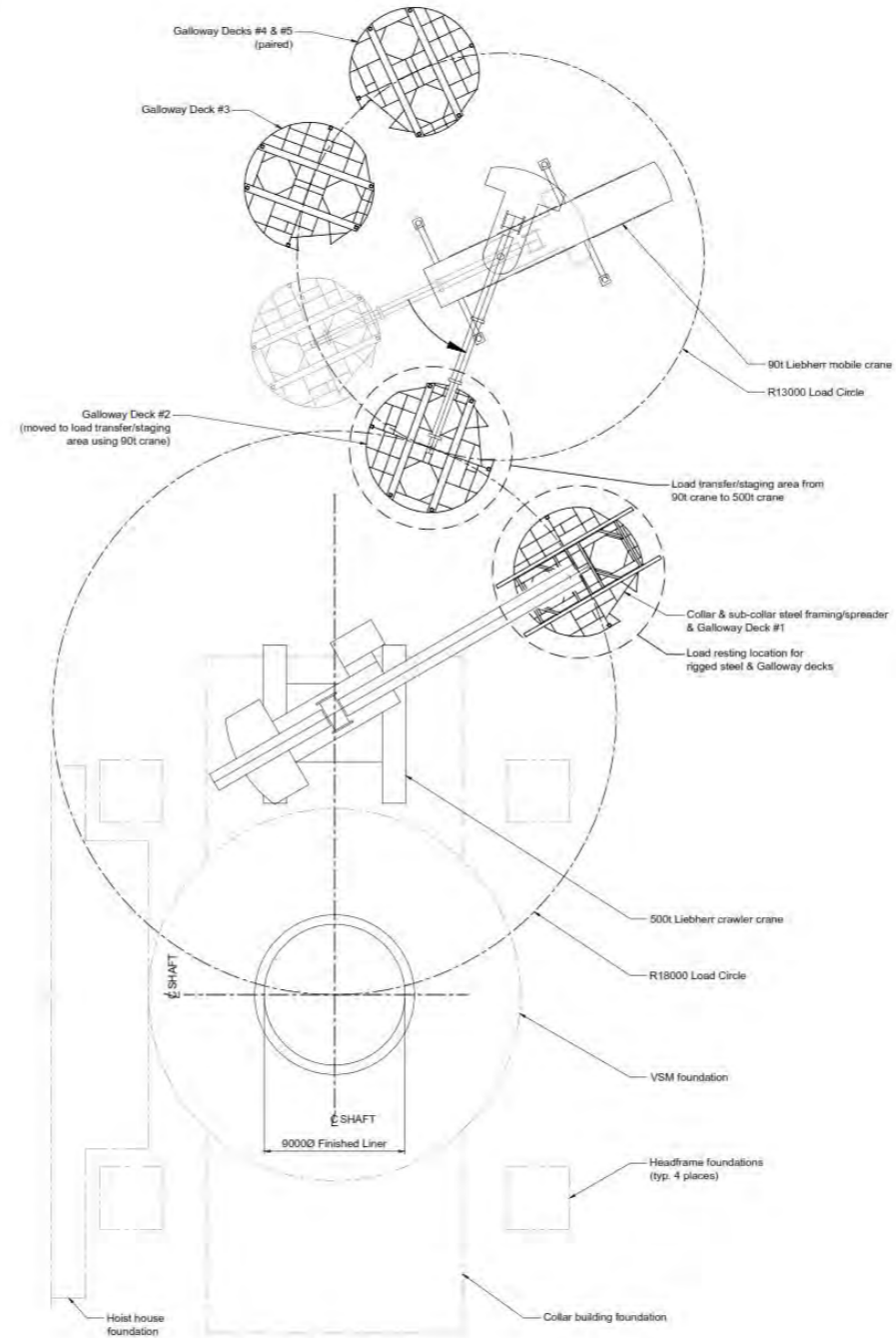
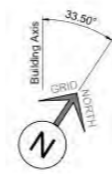


**Sequence 3**

1:200

**Construction Sequence:**

1. Lift collar & sub-collar steel and position over Galloway Deck #1 at load transfer/staging area using 500t crane.
2. Rig Galloway Deck #1 to sub-collar steel.
3. Swing assembly (collar & sub-collar steel & Galloway Deck #1) back to resting area and temporarily set down until next deck is staged.



**Sequence 4**

1:200

**Construction Sequence:**

1. Use 90t crane to move assembled Galloway Deck #2 to load transfer/staging area. Assembled decks to be rigged using spreader bars as required.
2. Level and set Galloway Deck #2 onto cribbing and unrig.
3. Swing 90t crane boom out of the path of the 500t crane boom.

**PRELIMINARY DRAWING**  
NOT TO BE USED FOR CONSTRUCTION

A2	11.01.2019	CMR		
Revision Description: Updated crane				
A1	11.01.2019	CMR		
Revision Description: Preliminary				
REV	DATE	BY	CHKD	APPD



Drawing Title: North Yorkshire Polyhalite Project  
Woodsmith Site - MTS Shaft  
Galloway Assembly & Installation  
Sequence Sheet 2

SCALE: As Noted  
CONT No: 719-1862080100-DWG-M0236



DWG No: 40-DMC-WS-1310-SS-54-00002 REV: A2

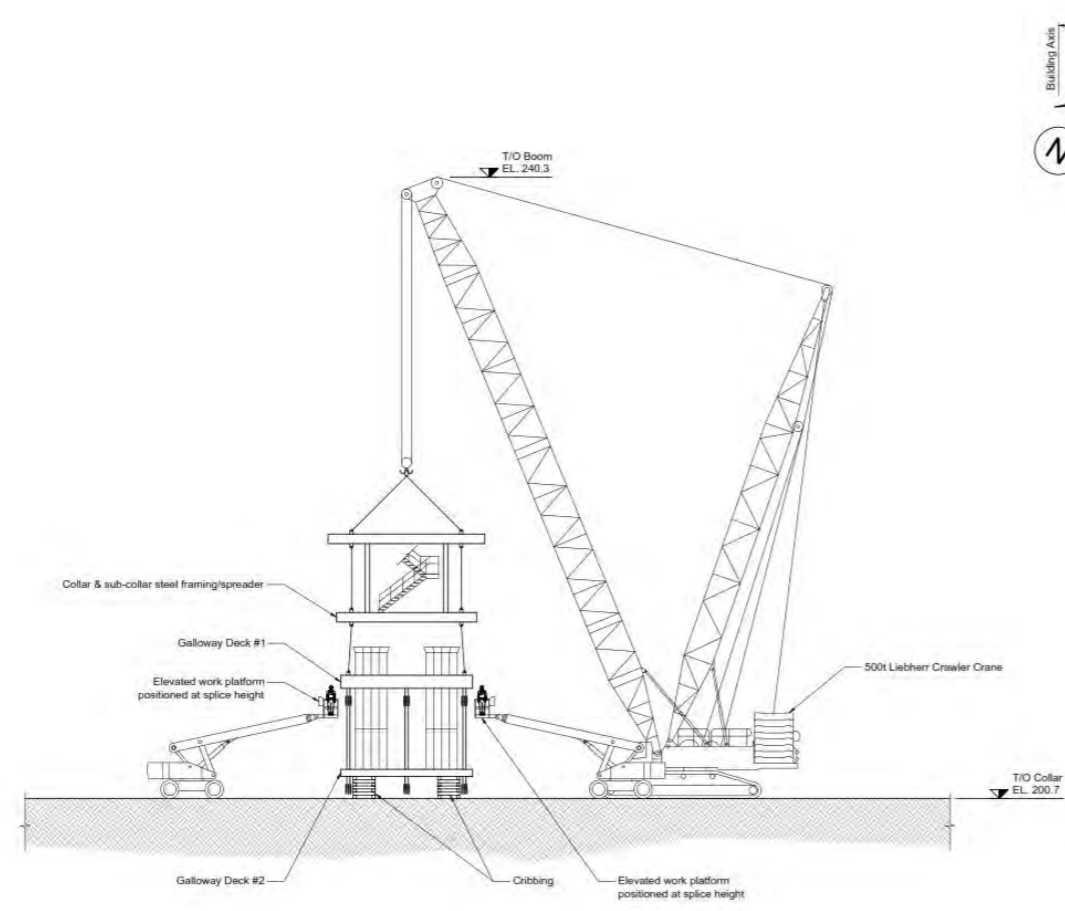
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40-DMC-WS-1310-SS-54-00003	Woodsmith Site - MTS Shaft Galloway Assembly & Installation Sequence Sheet 3		
40-DMC-WS-1310-SS-54-00001	Woodsmith Site - MTS Shaft Galloway Assembly & Installation Sequence Sheet 1		



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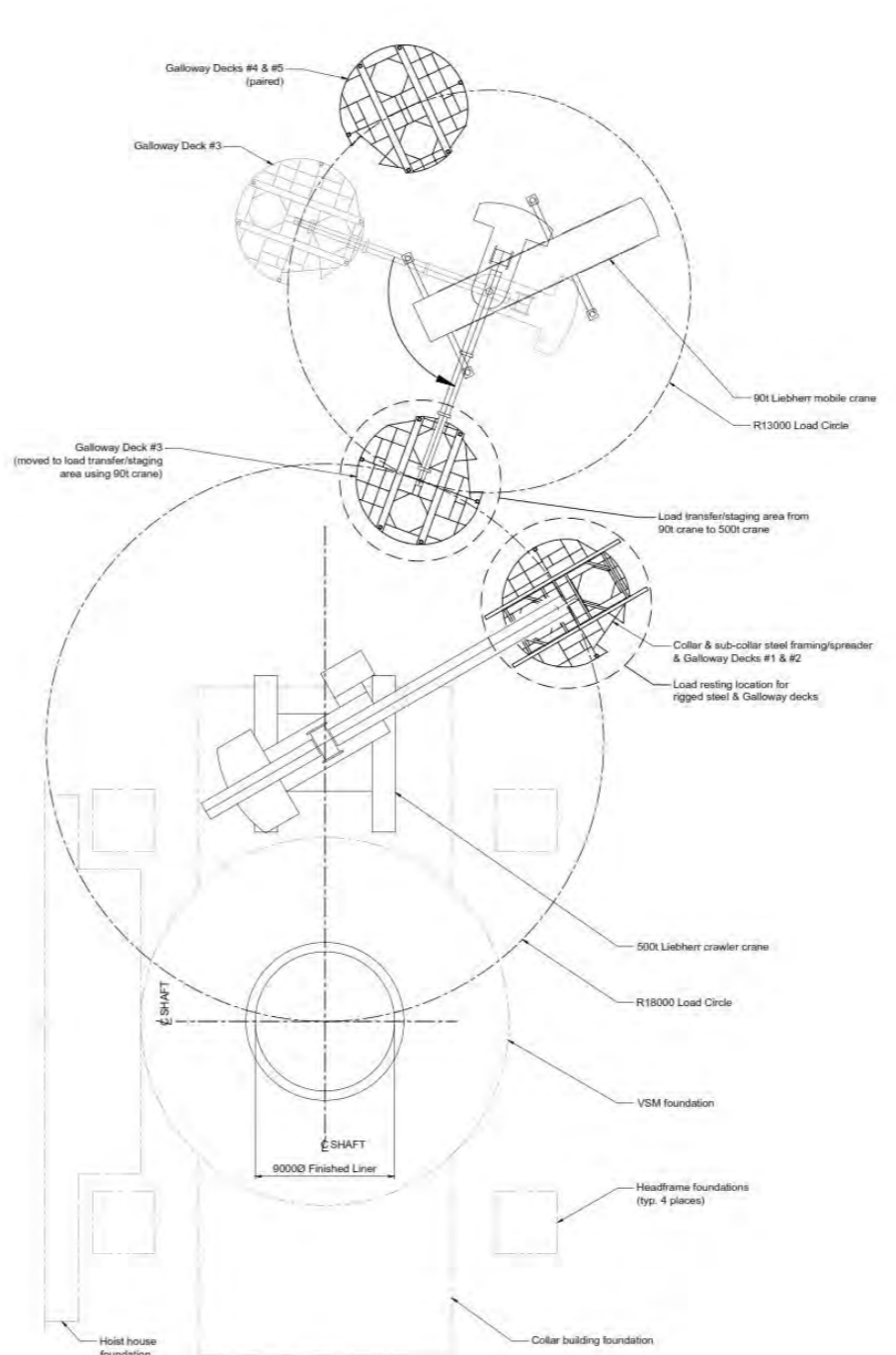
1. All dimensions in millimeters, all elevations in meters ADD unless noted otherwise.
2. Building axis aligned with collar building.
3. Equipment shown:
  - 3.1. 500t Crane: Liebherr LR 1500
  - 3.2. 90t Crane: Liebherr LTM 1000-4.2
  - 3.3. Elevated Work Platform: Gene S-80 HF



**Sequence 5**  
1: 200

Construction Sequence:

1. Lift assembly (collar & sub-collar steel & Galloway Deck #1) and position over Galloway Deck #2 at load transfer/staging area using 500t crane.
2. Using elevated work platforms, make splice connections between Decks #1 and #2 around perimeter of Galloway.
3. Swing assembly (collar & sub-collar steel & Galloway Decks #1 and #2) back to resting area and set down until next deck is staged.



**Sequence 6**  
1: 200

Construction Sequence:

1. Use 90t crane to move assembled Galloway Deck #3 to load transfer/staging area. Assembled decks to be rigged using spreader bars as required.
2. Level and set Galloway Deck #3 onto cribbing and unrig.
3. Swing 90t crane boom out of the path of the 500t crane boom.
4. Repeat Sequence 5 and 6 with Decks #4 & #5 (paired).

**PRELIMINARY DRAWING**  
NOT TO BE USED FOR CONSTRUCTION

A2	11.01.2019	CMR		
Revision Description: Updated crane				
A1	11.01.2019	CMR		
Revision Description: Preliminary				
REV	DATE	BY	CHKD	APPD



Drawn: North Yorkshire Polyhalite Project  
Title: Woodsmith Site - MTS Shaft Galloway Assembly & Installation Sequence Sheet 3  
SCALE: As Noted

CONT No: 719-1862080100-DWG-M0237  
**DMC**  
MINERALS ENGINEERING AND LTD

DWG No: 40-DMC-WS-1310-SS-54-00003 REV: A2

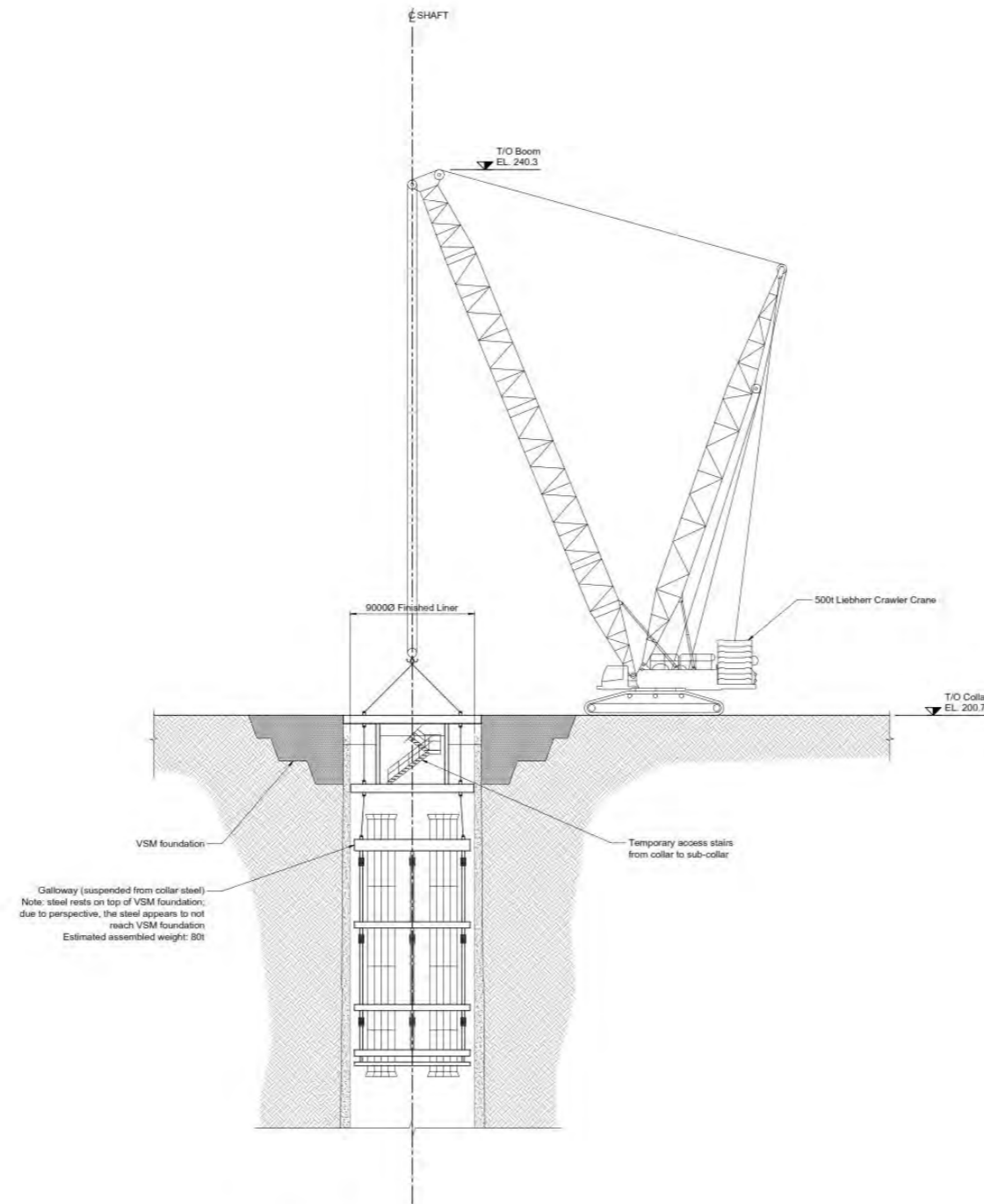
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40-DMC-WS-1310-SS-54-00002	Woodsmith Site - MTS Shaft Galloway Assembly & Installation Sequence Sheet 2			
40-DMC-WS-1310-SS-54-00001	Woodsmith Site - MTS Shaft Galloway Assembly & Installation Sequence Sheet 1			



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Notes

1. All dimensions in millimeters, all elevations in meters ADD unless noted otherwise.
2. Building axis aligned with collar building.
3. Equipment shown:
  - 3.1. 500t Crane: Liebherr LR 1500
  - 3.2. 90t Crane: Liebherr LTM 1000-4.2
  - 3.3. Elevated Work Platform: Genie S-80 HF



**Sequence 7**

1:200

Construction Sequence:

1. Lift complete assembly (collar & sub-collar steel & Galloway) and lower into shaft.
2. Install collar steel frame anchors.
3. Sub-collar steel frame anchors to be installed after Galloway is roped up and weight relieved from the collar & sub-collar steel.
4. Remove rigging from collar steel to 500t crane.

**PRELIMINARY  
DRAWING**  
  
NOT TO BE  
USED FOR  
CONSTRUCTION

A2	11.01.2019	CMR		
Revision Description: Updated crane				
A1	11.01.2019	CMR		
Revision Description: Preliminary				
REV	DATE	BY	CHKD	APPD



Drawn: North Yorkshire Polyhalite Project  
 Title: Woodsmith Site - MTS Shaft Galloway Assembly & Installation  
 Sequence Sheet 4  
 SCALE: As Noted

CONT NO:  
719-1862080100-DWG-M0238



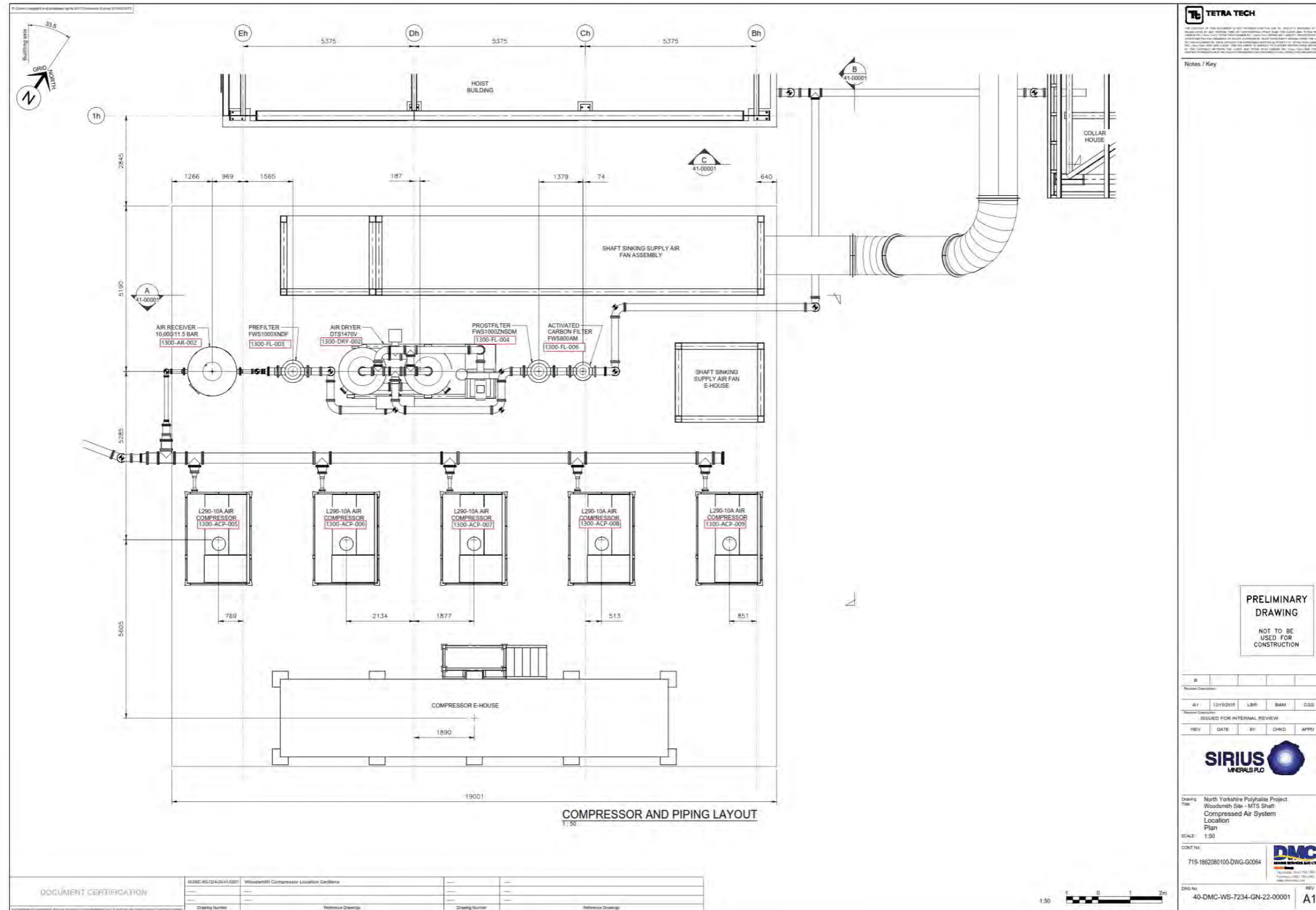
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 REV: A2

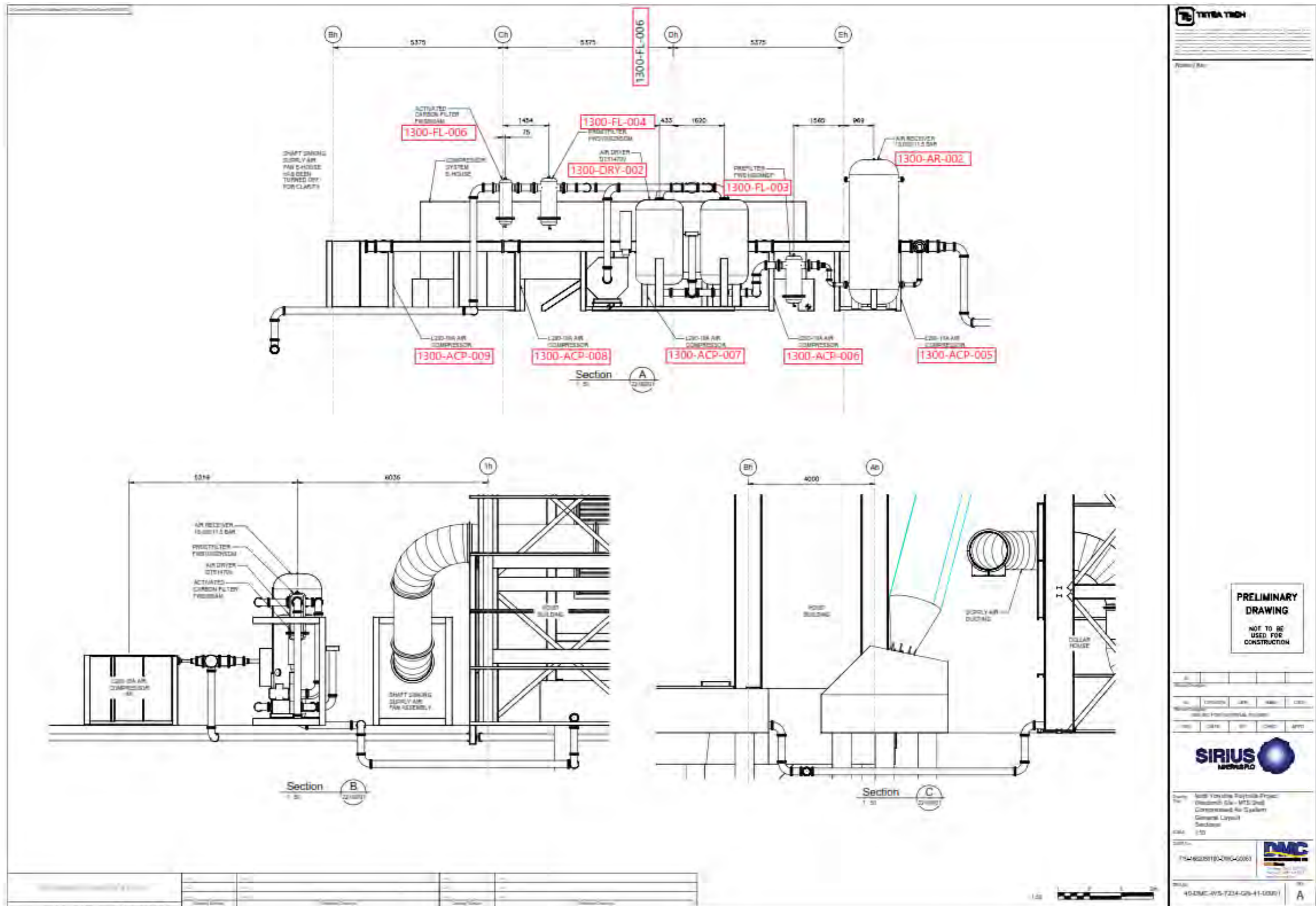
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40-DMC-WS-1310-SS-54-00001	Woodsmith Site - MTS Shaft Galloway Assembly & Installation Sequence Sheet 1	---	---

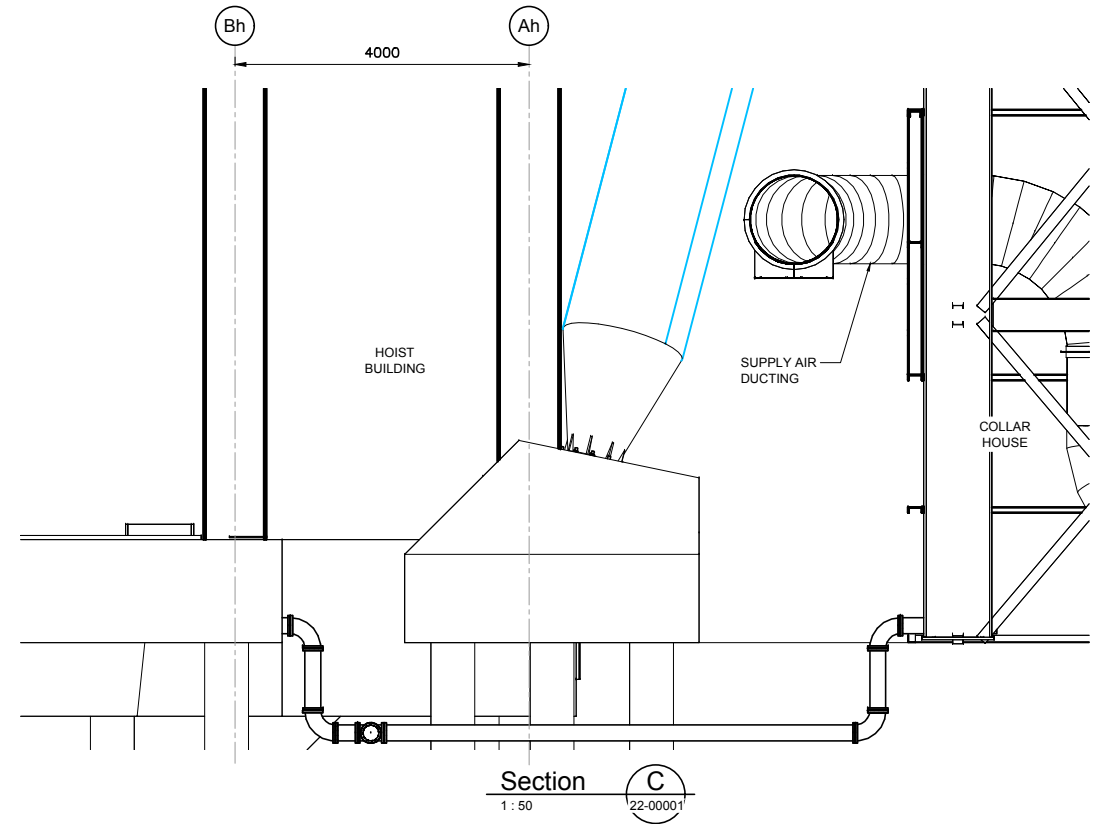
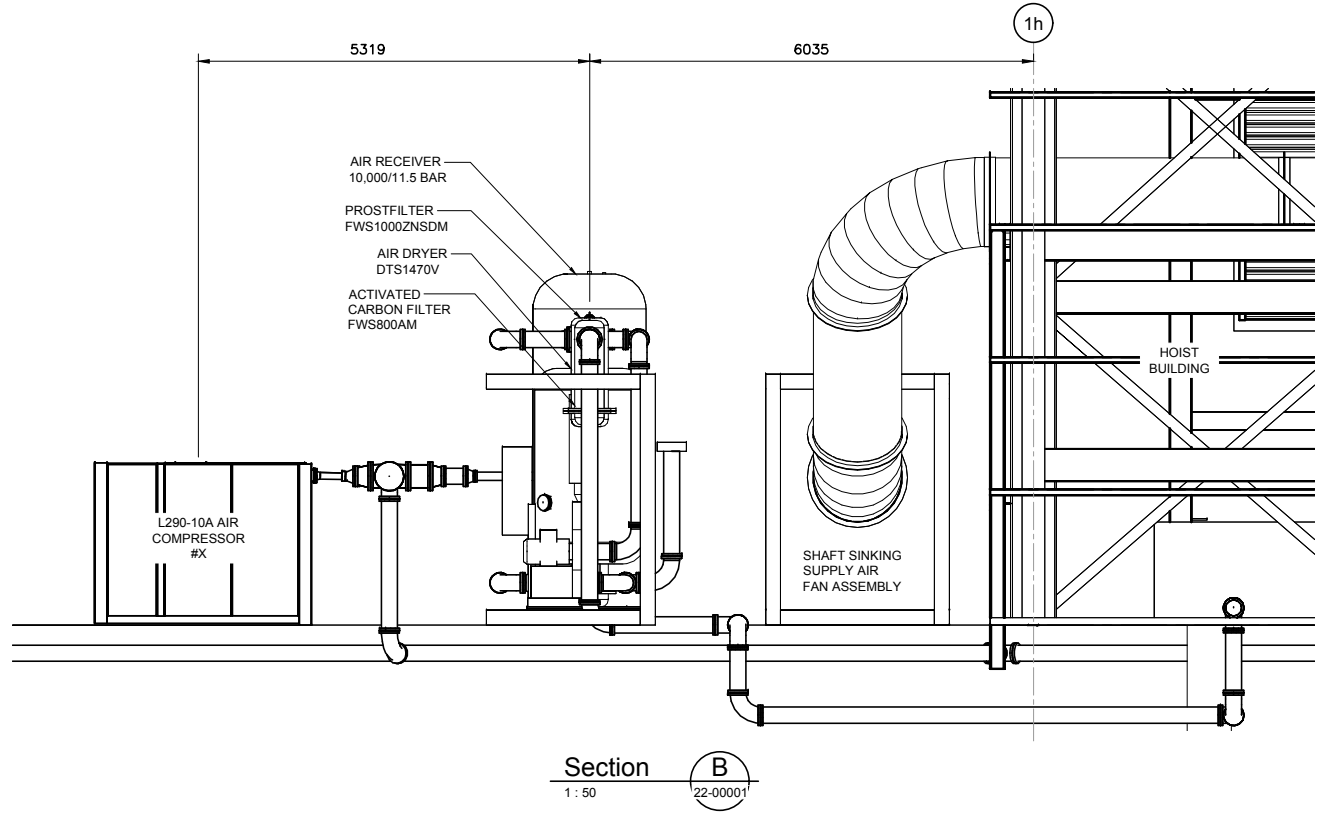
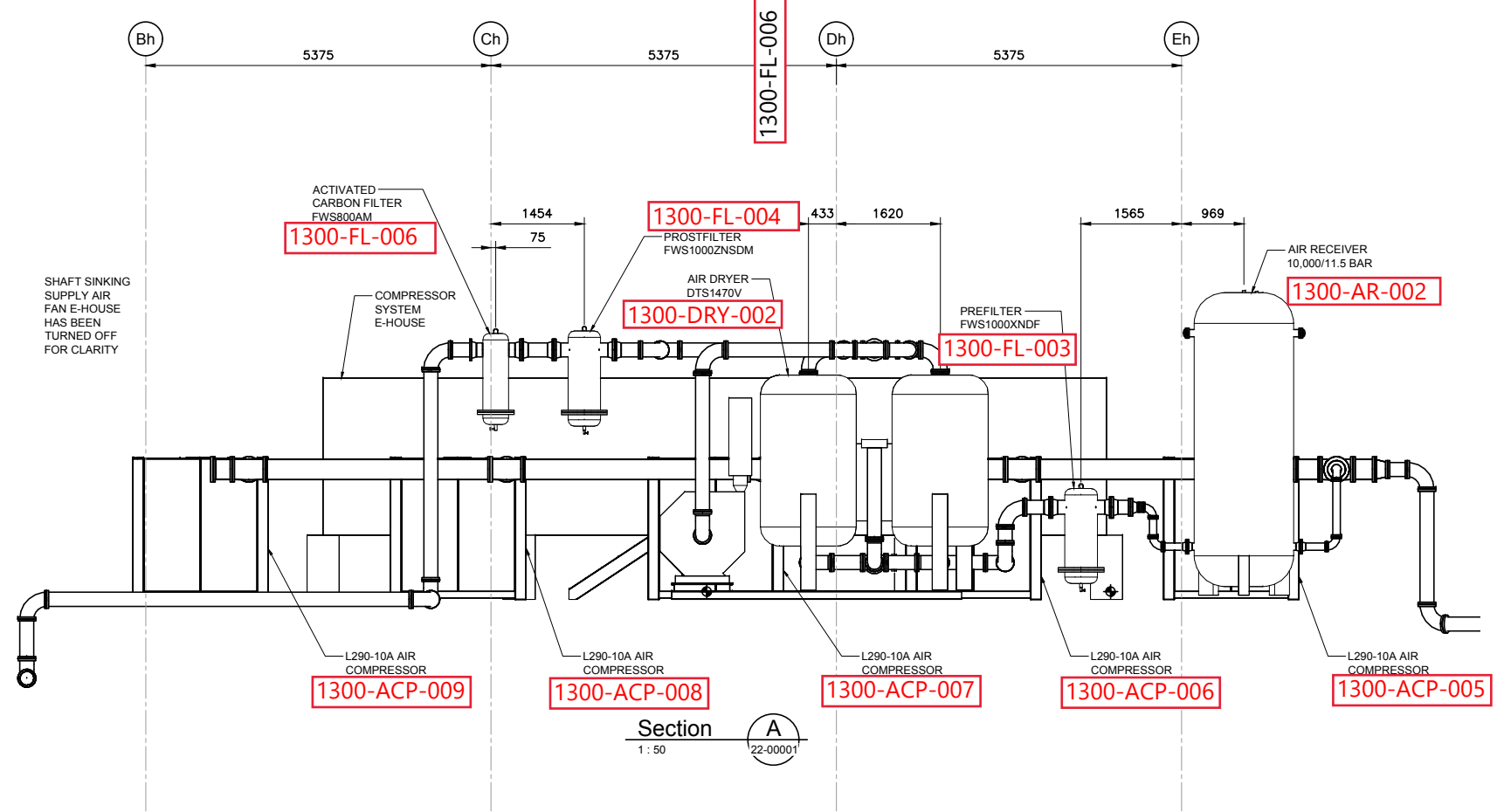
DOCUMENT CERTIFICATION



Appendix D – DMC Compressed Air System Installation







**PRELIMINARY  
DRAWING**  
  
NOT TO BE  
USED FOR  
CONSTRUCTION

Revision Description	DATE	BY	CHKD	APPD
A	12/19/2018	LBR	BAM	CSS
ISSUED FOR INTERNAL REVIEW				



Drawing Title: North Yorkshire Polyhalite Project  
 Woodsmith Site - MTS Shaft  
 Compressed Air System  
 General Layout  
 Sections

SCALE: 1:50  
 CONT No: 719-1862080100-DWG-G0063  
**DMC**  
DMC MINERALS (CANADA) LTD  
 TEL: (905) 780-1980  
 FAC: (905) 780-1990  
 WWW.DMCINC.COM

DRG No: 40-DMC-WS-7234-GN-41-00001  
 REV: A

DOCUMENT CERTIFICATION

Drawing Number	Reference Drawings	Drawing Number	Reference Drawings





# NORTH YORKSHIRE POLYHALITE PROJECT

## AIR COMPRESSED SYSTEM

Doc no. NYPP-WS-QF-DMC-MDA-0001

# GENERAL ARRANGEMENT DRAWING

WOODSMITH SITE

REV #	DATE	ISSUE	PREP.	CHECK	APVD.
A	03/12/2018	First Issue	AC	LM	LM

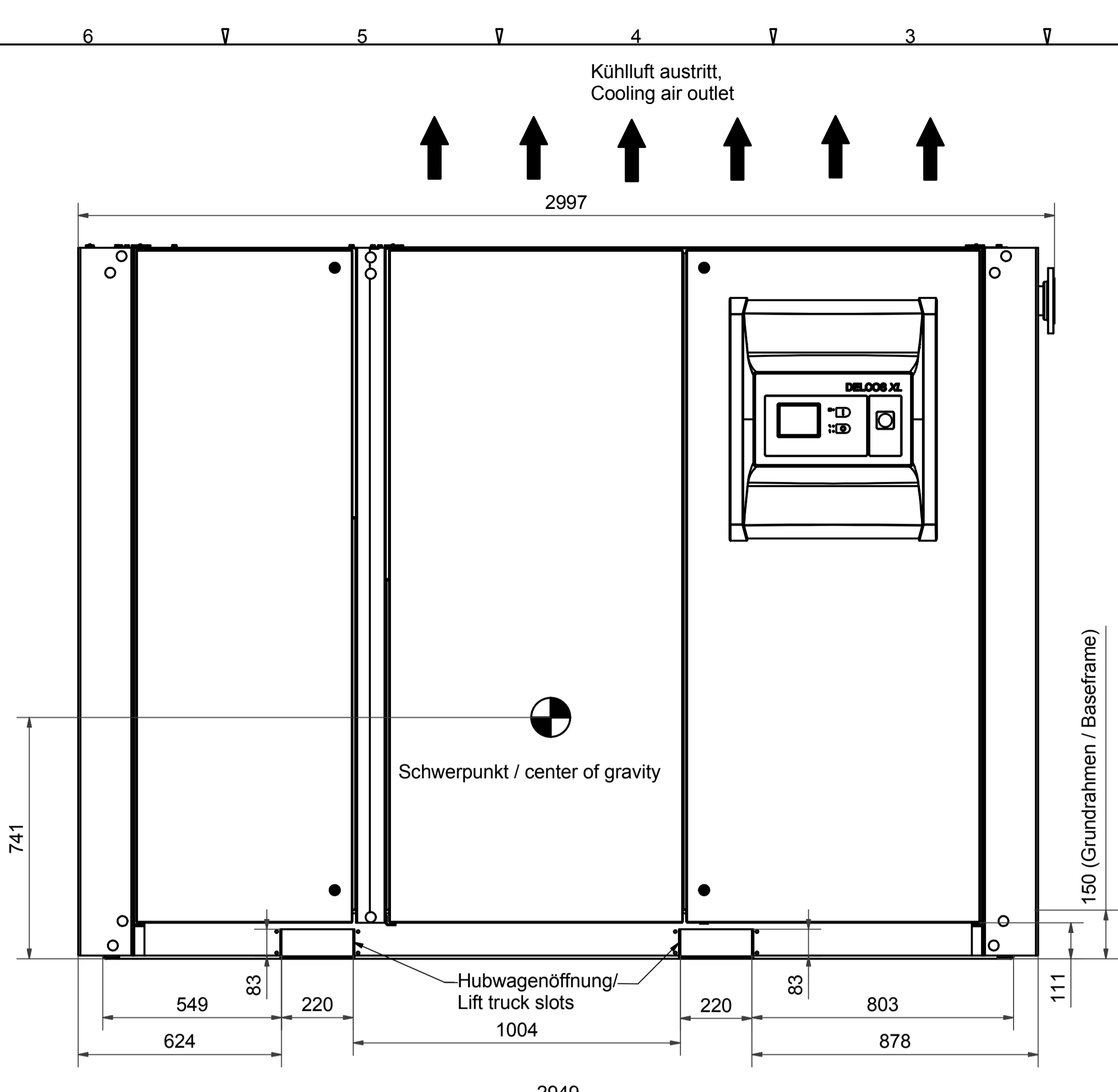
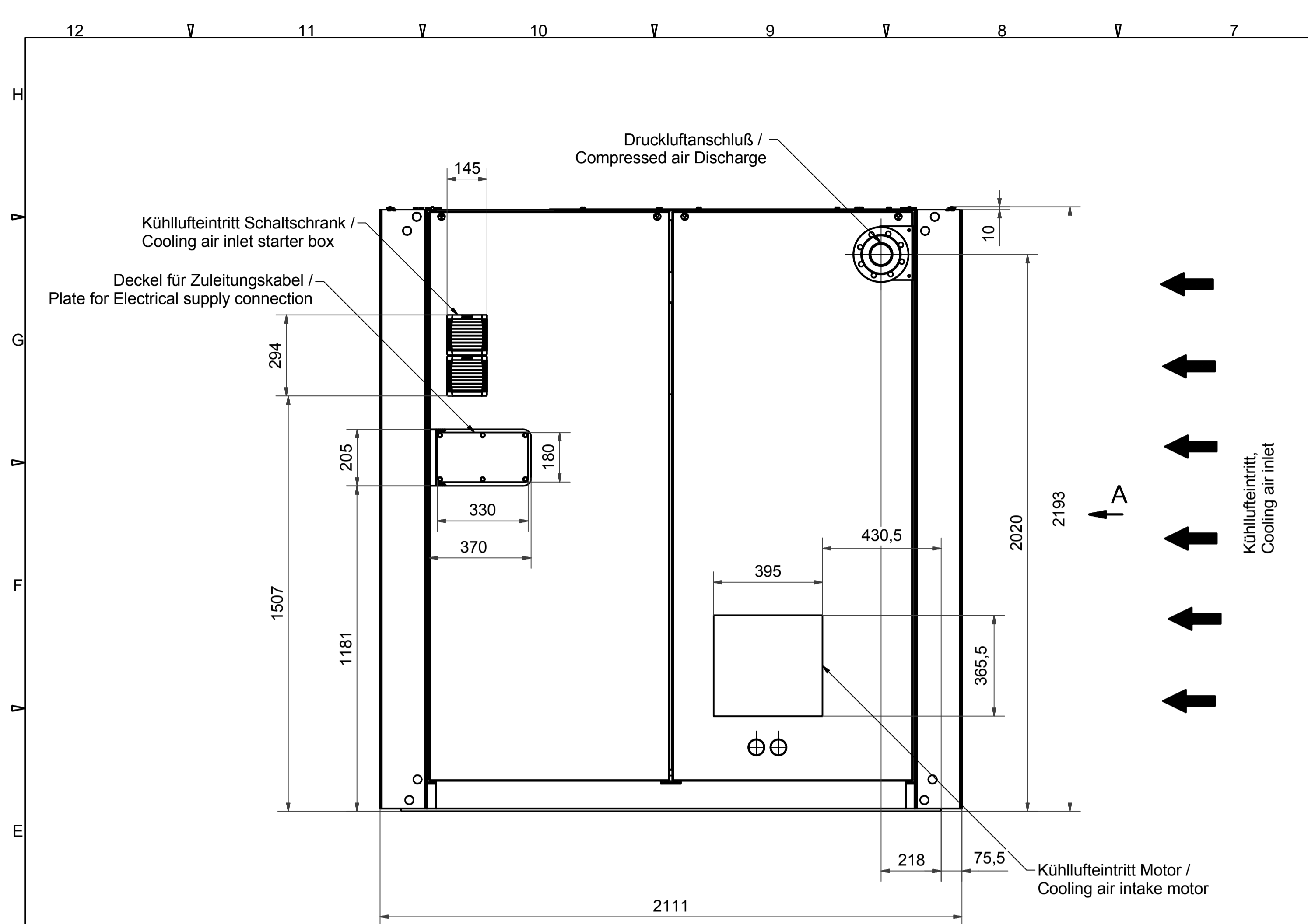
## **TABLE OF CONTENT**

<b>1. COMPRESSOR DRAWINGS .....</b>	<b>3</b>
<b>2. AIR RECEIVER DRAWING .....</b>	<b>7</b>
<b>3. AIR DRYER DRAWING .....</b>	<b>9</b>
<b>4. FILTER DRAWINGS.....</b>	<b>11</b>

## **1. COMPRESSOR DRAWING**

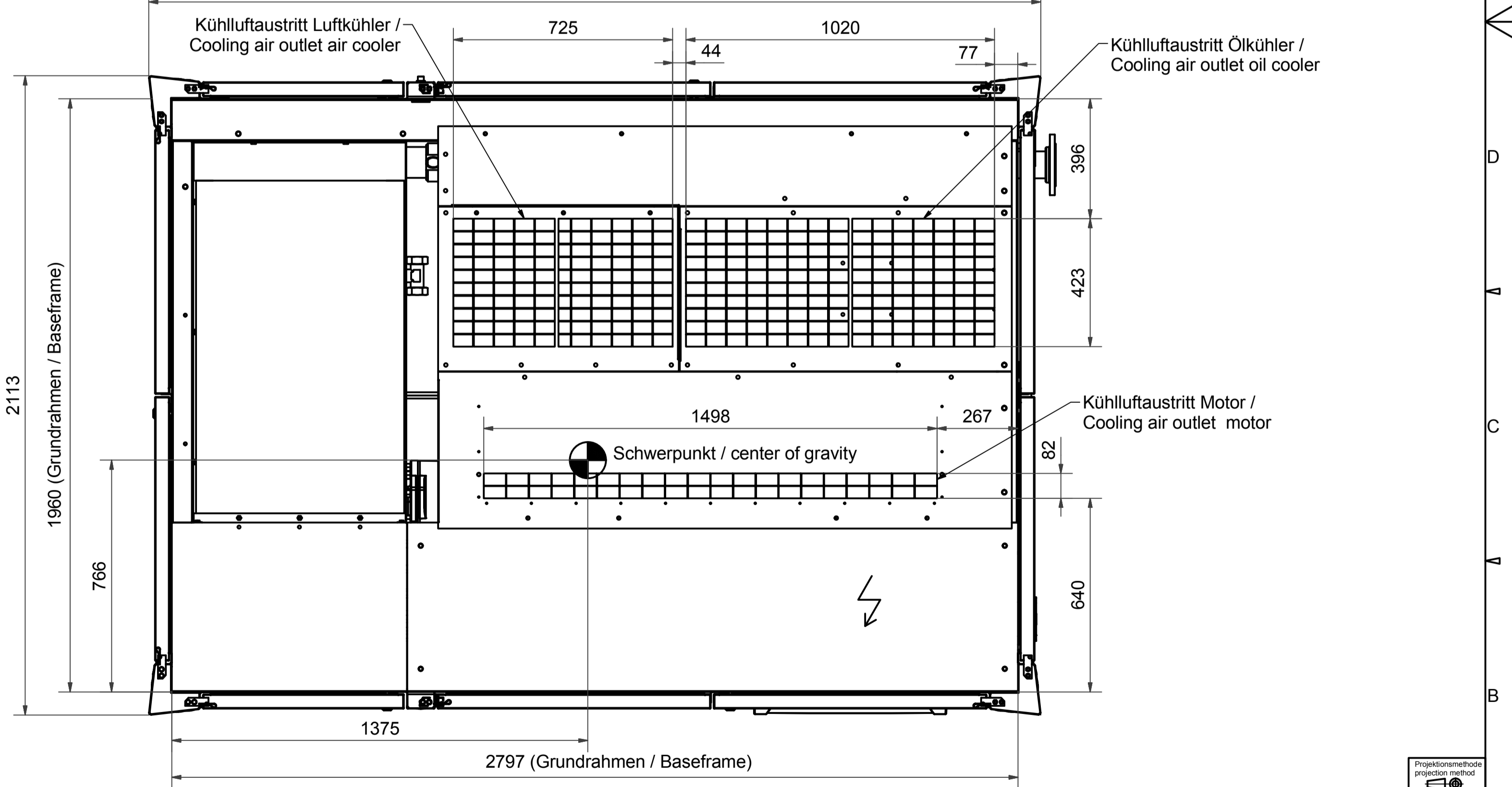
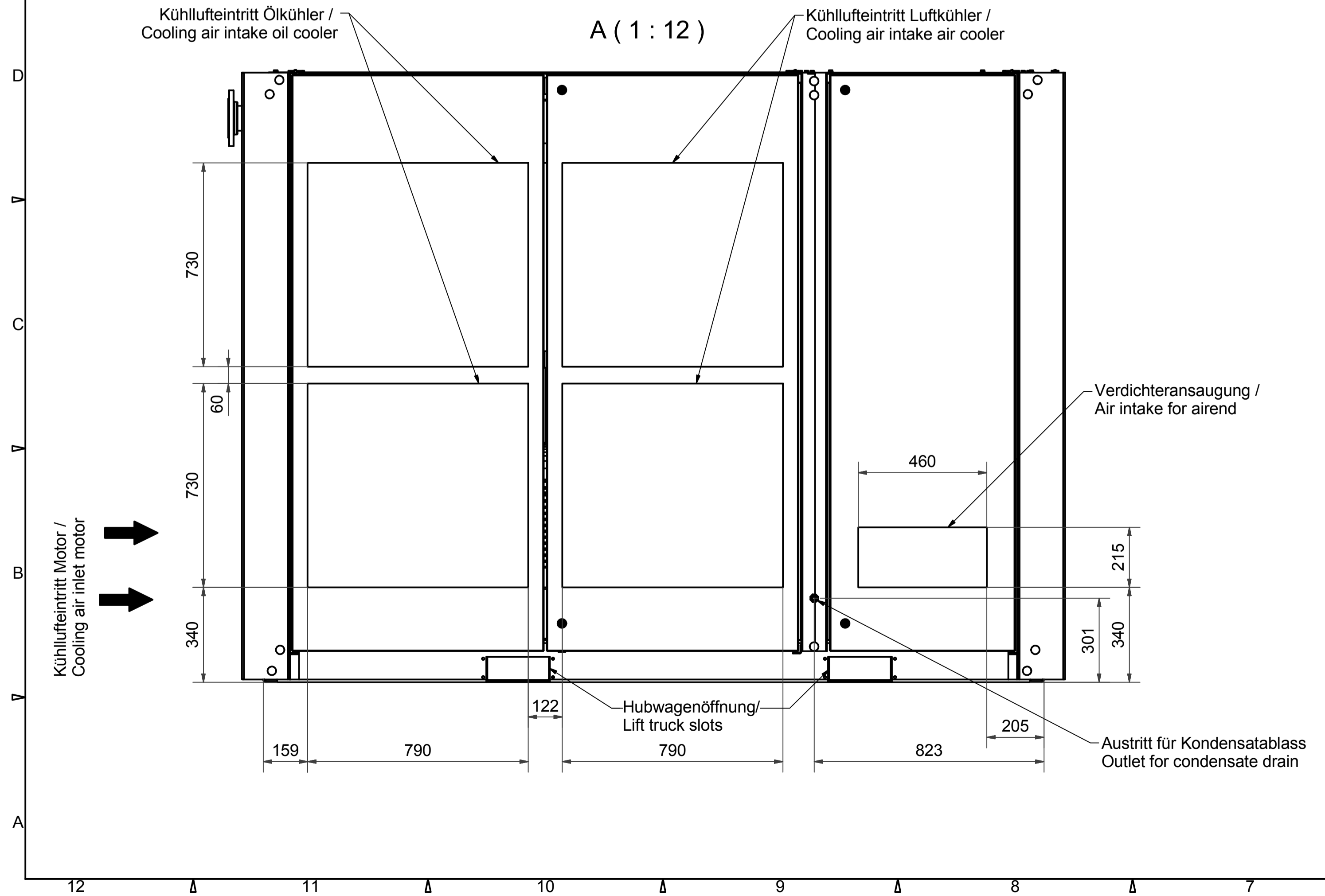
General arrangement drawing for the compressor:

- Gardner-Denver L290-10A



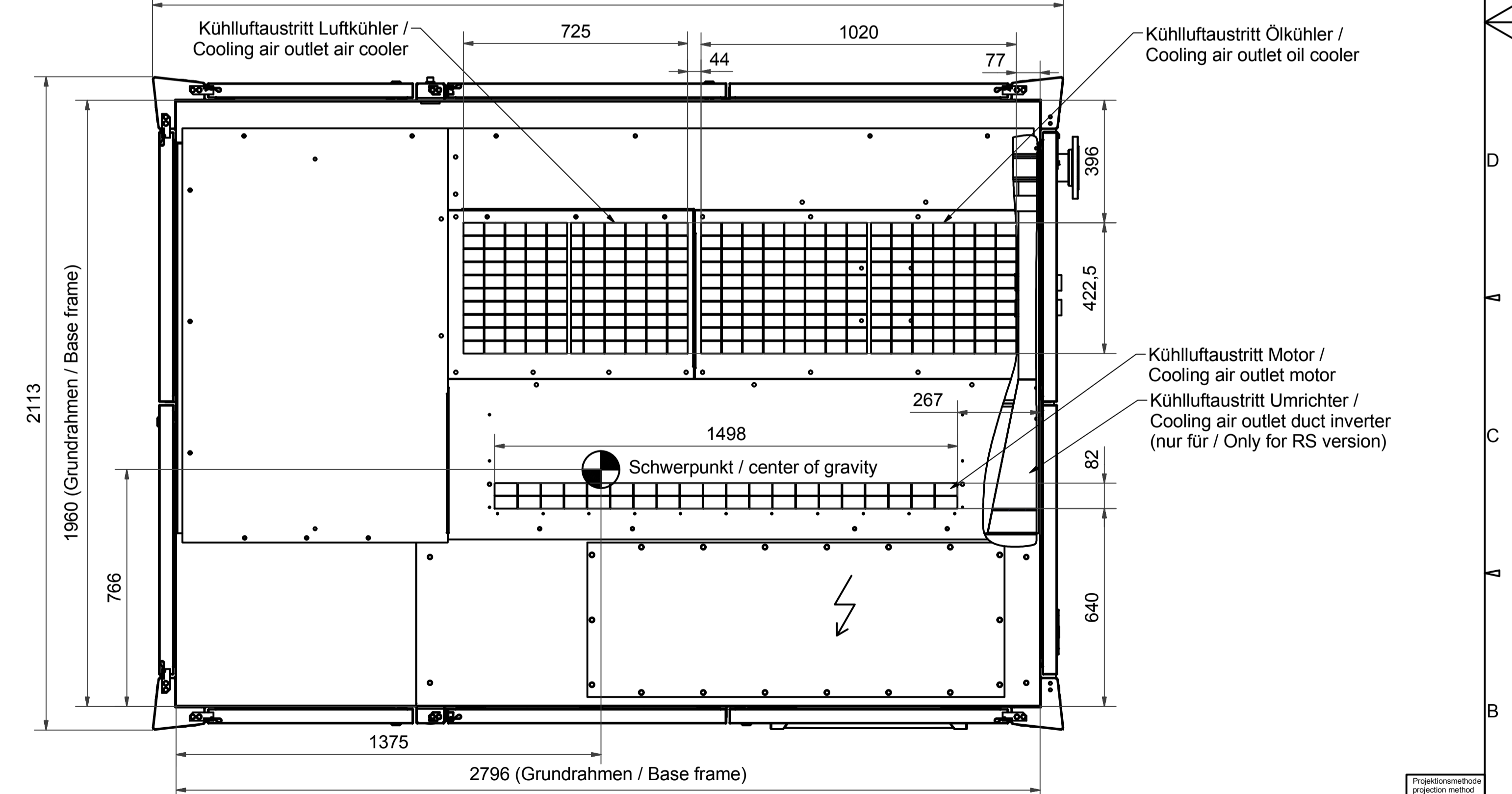
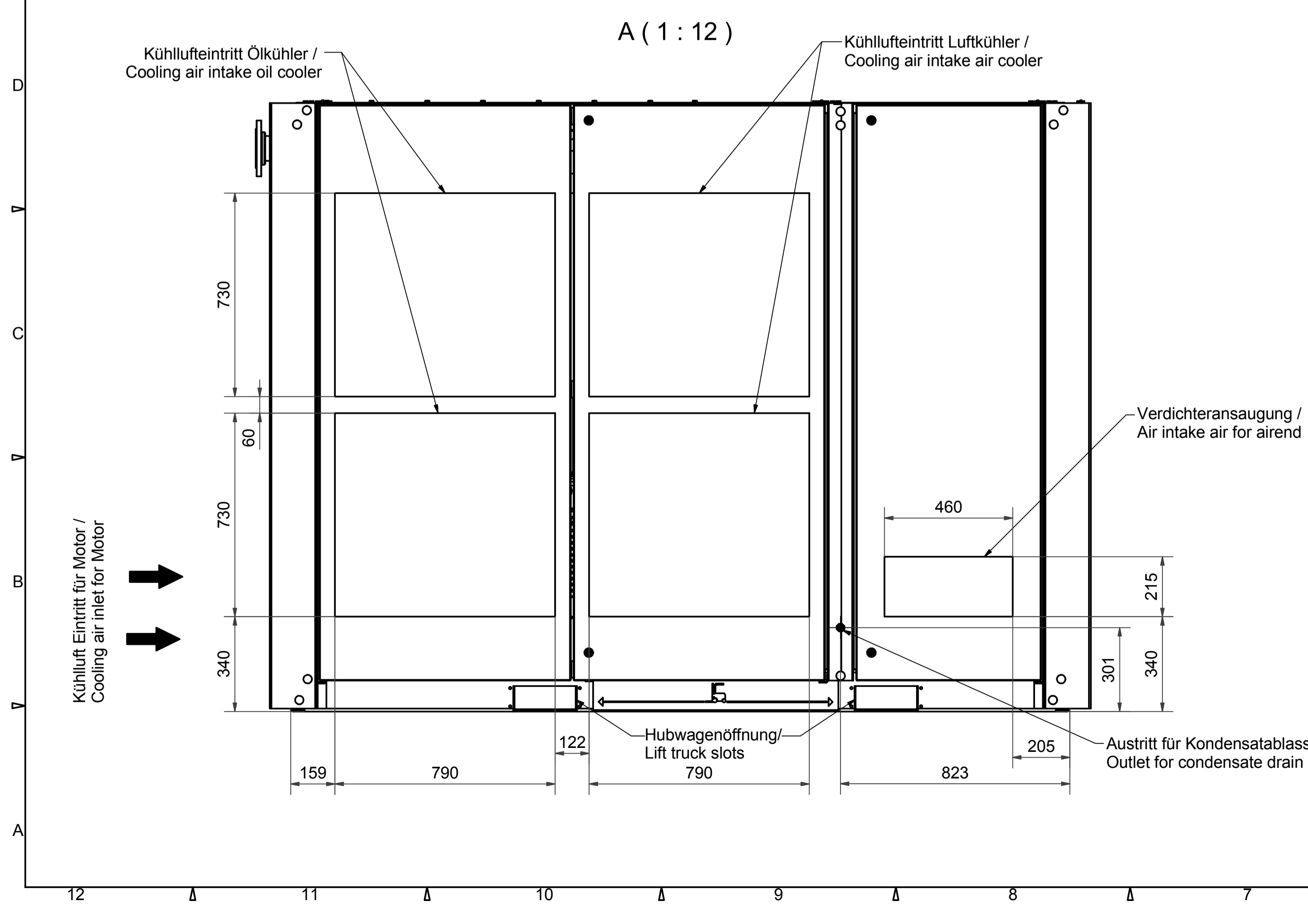
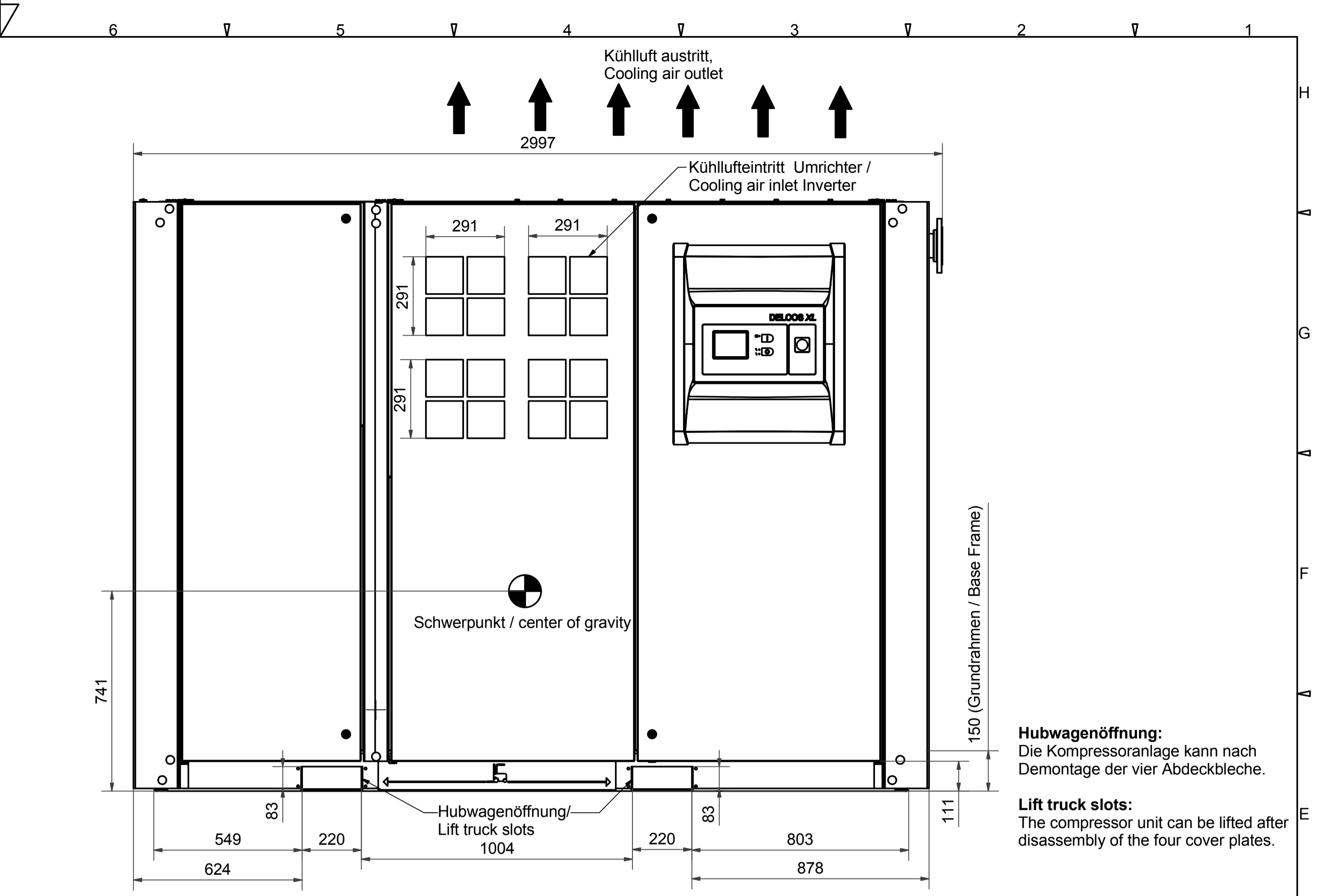
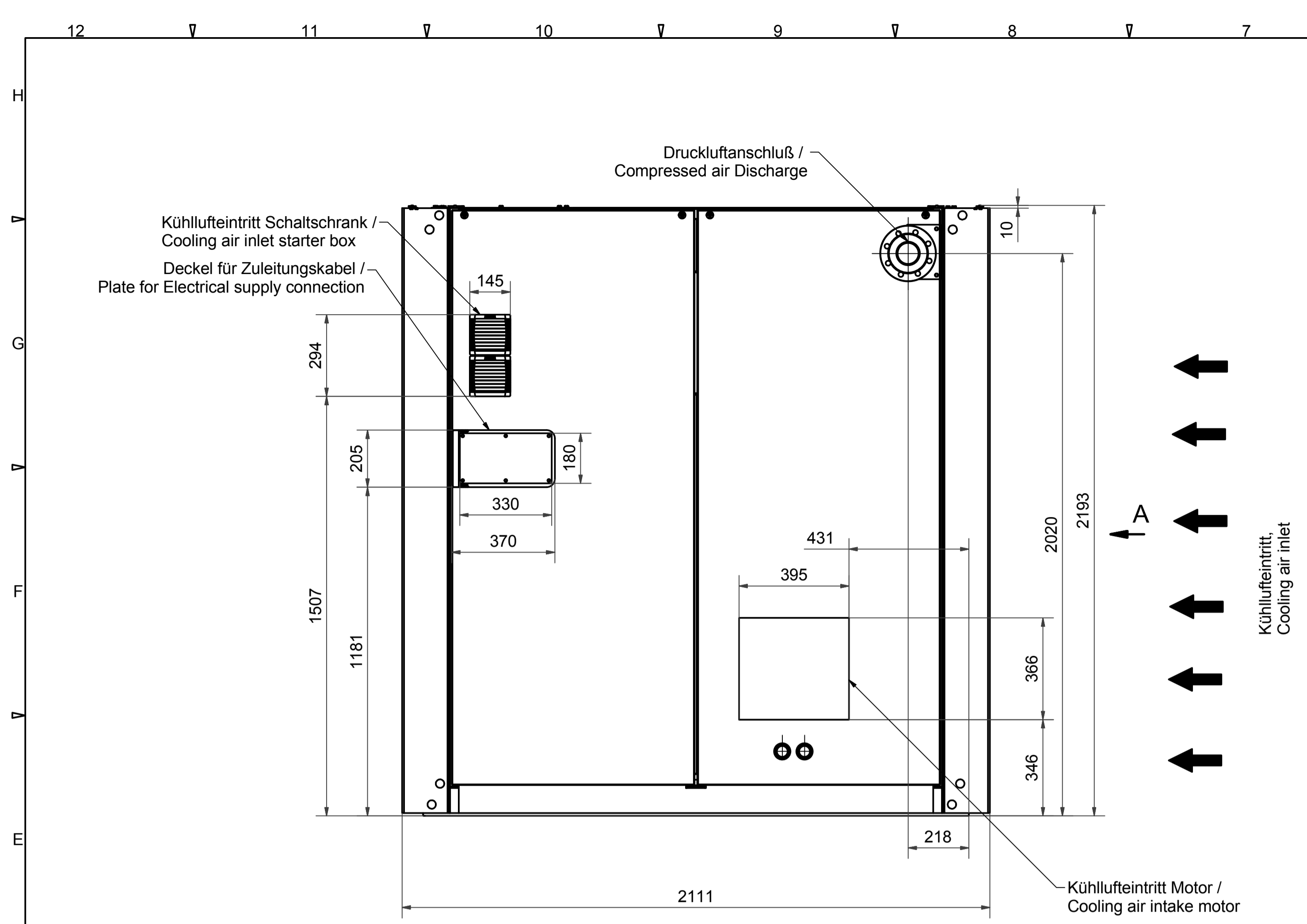
**Hubwagenöffnung:**  
Die Kompressoranlage kann nach Demontage der vier Abdeckbleche.

**Lift truck slots:**  
The compressor unit can be lifted after disassembly of the four cover plates.



**L160-290**

Tolerierung DIN 7167 Allgemeintoleranzen ISO 2768-mS		Rauhtiefe Rz Reihe 2 DIN 3141		Maßstab: 1:12		Gewicht:	
Gezeichnet 18.11.2015 Tries		Datum 18.11.2015 Tries		Bezeichnung / Document description Aufstellungsplan, Installation schematic		Auftr.-Nr. Werkstoff	
Abz. 0463 Copyright reserved		Refer to protection notice ISO 16016		Klass.-Nr. UA Spr Codestelle		Blatt/Blätter 1/3 A1	
Gardiner Denver Deutschland GmbH Argenthaler Str. 11 55469 Simmern / Hunsr.		Ersatz für:		Ersetzt durch:		1	

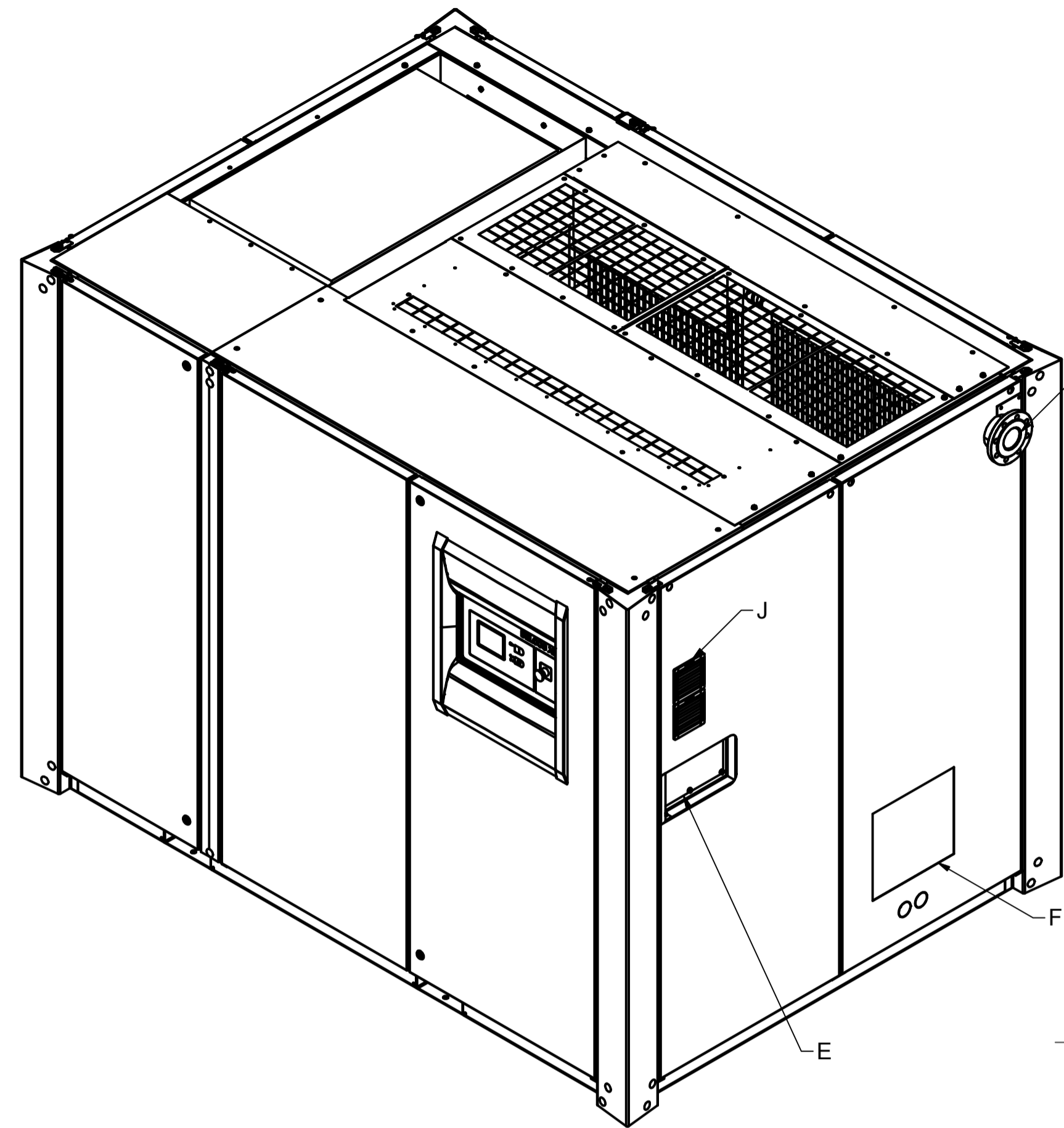


**L160RS-290RS**

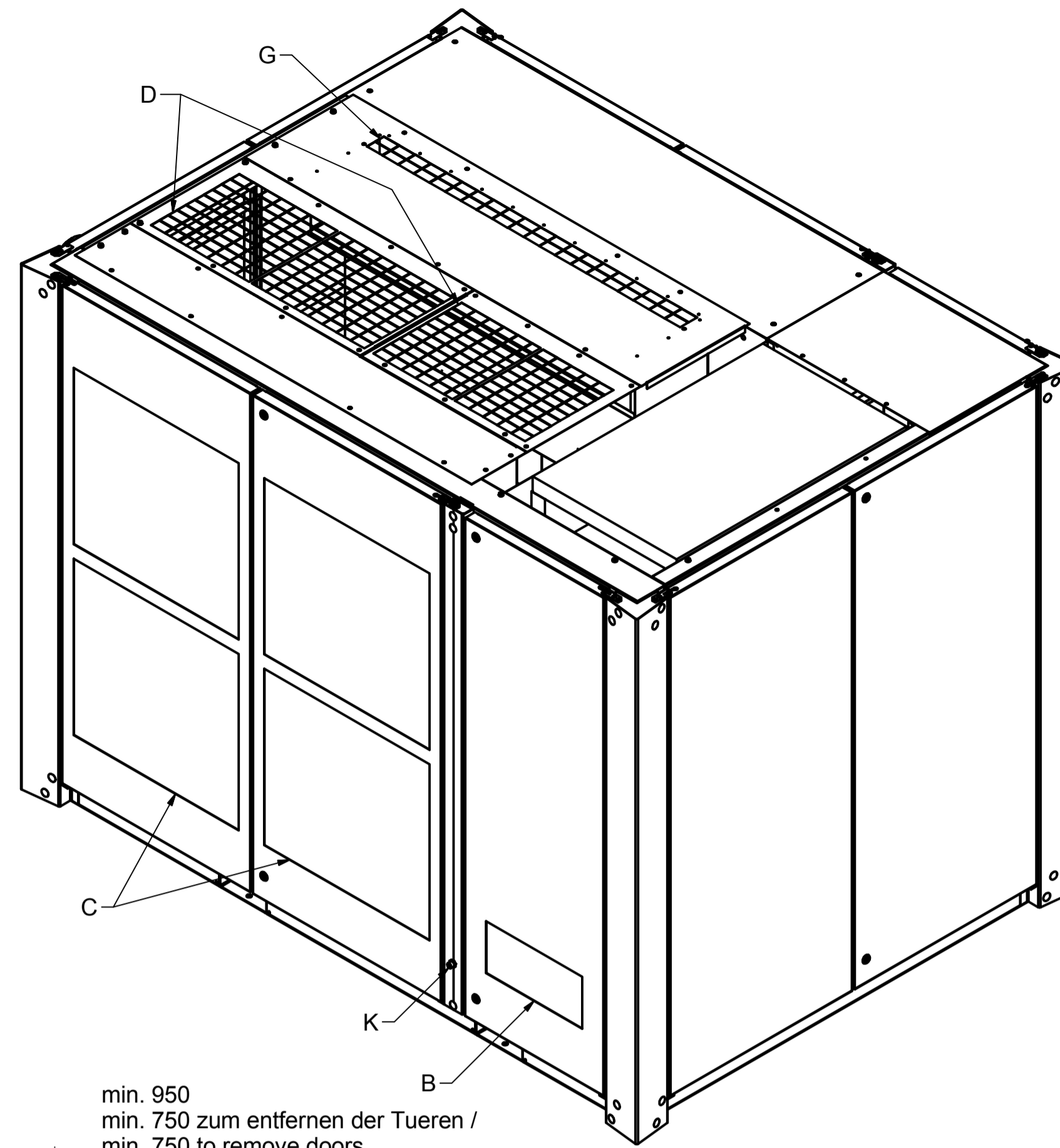
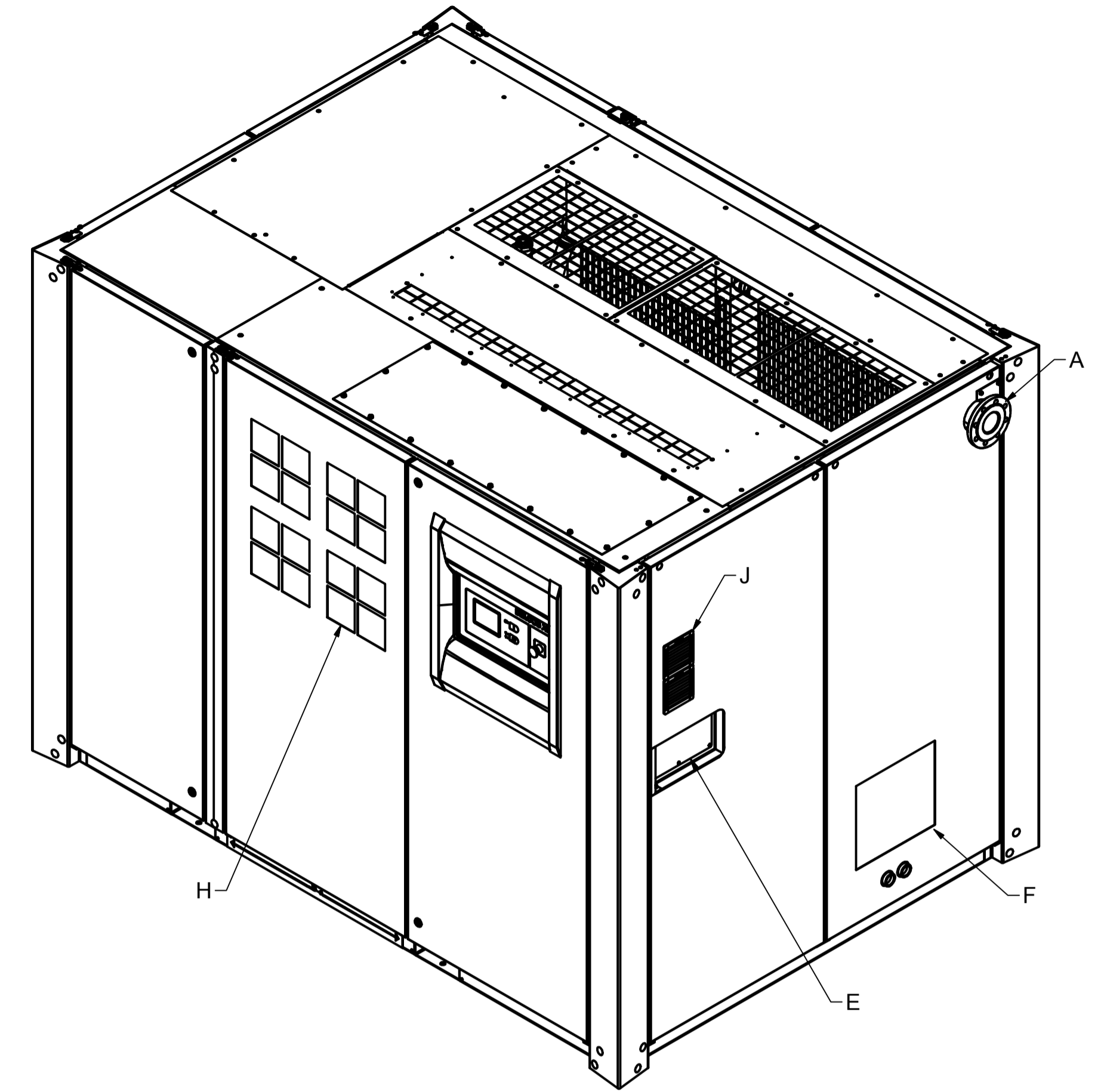
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Datum		Name		Rohteil-Nr.		Auftr.-Nr.	
Gezeichnet		18.11.2015		Fertigteil-Nr.		Werkstoff	
Bezeichnung / Document description Aufstellungsplan, Installation schematic				Klass.-Nr.			
Abz. 0463 Copyright reserved				160-290, L160RS-L290RS			
Refer to protection notice ISO 16016				Klass.-Nr. UA Spr Codestelle			
Bardrier Denver Deutschland GmbH Argenthaler Str. 11 55469 Simmern / Hunsr.				Zeichnungs-Nr. / Document-No. A13552074			
Blatt/Böcher 2/3				A1			
Ersatz für:				Ersetzt durch:			



# L160-290

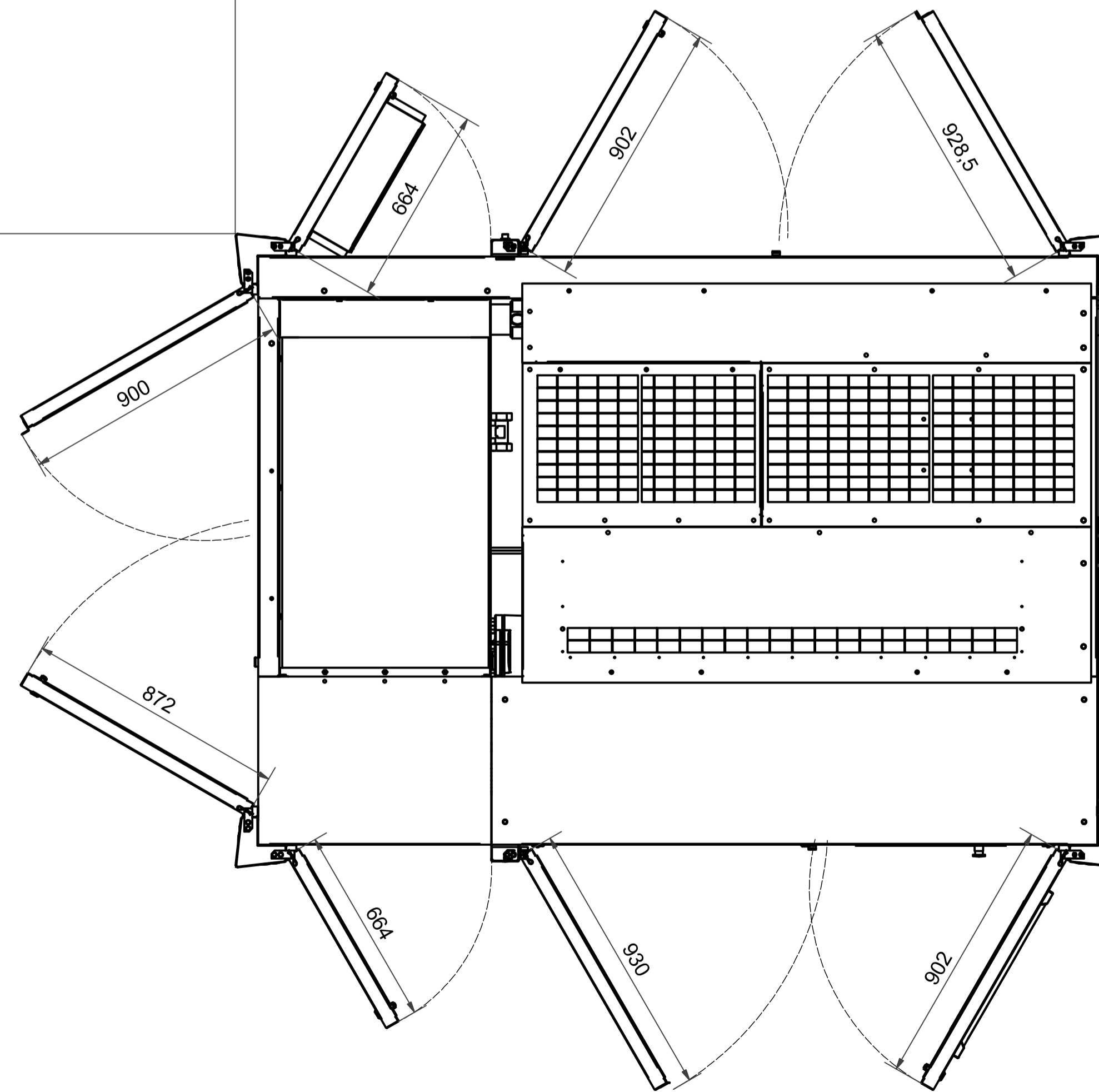


# L160RS-290RS



min. 950  
min. 750 zum entfernen der Tueren /  
min. 750 to remove doors

min. 950  
min. 750 zum entfernen der Tueren /  
min. 750 to remove doors



Ansicht zeigt empfohlene Installations-Abstände,  
plan view showing recommended installation space

min. 950  
min. 750 zum entfernen der Tueren /  
min. 750 to remove doors

min. 950  
min. 750 zum entfernen der Tueren /  
min. 750 to remove doors

A - Druckluftanschluß / Compressed Air Discharge  
Europa / Europe Version:  
Gewindefansch EN1092-1 DN80 / PN16  
/ Threaded Flange according to EN1092-1 / DN80 /PN16

B- Verdichteransaugung / air intake for airend

C- Kühlluftaustritt Luft- und Ölkühler / Cooling air intake for Air cooler and Oil cooler

D- Kühlluftaustritt Luft- und Ölkühler / Cooling air outlet for Air cooler and Oil cooler

E- Deckel für Zuleitungskabel / Plate for Electrical supply connection

F- Kühlluftaustritt Motor / Cooling air intake motor

G- Kühlluftaustritt Motor / Cooling air outlet for motor

H- Kühlluftaustritt Umrichter / Cooling air inlet inverter (nur für / only for RS Version)

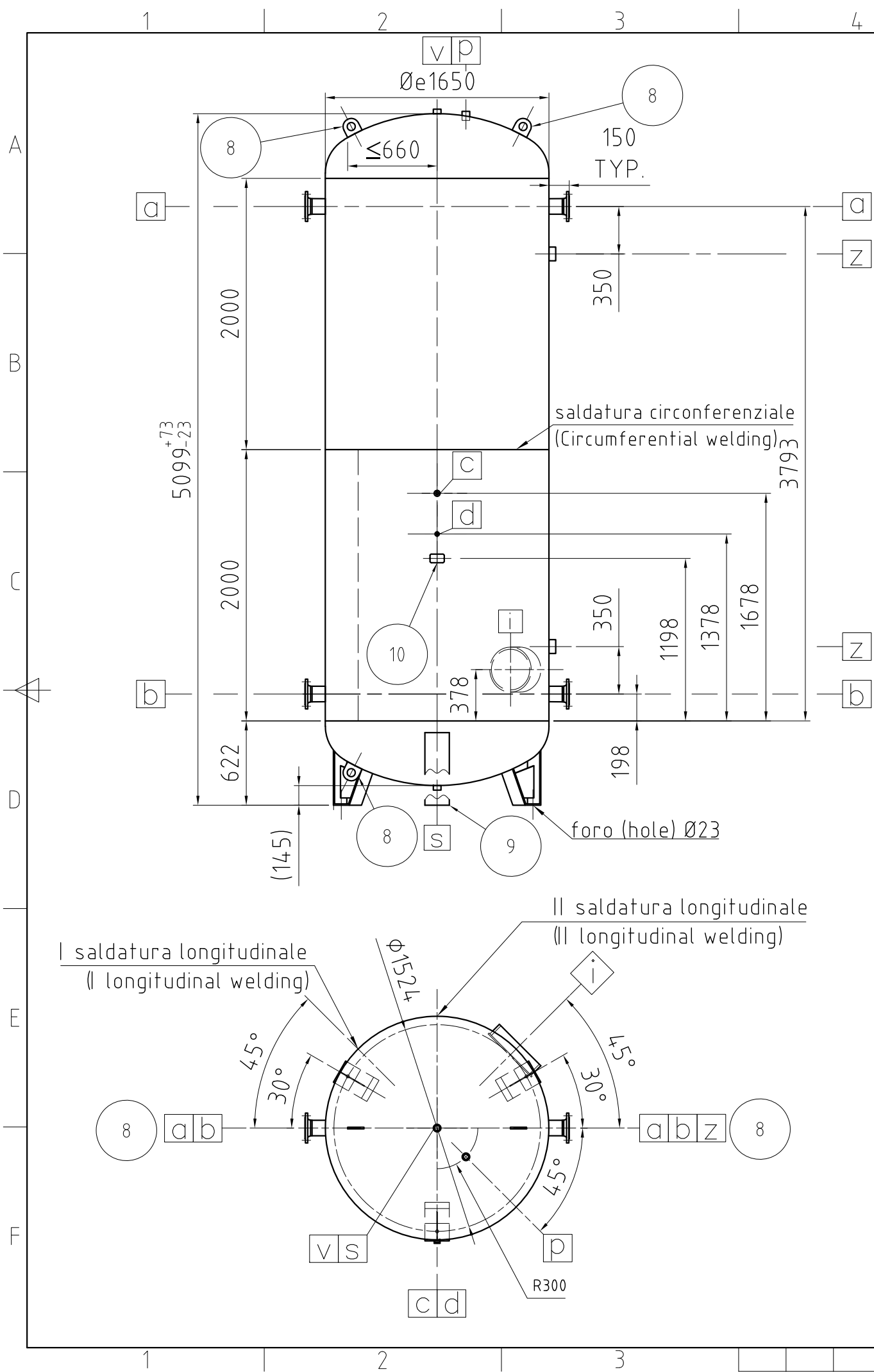
J- Kühlluftaustritt Schaltschrank / Cooling air inlet starter box

K- Austritt für Kondensatablass / Outlet for condensate drain  
M20x1,5 a / G1/4" i

Tolerierung DIN 7167 Allgemeintoleranzen ISO 2768-mS		Rauhtiefe Rz Reihe 2 DIN 3141		Maßstab: Rohteil-Nr. _____ Fertigteil-Nr. _____	Gewicht: Auftr.-Nr. _____ Werkstoff _____
Gezeichnet 18.11.2015 Tries		Datum Name		Bezeichnung / Document description Aufstellungsplan, Installation schematic	
Norm		Abz. 0463 Copyright reserved		L160-290, L160RS-L290RS	
Refer to protection notice ISO 16016		Klass.-Nr.		UA	Spr Codestelle
Bardner Denver Deutschland GmbH Argenthaler Str. 11 55469 Simmern / Hunsr.		Zeichnungs-Nr. / Document-No. A13552074		Blatt/Blätter 3/3 A1	
Rev.	Änd. Mitteilung-Nr.	Datum	Name	Ersatz für: _____ Ersetzt durch: _____	

## **2. AIR RECEIVER DRAWING**

General arrangement drawing for the air receiver tank 10.000/11.5:



Det.	Item	Qty	Description	Standard	Note
z	13	2	Manicotto mezzo/Half coupling	G 3" H=50 con tappo/with plug	necessary for hot dip galvanized
p	12	1	Manicotto/Coupling	G 1"1/4 H=67	PSV
v	7	1	Manicotto mezzo/Half coupling	G 1"1/4 H=25	Servizio/Service
s	6	1	Manicotto mezzo/Half coupling	G 1"1/4 H=25	Scarico/Drain
i	5	1	PASSO D'UOMO/Man hole	300x400 [PAD 50x 6.5 Thk.]	Apertura d'Ispezione/Inspection opening
d	4	1	Manicotto mezzo/Half coupling	G 3/8" H=15	Servizio/Service
c	3	1	Manicotto mezzo/Half coupling	G 3/4" H=20	Servizio/Service
b	11	2	Flangia/Flange DN100 PN16 EN1092-1/ TYPE 11	Tube/Nozzle $\phi e$ 114.3x8.56	Utilizzo/Outlet
a	1	2	Flangia/Flange DN100 PN16 EN1092-1/TYPER 11	Tube/Nozzle $\phi e$ 114.3x8.56	Utilizzo/Outlet
	10	1	Targa/Name plate	dwg. 20008	
	9	3	Piede di sostegno/Leg	type 18 dwg.5635	
	8	3	Anello di sollevamento/Lifting lug	type G3 dwg.1141	

**CARATTERISTICHE SERBATOIO/DESIGN DATA:**

Capacità/Capacity: ~10000 lt.  
 Pressione di progetto/Design pressure: 11.5 bar  
 Temperatura di progetto/Design temperature: -10° ÷ +80°C  
 Fluido/Fluid: Gruppo 2 / Group 2 - ARIA COMPRESSA (Compressed air)  
 Codice di calcolo/Design code: VSR REV.95 ED.99  
 Collaudo/Test: 2014/68/UE PED

**TRATTAMENTI/TREATMENTS:**

TRATTAMENTO INTERNO/Internal treatment: ZINC. A BAGNO CALDO/Hot dip galvanized	TRATTAMENTO ESTERNO/External treatment: ZINC. A BAGNO CALDO/Hot dip galvanized
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**NOTE:**

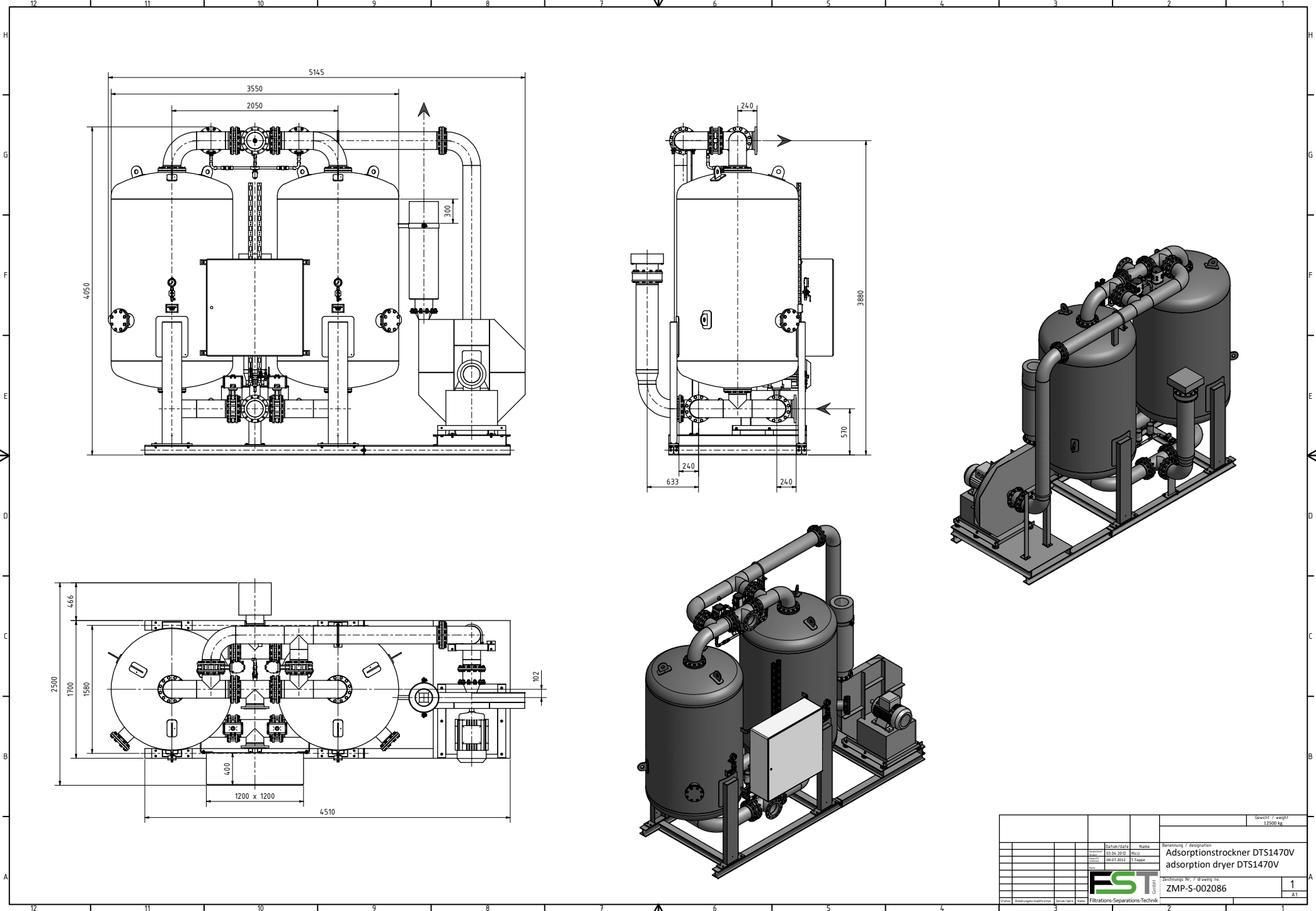
-Tolleranze di assemblaggio sulle quote lineari e angolari prive di indicazione specifica, in accordo con UNI EN 22768/1-V./Linear and angular tolerance without reference in accordance with UNI EN 22768/1-V.  
 -Costruzione in accordo con il disegno di approvazione n°20011 ultima rev../Construction according to drawing n°20011 last rev.

1	22/11/2018	Aggiornato logo e modificato disegno approvazione.		FB	FB	
Rev.	Data	Descrizione			Disegnatore	Verificatore
<b>Revisioni</b>						
 Siccotech SRL Rovigo  VIALE PORTA PO,89 45100 ROVIGO (ITALY) Phone +390425403111 Telefax +390425403177	Codice	Scala	Sostituisce	Unità		
	1285610000115		R.00	mm		
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				12856	1	
	File	Data		A3		
	12856R1.dwg	14/09/11				
	Riferimenti	Disegnatore				
	Sicc tech	Mariotto V.				
		Verificatore				
		Cervellati C.				

### **3. AIR DRYER DRAWING**

General arrangement drawing for the air dryer:

- FST model DTS 1470 V

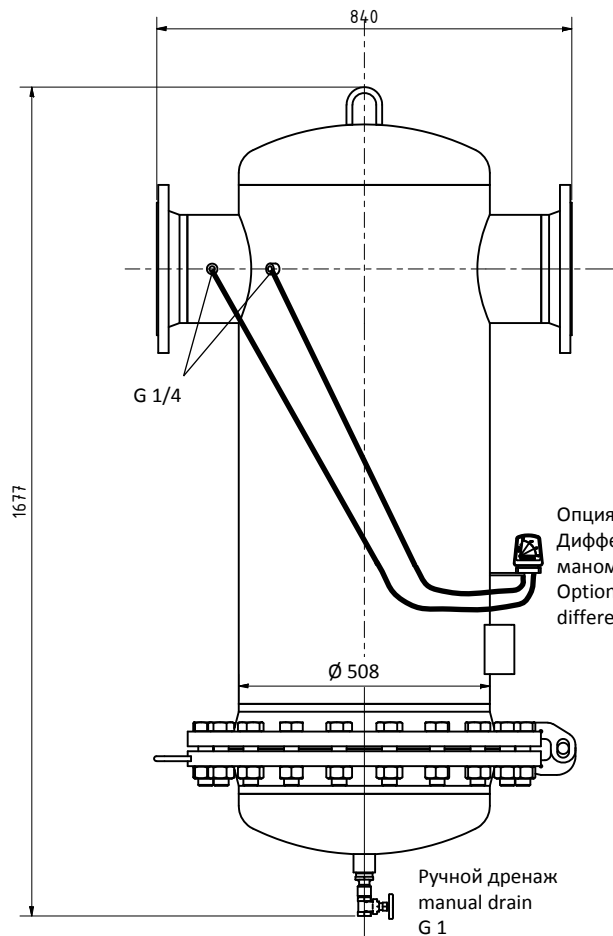


		Gewicht / weight	
		3200 kg	
		Bezeichnung / designation	
		Adsorptionstrockner DTS1470V	
		adsorption dryer DTS1470V	
		Zeichnungs-Nr. / drawing no.	
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		1	
		Δ1	
Status		Filtrations-Separations-Technik	

## **4. AIR FILTERS DRAWING**

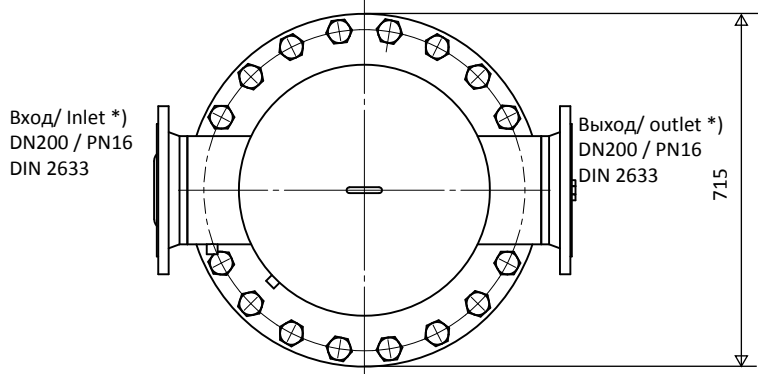
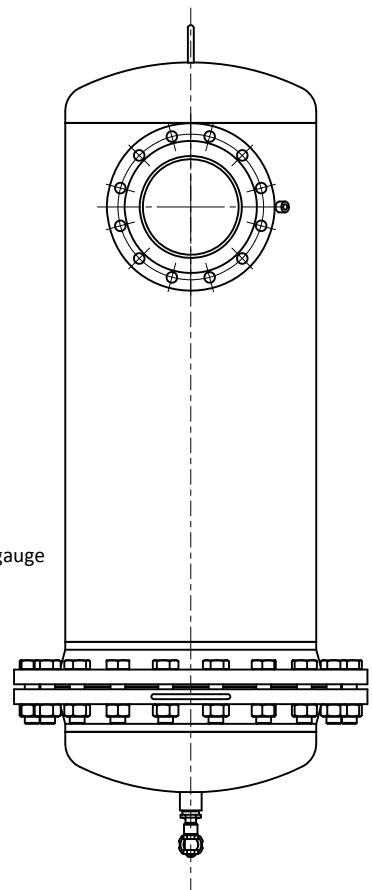
General arrangement drawing for the air filters:

- FST model FWS 1000



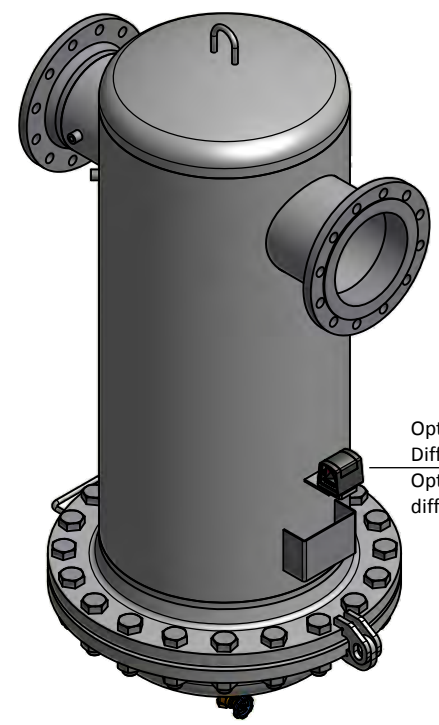
Опция  
Дифференциальный  
манометр  
Optional  
differential pressure gauge

Ручной дренаж  
manual drain  
G 1



Вход/ Inlet \*)  
DN200 / PN16  
DIN 2633

Выход/ outlet \*)  
DN200 / PN16  
DIN 2633



Option  
Differenzdruckmanometer  
Optional  
differential pressure gauge

				Gewicht / weight 353 kg	
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		02.01.2012		Kurth	
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		Name		Benennung / designation	
		Name		Filter FWS 1000..DM	
		Name		Zeichnungs-Nr. / drawing no.	
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		Name		1	
		Name		AZ	
Status		Änderungen/modification		Datum/date	
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				Filtrations-Separations-Technik	
				Für diese Zeichnung behalten wir uns alle Rechte vor.	
				Schutzzeichen nach DIN ISO 10165 besetzen	

Sirius Minerals Plc

**Woodsmith Mine - Phase 9 Works**

**NYMNPA 81 Non-Domestic  
Wastewater Management Scheme**

40-ARI-WS-7100-CI-RP-01005

Rev 0 | 22 January 2019

NYMNPA

23/01/2019

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

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**ARUP**



# Document Verification

<b>Job title</b>		Woodsmith Mine - Phase 9 Works		<b>Job number</b>	
				253285	
<b>Document title</b>		NYMNPAs 81 Non-Domestic Wastewater Management Scheme		<b>File reference</b>	
<b>Document ref</b>		40-ARI-WS-7100-CI-RP-01005			
<b>Revision</b>	<b>Date</b>	<b>Filename</b>	40-ARI-WS-7100-CI-RP-01005_A_IFR_20190116_Ph 9 NYM 81 NDWW Strategy.docx		
Draft A	18 Jan 2019	<b>Description</b>	First draft		
			Prepared by	Checked by	Approved by
		Name	Chris Williams	Andrew Hornung	Andrew Hornung
		Signature			
Draft B	21 Jan 2019	<b>Filename</b>	40-ARI-WS-7100-CI-RP-01005_B_IFR_20190116_Ph 9 NYM 81 NDWW Strategy.docx		
		<b>Description</b>	Draft		
			Prepared by	Checked by	Approved by
		Name	Julia Beaumont	Chris Williams	Andrew Hornung
		Signature			
Rev 0	22 Jan 2019	<b>Filename</b>	40-ARI-WS-7100-CI-RP-01005_0_IFU_20190122_Ph 9 NYM 81 NDWW Strategy.docx		
		<b>Description</b>	Issue		
			Prepared by	Checked by	Approved by
		Name	Julia Beaumont	Chris Williams	Andrew Hornung
		Signature			
		<b>Filename</b>			
		<b>Description</b>			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document



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# 1 Introduction

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## 1.1 Overview

This document has been prepared on behalf of Sirius Minerals PLC and details the Non-Domestic Wastewater Management scheme for the Phase 9 construction activity at Woodsmith Mine (Phase 9 Works). This is required to discharge condition 81 of the North York Moors National Park Authority (NYMNP) planning permission NYM/2014/0676/MEIA, as subsequently varied by NYM/2017/0505/MEIA [1].

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

The Phase 9 Works comprise:

- Installation and operation of temporary Secure Storage Unit (SSU);
- Installation and operation of first stage of non-domestic waste water treatment plant;
- Installation and commissioning of compressors;
- Assembly and fit-out of Galloway;
- Extension of internal access road;
- Installation of environmental fence to facilitate use of reinjection pad for temporary HGV parking.

## 2 Non-domestic wastewater treatment strategy

---

The activities giving rise to the generation of non-saline, non-domestic wastewater during the Phase 9 works, and the management of the wastewater is described in the following sub-sections.

The plant will be installed in two stages as follows.

- Stage 1: short-term solution to handle the smaller effluent volumes expected from the start of April 2019 to the end of August 2019.
- Stage 2: long-term solution to handle the maximum anticipated non-saline effluent volumes. The equipment will be available for operation at the latest by August 2019.

If practicable, the Stage 1 and Stage 2 plant will be integrated to reduce vehicle movements to and from site.

The treatment plant proposed in the Phase 9 works is for the treatment of non-saline, non-domestic wastewater that is encountered above 750mbgl. Non-domestic wastewater containing saline water from rock strata below 750mbgl will be collected by a separate drainage system and conveyed to a separate treatment plant. This will form part of a separate submission and is not covered in the Phase 9 works.

The treated water from the non-saline wastewater treatment plant will discharge to the upper tributaries of Sneaton Thorpe Beck. The treated water will be conveyed in an above ground carrier pipe and will discharge to Sneaton Thorpe Beck via a separate outfall and outfall location from the surface water drainage system. This is currently subject to approval of a separate Environmental Permit application submitted to the Environment Agency in October 2018.

Wastewater from the non-saline wastewater treatment plant will not be re-injected into the sandstone aquifer.

## 2.1 Estimated Non-Domestic Wastewater Quantities

Estimates for the quantity of non-saline wastewater to be treated have been developed to provide a basis of design for the treatment plant. These estimates will continue to be refined and more detailed wastewater estimates provided with each subsequent development phase as details of the below ground structures are provided. The following non-saline wastewater quantities are anticipated as part of the development:

- Services shaft (to 750mbgl): 86m<sup>3</sup>/day;
- Production Shaft (to 750m bgl): 86m<sup>3</sup>/day;
- MTS shaft (120 to 360mbgl): 53m<sup>3</sup>/day;
- MTS Cavern: 41m<sup>3</sup>/day
- Tunnel drive 3 0 to 181m<sup>3</sup>/day

In the event that unexpectedly high wastewater inflows occur during the construction works, the seven existing storage tanks that were previously used for bentonite storage during the D-walling operations are to be retained and used for the temporary storage of wastewater if flows exceed the design capacity of the treatment plant, these storage tanks have been cleaned and are fit for purpose.

## 2.2 Non-domestic wastewater treatment

Full details of the non-domestic wastewater treatment plant layout are shown on drawing 40-ARI-WS-7100-CI-22-01054. The treatment plant is to be constructed on an existing construction platform, constructed as part of a previous construction phase. Where appropriate the treatment plant will be formed on concrete hardstanding areas and within concrete bunded slabs to minimise the risk of pollution.

Vehicle access for the maintenance of the treatment works and the removal of sludge will be accessed from a circulatory access road.

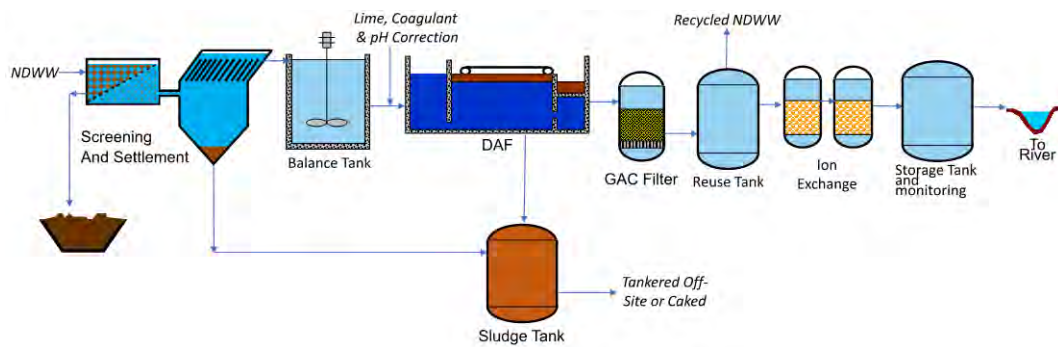
The treatment plant will consist of a number of different stages/processes as follows:

1. A reception /pre-treatment screening system for the removal of gross solids.
2. Primary settlement for solids removal, free and emulsified oil removal, dissolved hydrocarbon removal, chemical offloading, storage and dosing systems, dissolved metal and ions removal and ammonia and nitrate removal.
3. Intermediate pumping stations and associated ancillaries required to achieve the specified water quality requirements and provide a source of re-use water.
4. Solids dewatering, to provide a cake suitable for treatment in the existing lime plant and segregation of any solids too contaminated for disposal on site.
5. Particulate filtration (using Turbidex media), activated carbon filtration and re-generable ion-exchange to first ensure that all particulates and organic contaminants have been removed prior to facilitating the reduction of metals and, where necessary, key anions i.e. chloride, from the abstracted waters.

The following table provides a summary of the capacity of the proposed non-saline water treatment facility.

Parameter		Units	Stage 1	Stage 2
Non-balanced flow through initial pre-treatment screening	Maximum flow	m <sup>3</sup> /day	200	480
	Instantaneous flow	L/sec	1.9	9.3
Balanced maximum flow through treatment plant	Maximum flow	m <sup>3</sup> /day	165	480
	Maximum instantaneous flow	L/sec	1.9	5.5
Average Flow		m <sup>3</sup> /day	65	N/A

The treatment plant will be fully automated and comprise the following modular (where feasible) components as defined in the following sections and summarised in the following figure.



### 2.2.1 Pre-treatment screening and gross solids removal

Wastewater will be pumped to the ground surface from each shaft and conveyed to the treatment works for initial pre-treatment screening and gross solids removal consisting of a vibrating deck screen and hydrocyclone. Dewatered screenings will be delivered to a cake bay for collection by the earthworks contractor.

The screen, hydrocyclone and associated equipment are to be installed in a duty / standby arrangement.

### 2.2.2 Balance tank

Following initial pre-treatment, wastewater will be transferred to a duty balance tank prior to further treatment to enable the flows and composition of incoming wastewater to be balanced.

### 2.2.3 Primary settlement tanks

Following the balancing tank, wastewater will pass through a duty sedimentation tank (lamella clarifiers) to remove the remaining bulk solids. Settled solids will be transferred to sludge holding tanks for further dewatering (press or centrifuge) to produce dry cake from settled solids for placement within landscape bunds.

Chemical dosing and flocculation will be added as required to ensure the solids removal is sufficient for the downstream equipment.

Scum boards or a slotted weir are to be used to capture free oil. This shall then be drained into an oil tank by skimming or rotation of the slotted weir.

### 2.2.4 Oil Interceptor

Oil interceptors will be incorporated to capture and remove any free hydrocarbons.

### 2.2.5 pH correction and chemical dosing for solids removal and oil separation.

A duty mixing tank is to be installed downstream of the primary sedimentation tanks with chemical dosing for pH correction, coagulation and flocculation as

required prior to the following downstream processes. All chemicals will be stored in IBCs and will be compatible with ion exchange systems and other downstream equipment.

### **2.2.6 Dissolved air flotation (DAF) tanks**

DAF tanks will be incorporated downstream of the mixing tanks to remove fine solids, diffused oil and metals. Removed solids will be transferred to a DAF sludge holding tank prior to being tankered off-site for disposal.

### **2.2.7 Re-use tank**

A water storage and re-use tank is incorporated downstream of the DAF plant for re-use as drilling flush water and other site uses including wheel wash, road sweeping, etc.

### **2.2.8 Sand and granulated activated carbon (GAC) filters**

Duty sand and granulated activated carbon filters are incorporated downstream of the re-use tank for the removal of remaining miniscule solids and hydrocarbons before the ion exchange process.

The layout will enable filter medium to be replaced if required.

### **2.2.9 Regenerable ion exchange**

A lead and lag ion exchange plant with interstage sample facilities is to be incorporated downstream of the sand and GAC filters to remove soluble species such as metals, ammonia and nitrate in accordance with the effluent quality requirements agreed through the H1 assessment as part of the Environmental Permit application.

The lead and lag units are each sized to treat 100% of the flow. They are to be installed in series and configured to enable 100% bypass of either the lead or lag unit to facilitate regeneration without compromising the ability to treat all the flows to the required quality. The regeneration of media will either be undertaken on or off site.

Treated effluent is to be then pumped to the treated water storage tank.

### **2.2.10 Treated effluent storage tank**

The treated effluent storage tank will be provided after the ion exchange plant to buffer flows prior to the discharge to Sneaton Thorpe Beck. The tank will include monitoring of the treated water quality for key parameters specified by the Environment Agency as part of the Environmental Permit.

A facility to return effluent that does not meet the discharge quality requirements to the start of the NDWW treatment process is also incorporated.

### 2.2.11 Pumps and pipelines

As part of the treatment plant, various pumps and pipelines are incorporated for the delivery of water from shaft heads to the treatment plant and between treatment processes to grey water tank or tanker loading point. All pumps will consist of a duty standby configuration.

### 2.2.12 Solid Waste Management

Solids removed from the treatment plant that are free from oil contamination will be dewatered to a minimum of 30%w/w DS and discharged to a skip for placement within the landscaping bunds following further conditioning as required within the existing site lime treatment plant.

## 2.3 Monitoring Arrangements

Sirius Minerals has applied for an Environmental Permit for discharge of treated effluent from the plant to the upper tributary of Sneaton Thorpe Beck. As part of the Environmental Permit process an analytical testing suite will be agreed with the Environment Agency and thereafter monitoring will be carried out in accordance with the permit and in accordance with the 'Surface and Ground Water Monitoring scheme' submitted to discharge Condition 46. Qualitative triggers for the discharge are included within this scheme.

## 2.4 Management, operation and maintenance

The plant will be operated and monitored by trained staff.

Variations in flow will be managed in the initial flow balancing tanks. In addition, the modular nature of the treatment plant will enable the addition/removal of treatment units if required to provide additional treatment capacity.

The treatment plant will be reliant on a number of pumps, sensors and other moving parts. Manufacturers guidance on the maintenance of these items will be followed, including regular inspections and servicing. Critical equipment such as pumps shall be used in a duty/standby configuration to ensure the failure of any one component shall not prevent the treatment plant from operating as intended. In addition, critical spares will be retained on site for rapid deployment.

All pipelines will be regularly inspected for leaks and will be installed above ground level to enable the easy identification of leaks. Where leaks are identified they will be promptly fixed with spares retained on site.

Additional emergency storage capacity will be provided on site, where wastewater can be temporarily stored for later treatment or to be tankered off site if the treatment plant was to go offline.



## 2.5 Opportunities for treated water re-use

Opportunities for the re-use of water on site will be explored during each future construction phase. This includes opportunities for the re-use of water as drilling flush and other site activities.

The quality of re-use water will be monitored by periodic grab samples to ensure that it meets the user's requirements.

In the event of re-use or fully treated water quality not meeting the specified quality limit, the effluent will be diverted to a storage tank before being returned to the start of the treatment process or tankered off site.

## 3 Conclusions

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This report demonstrates that the non-domestic wastewater management scheme during the Phase 9 Works meets the requirements of conditions 81 of the North York Moors National Park Authority (NYMNP) planning permission NYM/2014/0676/MEIA, as subsequently varied by NYM/2017/0505/MEIA.

## References

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- [1] North York Moors National Park Authority planning permission  
NYM/2014/0676/MEIA and as subsequently varied by  
NYM/2017/0505/MEIA.

# REPORT

## Phase 9 - Woodsmith Mine Noise and Vibration Management Plan

### Woodsmith Mine Phase 9 - NVMP

Client: Sirius Minerals plc

Reference: 40-RHD-WS-70-EN-PL-0037 Rev 1

Status: 01/Final

Date: 23 January 2019

NYMNP

23/01/2019

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Document title: Phase 9 - Woodsmith Mine Noise and Vibration Management Plan

Document short title: PHASE 9 WOODSMITH MINE NOISE AND VIBRATION MANAGEMENT PLAN

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Date: 23 January 2019

Project name: Sirius North Yorkshire Polyhalite Project

Project number: PB1110

Author(s): Alasdair Baxter

Drafted by: Alasdair Baxter

Checked by: Charlotte Goodman

Date / initials: 23/01/2019 CG

Approved by: Charlotte Goodman

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Classification

Project related



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## Appendices

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## 1 INTRODUCTION

### 1.1 Purpose of this Report

- 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 permission was subsequently granted in 2015 subject to conditions, as varied in February 2018 by NYM/2017/0505/MEIA.
- 1.1.2 This document has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) and details the requirements with respect to noise and vibration management for the Phase 9 Works (see Paragraph 1.1.4 below) at Woodsmith Mine. This document is required to partially satisfy the requirements of Condition 18 of the NYMNPA planning permission. This planning condition states that:

Table 1-1: Condition NYMNPA 18 Noise and Vibration Management Plan

NYMNPA 18	Compliance with Condition NYMNPA-18
Prior to the commencement of the development at Dove's Nest Farm or Lady Cross Plantation, a Noise and Vibration Management Plan (NVMP) for the control, mitigation and monitoring of noise and vibration for both construction and operational phases at the two sites shall be submitted to and approved in writing by the MPA in consultation with the SBC EHO. The scheme shall set out the following:	This document addresses Phase 9 Works at Woodsmith Mine. Works at Lady Cross Plantation are deferred and are therefore not addressed in this Plan.
Noise-sensitive receptors for which predictions shall be made and at which the noise and vibration limits shall apply and which shall include recreational receptors.	Section 3.1
Predicted noise levels at the noise-sensitive receptors from noise and vibration generated at the DNF and LCP sites for the key construction phases during the forthcoming year including any periods in which the higher daytime limit of 70 dB $L_{Aeq}$ shall apply (permitted 56 days for temporary works to create noise-reducing bunds and/or barriers as per Conditions 16 and 18).	Section 3, and Appendix C
The best practicable means which will be used to control noise and vibration levels on site including such measures proposed in the Environmental Statement and Supplementary Environmental Information. Such measures shall include, but are not limited to: the use of the quietest available plant, equipment and techniques; the regular maintenance and inspection of such plant and equipment; the use of cladding, attenuators and barriers to reduce noise levels from noisy plant and operations; the specification of appropriate reversing alarms to minimise annoyance; and, measures to reduce vibration and air overpressure during blasting.	Section 5
Details of the noise and vibration monitoring system to be installed around the DNF and LCP sites to continuously log noise levels during construction and operation. The system shall include at least six noise monitors installed around the boundary of the Dove's Nest site and at least four monitors at key residential receptors near the Dove's Nest site and at least four noise monitors around the Lady Cross Plantation Site and at least three monitors at key residential receptors near the Lady Cross Plantation site.	Section 4

NYMNPA 18	Compliance with Condition NYMNPA-18
The precise number and location of noise monitors shall be set out in the NVMP. The developer shall use reasonable endeavours to obtain access to the residential receptor properties for the installation of noise monitors and only if access cannot be obtained the number or location of noise monitors may be reduced. The MPA and the SBC EHO and/or their advisers shall be granted access to inspect the noise and vibration data whenever required, records of the data should be kept for a reasonable period and these records should be accessible by the public.	Section 3, Section 4 and Figure B.1
Details of the procedure to be followed in the event that the noise predictions detailed in the NVMP or the noise limits detailed in conditions 16 to 19 are exceeded. Such procedures shall require the investigation of the reasons for the breach of the limits and the cessation of the activity causing the breach until such a time as additional mitigation can be provided.	Section 5.4
Details of how the residents will be informed and consulted about the site operations and progress, particularly in regard to blasting and especially noisy operations including details of complaints logging and management procedures and a 24-hour telephone incident hotline. Details of the procedure for investigating complaints and informing complainants of the results of such investigations and of any actions resulting from them.	Section 5.4
The NVMP shall be adhered to at all times unless agreed previously in writing by the MPA.	A document sign off section has been included within this report requiring the Contractor to commit to compliance with the NVMP
The NVMP shall be updated and agreed whenever appropriate to reflect changes in the programme during construction and operation and at intervals not less than 6 months after the initial start on site and thereafter annually.	Section 1

- 1.1.3 This NVMP relates to the Phase 9 Works at Woodsmith Mine and does not include any activities at Lady Cross Plantation, as these works have been deferred. The NYMNPA has confirmed that it supports this approach.
- 1.1.4 Phase 4, 4a, 5, 6 and 7 activities will continue past the start date of Phase 9. Phase 8 activities are subject to a separate NVMP (40-RHD-WS-70-EN-PL-0034) and are not considered in this document. Phase 8 included the construction of permanent buildings, which is subject to separate noise limits as specified in condition NYMNPA-20.
- 1.1.5 This NVMP therefore supersedes all previous NVMPs (with the exception of that for Phase 8) upon the commencement of Phase 9 and considers processes and controls with respect to all activities on site throughout Phase 9. Activities required for Phase 9 comprise the following:
- Installation and operation of a temporary Secure Storage Unit (SSU);
  - Installation and operation of the first stage of a Non-Domestic Waste Water Treatment Plant (NDWWTP);
  - Installation and commissioning of compressors;
  - Assembly and fit-out of Galloway;
  - Extension of internal access road; and
  - Installation of environmental fence to facilitate use of the reinjection pad for temporary Heavy Goods Vehicle (HGV) parking.



### ***Planning Conditions***

- 1.1.6 In addition to Condition NYMNPA 18, two further conditions NYMNPA 20 and NYMNPA 21 establish noise limits relating to the Woodsmith Mine site (see **Section 2.2**). Conditions NYMNPA 24, 27, 28 and 29 relate to vibration arising from blasting activities during underground chamber construction, and so are not relevant to this phase of works.
- 1.1.7 In this document, the term “*construction*” includes all physical and related engineering and construction activities associated with the Phase 9 Works, as described above. Updates to this plan will be prepared and submitted to the NYMNPA for approval in advance of subsequent construction phases and following any material design or method change.

## **2 GUIDANCE**

### **2.1 Legislation and British Standards**

2.1.1 As a minimum, the Contractor will adhere to the following standards:

- BS 7445:2003 *Description and measurement of environmental noise*; and
- BS 5228:2009+A1:2014 *Code of Practice for noise and vibration control on construction and open sites*.

### **2.2 Construction Limits**

2.2.1 Established construction noise limits (as measured at the identified receptors) remain as:

- 55 dB  $L_{Aeq,1hr}$  for daytime (07:00 – 19:00);
- 65 dB  $L_{Aeq,1hr}$  for the demolition of buildings and erection of new structures;
- Up to 70 dB  $L_{Aeq,1hr}$  for temporary noisy operations to provide noise-reducing earth bunds and / or barriers; and
- 42 dB  $L_{Aeq,1hr}$  for evening and night-time (19:00 – 07:00).

### **2.3 Construction Method**

2.3.1 Contractors responsible for implementing the Phase 9 Works (see Construction Environmental Management Plan (CEMP; reference 40-RHD-WS-70-EN-PL-0038)) have provided details of the construction plan, number and type of plant items to be used and location/duration of construction activities within the site. The Construction Method Statement for the Phase 9 Works (reference 40-SMP-WS-7100-PA-MS-00007) outlines the proposed approach.

2.3.2 **Appendix C** details the plant items used within the model, their sound power level and location on site. Predictions of noise levels based upon these details are assessed within this NVMP.

### 3 PREDICTED CONSTRUCTION NOISE AND VIBRATION LEVELS

#### 3.1 Baseline Receptor Locations

3.1.1 Residential and recreational receptors for this NVMP remain as identified in the Environmental Statement (ES) which accompanied the planning application, in previous iterations of the NVMP (e.g. Phase 4 NVMP; document reference 40-RHD-WS-70-EN-PL-0017), and as shown in **Appendix B, Figure B1**.

#### 3.2 Predicted Noise Levels

3.2.1 Noise modelling was undertaken to provide predictions of noise levels throughout the Phase. **Tables C.1 and C.2 in Appendix C** outline the construction noise assessment predictions for the Phase 9 Works.

3.2.2 Noise levels due to construction activities in the Phase 9 Works were not predicted to exceed the agreed construction noise limits at any of the identified noise-sensitive receptors during the daytime, evening or night-time following the application of suitable measures, including phasing and physical mitigation.

#### 3.3 Vibration

3.3.1 In relation to all construction works ground borne vibration was considered according to the conservative approach outlined in previous NVMPs (e.g. Phase 4 document reference 40-RHD-WS-70-EN-PL-0017; see Table C.7, Appendix C for minimum set-back distances for vibration levels of reportable significance).

3.3.2 All identified sensitive receptors are at least 180m from the nearest site boundary, and the minimum distance between the primary haul route and any of the surrounding receptors is over 400m. Therefore ground-borne vibration levels will be below levels considered to be *“just about perceptible in residential environments”*<sup>1</sup>.

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<sup>1</sup> Planning Policy Guidance Note 24 (PPG24, 1994), Department for Communities and Local Government

## 4 NOISE MONITORING PROGRAMME

### 4.1 Noise Monitoring

- 4.1.1 Continuous noise monitoring, as required by condition NYMNPA 18, is being undertaken during construction at three key residential receptor locations and seven boundary locations as described in previous NVMP (e.g. Phase 4 document reference 40-RHD-WS-70-EN-PL-0017) and shown in **Appendix B, Figure B1**.
- 4.1.2 Monitoring commenced at each location on 04 April 2017 and continues to operate in compliance with relevant guidance as outlined in previous NVMPs (e.g. Phase 4 document reference 40-RHD-WS-70-EN-PL-0017). The Sound Level Meters (SLMs) record  $L_{Aeq}$ ,  $L_{Amax}$ ,  $L_{A90}$ , and  $L_{A10}$  data with a “fast” time constant and A-weighting (see **Appendix A** for descriptions of these terms). Weather condition monitoring is carried out simultaneously.
- 4.1.3 A system of real time alerts allows remote monitoring of noise levels. Alerts are managed by the Contractors, who respond to any potential breaches appropriately. Reports are produced monthly for submission to SBC and NYMNPA, confirming the measured noise data at each location and cross-referencing to corresponding weather data and Works Contractor Site Activity Logs. The full dataset is presented in graphical format.

## 5 MITIGATION AND PROCEDURES

### 5.1 Purpose of the Section

- 5.1.1 This section outlines measures to be taken by the Contractors to limit, and manage the impact of, noise. This section also outlines the Best Practicable Means and specific mitigation actions to be adopted.

### 5.2 Best Practice Measures

- 5.2.1 The Control of Pollution Act (1974) and BS 5228:2009+A1:2014 define working methods and mitigation measures referred to as Best Practicable Means (BPM). Appropriate BPM, set out in previous NVMPs (e.g. Phase 4, reference 40-RHD-WS-70-EN-PL-0017), will continue to be applied to the Phase 9 Works.

#### Management Structure and Responsibilities

- 5.2.2 While overall responsibility for compliance with environmental and approvals requirements will remain with Sirius Minerals, all Contractors working on site are accountable for undertaking the construction activities in accordance with the requirements of this NVMP.
- 5.2.3 The CEMP (reference 40-RHD-WS-70-EN-PL-0038) provides details of the lines of responsibility for environmental management (including relating to robust implementation of noise management and mitigation measures) during the Phase 9 Works.

## **Maintenance**

- 5.2.4 Maintenance of plant will be carried out routinely and in accordance with the manufacturers' guidance. Daily inspections will be undertaken as described in previous NVMPs (e.g. Phase 4, reference 40-RHD-WS-70-EN-PL-0017).

## **Training**

- 5.2.5 The site induction programme and site rules will include good working practice instructions for site staff, managers, visitors and contractors to help minimise noise, as set out in previous NVMPs (e.g. Phase 4, reference 40-RHD-WS-70-EN-PL-0017).

## **5.3 Specific Mitigation**

### **Bunds and barriers**

- 5.3.1 The bunds to the north and north east of the platform area now form a continuous barrier following the closure of the access gap.
- 5.3.2 A noise barrier, of appropriate construction, is to be installed around the adsorption drier unit within the compressor plant compound) to a height of 1m above the top of the unit.

## **5.4 Communications**

### **Procedure for complaints or breach of limits**

- 5.4.1 The procedures to be followed in the event of a complaint or a breach of permitted noise limits will remain as set out in previous NVMPs (e.g. Phase 4, reference 40-RHD-WS-70-EN-PL-0017).

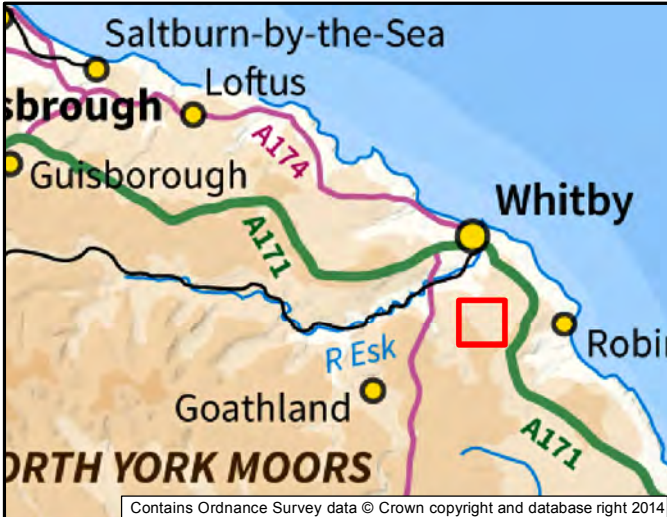
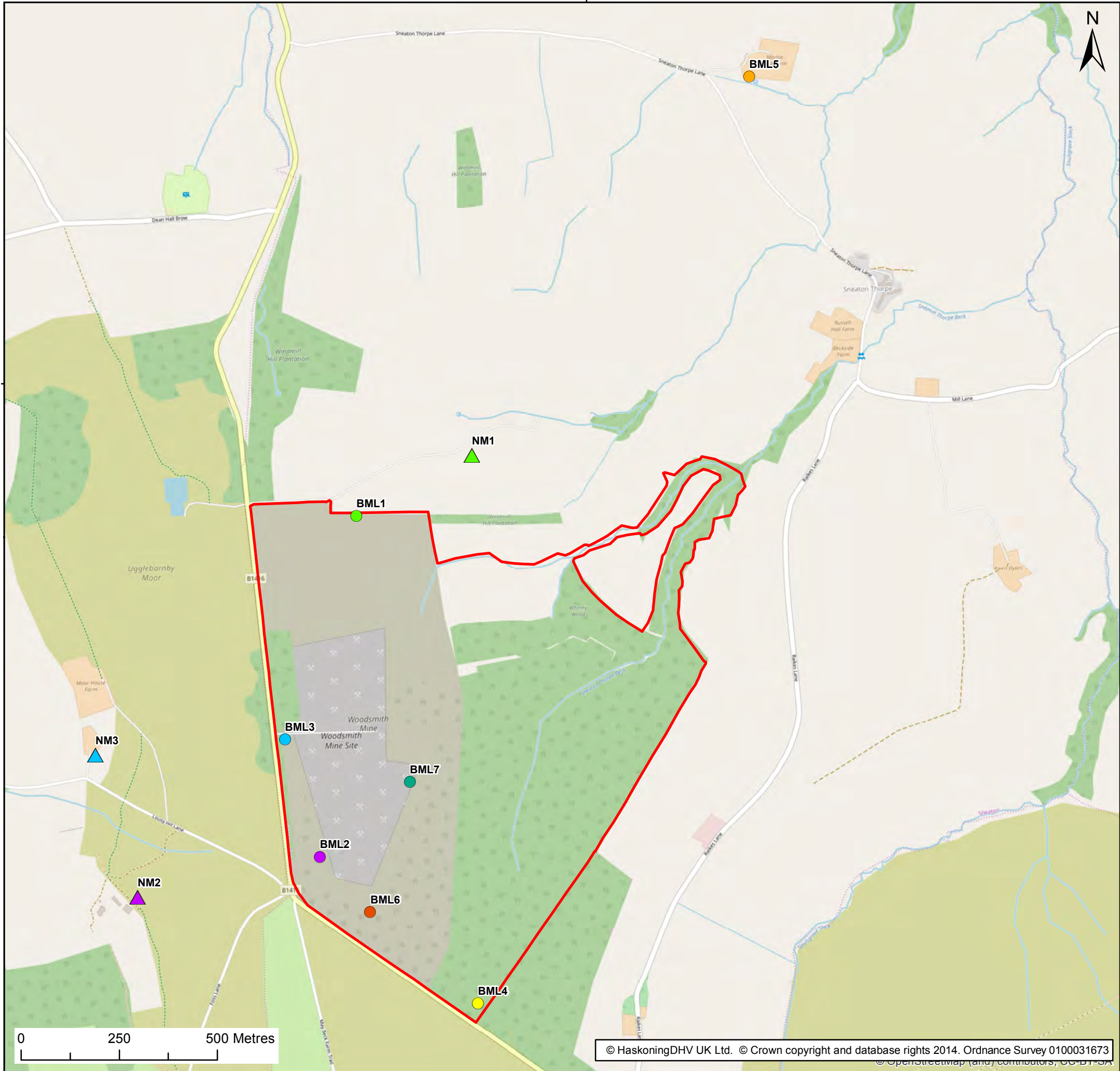
### **Public relations**

- 5.4.2 Good public relations with local residents in nearby noise-sensitive receptors will be maintained.
- 5.4.3 A Community and Stakeholder Engagement Plan is provided in Appendix 4 to the Phase 3 CEMP (40-RHD-WS-70-EN-PL-0014). It remains valid for Phase 9 Works, and details actions to be taken by Sirius Minerals plc and the Contractors.

## Appendix A Acoustic Terminology

Term	Definition
Noise sensitive receptors	People, property or designated sites for nature conservation that may be at risk from exposure to noise and vibration that could potentially arise as a result of the proposed development/project
Noise and Vibration study area	The area assessed for noise and vibration impacts during this assessment
Baseline scenario	Scenarios with the proposed development/project not in operation
Decibel (dB)	A unit of noise level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 $\mu$ Pa, the threshold of normal hearing is 0dB, and 140dB is the threshold of pain. A change of 1dB is only perceptible under controlled conditions. Under normal conditions a change in noise level of 3dB(A) is the smallest perceptible change.
dB(A)	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
$L_{Aeq,T}$	The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.
$L_{A10,T}$	The A weighted noise level exceeded for 10% of the specified measurement period (T). $L_{A10}$ is the index generally adopted to assess traffic noise
$L_{A90,T}$	The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142:2014 it is used to define the 'background' noise level.
$L_{Amax}$	The maximum A-weighted sound pressure level recorded during a measurement.
PPV	Instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position.
'A' weighting	A frequency weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Fast time constant	Sound level meters have two conventional time weightings, F = Fast and S = Slow with time constants of 125 ms and 1000 ms respectively. Fast time constant relates to the response time of the meter which allows rapid variations in noise level to be registered.

## Appendix B Figures



- Legend:
- Land Ownership Boundary
- Site Boundary Monitoring Locations**
- BML1 - Parkdown Bungalow
  - BML2 - Thornhill
  - BML3 - Moorside Farm
  - BML4 - Soulsgrave Farm/Wainwright Coast to Coast Walk
  - BML5 - Mortar Hall Farm
  - BML6 - Sneaton Foss/Falling Foss
  - BML7 - Between shaft sinking area and BML4
- Receptor Monitoring Locations**
- ▲ NM1 - Parkdown Bungalow
  - ▲ NM2 - Thornhill
  - ▲ NM3 - Moorside Farm

Client:	Project:
Sirius Minerals plc	Sirius North Yorkshire Polyhalite Project

Title:  
Proposed Residential Receptor and Boundary Noise Monitoring Locations

Appendix: B	Figure: B.1	Drawing No: 40-RHD-WS-70-EN-PL-0016-D001			
Rev:	Date:	Drawn:	Checked:	Size:	Scale:
B	16/10/2018	JT	AB	A3	1:10,000
A	23/05/2017	GC	AB	A3	1:10,000

Co-ordinate system: British National Grid

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## Appendix C Predicted Construction Noise Levels

The predicted noise levels detailed within the tables below are considered to represent the most conservative scenario.

**Table C.1 Calculated highest noise levels during Phase 9 – Daytime**

Receptor Location	Daytime (07:00–19:00)	
	Limit $L_{Aeq,1hr}$ dB	Maximum Predicted $L_{Aeq,1hr}$ dB
Parkdown Bungalow	55	51.7
Moor House Farm	55	49.1
Moorside Farm	55	47.8
Thornhill	55	47.0
Soulsgrave	55	46.9
Wainwright Coast to Coast Path	55	47.5
Sneaton Foss Caravan Park	55	46.3
Falling Foss Tearooms	55	33.6
Lound House Caravan Park	55	47.0



**Table C.2 Calculated highest noise levels during Phase 9 – Evening and night time**

Receptor Location	Evening and Night-time (19:00–07:00)	
	Limit $L_{Aeq,1hr}$ dB	Maximum Predicted $L_{Aeq,1hr}$ dB
Parkdown Bungalow	42	41.6
Moor House Farm	42	38.6
Moorside Farm	42	37.4
Thornhill	42	36.6
Soulsgrave	42	39.8
Wainwright Coast to Coast Path	42	38.2
Sneaton Foss Caravan Park	42	37.8
Falling Foss Tearooms	42	22.7
Lound House Caravan Park	42	36.0

During the past year, visits have been made to the various receptors for equipment maintenance and monitoring purposes. At those receptors to the south and west of the site (particularly Moorside, Thornhill and the Wainwright Coast to Coast Path) it was observed, over a number of visits, that site noise is generally inaudible. Predicted noise levels in the tables above can, therefore, be considered to be a very conservative case.

### Modelling Assumptions

Concurrent Phase 5, 6 and 7 activities were logarithmically added to the modelled results for Phase 9 to produce the noise levels in Tables C.1 and C.2.

The following Phase 9 equipment and associated sound power levels were used within the SoundPLAN noise models:

### Galloway Assembly

1no. Liebherr LR1500, 106 dB(A), 100% daytime, 20% evening and nighttime ontime

1no. Liebherr LTM 1090-4.2, 110 dB(A) 100% daytime, 10% nighttime ontime

Mobile elevated work platform, Genie S80 HF or similar, 106 dB(A) daytime only

**SSU**

- 1x Excavator, 103 dB(A) daytime only
- 1x tracked mobile crane, 1107 dB(A) daytime only

**Road extension**

- 1x Excavator, 103 dB(A), daytime only
- 1x Dump truck, 102 dB(A), daytime only

**Air Compressing Facility**

- 5x Compressors LR290, 90 dB(A), 100%
- 2x Condensates pumps, 80.5 dB(A), 100%
- 1x Adsorption Dryer, 106 dB(A), 100%

**NDWWTP**

- 1x Dissolved Air Flotation Unit, 93.1 dB(A), 100%
- 3x Shaft Head Shaker Unit, 97.7 dB(A), 100%

Mobile equipment was modelled as a moving point line source with speeds of between 5 and 20 kph.  
Stationary plant was modelled as a point source.

Noise propagation was calculated using the BS 5228:2009+A1:2014 methodology.